LB-806

Licensee Patent Bulletin

Series 50-3

RADIO CORPORATION OF AMERICA
RCA LABORATORIES DIVISION
INDUSTRY SERVICE LABORATORY

RADIO CORPORATION OF AMERICA

RCA LABORATORIES DIVISION

INDUSTRY SERVICE LABORATORY

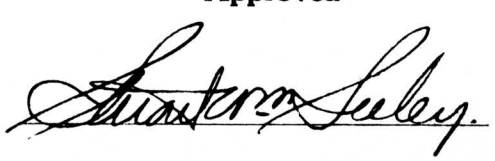
LB-806

Licensee Patent Bulletin

Series 50-3

July 1, 1950 to September 30, 1950

Approved



Index

Total . . . 217 patents

Note

THIS bulletin contains a list of recently issued patents and patents under which rights have recently been acquired, in respect of which Licensees of Radio Corporation of America are licensed pursuant to the terms of their respective license agreements with Radio Corporation of America and of the agreements with others whereby Radio Corporation of America has acquired such rights.

With respect to the listed patents of Raytheon Manufacturing Company and/or its subsidiaries Belmont Radio Corporation and Submarine Signal Company, the scope of the licenses granted by RCA under such patents is set forth in revised page 3 of LB-766.

Patents up to and including No. 1,928,609 have expired on or before September 26, 1950.

DISCLAIMERS FILED IN THE UNITED STATES PATENT OFFICE

2,220,689.—*Henry Shore,* Elizabeth, N. J. OSCILLATORY CIRCUITS. Patent dated Nov. 5, 1940. Disclaimer filed July 28, 1950, by the assignee, *Radio Corporation of America.*

Hereby enters this disclaimer to claims 1 to 10 inclusive of said patent.

2,416,155.—*Lewis W. Chubb,* Pittsburgh, Pa. POSITION LOCATOR. Patent dated Feb. 18, 1947. Disclaimer filed May 27, 1950, by the assignee, *Westinghouse Electric Corporation.*

Hereby enters this disclaimer to claims 1, 4, and 13 of said patent.

2,419,024.—*Harley A. Iams,* Princeton, N. J. RADIO VIEWING SYSTEM. Patent dated Apr. 15, 1947. Disclaimer filed June 30, 1950, by the assignee, *Radio Corporation of America.*

Hereby enters this disclaimer to claim 4 of said patent.

2,425,491.—*Kurt Schlesinger,* West Lafayette, Ind. DEFLECTION CIRCUIT. Patent dated Aug. 12, 1947. Disclaimer filed June 22, 1950, by the assignee, *Radio Corporation of America.*

Hereby enters this disclaimer to claims 8, 9, and 10 of said patent.

2,443,445.—*John S. Donal, Jr., Barremore B. Brown,* and *Carmen Louis Cuccia,* Princeton, N. J. CAVITY RESONATOR MAGNETRON AND STRAPPING ARRANGEMENT THEREFOR. Patent dated June 15, 1948. Disclaimer filed June 20, 1950, by the assignee, *Radio Corporation of America.*

Hereby enters this disclaimer to the single claim of said patent.

2,456,026.—*Eugene R. Shenk,* Brooklyn, and *Anthony Ligouri,* New York, N. Y. MODULATOR EMPLOYING TRIGGER CIRCUIT. Patent dated Dec. 14, 1948. Disclaimer filed July 28, 1950, by the assignee, *Radio Corporation of America.*

Hereby enters this disclaimer to claims 1, 2, 9, 10, and 14 of said patent.

2,496,887.—*Richard B. Nelson,* Schenectady, N. Y. HIGH-FREQUENCY ELECTRICAL APPARATUS. Patent dated Feb. 7, 1950. Disclaimer filed Aug. 10, 1950, by the assignee, *General Electric Company.*

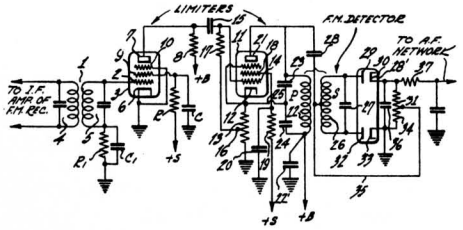
Hereby enters this disclaimer of claims 9, 10, and 11 of said patent.

Contents

SECTION I. RADIO BROADCAST RECEIVERS

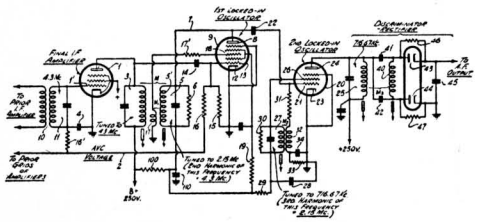
I-A. Sound Receivers (Includes Phonographs).

2,513,727
FREQUENCY MODULATION RECEIVER
Winfield R. Koch, Haddonfield, N. J., assignor to Radio Corporation of America, a corporation of Delaware
Application August 3, 1945, Serial No. 608,677
3 Claims. (Cl. 250—20)



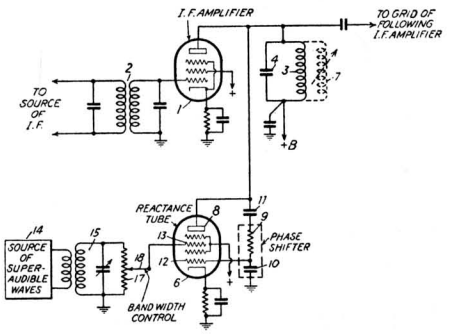
1. In a frequency modulated carrier wave receiver, a carrier wave amplifier having a cathode, a control grid and an anode, means for impressing said carrier wave between said cathode and grid, an unbypassed resistor for connecting said cathode to a point of fixed potential, a frequency discriminator network coupled between said anode and a point of fixed potential, said network including a primary circuit resonant to the center frequency of said carrier wave, a balanced rectifier system effectively coupled across said primary circuit and causing excessive damping thereof, and a positive feedback connection between said cathode and an intermediate point of said primary circuit to reduce said damping and to maintain the linearity of the discriminator curve regardless of the strength of said carrier wave.

2,513,763
LOCKED-IN OSCILLATOR CIRCUIT
Benjamin S. Vilkomerson, Camden, N. J., assignor to Radio Corporation of America, a corporation of Delaware
Application January 4, 1945, Serial No. 571,222
13 Claims. (Cl. 250—20)



3. In combination, a vacuum tube containing an anode, cathode and a plurality of grids, means for impressing angle modulated signal waves on one of said grids, an oscillator including said anode, another of said grids and a tank circuit connected to the anode and containing inductance and capacity, said tank circuit being tuned to a predetermined sub-harmonic frequency of the frequency of said signal waves, and means providing substantially close magnetic coupling between the oscillator tank circuit and said impressing means for causing the oscillator to lock in with a desired signal wave over a range of angle variations.

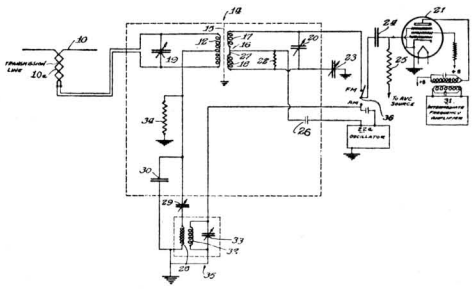
2,514,443
SELECTIVITY CONTROL SYSTEM
Murray G. Crosby, Riverhead, N. Y., assignor to Radio Corporation of America, a corporation of Delaware
Application June 7, 1943, Serial No. 489,923
3 Claims. (Cl. 250—20)



3. In a band-pass system having input and output connections for receiving signal-modulated electric waves within a modulation channel and selectively passing to the output connections those waves having frequencies within a desired portion of the modulation channel: wave-conducting circuit elements for passing modulated waves from the input to the output connections, said circuit elements including a pair of conductors for carrying the waves, resonant circuit means connected between the conductors and having a narrow resonance selectivity for causing the conductors to selectively pass a band of waves narrower than said modulation channel; selectivity-broadening elements connected to shift the resonance of the resonant circuit means and to sweep this shift over a displacement range corresponding essentially to said modulation channel, at a frequency higher than the highest frequency of modulation signal, to pass a correspondingly broadened band of modulated waves in which the sweeping does not interfere with the modulation signals.

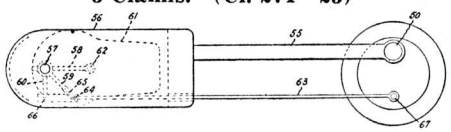
2,515,441
ANTENNA INPUT CIRCUITS
Jeffrey S. Cohen, Los Angeles, Calif., assignor to Avco Manufacturing Corporation, Cincinnati, Ohio, a corporation of Delaware

Application June 25, 1947, Serial No. 756,992
1 Claim. (Cl. 250—20)



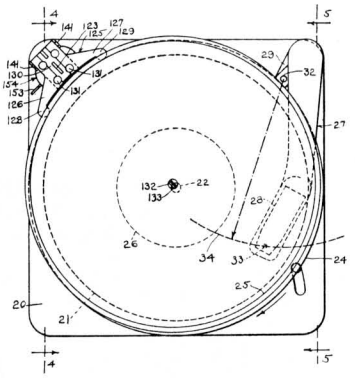
In an electromagnetic wave receiver of the type comprising an input transformer having a primary and a center-tapped secondary, a mixer tube having a single anode and cathode and control electrode elements, said secondary being coupled to said cathode and control electrode, and an oscillator effectively coupled between said cathode and the tap on said secondary, whereby two paths are in parallel with said oscillator, one comprising one half of said secondary and the effective input impedance of said tube and including capacitance and resistance, and the other path comprising the remainder of said secondary, the improvement which resides in means for producing an oscillator voltage null across said secondary comprising a capacitor in series with said secondary and a resistor in parallel with said remainder of said secondary, said capacitor and resistor being in such other path and having such values as to equalize said paths.

2,516,565
PHONOGRAPH REPRODUCING ARM
Glen E. Guy, Shaker Heights, Ohio, assignor to General Electric Company, a corporation of New York
Application March 30, 1948, Serial No. 17,969
3 Claims. (Cl. 274—23)



2. A tone arm mechanism for use in devices for reproducing sounds from records of the disc type comprising, a member pivoted at a point and arranged for angular motion about said point, a reproducing head rotatably mounted on said member at the free end thereof, a second member pivoted at a point adjacent said first-mentioned pivot point, an arm member connected between the free ends of said first and second members, a second arm member pivotally connected to said head and slidably connected to said second member at a point intermediate the pivoted and free ends thereof, and a third arm member rigidly connected to said second arm member and attached to said reproducing head at a point axially displaced from said rotatable mounting.

2,517,050
REPEAT DEVICE FOR AUTOMATIC PHONOGRAPHS
Sven A. Stolberg, Chicago, Ill., assignor, by mesne assignments, to Raytheon Manufacturing Company, Newton, Mass., a corporation of Delaware
Application February 5, 1945, Serial No. 576,202
3 Claims. (Cl. 274—10)

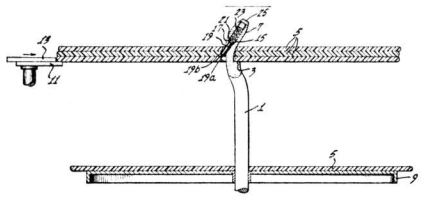


1. In a record changing phonograph, a turntable, a centering pin extending upwardly from said turntable provided with means defining a notch on one side thereof including a shoulder at the lower end of said notch to support a record eccentrically on said centering pin above said turntable, means for shifting said record laterally to bring it into concentricity with said centering pin and to release said record from said shoulder so it may fall onto said turntable comprising a vertical post adjacent said turntable and positioned radially opposite said notch relative to said turntable, means on the upper portion of said post to support the peripheral edge portion of said record when said record is eccentrically mounted on said centering pin and supported on said shoulder, said last-mentioned means being of such a size and positioned so as to be free of said record when said record is shifted laterally so as to be concentric with said centering pin, a feeder plate radially reciprocal relative to said turntable for engaging the peripheral edge of said record and movable in a direction to release said record from said shoulder positioned at the upper portion of said post, movable means associated with said feeder plate for postively moving said feeder plate radially outward from said centering pin, yieldable means tending to move said feeder plate in the other direction, means including an intermittently driven element in the phonograph for effecting movement of said movable means during a record changing cycle of said phonograph, and manually operable means for blocking movement of said feeder plate radially inward toward said centering pin regardless of the movement of said movable means.

2,517,630
PHONOGRAPH TURNTABLE SPINDLE
Benjamin R. Carson, Haddonfield, N. J., assignor to Radio Corporation of America, a corporation of Delaware
Application April 1, 1946, Serial No. 658,645
3 Claims. (Cl. 274—10)

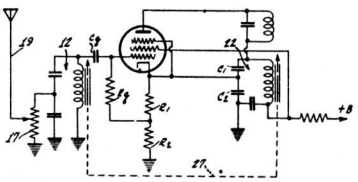
1. A record feed controlling spindle for phonographs that automatically reproduce in sequence the recordings on successive disc-shaped records having center holes, said spindle comprising a shank portion for mounting to guide the successive records to be reproduced into reproducing positions, said shank portion having a record supporting shoulder thereon, a head portion beyond said shoulder for reception, by their center

holes, of a stack of unplayed records the lowermost one of which may rest on said shoulder, said head portion having a hollow bore therein terminating in an opening at the side of said head opposite said shoulder, and a record detaining member movably carried in said hollow bore, said member having an elongated portion normally extending through said opening at an angle less than a right angle to the flare of said shoulder to



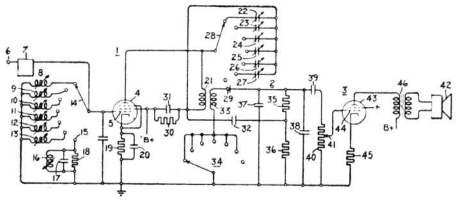
a point spaced from said shoulder a distance somewhat greater than the thickness of a record whereby said lowermost record may be moved laterally off of said shoulder while said detaining member prevents lateral movement of the remaining records of the stack, the transverse cross section of said elongated portion being substantially equal to the cross section of said hollow portion at said opening, and said extending portion of the detaining member having an edge that is angular in longitudinal section and projects in direction opposite to the shoulder as the sole engagement element for contacting the center hole edge of the lowest detained record at a point intermediate the record thickness.

2,517,719
FREQUENCY CONVERTER SYSTEM
William F. Sands, Haddonfield, N. J., assignor to Radio Corporation of America, a corporation of Delaware
Application March 30, 1945, Serial No. 585,747
15 Claims. (Cl. 250—20)



8. A combined detector-oscillator system comprising an electron discharge tube having at least a cathode, a signal control grid and an anode, a signal input circuit tunable over a predetermined frequency range connected between said control grid and ground, an oscillator circuit tunable over a different frequency range connected in circuit with said anode, cathode and ground, a circuit tuned to a frequency resulting from the interaction between the frequencies of said first mentioned circuits connected between the anode and the oscillator circuit, a first resistor connected between cathode and ground, a first condenser of substantially low reactance at the intermediate frequency included in the connection between the signal circuit and control grid, and a second resistor of substantially large value connected between control grid and said first resistor, said oscillator circuit including as an element thereof a second condenser which is effectively in shunt with said first resistor to provide an effective by-pass therefor only for currents of said intermediate frequency or higher.

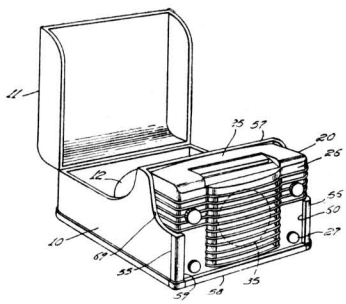
2,519,063
RADIO-PHONOGRAPH COMBINATION
James Moir, Rugby, England, assignor to General Electric Company, a corporation of New York
Application October 25, 1947, Serial No. 782,120
In Great Britain November 1, 1946
3 Claims. (Cl. 179—100.11)



1. In a radio receiver, the combination comprising a high frequency amplifier comprising an electron discharge device having an input circuit and an output circuit, switching means for selectively supplying to said input circuit signal modulated carrier waves and an audio frequency wave, a resonant circuit and a load resistance connected in series in said output circuit, said resonant circuit being tuned to the frequency of the carrier waves supplied to said input circuit, demodulating means coupled to said resonant circuit, an audio frequency amplifier having an input circuit connected to said demodulating means, and fixed coupling means for supplying said waves from the junction of said load resistance and said resonant circuit to the input circuit of said audio frequency amplifier, said coupling means comprising a series coupling capacitor capable of passing both high frequency and low frequency currents, and means for bypassing high frequency currents from the input circuit of said audio frequency amplifier.

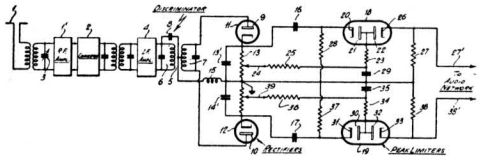
2,519,292
COMBINATION RECORD PLAYER AND RADIO
Harold W. Schaefer, Eagles Mere, Pa., assignor to Westinghouse Electric Corporation, East Pittsburgh, Pa., a corporation of Pennsylvania
Application August 22, 1946, Serial No. 692,293
8 Claims. (Cl. 179—100.12)

1. In combination, a record player comprising a cabinet having a compartment for accommodating a radio for reproducing records played on said record player, a radio adapted to be lowered into said compartment from a position above said compartment, vertical guide means on said cabinet and adjacent the front of said compart-



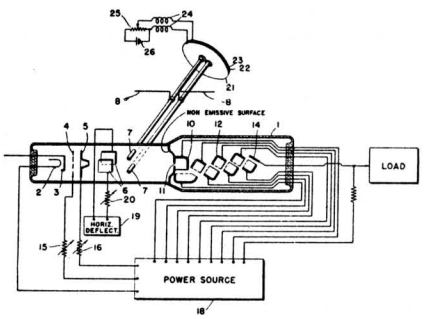
ment in such a position as to coact with said radio for guiding said radio into a proper position as it is lowered into said compartment, and connectors in said compartment electrically connecting said record player to said radio.

2,519,890
ANGLE MODULATED WAVE RECEIVER
Murray G. Crosby, Riverhead, N. Y., assignor to Radio Corporation of America, a corporation of Delaware
Application December 9, 1944, Serial No. 567,421
5 Claims. (Cl. 250—20)



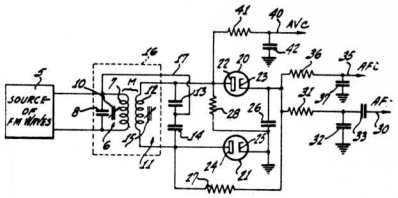
4. In combination with a pair of balanced detectors for angle modulated carrier waves, an output circuit for each of said detectors, said output circuits being connected in push-pull, a first peak limiter having input terminals coupled over a first audio path to the output circuit of one of said detectors, a second peak limiter having input terminals coupled over a second audio path to the output circuit of the other one of said detectors, an audio output circuit coupled to the output terminals of each of said limiters, said audio output circuits being connected in push-pull, and direct current voltage connections separate from said audio paths, each responsive to the rectified carrier output of one of said detectors for respectively controlling the bias of each of said limiters.

2,520,152
RADIANT ENERGY RECEIVING DEVICE
Christian C. Larson, Fort Wayne, Ind., assignor, by mesne assignments, to Farnsworth Research Corporation, a corporation of Indiana
Application November 18, 1943, Serial No. 510,714
11 Claims. (Cl. 250—20)



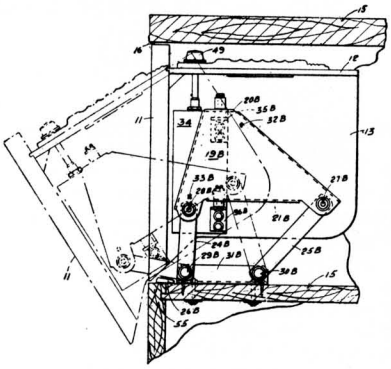
1. A signal receiver comprising means for generating a beam of electrons, electron multiplier means in the path of said beam of electrons having a predetermined frequency cutoff characteristic, an electron barrier, a source of carrier modulated signals the carrier frequency of which is beyond the frequency cutoff of said electron multiplier and the signal modulations thereof are below the cut-off frequency of said multiplier. beam control means responsive to said carrier modulated signals for deflecting the flow of electrons of said beam with respect to said barrier, and tunable means for applying carrier modulated signals from said source to said beam control means.

2,520,621
FREQUENCY DISCRIMINATOR
Roy A. Beers, Jr., Audubon, N. J., assignor to Radio Corporation of America, a corporation of Delaware
Application May 31, 1949, Serial No. 96,353
12 Claims. (Cl. 250—27)



1. In combination with a source of angle modulated carrier waves, a discriminator network for deriving from the waves a pair of carrier wave voltages whose relative magnitudes are dependent upon the angular modulations of the waves, two rectifiers, each having an input electrode and an output electrode, circuit connections between said discriminator network and the input electrodes of said rectifiers for impressing said voltages on respective ones of said rectifiers, an impedance element connected between the output electrodes of said rectifiers, and a load resistor for each of said rectifiers, each of said load resistors being directly connected between the input electrode of one rectifier and the output electrode of the other rectifier.

2,522,467
RADIO CABINET TILT-OUT MECHANISM
Frank Michael Shea, Cincinnati, Ohio, assignor to Avco Manufacturing Corporation, Cincinnati, Ohio, a corporation of Delaware
Application February 19, 1949, Serial No. 77,368
2 Claims. (Cl. 312—7)

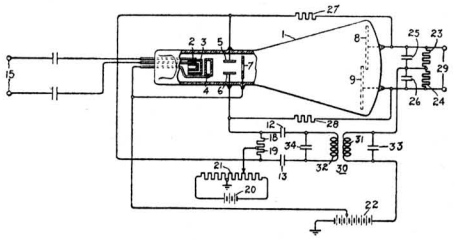


1. In a radio receiver of the type which includes a cabinet formed with an opening in the front thereof and a box-like radio housing unit mounted in movable tilting relation with respect to said cabinet, the combination of a receiver chassis, individual supporting plates located on each side of and exteriorly of said chassis but interiorly of said housing unit, each of said plates being of a generally triangular formation and formed with a flat outer surface in abutment with said housing and with inwardly directed apertured flanges at base and apex, means for securing said housing to said plates, said chassis being disposed with its length dimension between and perpendicular to said plates and its

width dimension normal to the bases of said plates, means for mounting said chassis on said plates, the mounting means comprising four angle members secured to said chassis and each formed with an outwardly directed apertured flange underlying one of said inwardly directed flanges, said mounting means also comprising individual washers of soft material disposed between each inwardly directed flange and an outwardly directed flange and individual removable fasteners for securing each outwardly directed flange to and in registry with an inwardly directed flange, and a complementary pair of means for mounting the assembly of plates and chassis and housing unit in movable tilting relation with respect to said cabinet, each of said means comprising a straight front connecting arm pivotally secured at one end to one extremity of the base of the associated plate and a longer straight gear connecting arm pivotally secured at one end to the other extremity of the base of said plate, spaced pivots for securing the other ends of said arms to said cabinet, said front arm extending generally upwardly in the general direction of the center of gravity of said chassis and said rear arm extending diagonally upwardly and rearwardly when the housing is in storage position, whereby the vertical linear displacement of the rear top corner of the housing is less than the vertical linear displacement of the front bottom corner of the housing when the housing is tilted forwardly.

2,523,043
FREQUENCY MODULATION RECEIVER SYSTEM
George F. Metcalf, Syracuse, N. Y., assignor to General Electric Company, a corporation of New York
Application March 27, 1948, Serial No. 17,443
7 Claims. (Cl. 250—27)

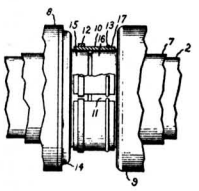
1. In a frequency modulation receiving system and the like, an evacuated envelope, means therein for producing a stream of electrical particles, means for controlling the intensity of said stream, means for deflecting said stream to either side of a mean path and means for extracting energy from said stream, means for impressing a frequency modulated signal received by said system on said stream intensity controlling means, means for deriving an amplified signal from said energy extracting means, means for impressing a portion of said amplified signal on said stream



deflecting means, said portion being phase displaced from said received frequency modulated signal and said phase displacement being proportional to the frequency variations of said received signal about the center frequency thereof, further means for deriving an amplified audio signal from said energy extracting means in response to the frequency modulation of said received signal.

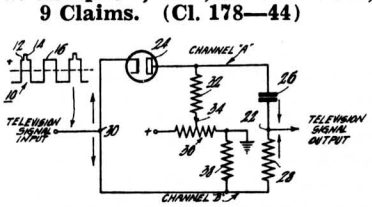
I-B. Television Receivers (Includes Facsimile).

2,513,929
BEAM CENTERING DEVICE FOR CATHODE-RAY TUBES
Richard B. Gethmann, Bridgeport, Conn., assignor to General Electric Company, a corporation of New York
Application May 21, 1948, Serial No. 28,315
3 Claims. (Cl. 250—161)



1. A beam centering device for a cathode ray tube of the type having a neck portion through which the cathode ray beam is projected comprising a supporting sleeve, a pair of circular permanent magnets supported on said sleeve, each of said magnets being of the type producing a uniform magnetic field parallel with a diameter thereof, said fields produced by said magnets being parallel, one of said magnets being fixed relative to said sleeve, a circular magnetic shunt slidable within said sleeve, the other of said magnets being movable axially of said sleeve to vary the position thereof relative to said first magnet and said shunt.

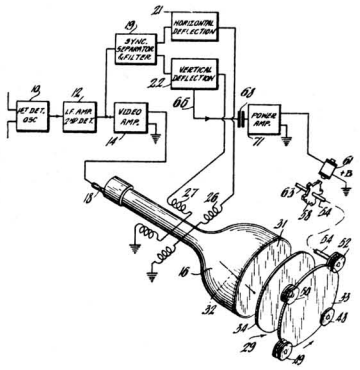
2,514,022
VIDEO SIGNAL CIRCUIT FOR NOISE LIMITING
Alda V. Bedford, Princeton, N. J., assignor to Radio Corporation of America, a corporation of Delaware
Application April 1, 1946, Serial No. 658,600
9 Claims. (Cl. 178—44)



1. In a television system having two channels joined together at their inputs and outputs, the method of reducing the effects of noise in said

system through which a composite video signal series is passed, which comprises dividing the said composite video signal series between said two channels each containing the said composite video signal, peak-limiting the said composite video signal in one of said channels, selecting from the peak-limited composite video signal in said one channel the high-frequency components thereof, selecting from the composite video signal in the other of said channels low-frequency components thereof which are substantially complementary to the high-frequency components of said video signal selected from said one channel, and combining the video signal components so selected.

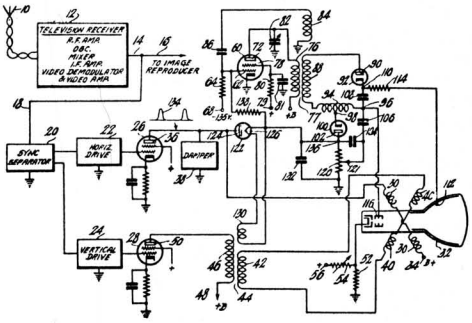
2,514,043
COLOR TELEVISION
Elmer W. Engstrom and George C. Sziklai, Princeton, N. J., assignors to Radio Corporation of America, a corporation of Delaware
Application January 3, 1946, Serial No. 638,781
7 Claims. (Cl. 178—5.4)



1. A color television system employing an image producing device and means for providing said device with a plurality of series of image signals, each series of signals representing light values of component colors of a view or object, a color filter interposed in the light path of said image producing device comprising a light polarizing member having the plane of polarization arranged on curved lines the final direction of said lines making an angle of 120° with respect to their original direction, a filter member cooperating with said light polarizing member, said filter member being composed of light transmitting parts, each part selectively transmitting light of a distinct color and in a given plane of polarization, and means to produce relative movement between said members, means whereby the planes of polarization of said light polarizing member are selectively brought into coincidence with a given plane of polarization of said filter member.

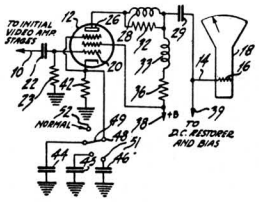
2,514,079
POWER SUPPLY INTERLOCK SYSTEM
Robert K. Lockhart, Collingswood, N. J., assignor to Radio Corporation of America, a corporation of Delaware
Application October 26, 1948, Serial No. 56,634
17 Claims. (Cl. 315—20)

1. In a cathode ray deflection system, a vertical deflection signal generator, a horizontal deflection signal generator, a high voltage generator employing a vacuum tube having at least a cathode and a control grid, said high voltage generator developing an output voltage of a magnitude dependent upon the proper operation of said vacuum tube, connections for applying the output of said high voltage generator for excitation of the cathode ray of said system, a voltage rectifying system connected with at least one of said deflection generators for producing a unidirectional potential in accordance with the deflection signals generated thereby, means coupling the unidirectional potential produced by said voltage rectifying system to the control grid cathode circuit of said high voltage generator



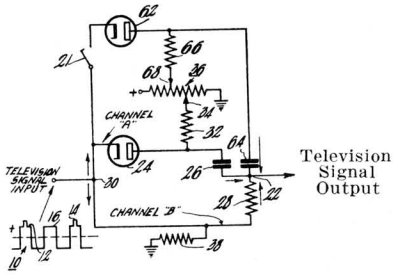
vacuum tube whereby failure of at least one of said deflection generators will cause disabling of said high voltage generator through a change in unidirectional potential produced by said voltage rectifying system.

2,514,112
RESPONSE CONTROL FOR WIDE BAND AMPLIFIERS
Antony Wright, Drexel Hill, Pa., and Edwin L. Clark, Collingswood, N. J., assignors to Radio Corporation of America, a corporation of Delaware
Application December 28, 1945, Serial No. 637,732
1 Claim. (Cl. 315—30)



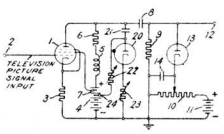
In a television receiver having an image producing device, a wide band amplifier comprising an electric discharge tube having a cathode, an anode, and a control grid, means to supply image signals to said control grid, an output circuit connected to said anode comprising a series peaking coil and a shunt peaking coil, means to couple said output circuit to said image producing device, a resistor connected to said cathode and to a voltage reference point for said tube to provide a degenerative effect on the characteristic of the amplifier, a plurality of capacitors having successively increasing capacitance values, one terminal of said capacitors being connected to said voltage reference point, a selecting switch having a movable contact connected to said cathode, a plurality of successive stationary contacts for said switch, the remaining terminal of each condenser in succession of capacitance value being connected to a stationary switch contact in succession.

2,514,117
NOISE LIMITING VIDEO CIRCUIT
Alda V. Bedford, Princeton, N. J., assignor to Radio Corporation of America, a corporation of Delaware
Application April 1, 1946, Serial No. 658,601
15 Claims. (Cl. 178—44)



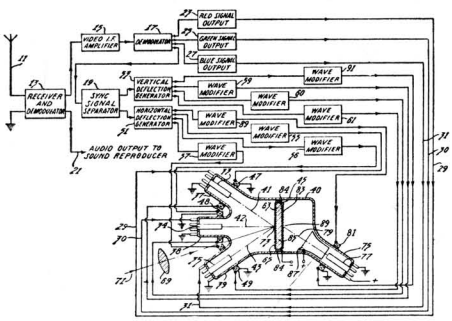
1. Apparatus for reducing the effect of noise in the video signal circuit of a television system, which comprises means for dividing the composite video signal among three channels, means for limiting to approximately a predetermined value the peak amplitude of the said composite video signal in a first of said channels, means for limiting to approximately a different predetermined value the peak amplitude of the said composite video signal in a second of said channels, means for selecting from the peak amplitude-limited composite video signal in both said first and second channels the high-frequency components thereof, means for selecting from the composite video signal in the third of said channels low-frequency components thereof which are substantially complementary to the high-frequency components of said video signals selected from both said first and second channels, and means for combining the video signal components so selected.

2,515,763
DIRECT CURRENT RESTORATION CIRCUIT FOR TELEVISION
John W. Downie, Syracuse, N. Y., assignor to General Electric Company, a corporation of New York
Application October 22, 1948, Serial No. 55,895
5 Claims. (Cl. 178—7.3)



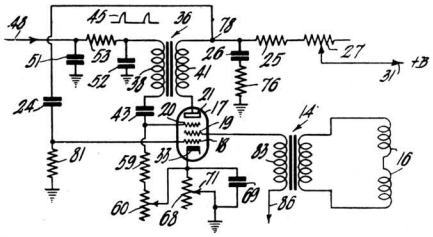
5. In a system for amplifying a composite television signal containing horizontal and vertical synchronizing pulses both attaining a like maximum value in one polarity, said vertical pulses having a time duration greatly in excess of the time duration of said horizontal pulses, an electronic valve operating as a constant current generator for supplying said signal to an intermediate point, a direct current restorer comprising a capacitance and a resistance in series connected between said intermediate point and a common point, said resistance having a rectifier connected in parallel, the junction of said capacitance with said resistance serving as an output terminal, said rectifier being poled to conduct during said synchronizing pulses to charge said capacitance and establish a unidirectional voltage reference level relative to the tips of said pulses at said output terminal, said capacitance charging closer to said tips during said vertical than during said horizontal pulses as a result of the longer time duration of said vertical pulses, whereby a distortion is introduced in said reference level, and a corrective circuit comprising a capacitance, a rectifier and a resistance serially connected between said intermediate point and said common point, said rectifier being poled to conduct during said pulses, said latter capacitance being substantially larger than said former capacitance and the time constant of said latter capacitance and resistance being substantially less than that of said former capacitance and resistance and of the order of magnitude of the time duration of said vertical synchronizing pulses.

2,516,314
COLOR TELEVISION APPARATUS
Alfred N. Goldsmith, New York, N. Y., assignor to Radio Corporation of America, New York, N. Y., a corporation of Delaware
Application July 7, 1945, Serial No. 603,686
18 Claims. (Cl. 178—5.4)



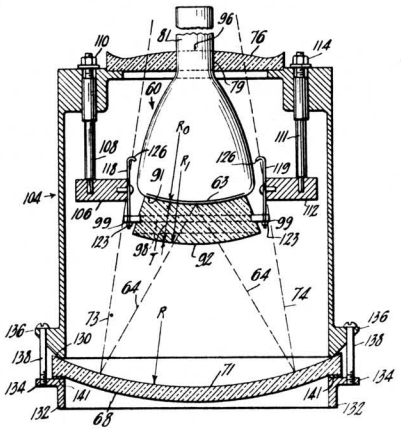
1. In a system of controlling the instantaneous impacting points of a plurality of electron beams upon a target area whereupon electro-optical images are to be initially developed, the method steps which comprise directing a first systematically moved electron beam to pass through a closed volume of dimensions which are small relative to those of the target area and containing an area on the target area, causing the said beam to trace a predetermined raster on the target so as thereby to develop upon the target a motionally progressive and systematic succession of electrostatic charges within the region of the correspondingly displaced closed volumes, tracing the target area with a plurality of additional electron beams directed thereupon from different angles with respect to the target and from the first electron beam and controlled in their motional paths so that each beam traces approximately like size homologous rasters which also approximate the raster traced upon the target area by the first beam and all of which said plurality of beams impact the target area within the instantaneous position of the small closed volume as determined by the first-mentioned beam, and thus instantaneously locating each of the last-named scanning beam impact points upon the target area in a succession of points which are determined by and coincide substantially with those target regions at which the electrostatic charges are developed by the first beam.

2,517,715
BEAM DEFLECTION SYSTEM FOR CATHODE-RAY DEVICES
Gordon F. Rogers, New Hyde Park, N. Y., assignor to Radio Corporation of America, a corporation of Delaware
Application December 30, 1949, Serial No. 135,915
2 Claims. (Cl. 315—27)



1. A combined blocking oscillator and output drive for a deflection coil comprising a transformer having a grid coil and a plate coil, a multi-element vacuum tube, a connection from said plate coil to the anode of said tube, a grid condenser, a connection from said condenser to a grid of said tube, a connection from said condenser to said grid coil, a resistor-condenser combination connected to said plate coil, a coupling from said plate coil to another grid of said tube, an output transformer having a primary and a secondary, a connection from said primary to a third electrode of said tube, and said deflection coil being connected to said output transformer secondary.

2,517,774
HALATION REDUCTION IN CATHODE-RAY TUBES
David W. Epstein, Princeton, N. J., assignor to Radio Corporation of America, a corporation of Delaware
Application March 30, 1848, Serial No. 17,967
16 Claims. (Cl. 178—7.5)

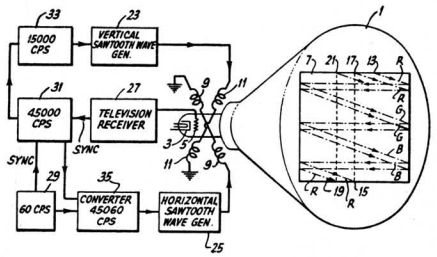


16. A projection system comprising a concave spherical mirror having a radius R, a correcting plate having a figured surface positioned to receive light reflected from said spherical mirror, a projection tube for projecting light to said mirror, said projection tube having an end in the form of a concentric spherical meniscus having an index of refraction N, the inner radius R_0 of the meniscus being substantially given by the formula

$$R_0=.53\frac{2N-1}{N^2}R$$

and the outer radius R_1 of the meniscus being substantially given by the formula $R_1=NR_0$ whereby the effect of said meniscus permits the figured surface of said correcting plate to be weaker and the curvature of the exposed tube face is permitted to be greater.

2,518,199
TELEVISION IN NATURAL COLOR
George C. Sziklai, Princeton, N. J., assignor to Radio Corporation of America, a corporation of Delaware
Application November 7, 1946, Serial No. 708,280
9 Claims. (Cl. 178—5.4)

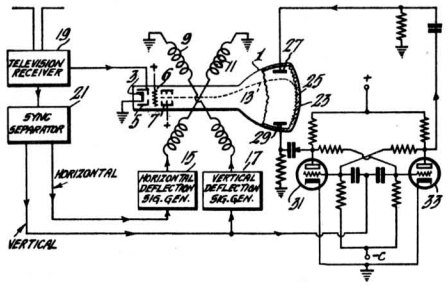


1. In a television system of the type employing a cathode ray tube having a target area whereupon an image is developed, a deflection system arranged in cooperative relationship with said cathode ray tube for causing the developed ray to traverse the target area along a series of substantially parallel paths, means to cause said deflection system to produce at the completion of a predetermined number of parallel paths of traversal additional series of substantially parallel paths interlaced with respect to the other series of parallel paths until substantially the total target area has been scanned, and wherein said deflection system is also arranged that there is more of said series of parallel paths than there are parallel paths in each of said series, and that each succeeding scanning line falls immediately adjacent the next previous scanning line.

2,518,200
TELEVISION SYSTEM
George C. Sziklai, Princeton, N. J., and Alfred C. Schroeder, Feasterville, Pa., assignors to Radio Corporation of America, a corporation of Delaware
Application October 3, 1947, Serial No. 777,750
14 Claims. (Cl. 250—164)

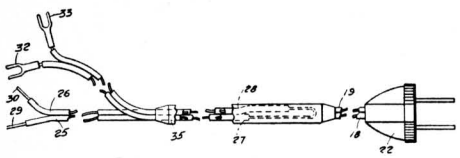
1. A color television system comprising an electron tube having a target based upon a quasi-focal plane adapted to be impacted by an electron beam substantially focused thereat, a multiplicity of substantially elementary size elements having a plurality of surfaces and covering the electron beam impact area of said target, said elementary size elements being discriminative to different selected component colors depending upon the direction of angular interception of said electron beam, electron beam deflection means for causing said beam to scan said target in a predetermined scanning raster, and electron

beam bending means positioned adjacent the edges of said target only, to bend said electron



beam to select color discrimination in accordance with a predetermined arrangement.

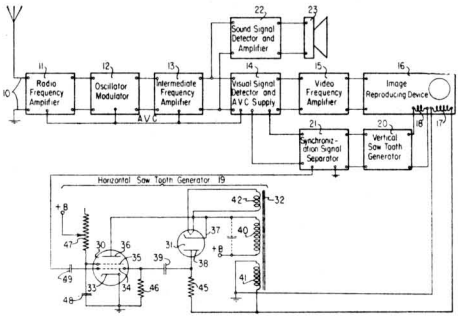
2,520,811
POWER LINE ANTENNA
John Drysdale Reid, Cincinnati, Ohio, assignor to Avco Manufacturing Corporation, Cincinnati, Ohio, a corporation of Delaware
Application January 6, 1949, Serial No. 69,485
5 Claims. (Cl. 250—16)



1. A self-contained antenna unit comprising a two-conductor service cord for the power supply circuit of a two-conductor radio receiver and a transmission line which is connected at one end to the signal input circuit of said receiver, said transmission line having a section at its other end electrostatically coupled to and spaced from the conductors of said service cord, said section beginning at points electrically spaced from the receiver power-input end of said cord by an odd quarter-wave length measured with respect to the middle of the received signal band, said section extending outwardly in parallel with said cord in a direction away from the receiver power-input end of said cord.

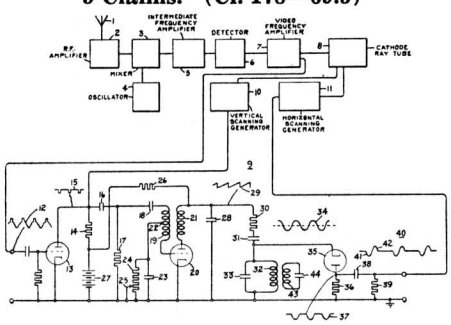
2,521,158
SAWTOOTH CURRENT GENERATOR
Robertson R. Gannaway, Oak Park, and Stanley Zurakov, Chicago, Ill., assignors to Belmont Radio Corporation, Chicago, Ill., a corporation of Illinois
Application May 4, 1946, Serial No. 667,305
23 Claims. (Cl. 315—27)

3. A sawtooth current generator comprising an electron discharge valve having at least a plate and a grid, a transformer having primary and secondary windings, a rectifier, a resistor and a capacitor, said primary winding being connected to said plate and said secondary winding being connected through said resistor and said capacitor to said grid of said discharge valve, said primary and secondary coils being proportioned and phased to provide regenerative action from said plate to said grid of said discharge



valve and said rectifier being coupled to said plate and said grid to provide degenerative action therebetween.

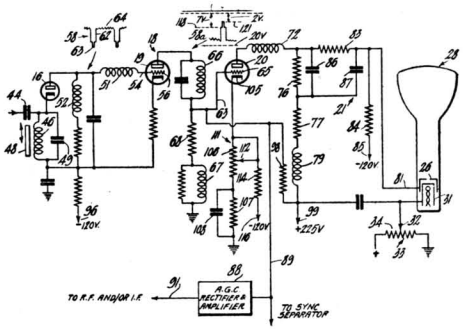
2,521,504
TELEVISION SYNCHRONIZING SYSTEM
Robert B. Dome, Bridgeport, Conn., assignor to General Electric Company, a corporation of New York
Application December 11, 1946, Serial No. 715,361
5 Claims. (Cl. 178—69.5)



1. In a receiver for television signals including horizontal synchronizing pulses, a multivibrator, means utilizing said pulses to operate said multivibrator to produce a saw-tooth wave of voltage of a frequency equal to the fundamental frequency of said pulses, a resonant circuit excited by said voltage to resonate at said fundamental frequency, said circuit having a ratio of reactance to resistance sufficiently large that noise voltages received with said signals have no appreciable effect on the frequency of the oscillations produced therein, means utilizing said sinusoidal wave of voltage for controlling the operation of said receiver, and means coupled to said resonant circuit for maintaining said sinusoidal wave of voltage in phase with said horizontal synchronizing pulses as the phase of said synchronizing pulses is shifted.

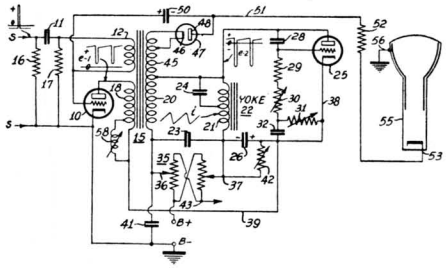
2,522,967
VIDEO AMPLIFIER FEEDING CONSTANT BLACK LEVEL OUTPUT TO CATHODE-RAY TUBE
Hubert R. Shaw, Drexel Hill, Pa., assignor to Radio Corporation of America, a corporation of Delaware

Application May 21, 1948, Serial No. 28,377
2 Claims. (Cl. 178—7.5)



2. In a television receiver, an amplifier having a control electrode circuit and a cathode circuit, means for applying operating voltages to said circuits, an image producing tube, a coupling connection from said amplifier to said image producing tube, said cathode circuit including a variable cathode resistor, said cathode resistor being connected to a potential reference point for said amplifier circuit, means to maintain a recurring signal level at the control electrode circuit of said amplifier, a resistor connected from the end of said cathode resistor opposite said potential reference point to a point negative with respect to said potential reference point, the end of said cathode resistor opposite said potential reference point having the same potential as said voltage reference point for the amplifier circuits upon occurrence of said recurring signal level.

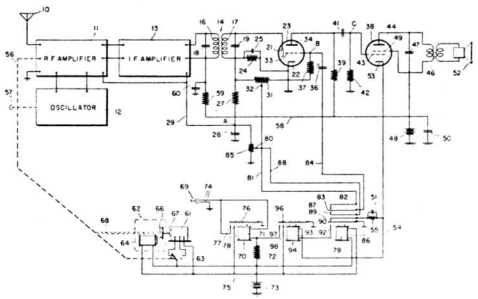
2,523,108
DEFLECTION OF ELECTRON BEAMS
Albert W. Friend, Lawrenceville, N. J., assignor to Radio Corporation of America, a corporation of Delaware
Application April 30, 1948, Serial No. 24,145
16 Claims. (Cl. 315—27)



1. The method for electromagnetically deflecting an electron beam which comprises, generating current pulses of short duration relative to a deflection cycle, storing energy from such a pulse as magnetic flux, and converting said flux into electromagnetic deflection current at a controlled rate continuously throughout the entire trace portion of said cycle.

I-C. Tuners.

2,516,856
AUTOMATIC STOP-ON CARRIER TUNING SYSTEM
Robert J. Cowles, Fort Wayne, Ind., assignor, by mesne assignments, to Farnsworth Research Corporation, a corporation of Indiana
Application April 30, 1947, Serial No. 744,967
12 Claims. (Cl. 250—20)

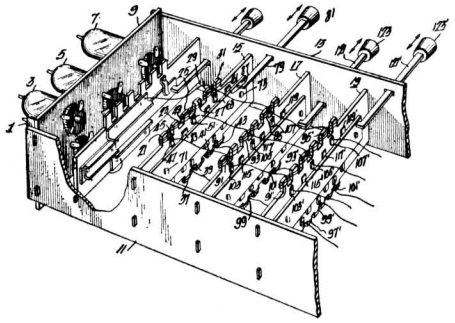


1. In a radiant energy receiver, means for recovering and reproducing the intelligence signal modulated on any one of a plurality of carrier waves, a mechanically driven tuning mechanism for varying the resonant frequency of said receiver to selectively receive said carrier waves, means for initiating operation of said tuning mechanism, means in said receiver for developing an electrical wave representative of the tuning of said receiver to any one of said carrier waves, a differentiation network coupled to said wave developing means for converting said electrical wave into a control impulse, and means coupled to said network and responsive to said control impulse for arresting the operation of said tuning mechanism.

2,522,973
PUSH-BUTTON ULTRA HIGH FREQUENCY TUNER
Alfred H. Turner, Collingswood, N. J., assignor to Radio Corporation of America, a corporation of Delaware
Application January 30, 1945, Serial No. 575,303
16 Claims. (Cl. 250—40)

1. An ultra-high frequency tuner including a plurality of parallel-disposed insulating supports each having a plurality of projections from the sides thereof, switch contacts mounted upon said supports adjacent said projections, a plurality of lines each comprising a plurality of windings supported by said projections and connected to said switch contacts, each of said lines having substantial mutual coupling with an adjacent line and coupling being minimized between individual

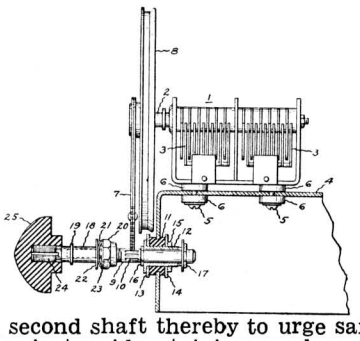
windings on the same and the other supports, means serially connecting corresponding windings on each of said supports, and movable



switch contact means on each of said supports operable with said fixed contacts for selectively connecting together windings on each of said supports.

2,523,032
TUNING MECHANISM
Louis D. La Flamme, Bridgeport, Conn., assignor to General Electric Company, a corporation of New York
Application March 24, 1948, Serial No. 16,830
2 Claims. (Cl. 74—10.8)

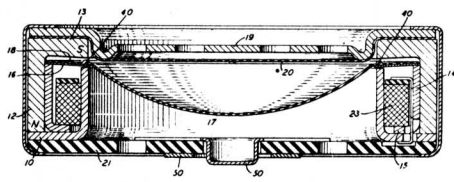
1. A tuning mechanism for radio apparatus and the like comprising a first shaft member, a second shaft member having a hollow sleeve portion adapted to fit over said first shaft member, said first shaft member and said hollow sleeve portion having aligned notches therein, retaining washer means positioned within said notches so as loosely to couple said first and second shaft members, frictional slipping means for transmitting motion from said second shaft member to said first shaft member, said last named means including spring washer means positioned on said first shaft and adapted to exert endwise pressure



on said second shaft thereby to urge said second shaft against said retaining washer means, a tuning unit having a movable element, gear means driving said movable element, and means including said first shaft member for driving said gear means, said frictional slipping means providing positive drive in said mechanism during the travel of said movable element.

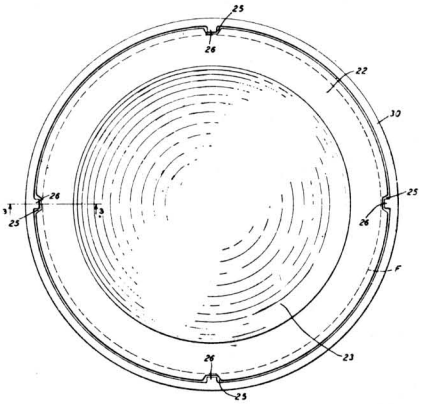
I-D. Loudspeakers and Pickups.

2,520,640
ELECTROACOUSTIC TRANSDUCER
Ralph R. Kreisel, New Providence, N. J., assignor to Bell Telephone Laboratories, Incorporated, New York, N. Y., a corporation of New York
Application September 9, 1948, Serial No. 48,382
13 Claims. (Cl. 179—114)



1. An electroacoustic transducer comprising a magnetic system including an annular armature, a support mounting said armature adjacent one of its margins, a retaining member adjacent and spaced from the other margin of said armature, said armature being held upon said support by magnetic forces, and means for preventing contact between said armature and said retaining member comprising spaced members coupled to said armature and projecting beyond said other margin toward said retaining member.

2,520,646
ELECTROACOUSTIC TRANSDUCER
Edward E. Mott, Upper Montclair, N. J., assignor to Bell Telephone Laboratories, Incorporated, New York, N. Y., a corporation of New York
Application September 9, 1948, Serial No. 48,433
9 Claims. (Cl. 179—115)

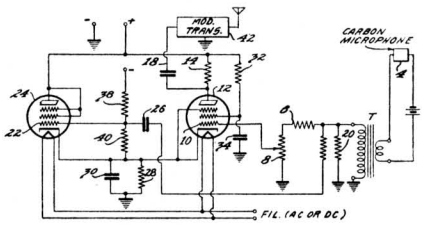


1. An electroacoustic transducer comprising a support, an armature seated upon said support and laterally displaceable thereon, and retainer means adjacent one margin of said armature and normally spaced a preassigned distance therefrom, said armature and retainer means having cooperating projections and slots constructed and arranged to limit displacement of said armature toward said retainer means to an extent less than said preassigned distance.

SECTION II. COMMERCIAL RADIO APPARATUS

II-A. Sound Transmitters.

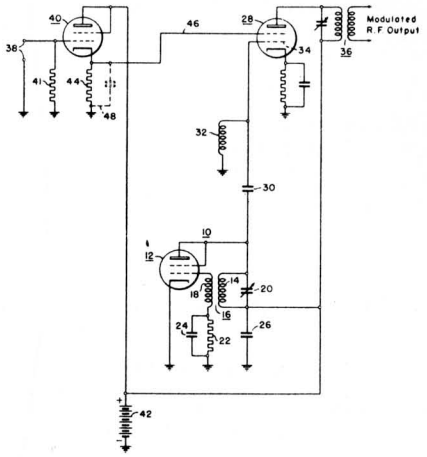
2,513,809
CURRENT AMPLITUDE LIMITER
Herschel B. Martin, Woodside, and Karl L. Neumann, Yonkers, N. Y., assignors to Radio Corporation of America, a corporation of Delaware
Application March 27, 1947, Serial No. 737,668
7 Claims. (Cl. 178—44)



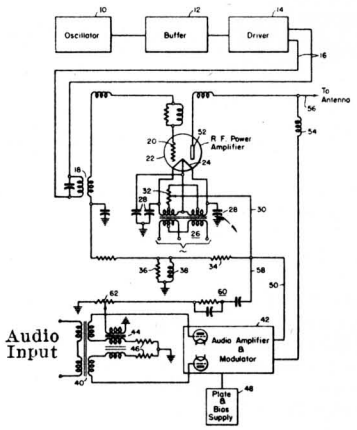
6. In a current amplitude limiter, a source of currents of audible frequency, a pair of electron discharge devices each having input electrodes including a grid and a cathode coupled to said source, one of said devices being a pentode and having its said grid connected to said source to receive said signal and having output electrodes coupled to an external output circuit to apply the output of said one device thereto, a source of direct potential in direct current circuits connecting the internal impedances of both of said devices with said source of direct potential, a resistor common to said last circuits between the cathodes of both of said devices and the negative terminal of said direct potential source, means for operating said one of said devices as a pentode including two auxiliary electrodes one operating at cathode potential, the other operating at a positive potential relative to the cathode, means for operating the other device as a triode biased to cut off in the absence of currents on the input electrodes thereof, and a bypassing condenser in shunt to said resistor of a magnitude such as to bypass voltages of a frequency higher than the lowest audible frequency.

2,519,256
HIGH FIDELITY MODULATOR
Reuben R. Lee, Linthicum Heights, Md., assignor to Westinghouse Electric Corporation, East Pittsburgh, Pa., a corporation of Pennsylvania
Application October 28, 1948, Serial No. 57,078
6 Claims. (Cl. 332—64)

1. A modulation system for high frequency wave transmitters or the like, comprising a source of carrier frequency energy, an amplifier tube having at least an anode, a cathode, a control grid and a screen grid, a connection between said source and one of the grids of said amplifier tube, and an impedance transformer connected between the other grid of said amplifier tube and a source of modulating frequency energy, said transformer presenting a relatively low impedance across the stray grid capacitance to ground of the grid to which it is connected.



2,519,305
RADIO APPARATUS
Harry D. Young, Pittsburgh, Pa., and Heber J. Morrison, Baltimore, Md., assignors to Westinghouse Electric Corporation, East Pittsburgh, Pa., a corporation of Pennsylvania
Application November 6, 1948, Serial No. 58,758
12 Claims. (Cl. 332—37)

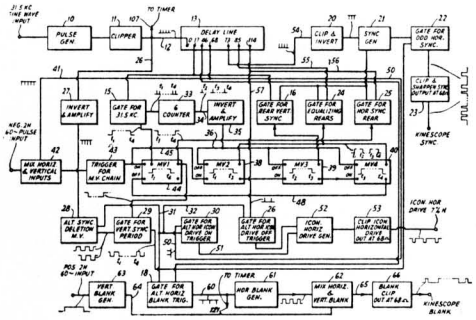


1. A system for reducing the amplitude modulated noise in the output of a radio frequency transmitter of the type comprising a radio frequency power output stage having a cathode,

an anode and at least one control electrode, a filament heater for said cathode, and an audio frequency modulator having stages arranged to modulate the anode-to-cathode current of said output stage, said system comprising a resistor in the filament heater circuit of said output stage, and connections for applying at least a portion of the audio frequency voltage developed across said resistor in series-opposing relation to the input of said audio frequency modulator.

II-B. Television Transmitters (Includes Facsimile).

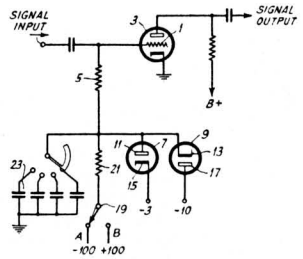
2,515,613
TIMER AND SYNCHRONIZING SIGNAL GENERATOR
Earl H. Schoenfeld, Mamaroneck, N. Y., assignor to Radio Corporation of America, a corporation of Delaware
Application July 11, 1946, Serial No. 682,738
19 Claims. (Cl. 178—69.5)



1. Apparatus for developing synchronizing signals comprising a generator, means for developing uniformly recurring control signals, time delay means responsive to said recurring control signals, means for impressing a uniformly recurring signal bearing a definite time relationship with the recurring control signal onto said generator to initiate each of the signals produced by the generator, a plurality of gate circuits, means for impressing the signal occurring at one of a plurality of points on said delay means onto a gate circuit, switching means connected to said gate circuits, means to selectively operate said switching means under the control of signals developed from the uniformly recurring control signal, and means for impressing the output of said gate circuits onto said generator to control the duration of each wave produced by the generator.

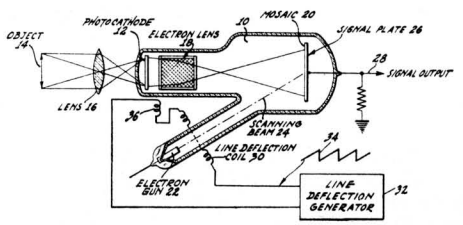
2,516,556
VOLTAGE CONTROL CIRCUITS
Vernon J. Duke, Rockville Centre, N. Y., assignor to Radio Corporation of America, a corporation of Delaware
Application July 13, 1946, Serial No. 683,319
9 Claims. (Cl. 179—171)

1. A circuit to obtain substantially linear voltage variations between two predetermined voltage levels and at predetermined rates of variation comprising a point of reference voltage, an electrical terminal, a capacity connected between said point of reference voltage and said terminal, a pair of sources of different predetermined voltage levels, a source of potential more positive in value than either of said predetermined voltage levels, a second source of potential more negative in value than either of said predetermined levels, a switch selectably connected to each of said sources of potential, a resistance connected between said terminal and said switch to permit



said capacity to receive a charge from one of said sources of potential, and means to limit the charge of said capacity including a pair of rectifiers connected to said terminal and so poled and biased that one only of said rectifiers will pass current when the potential of said terminal exceeds the range of potential whose limits are defined by said predetermined voltage levels.

2,517,807
NEUTRALIZATION OF DEFLECTION FIELD BETWEEN PHOTOCATHODE AND MOSAIC OF PICKUP TUBE
George C. Sziklai, Princeton, N. J., assignor to Radio Corporation of America, a corporation of Delaware
Application May 30, 1945, Serial No. 596,686
5 Claims. (Cl. 178—7.2)



5. In television apparatus, the combination of means for producing an electronic current image representative of a subject, means for focussing the produced electronic current image upon a target area there to develop a charge image under

the control of the electronic current image, means for developing an electron beam and for directing it toward the charge image on the said target area, means for developing a first electro-magnetic field to deflect the electron beam according to a selected scansion pattern to scan the charge image and thereby to release signals representative thereof to an output circuit, and means for developing a second electro-magnetic field concurrently with the first electro-magnetic field and in the region wherein the electronic current image flows so that the effect of the said first electro-magnetic field upon the electronic current image in that region is neutralized and nullified.

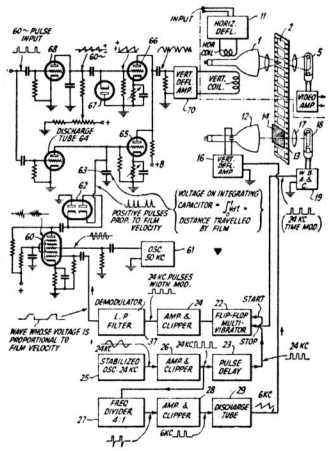
2,523,156

VERTICAL SWEEP VOLTAGE CORRECTION FOR FILM MOVEMENT IN FLYING SPOT SCANSION

Frank J. Somers, Rockville Centre, N. Y., assignor to Radio Corporation of America, a corporation of Delaware

Application June 12, 1947, Serial No. 754,250
17 Claims. (Cl. 178—7.2)

8. In film scansion apparatus for scanning optical images recorded on a motion picture film, a first cathode ray tube having means to develop and direct a cathode ray beam toward a luminescent target to produce a spot of light, means to deflect said beam so as to move the position of said spot of light, a first photoelectric means positioned so as to receive light which has been modulated in accordance with the portions of the image recorded on the motion picture film, a second cathode ray tube having means to develop and direct a cathode ray beam toward a luminescent target, a second photoelectric element positioned so as to receive light from the second cathode ray tube which has passed to a position whereby it has been influenced by the transparency and opacity of portions of the film, a first oscillating means, means to control the movement of the cathode ray beam in said second cathode ray tube under the influence of a waveform which is a harmonic of the output frequency of the first oscillating means, a multi-stroke multivibrator, means for controlling the operating state of said multivibrator under the control of the output frequency of the first oscillating means and the output wave from the second photoelectric element, means to demodulate the output waveform of the multivibrator, means for integrating the pulses derived from the demodulation of the output wave of the multivibrator, means for developing a compensatory waveform under the influence of said integrated waveform, a second oscillator, means for altering the output wave from the said second oscillator in accordance with the values of the compensatory wave form, and means for impressing said altered waveform onto the deflecting means of the first cathode ray tube to control the movement of the cathode ray beam in a manner which bears a definite relationship to the speed of movement of the film.



9. Apparatus in accordance with claim 8 wherein the means for integrating the pulses derived from the demodulation of the output wave of the multivibrator comprise a third oscillator, a multigrid thermionic tube, means for impressing the output waves from the demodulator onto one of the grids of said multigrid tube, means for impressing the output wave from the third oscillator onto another of the grids of the multigrid tube, rectifying means connected in the output circuit of said thermionic tube, and an electrical energy storage element connected to said rectifying means to receive and store energy rectified by said rectifying means.

II-C. Direction and/or Position Finding.

2,513,447

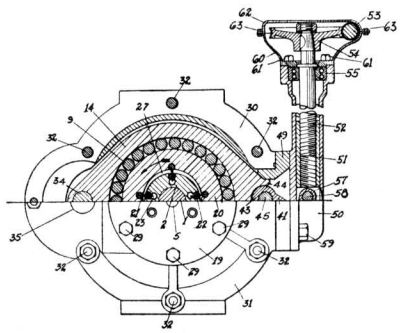
ROTARY PUMP OR MOTOR

Wesley H. Brown, Knoxville, Tenn., assignor to Brown and Brown, Knoxville, Tenn., a partnership composed of Wesley H. Brown and O. T. Brown

Application May 17, 1946, Serial No. 670,593
4 Claims. (Cl. 103—120)

1. A variable-discharge, rotary, hydraulic pump with inlet and outlet ports, which pump comprises a hollow outer vane-driving member with an inner vane-driving member located eccentrically within the outer vane-driving member, and vanes connecting the two vane-driving members to divide the space between the two vane-driving members into compartments, a shaft, a gear, an eccentric arm one end of which is movable to change the relative position of the two vane-driving members and the other end of which is mounted concentrically with said gear, the inner vane-driving member being fastened to

the shaft and the outer vane-driving member being supported in the eccentric arm, there being teeth operatively connected with each vane-driv-



ing member which teeth mesh with the teeth of the gear for driving each vane-driving member independently of the vanes.

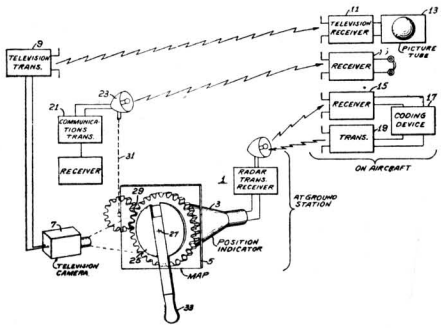
2,513,490

SELECTIVE COMMUNICATION SYSTEM BETWEEN GROUND STATION AND A PLURALITY OF MOBILE STATIONS

Loren F. Jones, Philadelphia, Pa., assignor to Radio Corporation of America, a corporation of Delaware

Application February 28, 1947, Serial No. 731,451

4 Claims. (Cl. 343—10)



1. In a radio navigation system including a ground station, radio locator means at said station including means providing a map-like display indicating the positions and relative altitudes of aircraft within the service area of said station, and television means reproducing said display on said aircraft, a system for selective communication from said ground station to any of said craft, including a visible index and means for superimposing said index over the point on said display corresponding to the position of the selected craft; directive transmitter means at said ground station, and means for controlling the direction and elevation of transmission of said directive transmitter means in accordance with the position of said index on said display.

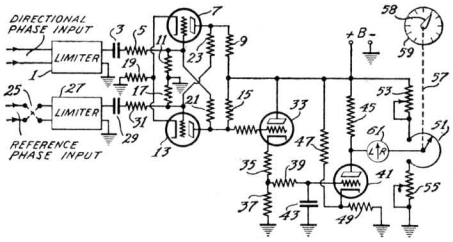
2,513,528

OMNIDIRECTIONAL RADIO RANGE

Harry Sohon, Havertown, Pa., assignor to Radio Corporation of America, a corporation of Delaware

Application March 8, 1946, Serial No. 652,920

3 Claims. (Cl. 343—102)



1. In a bearing indicator for omnidirectional radio range systems of the type which provide a reference phase signal and a directional phase signal, means for converting said signals to respective trains of pulses, pulse interval timer means responsive alternately to successive pulses of said trains to provide a pulsating output whose average magnitude is normally proportional to the phase difference between said two signals except when said difference is approximately zero or 360 degrees, whereupon said average magnitude is unstable; means for selectively reversing the phase of one of said signals to avoid operation of said pulse interval timer means with said zero or 360 degree phase relationship; a left-right indicator meter connected to said interval timer and responsive substantially to said average value of the output thereof, means, including a resistive element and a tap engaging it, for biassing said meter adjustably by movements of said tap along a path of engagement with the resistive element to produce zero deflection with a predetermined average value of said output, and means for indicating the adjustment of said biassing means in terms of bearing angle according to the position of the tap along said path of engagement, said means for biasing including calibrating means adjustable both to control the value of the bias provided for a given position of said tap and the amount of bias change which is produced by moving said tap along said path of engagement over a given portion thereof.

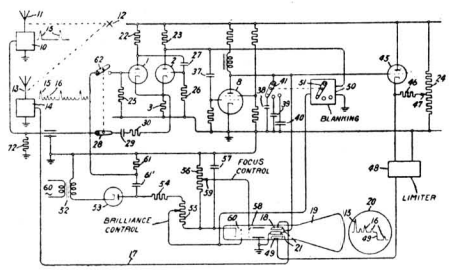
2,513,954

SYNCHRONIZED PULSE GENERATOR

Robert E. Moe, Bridgeport, Conn., assignor to General Electric Company, a corporation of New York

Original application September 28, 1942, Serial No. 459,894. Divided and this application May 16, 1945, Serial No. 594,090

1 Claim. (Cl. 250—27)



A single-pulse generator comprising first and second electron discharge devices in cascade, each having a corresponding anode, cathode and control electrode, a source of operating potential having a positive pole connected through first

and second resistors to said first and second anodes respectively and having a negative pole connected through a third common resistor to both said cathodes, means comprising said three resistors and a fourth resistor connected from said first control electrode to said negative pole for normally maintaining said first device conductive and said second device non-conductive, a pulse timing network serially comprising said first resistor, a capacitor connected from said first anode to said second control electrode and a fifth resistor connected from said second control electrode to said negative pole, the time constant of said network determining the rate of charge of said capacitor from said source, and selectively operable means to impress either short negative synchronizing pulses on said first control electrode or short positive synchronizing pulses on said cathodes, said pulses each having sufficient magnitude momentarily to reverse said conditions of conductivity for a time interval determined by said time constant, said network being effectively isolated from said last means by the anode-cathode paths of said devices.

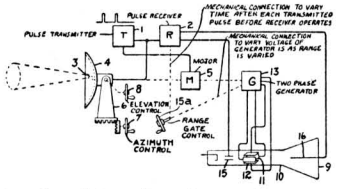
2,513,962

DIRECTIVE RADIANT ENERGY OBJECT LOCATING SYSTEM

Franklin G. Patterson, Schenectady, N. Y., assignor to General Electric Company, a corporation of New York

Application May 9, 1944, Serial No. 534,739
8 Claims. (Cl. 343—11)

1. In a pulse echo locating system having an axis of orientation and an axis of maximum sensitivity to echoes from remote objects, said axis of maximum sensitivity extending at a small angle to said axis of orientation, means to rotate said axis of maximum sensitivity about said axis of orientation, a viewing screen, means to produce a spot on said screen and to move said spot about a circular trace thereon synchronously with



movement of said axis of maximum sensitivity about said axis of orientation, and means to deflect said spot at right angles to said circular trace at regular intervals during its movement about said trace and to an extent dependent upon the intensity of echoes received in said system.

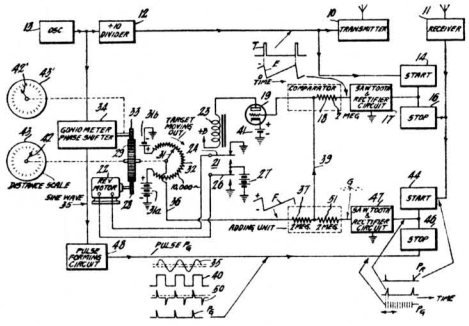
2,513,988

PULSE ECHO ALTIMETER WITH MECHANICALLY DRIVEN INDICATOR

Irving Wolff, Princeton, and Philip J. Herbst, Moorestown, N. J., assignors to Radio Corporation of America, a corporation of Delaware

Application July 22, 1948, Serial No. 40,146
12 Claims. (Cl. 343—13)

3. A pulse-echo distance measuring system comprising means for transmitting pulses of energy and receiving them after reflection from an object, means for producing a first voltage having an amplitude that is a function of the time interval between transmission of a pulse and reception of said pulse after reflection, a main distance indicator that indicates full range and a phase shifter which is geared to said indicator so that it is driven through 360 electrical degrees a plurality of times as said indicator is driven through its full range, means for producing a voltage whose amplitude is a function of the angular position of the phase shifter and of said time interval, means comprising a follow-up cir-



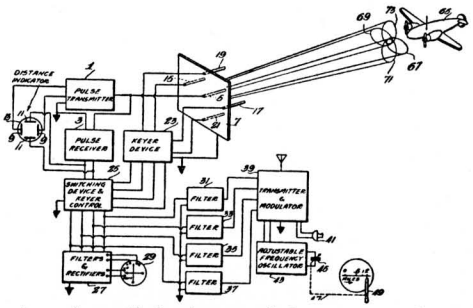
cuit for driving said distance indicator, said follow-up circuit including means for developing a third voltage as a function of the indicator position, and means for combining said three voltages in said follow-up circuit to position said distance indicator.

2,514,351

AIRCRAFT LANDING SYSTEM EMPLOYING LOBE SWITCHING OF RADIO BEAMS

Rogers M. Smith, Merchantville, N. J., assignor to Radio Corporation of America, a corporation of Delaware

Application January 3, 1940, Serial No. 312,273
12 Claims. (Cl. 343—11)



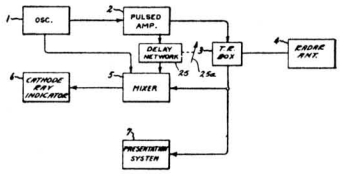
1. An aircraft instrument landing system including a radio transmitter for transmitting pulses, means for radiating said pulses in the form of a beam, means for directing said beam up and down and right and left sequentially so that overlapping portions of said directed beam form a glide path, means for modulating said beam in each of its respective positions with signals of distinctive frequencies, a receiver responsive to said modulated beam signals after said signals are reflected from an aircraft in said beam, filters respectively responsive to said distinctive modulation connected to said receiver for selecting said distinctive signal modulation, a second radio transmitter, and means connecting said second transmitter and said receiver for applying said selected distinctive modulation signals to modulate said second transmitter for transmission of said modulation signals to said aircraft.

2,514,924

PULSE ECHO DETECTION OF MOVING TARGETS

Howard I. Becker, Rexford, N. Y., assignor to General Electric Company, a corporation of New York

Application March 27, 1946, Serial No. 657,407
4 Claims. (Cl. 343—9)



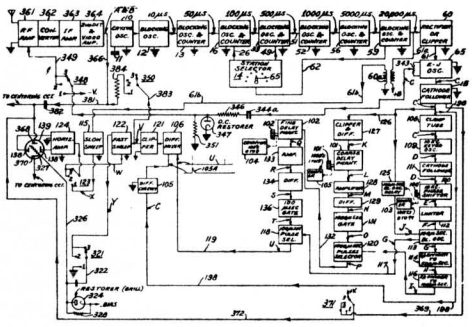
1. A velocity-measuring pulse echo system comprising means for generating continuous ultra-high frequency oscillations of constant frequency, pulse transmitting means controlled by said generated oscillations for radiating pulses of energy at said frequency toward a remote object, said pulses each having a duration long as compared to the period of said oscillations, pulse receiving means for receiving corresponding pulses of ultra-high frequency oscillations reflected from said object, means for combining said reflected oscillations with said generated oscillations, means responsive to any difference frequency between said combined oscillation for developing a pulse voltage at said difference frequency, a cathode ray device having a viewing screen, a sweep voltage generator operable over a range of low frequencies comparable to said difference frequency, means for deflecting said ray in one direction in response to said pulse voltage and in another direction in response to said sweep voltage, and means for independently adjusting the frequency of said sweep generator so that said ray traces a stationary pattern on said screen when the frequencies of said voltages have an integral ratio, whereby said relative velocity may be determined from said sweep frequency.

2,515,464

DIRECT READING RADIO NAVIGATION SYSTEM

Milton J. Minneman, Camden, N. J., assignor to Radio Corporation of America, a corporation of Delaware

Application April 26, 1947, Serial No. 744,239
9 Claims. (Cl. 343—103)



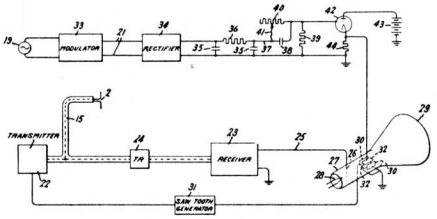
1. In a radio system wherein periodically recurring A pulses and B pulses are received from ground stations and wherein two similar deflecting waves, one of fixed timing and the other of adjustable timing, are to be produced for deflecting the cathode ray of a cathode ray tube indicator, said A pulses having the same repetition period as said B pulses, means for producing a square wave having the same repetition period as said A and B pulses, the half cycle of said square wave that occurs during the occurrence of a B pulse being identified as the slave period, means for producing a sine wave signal having a fixed phase with respect to said slave period, a phase shifter through which said sine wave signal is passed to obtain a phase-shifted wave, means for converting said phase-shifted wave to periodically recurring short-duration timing pulses, means for selecting a desired one of said timing pulses, and means for producing said adjustable deflecting wave in response to the occurrence of said selected pulse whereby said adjustable deflecting wave may be shifted to a desired position along a time axis by selecting a desired timing pulse and by shifting the phase of the selected timing pulse by said phase shifter.

2,519,017

PHASE LAG CORRECTION CIRCUIT FOR THE SWEEP CIRCUIT OF A RADIO ECHO SYSTEM

Nathaniel Bishop, Fairfield, Conn., assignor to General Electric Company, a corporation of New York

Application November 9, 1945, Serial No. 627,720
2 Claims. (Cl. 343—11)



1. In a radio echo system of the type in which pulses of a high frequency carrier wave are radiated from an oscillating antenna and received by the same antenna after reflection from an object in space, means for producing a composite signal comprising a wave of the frequency of the carrier wave modulated with a wave of the frequency of the oscillations of the antenna, means for filtering waves of one of said frequencies, and means connected to the output of said filtering means for correcting the shift in phase of the other of said waves caused by said filtering means, said last means consisting of a resistance connected in series with said filtering means and a capacitance connected in shunt with said resistance, a viewing screen, and means utilizing said corrected wave for repeatedly moving a beam of electrons across said screen.

2,520,595

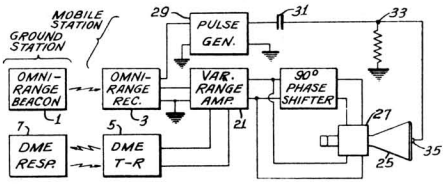
VISUAL INDICATOR OF DISTANCE BETWEEN TWO POINTS AND THE BEARING OF A LINE CONNECTING THEM

George L. Fernsler, Lawrenceville, N. J., assignor to Radio Corporation of America, a corporation of Delaware

Application February 27, 1948, Serial No. 11,421
6 Claims. (Cl. 343—6)

4. In a radio system for obtaining and visually representing information as to the position of an object both with respect to a reference point and to a reference line in which the system includes

omnidirectional radio range means for supplying two wave trains having a phase relationship depending on the azimuth angle between the reference line and a straight line passing through the object and the reference point and distance measuring equipment for supplying a voltage having a characteristic proportional to the distance between said object and said reference point, a unitary indicator system including a cathode ray oscilloscope, means providing deflection signals for deflecting the cathode ray beam of the oscilloscope to trace a circular path,



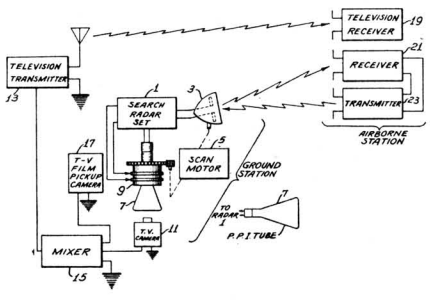
means responsive to said voltage supplied by the distance measuring equipment to control the amplitude of said deflection signals so that said circular path has a radius proportional to said distance, means periodically operative to deflect said beam momentarily along a linear path which is radial to said circular path, means responsive to said two wave trains according to the phase relationship between them to control the direction of said radial deflection so that the angle between it and a predetermined radius from the center of said circular path will be equal to the angle between said straight line and said reference line, whereby said cathode ray tube produces a visual display comprising a circular trace and a radial trace intersecting it at a point whose distance from the center of the circular trace represents said distance between the object and said reference point and whose angular displacement along said circular trace from said predetermined radius represents said azimuth angle.

2,520,600
AIR TRAFFIC CONTROL

Loren F. Jones, Philadelphia, Pa., assignor to Radio Corporation of America, a corporation of Delaware

Application March 13, 1948, Serial No. 14,715

13 Claims. (Cl. 343—6)



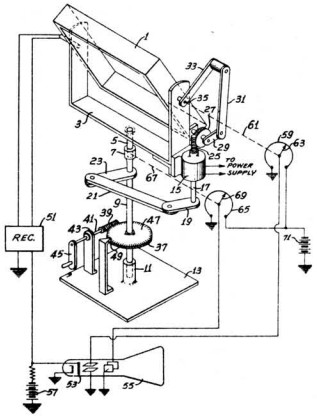
1. An air traffic control system including, at a ground station, means providing a map-like indication of the positions of aircraft within the service area of said station, and means for reproducing said indication on board said aircraft, means at said ground station producing a display including a plurality of characteristic marks which move at rates corresponding to typical aircraft ground speeds and represent individual moving airspaces each of which can be occupied by an aircraft without interference with an aircraft in another of said airspaces, and means superimposing said display upon said map-like indication for transmission to and reproduction on board said aircraft.

2,520,693
DIRECTION FINDER

Walter van B. Roberts, Princeton, N. J., assignor to Radio Corporation of America, a corporation of Delaware

Application April 22, 1948, Serial No. 22,599

3 Claims. (Cl. 343—113)

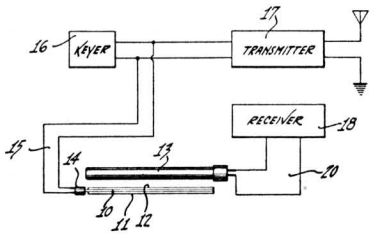


1. In a radio direction finder system including wave collector means subject to polarization error and having a null axis in the center of a solid angle of minimum responsiveness the method of determining the true azimuth of arrival of radio waves, which are transmitted from a remote station, substantially independently of said polarization error, comprising the steps of cyclically varying the direction of said null axis both in azimuth and in elevation to periodically orient said axis in substantially each direction within a prescribed second solid angle which is many times larger than said first-mentioned solid angle and includes a line to said remote station, identifying, according to both the azimuth and the elevation of said axis, each of a plurality of minimum responses to said waves which minimum responses occur respectively for different directions of elevation of said axis and may include some whose occurrences, because of polarization error effects, are not for the true direction in azimuth of said axis, and selecting as the true azimuth that azimuth on which, at different elevations, a preponderance of said signals is received.

2,521,804
RADAR TARGET DISTANCE INDICATOR

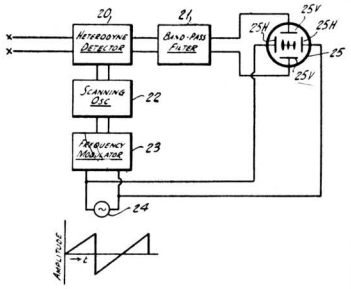
Robert P. Roetter, Westmont, N. J., assignor to

Radio Corporation of America, a corporation of Delaware
Application April 17, 1946, Serial No. 662,796
7 Claims. (Cl. 343—13)



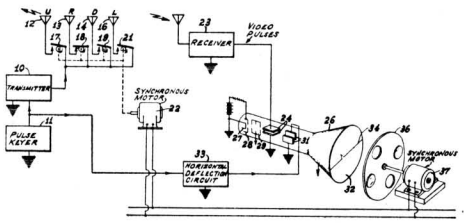
1. The method of measuring the distance of a target, comprising the steps of sending a radio signal towards a target to be reflected therefrom, simultaneously producing a sound wave, causing the reflected signal to illuminate the position of the sound wave at the instant the signal returns from the target, and measuring the travel of the sound wave to the illuminated position as a function of the distance of the target.

2,522,863
FREQUENCY-MODULATION DISTANCE FINDER
Murray G. Crosby, Upper Montclair, N. J., assignor to Radio Corporation of America, a corporation of Delaware
Application November 15, 1945, Serial No. 628,921
4 Claims. (Cl. 343—14)



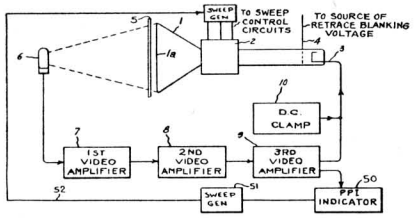
2. In a distance measuring system wherein a frequency modulated wave is transmitted toward objects that reflect said wave, means for locally generating a frequency modulated wave, means for combining said reflected wave with said locally generated wave, means for frequency demodulating said combined waves, means for heterodyning the demodulated waves with a wave which has been frequency modulated by a sawtooth wave, means for filtering the heterodyned waves to pass only waves in a narrow frequency band corresponding to a certain distance, means for deflecting a cathode ray along a time axis by said sawtooth wave, and means for causing said filtered wave to act upon said cathode ray as it is being deflected along the time axis to produce distance indications thereon.

2,522,880
INDICATING SYSTEM FOR RADAR DIRECTION FINDERS
Nils E. Lindenblad, Port Jefferson, N. Y., assignor to Radio Corporation of America, a corporation of Delaware
Application December 14, 1946, Serial No. 716,213
3 Claims. (Cl. 343—16)



1. In combination, a cathode ray tube having a screen on which successive indications are caused to appear during successive time periods and in substantially superimposed relation, optical means comprising a refractive element mounted on a rotatable opaque disc for causing an indication produced during one of said time periods to appear displaced on said screen when said element is moved into a viewing position, said disc having a non-refracting window therein for causing an indication produced during a succeeding time period to appear displaced a zero amount when said non-refracting window is moved into a viewing position whereby said two indications appear to an observer to be a pair of indications.

2,523,328
CATHODE-RAY MAPPING SYSTEM
John E. Ranks, Syracuse, N. Y., assignor to General Electric Company, a corporation of New York
Application June 30, 1948, Serial No. 36,230
6 Claims. (Cl. 315—10)



1. A cathode ray mapping system comprising in combination, a cathode ray tube having a viewing screen, means for causing the cathode ray to scan said screen in a predetermined pattern, a transparency having opaque markings thereon, a photoelectric cell, means for projecting the light emitted by said screen through said transparency and upon said photoelectric cell, and a feedback path between said photoelectric cell and said cathode ray tube whereby variations in light intensity, as seen by said photoelectric cell due to irregularities in said screen, are substantially reduced.

II-D. Telegraphy.

2,513,525

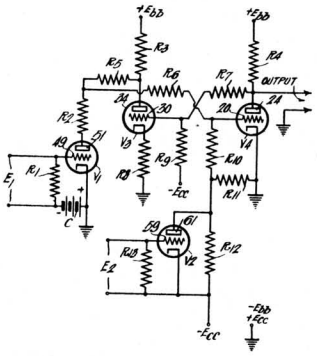
LOCKING CIRCUIT WITH DOUBLE SIGNAL CONTROL

Eugene R. Shenk and James R. Weiner, Brooklyn, N. Y., assignors to Radio Corporation of America, a corporation of Delaware

Application December 1, 1944, Serial No. 566,129

6 Claims. (Cl. 250—27)

6. In a telegraphy system of the type wherein the signals are represented by two potentials of varying magnitude, alternatively present, two tubes each having electrodes including a control electrode and an anode and having their control electrodes and anodes interconnected by impedances so that when one tube is biased to cut off, the voltage on the control electrode of the other tube becomes less negative, and vice versa, a first control tube having a control electrode and having output electrodes coupled directly to the control electrode of one of said first two tubes to vary the potential thereon in accordance with the signals, a second control tube having a control electrode and having its output electrodes coupled directly to the control electrode of said one of said first two tubes to vary the potential thereon



in accordance with said signal potentials, means for applying one of said signal potentials to the control electrode of said first control tube, and means for applying the other of said signal potentials to the control electrode of said second control tube.

2,513,910

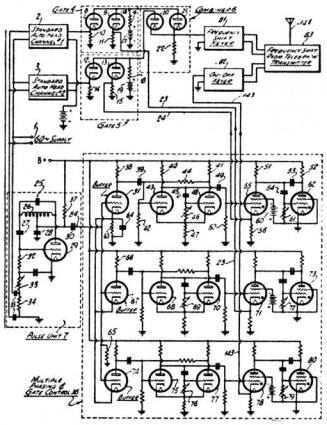
MULTIPLEX TELEGRAPH SYSTEM

Warren H. Bliss, Riverhead, N. Y., assignor to Radio Corporation of America, a corporation of Delaware

Application March 28, 1945, Serial No. 585,344

10 Claims. (Cl. 250—9)

1. A radio telegraph multi-channel system in which the conventional length code characters in each channel are converted into one or more spaced pulses of constant amplitude but appreciably shorter in duration than said code characters, comprising a plurality of sources of conventional length telegraph code signals corresponding in number to the number of channels in the system, a phasing circuit for sequentially assigning portions of the signals from said sources to a common radio frequency transmitter, means for assuring synchronism in the operation of said sources of signals and said phasing circuit, said phasing circuit including $n+1$ chain circuits wherein n corresponds in number to the number of said signal sources, means supplying recurring waves to said chain circuits, said chain circuits each including a pair of self-restoring trigger circuits operating in cascade, the trigger circuits in the different chains having different time constants and having such values that the outputs from the different chains constitute phase displaced pulses whose durations are shorter than the code characters from said signal sources, a gate circuit individual to each channel and located between the output of the signal source for



each channel and said common radio frequency transmitter, connections from the different outputs of said chain circuits to different gate circuits, there being one connection from the output of each chain circuit to a single gate circuit, each of said gate circuits being so constructed and arranged that it operates to pass a pulse only during the simultaneous occurrence of a telegraph code character from its associated signal source and a pulse from the chain connected to it, as a result of which the duration of the pulse passed by the gate circuit is limited by the duration of the pulse obtained from its associated chain circuit, means for combining the outputs of said gate circuits to form a composite signal composed of pulses obtained from the different gate circuits, means for passing a signal representative of said composite signal to said radio frequency transmitter, and means for keying said transmitter on and off at a rate which is the same as the pulse rate in one of said chains.

2,513,911

ELECTRONIC CIRCUITS FOR SIGNALING

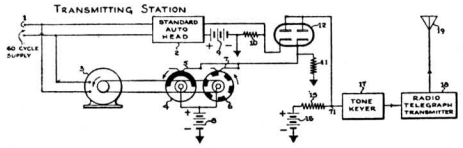
Warren H. Bliss, Riverhead, N. Y., assignor to Radio Corporation of America, a corporation of Delaware

Original application June 22, 1944, Serial No. 541,569. Divided and this application December 21, 1945, Serial No. 636,473

11 Claims. (Cl. 250—27)

1. In a communication system, signal superimposing means including two independent sources of signals at least one of which constitutes message waves, means including a pair of rectifier electrode structures each including an

anode and a cathode, a direct connection between said anodes, individual cathode resistors directly connecting said cathodes to ground, a source of unidirectional potential, a direct current connection between the positive terminal of said source of unidirectional potential and said anodes through a common output resistor and its negative terminal connected to ground,

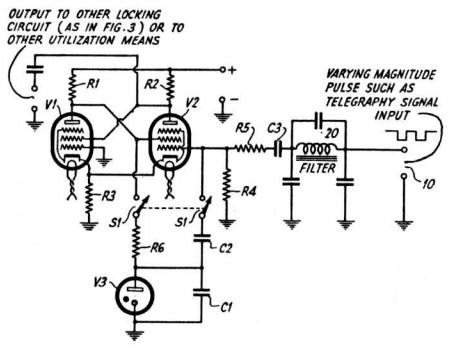


circuit connections between each of said individual signal sources and a respective one of said cathodes, a keyer circuit coupled to said output resistor, and a transmitter controlled by said keyer circuit.

2,515,052
RESTORING DEVICE FOR LOCKING CIRCUITS

John C. E. Mitchell, Montreal, Quebec, Canada, assignor to Radio Corporation of America, a corporation of Delaware

Application April 4, 1946, Serial No. 659,477
7 Claims. (Cl. 178—70)



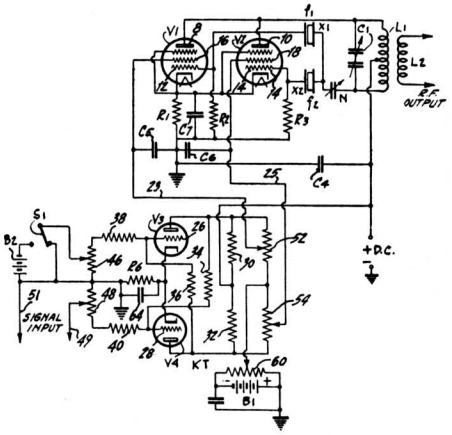
1. In combination, a locking circuit comprising two electron control devices having electrodes intercoupled and connected to direct current sources in such a manner that when current is cut off in one device current flows in the other device and vice versa, apparatus for applying potentials which vary between two magnitudes representing signal elements to said locking circuit to trip the same back and forth between the two conditions of current conduction in the devices as the potentials vary between said magnitudes, and means for reestablishing a stable condition of current cut off in a predetermined one of said devices and current flow in the other of said devices in the event the locking circuit is tripped from said condition of stability and remains tripped for a time period exceeding the duration of the longest signal element, comprising a relaxation oscillator including an electron discharge device in a capacitive and resistive circuit having a time constant which is longer than the time duration of the longest signal element, means responsive to current in said locking circuit for developing a potential of a magnitude sufficient to start oscillation in said relaxation oscillator when current is turned on in said one device and off in the said other device for a time period exceeding the time duration of the longest signal element, means for applying said potential to said electron discharge device, and means coupling said resistive circuit to an electrode in one of said control devices to trip said locking circuit to reestablish said condition of current cut off in said one device and current flow in said other device.

2,515,971
OSCILLATORY ENERGY GENERATING AND MODULATING SYSTEM

George L. Usselman, Port Jefferson, N. Y., assignor to Radio Corporation of America, a corporation of Delaware

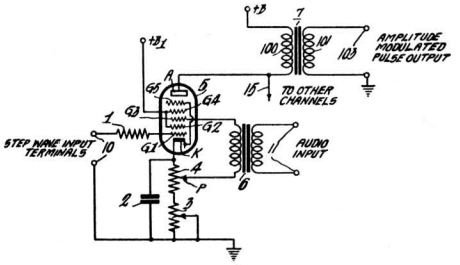
Application July 28, 1945, Serial No. 607,646
7 Claims. (Cl. 332—23)

1. In a signalling system, two electron discharge tubes each having electrodes including an oscillator anode, a cathode, and a control grid, two piezoelectric crystals one tuned above, the other tuned below a desired mean operating frequency, a circuit parallel tuned to said desired mean frequency which is substantially intermediate the frequencies to which said crystals are tuned, a connection tying the oscillator anodes of said tubes together and to one end of said parallel tuned circuit, connections of low impedance to voltages of the said desired frequency coupling a point intermediate the ends of said parallel tuned circuit to the cathodes of said tubes, couplings between the other end of said parallel tuned circuit and corresponding control grids of said tubes, means including one crystal in a coupling between the control grid and another electrode of one tube and the other crystal in a coupling between the control grid



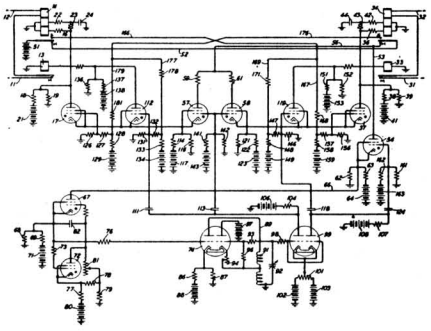
and another electrode of the other tube, the arrangement being such as to establish regeneration in said tubes and circuits for the production of oscillations which are entrained by said parallel tuned circuit to be of said desired operating frequency, and connections to said tubes for differentially modulating the same in accordance with signals to correspondingly vary the frequency of the oscillations generated.

2,518,013
TIME DIVISION MULTIPLEX SYSTEM
William D. Houghton, Port Jefferson, N. Y., assignor to Radio Corporation of America, a corporation of Delaware
Application July 16, 1947, Serial No. 761,275
18 Claims. (Cl. 332—9)



1. The method of producing an amplitude modulated pulse which includes the steps of generating a discrete voltage wave, causing a space flow of charged particles when said voltage wave reaches a predetermined value for the remaining duration of said voltage wave, utilizing said space flow of charged particles to produce a voltage pulse of a duration shorter than the duration of said space flow of particles, applying said voltage pulse to said space flow of charged particles, and superimposing a modulating voltage on said voltage pulse.

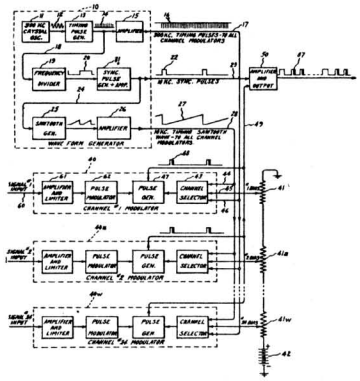
2,518,027
TELEGRAPH REPEATER
Joseph A. Krecek, New Rochelle, N. Y., assignor to Bell Telephone Laboratories, Incorporated, New York, N. Y., a corporation of New York
Application May 18, 1946, Serial No. 670,684
11 Claims. (Cl. 178—71)



11. In a regenerative telegraph repeater, a first telegraph line having a receiving relay and a transmitting relay associated therewith, a second telegraph line having a receiving relay and a transmitting relay associated therewith, a source of timing impulses, a gas-filled electron discharge tube having its anode connected to the transmitting relay associated with one of said lines and operable jointly by said source of timing impulses and the receiving relay associated with the other line for operating the transmitting relay associated with said one line to spacing condition, a gas-filled electron discharge tube having its anode connected to a winding of the receiving relay associated with said one line and operable directly by the receiving relay associated with said other line for holding the receiving relay associated with said one line in marking condition, and a gas-filled electron discharge tube operable jointly by said source of timing impulses and the receiving relay associated with said other line upon each response thereof to a marking signal for quenching said first-mentioned and said second-mentioned electron discharge tubes to restore the transmitting relay associated with said one line to marking condition and to release the marking hold on the receiving relay associated with the same line.

2,519,083
TIME DIVISION PULSE MULTIPLEX SYSTEM
Walter E. Sutter, Syracuse, and Thomas G. Custin, Baldwinsville, N. Y., assignors to General Electric Company, a corporation of New York
Application August 8, 1949, Serial No. 109,220
21 Claims. (Cl. 179—15)

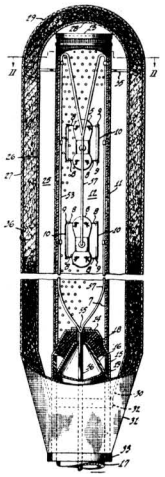
1. A time division pulse multiplex system comprising a transmitting station including a master oscillation source, means synchronized from said source for producing a group of synchronizing pulses at a desired group frequency, means also synchronized from said source for producing a plurality of groups of channel pulses recurring at said frequency but progressively time-displaced so as to be interleaved with each other and with said synchronizing pulses, means for modulating each of said groups of channel pulses with a desired signal to be multiplexed, and means for combining and transmitting all said pulse groups; and a receiving station including means for deriving a timing wave from said synchronizing



pulses, means for deriving individual timing pulses from each of said channel pulses, means conjointly controlled by said timing wave and timing pulses for separately selecting each of said groups of channel pulses, and means for demodulating each of said selected groups to reproduce each of said signals.

2,520,706
WINDSCREEN FOR MICROPHONES
Leslie J. Anderson, Moorestown, and Alfred H. Kettler, Collingswood, N. J., assignors to Radio Corporation of America, a corporation of Delaware
Application January 30, 1948, Serial No. 5,436
8 Claims. (Cl. 181—33)

1. A windscreen system for sound transducers and the like, comprising in combination, an inner cylindrical screen providing an enclosure for a sound transducer, and an outer cylindrical screen assembly substantially concentric with and spaced from said first named screen, whereby a



shunt air flow path is provided around the inner screen, said screen assembly comprising two spaced substantially concentric screen cylinders of relatively larger mesh than the first named screen, and a filler of fibrous sound conducting material between said last named screen cylinders.

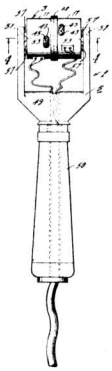
2,520,714

ELECTRODYNAMIC HAND MICROPHONE OF THE PRESSURE GRADIENT TYPE

Robert K. Duncan, Mount Ephraim, N. J., assignor to Radio Corporation of America, a corporation of Delaware

Application August 25, 1949, Serial No. 112,227

9 Claims. (Cl. 179—115.5)



1. A pressure gradient responsive microphone of the moving coil type comprising a casing of magnetic material, a diaphragm mounted within said casing and dividing the interior thereof into separate chambers on opposite sides of said diaphragm, magnetic structures including said casing symmetrically disposed on opposite sides of said diaphragm and providing balanced magnetic circuits on opposite sides of said diaphragm, said magnetic structures including a pair of air gaps, one in each of said chambers, and coil means carried by said diaphragm on opposite sides thereof, said coil means being disposed each in a separate one of said air gaps, and said casing being provided with spaced apertures communicating separately with each of said chambers.

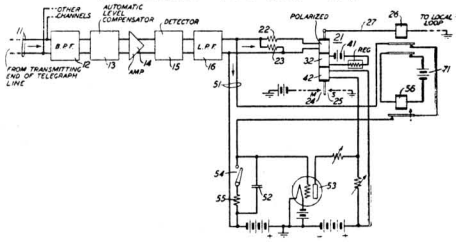
2,522,130

CARRIER TELEGRAPH RECEIVING CIRCUIT

Kenneth W. Pfleger, Arlington, N. J., assignor to Bell Telephone Laboratories, Incorporated, New York, N. Y., a corporation of New York

Application June 19, 1947, Serial No. 755,633

6 Claims. (Cl. 178—69)



3. A receiving circuit for a single tone carrier telegraph system for transmitting marking and spacing signals by interrupting the carrier wave, said system subject to interference due to thermal noise and including a receiving relay, a line winding for said relay, means for applying received signals to said line winding, a biasing winding for said relay, neutralizing means responsive to the interference to which said line winding is subjected, means comprising said last-named means for applying to said biasing winding a current which varies as the magnitude of said last-named interference, means for rendering said neutralizing means unresponsive during the reception of mark signals, and means for rendering said neutralizing means unresponsive during the reception of transient currents caused by the building up of said mark signals.

2,522,874

CIRCUIT FAILURE INDICATOR FOR RECEIVING TELEGRAPHS

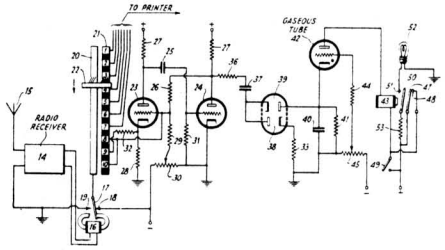
Alfred Kahn, Queens Village, N. Y., assignor to Radio Corporation of America, a corporation of Delaware

Application January 4, 1946, Serial No. 639,088

11 Claims. (Cl. 178—69)

11. Monitoring apparatus for use with telegraph circuits comprising a receiving distributor having segments reserved for message signals and further segments reserved for pre-arranged signals, an electronic trigger circuit normally biased to maintain a first condition of equilibrium, means to couple said trigger circuit to said further segments to shift said trigger circuit to a second condition of equilibrium upon failure to receive said pre-arranged signals, said trigger circuit having time constant of values at which the trigger circuit is returned to said first condition of equilibrium to be in readiness for the succeeding transmission, a capacitor, rectifier elements coupling said capacitor to said trigger circuit to place an incremental charge on said capacitor upon each return to said first condition of equilibrium in response to each failure to receive said pre-arranged signals, a resistor coupled to said capacitor to discharge the same at a predetermined rate, a circuit including a grid controlled gaseous discharge tube coupled to said

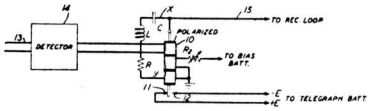
capacitor, and adapted to be triggered into conductivity at a predetermined charge on said capacitor, a utilization device in circuit with the discharge path of said discharge tube whereby said utilization device is actuated upon triggering into conductivity of said discharge tube in



response to the upbuilding of the charge on said capacitor, and means to vary the potential at which said discharge tube is triggered to vary the circuit failure repetition rate at which said utilization device is actuated.

2,523,717
CORRECTION OF DISTORTION IN TELEGRAPH SIGNALS
Kenneth W. Pfleger, Arlington, N. J., assignor to Bell Telephone Laboratories, Incorporated, New York, N. Y., a corporation of New York
Application August 20, 1946, Serial No. 691,851
4 Claims. (Cl. 178—69)

3. In a telegraph receiver for receiving direct-current signal waves of current, no-current signal conditions, said waves subject to distortion, said distortion including a variation in the tail of each of said waves resembling a damped oscillatory transient oscillating about the final steady state full-current and no-current amplitudes of said waves for said conditions, a magnetic polar relay, an armature and two opposed contacts thereon, a line winding and a biasing winding on said relay, means connected to said biasing winding for generating therein a magnetizing force equal and opposite to one-half of that generated in said line winding when said line winding has full steady state current therein, a timed damped oscillatory transient generating circuit, connected to said relay, said generating circuit comprising a source of direct-current potential, a lumped capacitance, a lumped inductance, and a lumped resistance, the constants of said generating circuit chosen so as to generate a transient corresponding to said distortion, said generating circuit responsive to transitions of said armature

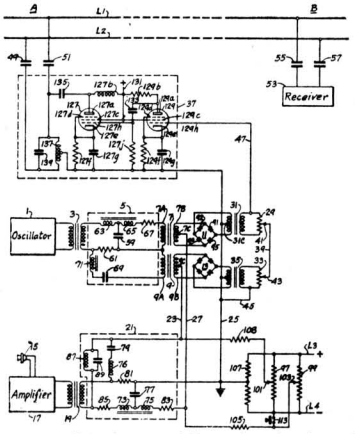


between said contacts to generate said transient on each transition, means connected to said generating circuit for producing a magnetic effect in said relay on each said transition corresponding to and opposed to the magnetic effect produced simultaneously by the distortion of said tail in said line winding, so as, in effect, to flatten said current and no-current signals at their normal full steady state and zero current values, before the first possible transition of said armature between said contacts after the reception of a signal element and thereafter, so that the time intervals between times of transition of said armature between said contacts corresponds to the duration of signals as transmitted from the transmitter to said relay.

II-E. Other Apparatus

23,258
SINGLE SIDE-BAND SYSTEM
Bernard E. Lenehan, Bloomfield, N. J., assignor to Westinghouse Electric Corporation, East Pittsburgh, Pa., a corporation of Pennsylvania
Original No. 2,476,880, dated July 19, 1949, Serial No. 623,594, October 20, 1945. Application for reissue December 28, 1949, Serial No. 135,411
24 Claims. (Cl. 332—45)

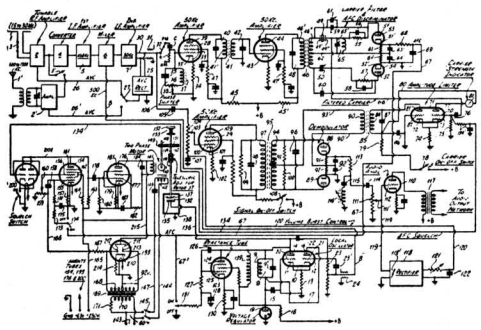
1. In a system for producing a single sideband quantity, means for producing a first carrier alternating quantity and a second carrier alternating quantity having a substantial phase displacement therebetween, said first and second carrier quantities being of the same frequency, means for producing a first modulating quantity and a second modulating quantity having substantially said phase displacement therebetween, means for modulating said first carrier quantity by said modulating quantity to produce a first double sideband output, means for modulating said second carrier quantity by said second modulating quantity to produce a second double sideband output, said modulating means comprising barrier-layer modulator means, and



means for combining said outputs to eliminate one of said sidebands.

2,513,786
RECEIVER SYSTEM
Murray G. Crosby, Riverhead, N. Y., assignor to Radio Corporation of America, a corporation of Delaware
Application February 14, 1945, Serial No. 577,902
1 Claim. (Cl. 250—20)

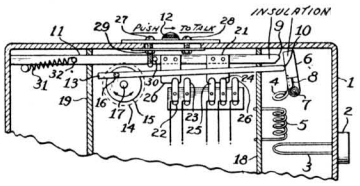
In a carrier-exalted receiving system, means for amplifying collected modulated carrier waves subject to selective fading, selective means for removing substantially all of the modulation from the carrier waves to provide substantially pure carrier energy, discriminator means coupled to the output of said selective means and to the output of said amplifying means to provide a frequency control bias in response to a shift in carrier frequency from a predetermined reference frequency and within a predetermined range, means coupled to the output of said selective means for limiting the amplitude of said pure carrier energy, a demodulator for combining the amplified modulated carrier waves with said limited carrier energy to provide demodulation of said modulated carrier waves, an elec-



tronic reactance device responsive to said frequency control bias for controlling the frequency of said amplified modulated carrier waves, a two-phase-motor-driven condenser device for controlling the frequency of said amplified modulated waves, a common source of alternating current supplying the two phases of motor-energizing current, said frequency control bias controlling the amplitude of one of said two phases of current, and means, responsive to a predetermined decrease of filtered carrier energy at said limiting means, for rendering at least one of said frequency controlling devices ineffective.

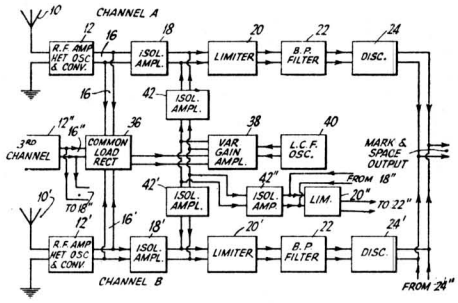
2,513,796
SWITCH AND TUNING DEVICE FOR RADIO TRANSCEIVERS
De Witt R. Goddard, Riverhead, N. Y., assignor to Radio Corporation of America, a corporation of Delaware
Application October 4, 1945, Serial No. 620,347
4 Claims. (Cl. 250—13)

3. In a two way radio apparatus, a sliding operating member, a spring tensioned pivoted arm disposed so as to be actuated by an end of said member, movable switch contact means carried by said member, a movable tuning loop located on an end of said arm, a tuning coil inductively coupled to said loop, fixed contact means for engaging said movable contact means, said member acting to shift said arm to thereby vary the tuning of said apparatus, resilient means secured to said member and acting to oppose the movement of said member, and a transmit-receive sys-



tem controlled by said contact means, said system including an oscillator whose tank circuit includes said tuning coil.

2,513,803
RECEIVER AND DIVERSITY RECEIVER SYSTEM
Leonard R. Kahn, New York, N. Y., assignor to Radio Corporation of America, a corporation of Delaware
Application January 29, 1948, Serial No. 5,018
4 Claims. (Cl. 250—8)

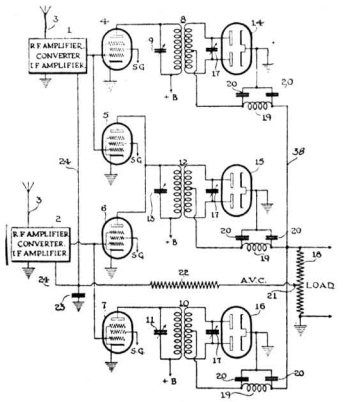


4. In a diversity system, a plurality of signal receivers each including a signal amplifier, all of which amplifiers are of like over-all gain, a detector for each signal receiver, means coupling each detector to the output of its corresponding amplifier, a current amplitude limiter in each coupling for feeding the signals to the corresponding detector, a source of oscillations of a frequency different from the signal frequency, connections between said source and the inputs of all of said limiters, a variable gain amplifier in said connections, apparatus for controlling the gain of the last named amplifier in accordance with the magnitude of the signals supplied to the first named amplifiers, and a common output coupled to all of the detectors.

2,513,811
DIVERSITY RECEIVING SYSTEM
Walter I. Matthews, Riverhead, N. Y., assignor to Radio Corporation of America, a corporation of Delaware
Application March 30, 1944, Serial No. 528,748
9 Claims. (Cl. 250—20)

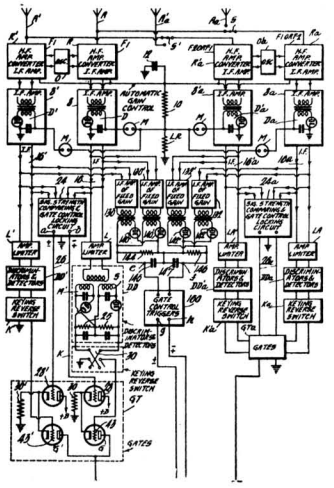
4. A diversity receiving system having two receiving channels, two detecting circuits each in-

dividual to a respective receiving channel, at least one detecting circuit under joint control of signal energies simultaneously derived from the two receiving channels, and a utilization circuit coupled in common to the outputs of all said



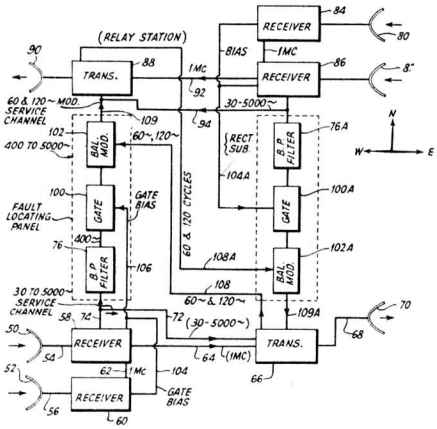
detecting circuits in such manner that the strongest signal passing through any of said detecting circuits produces a dominating effect upon said utilization circuit.

2,514,162
DIVERSITY RECEPTION
Harold O. Peterson, Riverhead, N. Y., assignor to Radio Corporation of America, a corporation of Delaware
Application April 25, 1947, Serial No. 743,960
4 Claims. (Cl. 250—8)



3. In a diversity system, a first pair of radiant energy receivers, a second pair of radiant energy receivers, a gate device coupled to each receiver, signal strength sensing detectors coupled to the receivers of each pair for comparing the signals in the receivers of the pairs and for deriving a potential for making conductive that one of the gate devices for each pair of receivers coupled to the receiver getting the strongest signal, a final gate device for each pair of said first named gate devices, each of said final gate devices being excited by electrical energy representing the energy passed by a different pair of said first named gate devices, signal strength detectors for comparing the total signals in one pair of receivers with the total signals in the other pair of receivers and for applying control potentials to said final gate devices to make them selectively conductive one at a time, and a common output circuit coupled to said final gate devices.

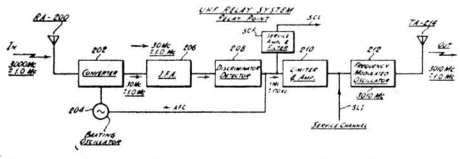
2,514,367
FAULT LOCATING FOR RADIO RELAY SYSTEMS
Donald S. Bond and Gerald G. Gerlach, Philadelphia, Pa., and Leland E. Thompson, Merchantville, N. J., assignors to Radio Corporation of America, a corporation of Delaware
Application September 12, 1946, Serial No. 696,566
18 Claims. (Cl. 250—15)



16. A relay station comprising east and west transmitters and east and west diversity receivers, a band pass filter, a gate and a balanced modulator, in the order named, connecting the common output circuit of the west diversity receiver to the west transmitter, a band pass filter, a gate and a balanced modulator, in the order named, connecting the east receiver to the east transmitter, a control voltage connection from the east transmitter to the balanced west modulator, and a control voltage connection from the west transmitter to the balanced east modulator.

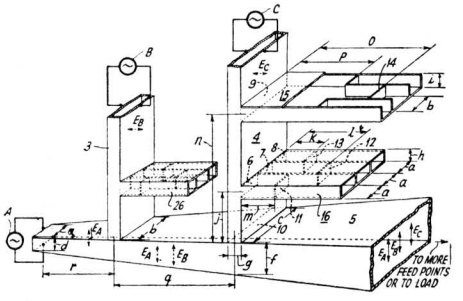
2,514,425
RADIO RELAYING
Leland E. Thompson, Merchantville, N. J., assignor to Radio Corporation of America, a corporation of Delaware
Application February 6, 1945, Serial No. 576.453
13 Claims. (Cl. 250—9)

1. The method of relaying a doubly angle modulated wave which includes subjecting the wave to a single angle demodulation so as to derive waves of single angle modulation, and utilizing



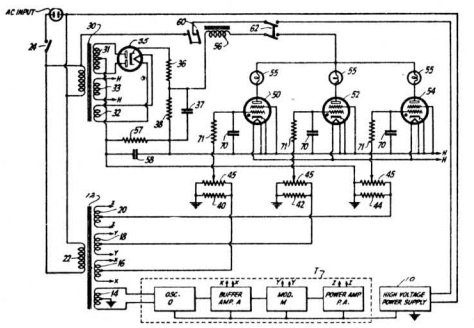
the latter to angle modulate a locally generated wave.

2,514,779
WAVE GUIDE SYSTEM
Charles A. Martin, Rocky Point, N. Y., assignor to Radio Corporation of America, a corporation of Delaware
Application May 14, 1947, Serial No. 748,058
14 Claims. (Cl. 178—44)



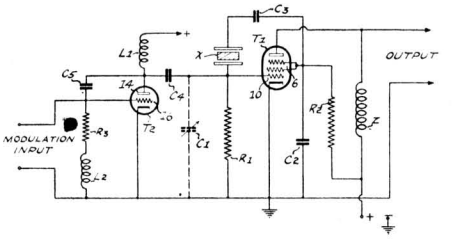
14. A wave guide system including a wave guide, a plurality of sources of high frequency energy of different frequencies coupled to said wave guide at spaced points along the longitudinal axis of said wave guide, said wave guide having dimensions transversely of said longitudinal axis between said spaced points at which energy from a source of lower frequency is prevented from flowing back over said wave guide toward a source of higher frequency.

2,514,863
MULTIPLE CIRCUIT BREAKER
George D. Hanchett, Jr., Millburn, N. J., assignor to Radio Corporation of America, a corporation of Delaware
Application December 6, 1947, Serial No. 790,060
12 Claims. (Cl. 250—17)



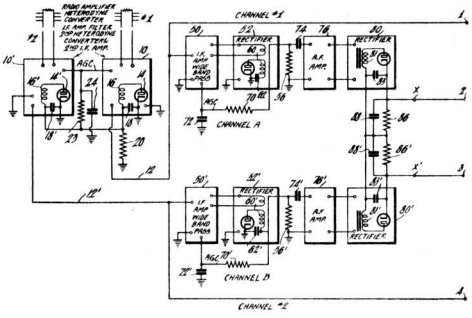
1. A circuit breaker arrangement including a number of resistors, one individual to each of a number of circuits to be protected, a gas discharge tube associated with each of said resistors, said tubes each having a control electrode and an anode, a connection from the control electrode of each of said tubes to its associated resistor and connections from said anodes through a common winding of a relay to a source of potential, said relay having normally closed back contacts connected between all of said circuits and another source of potential.

2,515,030
WAVE GENERATION AND CONTROL
Stanley M. Beleskas, Oaklyn, N. J., assignor to Radio Corporation of America, a corporation of Delaware
Application October 31, 1945, Serial No. 625,889
9 Claims. (Cl. 332—26)



1. In a wave generating circuit to be used with an electron control device having oscillation generating electrodes including an electron-emitting electrode, an electron-receiving electrode and a control electrode, a piezoelectric crystal regeneratively coupled substantially directly between said receiving electrode and said control electrode, a frequency-determining capacitor connecting said control electrode substantially directly to said emitting electrode, a frequency-determining capacitor connecting said receiving electrode substantially directly to said emitting electrode, the capacitance of at least one of said capacitors being variable in response to signals, means for applying direct operating potentials to the electrodes of said device, whereby sustained oscillations are generated, and signal-responsive means for varying the effective capacitance of said one capacitor to frequency modulate the oscillations generated.

2,515,055
DIVERSITY RECEIVER
Harold O. Peterson, Riverhead, N. Y., assignor to Radio Corporation of America, a corporation of Delaware
Application May 31, 1946, Serial No. 673,291
7 Claims. (Cl. 250—8)

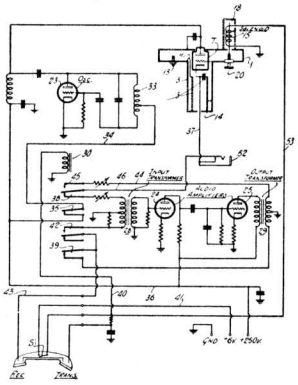


6. In apparatus for selecting that version of several versions of a signal, represented by currents the frequencies of which are modulated by signals and the amplitudes of which may vary at random, which has the least amplitude variation, a detector for the current of each version of said signal, a wide bandpass coupling for each detector for impressing the current versions on the respective detectors, a rectifier coupled to each detector for rectifying the detected currents, apparatus for comparing the intensities of the rectified currents, and apparatus coupled with said last named apparatus and actuated by the

resultant of the compared currents for selecting and putting to use that version of the signal having the least amplitude variation.

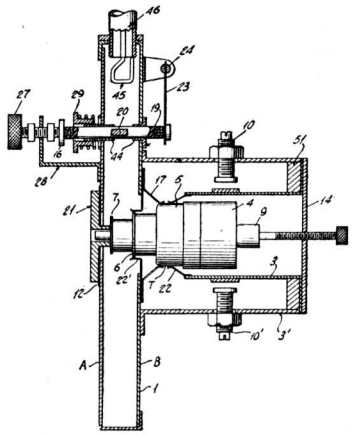
2,515,213
ULTRA HIGH FREQUENCY COMMUNICATION SYSTEM
De Witt R. Goddard and Kenneth G. MacLean, Riverhead, N. Y., assignors to Radio Corporation of America, a corporation of Delaware
Application May 20, 1943, Serial No. 487,722
19 Claims. (Cl. 250—13)

1. In combination, an ultra high frequency oscillator having a cavity resonator as a frequency determining element, means for operating said oscillator either as a transmitter or as a detector of signals, and separate means under



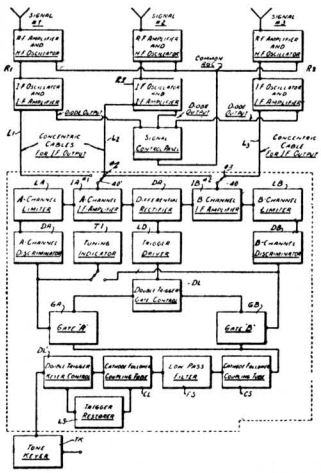
control of said first means for automatically changing the tuning of said cavity resonator by a predetermined amount when the function of said oscillator is changed.

2,515,225
TRANSCEIVER HAVING SWITCH CONTROLLED FREQUENCY COMPENSATOR
Paul F. G. Holst and Loren R. Kirkwood, Oaklyn, N. J., assignors to Radio Corporation of America, a corporation of Delaware
Application December 30, 1944, Serial No. 570,670
8 Claims. (Cl. 250—13)



8. The combination with an ultra high frequency oscillator having a resonant chamber for controlling the frequency of said oscillator, and a movable insert for said chamber, of means for operating said oscillator either as a transmitter or as a detector of signals, a relay having contacts under control of said first means for changing the position of said insert, said contacts and associated circuit means serving to change the operating condition of said combination as either a transmitter or a detector, and adjustable means for controlling the frequency of reception both above and below the frequency of transmission.

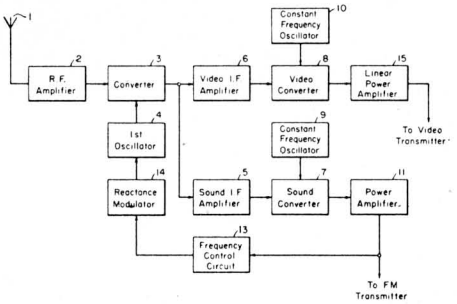
2,515,668
GATING CIRCUIT FOR DIVERSITY RECEIVERS
Robert E. Schock, John B. Atwood, Harold O. Peterson, and Grant E. Hansell, Riverhead, N. Y., assignors to Radio Corporation of America, a corporation of Delaware
Application December 5, 1945, Serial No. 632,978
14 Claims. (Cl. 250—8)



1. In signaling apparatus, in combination, a plurality of signal pick-up devices, means for comparing the relative strengths of the signals picked up and for producing a potential the polarity of which is positive or negative with respect to a reference level depending on which signal is strongest, an electronic valve for each pick-up device excited by the signal picked up by said device, means controlled by said potential and operating on said valves to make one thereof conductive to pass the strongest signal, an output circuit, a load impedance common to all of said valves, and a locking circuit, having two conditions of electrical stability and comprising a pair of intercoupled electrode structures, so arranged that the flow of current in one structure causes a cessation of current in the other structure, and vice versa, coupling said load impedance to said output circuit.

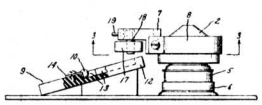
2,516,009
CONVERTER SYSTEM
Kent M. Mack, Baltimore, and Coleman J. Miller, Catonsville, Md., assignors to Westinghouse Electric Corporation, East Pittsburgh, Pa., a corporation of Pennsylvania
Application October 28, 1948, Serial No. 57,016
6 Claims. (Cl. 250—9)

2. A multi-signal radio relay station for relaying a prescribed number of radio signals comprising a broad-pass input circuit and a broad-pass frequency converter coupled to said input circuit, a single source of high frequency energy coupled to said input circuit, an intermediate frequency amplifier for the heterodyned frequency of each of said radio signals coupled to said frequency converter, second converter means coupled to each said intermediate frequency amplifier, means for injecting high frequency energy in each second converter, and a power amplifier coupled to the output of each converter, means for generating a frequency control potential coupled to one of said power amplifiers, and means



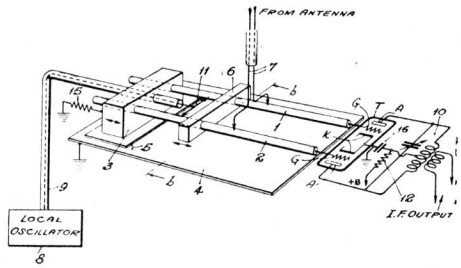
for impressing said potential on said source of high frequency energy to control the same and thereby stabilize the frequency of the output signal from the power amplifiers.

2,516,564
PROTECTIVE THERMOCONTROL DEVICE FOR ELECTRIC DISCHARGE DEVICES
Anatole M. Gurewitsch, Schenectady, N. Y., assignor to General Electric Company, a corporation of New York
Application December 17, 1949, Serial No. 133,617
7 Claims. (Cl. 315—112)



1. A protective device for an electric discharge device of the type having an external anode comprising a heat conducting plate in thermal relation with said anode, said plate having a cavity formed therein constructed to accommodate a separable contact member, switching means located adjacent said plate and electrically isolated therefrom, and a temperature responsive control arm in thermal relation with said plate and extending across the mouth of said cavity, said control arm being constructed to move out of the path of said cavity in response to a predetermined temperature variation of said plate to release a separable contact member placed within said cavity to move out of said cavity to operate said switching means.

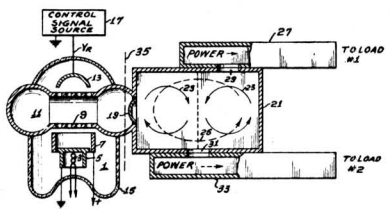
2,516,990
ULTRA HIGH FREQUENCY MIXER CIRCUITS
Edward W. Herold, Spring Lake, N. J., assignor to Radio Corporation of America, a corporation of Delaware
Application September 14, 1942, Serial No. 458,189
24 Claims. (Cl. 250—20)



1. An electron discharge device system comprising a pair of electrode structures, a transmission line circuit comprising a pair of parallel conductors connected to corresponding electrodes of said electrode structures, a short-circuiting element shunting said parallel conductors and adjustable over at least a portion of the lengths of said conductors, a metallic surface of zero radio frequency potential substantially equally spaced from said pair of parallel conductors, a conducting extension for said pair of conductors located beyond said short circuiting element, and a short-circuiting element connecting said extension to said surface and adjustable over a portion at least of said extension, said last short-circuiting element being located at a distance from said corresponding electrodes which is different from one-half wavelength or an integral multiple thereof at an operating frequency, whereby said pair of conductors form a balanced circuit for one resonance frequency and an unbalanced circuit relative to said surface for a different resonance frequency, and means for supplying high frequency energy to said last short-circuiting element.

2,517,731
MICROWAVE TRANSMISSION SYSTEM
Robert L. Sproull, Ithaca, N. Y., assignor to Radio Corporation of America, a corporation of Delaware
Application April 9, 1946, Serial No. 660,594
8 Claims. (Cl. 250—17)

1. An ultra-high frequency energy switching system for selectively connecting a source of energy to different load elements, said system including a cavity resonator coupled to said source and having at least two different longitudinal resonant modes, means for coupling one of said load elements to said resonator to extract energy



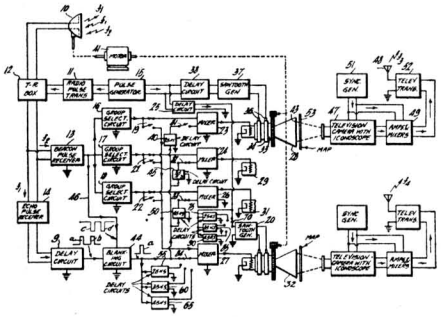
in one of said modes, means for coupling another of said load elements to said resonator to extract energy in another of said modes, and means for varying the frequency of said energy source to excite said resonator selectively in different ones of said modes.

2,517,752

RADIO NAVIGATION SYSTEM FOR AFFORDING SELECTIVE DISPLAY OF TRAFFIC INFORMATION

Irving Wolff, Princeton, N. J., assignor to Radio Corporation of America, a corporation of Delaware

Application October 31, 1945, Serial No. 625,913
6 Claims. (Cl. 343—5)



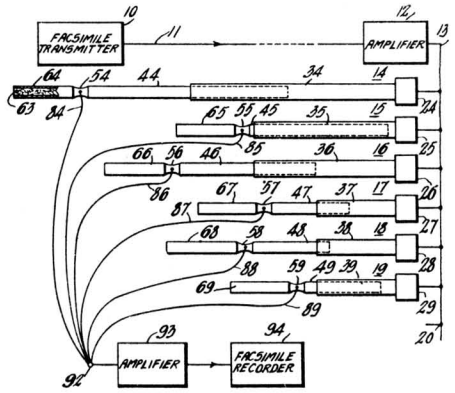
2. A search radar station comprising a pulse transmitter for transmitting radio pulses on a certain carrier frequency to all aircraft within the service area of said station including aircraft equipped with beacons for transmitting pulse signals on a different frequency in response to transmission thereto by said search station, said search station further comprising a beacon pulse receiver tuned to said different carrier frequency for receiving the beacon pulses produced in response to transmission by said pulse transmitter, an echo pulse receiver tuned to said certain carrier frequency for receiving echo pulses reflected from all of said aircraft, an indicator, an amplifier circuit connected to supply pulses from said echo receiver to said indicator, and means supplying beacon pulses from said beacon receiver to said amplifier circuit for making it ineffective to pass an echo pulse during the presence of a simultaneously occurring beacon pulse.

2,517,819

ELECTROACOUSTIC DELAY SYSTEM

Charles Jacob Young, Princeton, N. J., assignor to Radio Corporation of America, a corporation of Delaware

Application April 30, 1948, Serial No. 24,391
2 Claims. (Cl. 179—1)



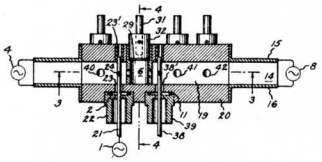
1. In an image transmission system in which image signals are transmitted over a communication channel which causes different delay times for different frequencies of the image signals, a receiving station for said image signal at the receiving end of said transmission channel, apparatus at said receiving station to compensate for the different delay times for different frequencies comprising a plurality of sound reproducers each tuned to a component of said image signals, a microphone for each sound reproducer, means connecting each sound reproducer to its associated microphone and providing a sound path of adjustable length therebetween, each of said path providing means being adjusted to provide a longer delay time locally for the less delayed image signal component and a minimum of local delay for the most delayed component of the image signal, and means for combining the output of said microphones to form the original image signal so that the sum of the line delay and the acoustic delay will be substantially the same for all of the components.

2,518,113

ULTRA HIGH FREQUENCY RECEIVER

Le Roy Apker, Niskayuna, N. Y., assignor to General Electric Company, a corporation of New York

Application June 23, 1945, Serial No. 601,124
5 Claims. (Cl. 250—20)



1. Apparatus for determining the frequency of an ultra high frequency wave comprising a metallic wave guide of the hollow pipe type, a pair of oscillators connected respectively to opposite ends of said guide for supplying thereto oscillations of a frequency substantially larger than the frequency of said wave, a pair of nonlinear devices connected across said guide at spaced points, filtering means comprising a cavity resonator positioned transverse said guide between said points, said resonator having apertures communicating with said guide on opposite sides of said resonator, means for supplying said wave to said guide on one side of said filtering means, and output means connected to said guide on the other side of said filtering means.

2,518,864

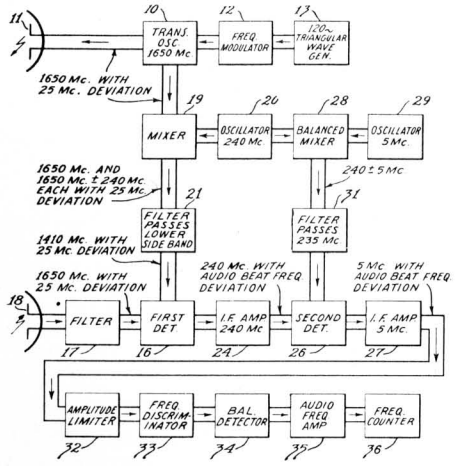
FREQUENCY MODULATION RADAR SYSTEM OF SUPERHETERODYNE TYPE WITH SUCCESSIVE INTERMEDIATE - FREQUENCY SIGNAL CONVERSIONS

Wendell L. Carlson, Princeton, N. J., assignor to Radio Corporation of America, a corporation of Delaware

Application March 9, 1946, Serial No. 653,259
5 Claims. (Cl. 343—14)

1. In a radio system for locating a reflecting object, a receiver including a first detector, transmitter means for producing a radio carrier wave signal, means for cyclically frequency modulating said carrier wave signal, means including a first oscillator for producing side band signals of said modulated radio wave signal, means for supplying one of said signals to said detector with said one

signal substantially undelayed, means for supplying another of said signals to said detector by way of radiation to said reflecting object and reflection back to said receiver whereby an intermediate-frequency signal is obtained, means including a second detector for converting said first intermediate-frequency signal to a second intermediate-frequency signal of comparatively low frequency,



said last converting means including a second oscillator and means for mixing its output signal with the output signal of the first oscillator for producing a heterodyning signal, and means for mixing in the second detector said heterodyning signal and said first intermediate-frequency signal, and means for discriminating against amplitude modulation of said second intermediate-frequency signal and converting said second intermediate frequency signal to a signal having a frequency that is a function of the distance to said reflecting object.

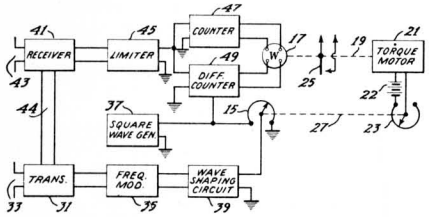
2,518,916

RADIO BOMB RELEASE SYSTEM

David G. C. Luck, Princeton, N. J., assignor to Radio Corporation of America, a corporation of Delaware

Application February 6, 1946, Serial No. 645,912

10 Claims. (Cl. 343—7)



1. In a radio bomb release system including means responsive to the slant range of a target from a bomber craft to provide an electrical output proportional to said slant range, and means responsive to the slant speed of said bomber with respect to said target to provide a second electrical output proportional to said slant speed, means for adjusting the proportionality of said first output to said slant range, means responsive to said adjusted first output and to said second output to produce a force proportional to the product of said adjusted first output by the difference of said adjusted first output and said second output, means providing a second force, and means responsive to equality of the magnitudes of said first and second forces to effect bomb release.

2,518,968

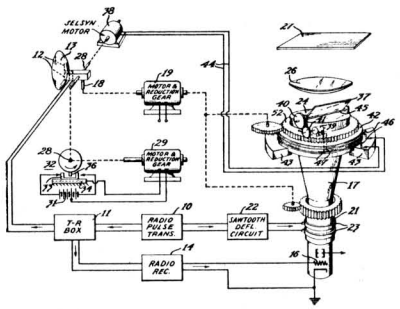
RADAR SYSTEM PROVIDING PLAN POSITION INDICATOR AND ELEVATION VIEWS

Irving Wolff, Princeton, N. J., assignor to Radio Corporation of America, a corporation of Delaware

Application March 27, 1946, Serial No. 657,419

5 Claims. (Cl. 343—11)

1. A radio locator system comprising a directive antenna having a directional radiation pattern, means for radiating radio energy from said antenna, means for scanning in elevation with said radiation, a cathode ray indicator tube having a short persistence luminescent screen and an electron gun for directing an electron beam against said screen and also having a control electrode for causing said electron beam to produce an indication in response to a signal being applied to said control electrode, means for receiving and demodulating said radio energy after reflection and for then applying the resulting signal to said control electrode, means for deflecting said electron beam along a time axis, a long persistence luminescent screen and means for projecting thereupon the view produced on



said short persistence screen whereby a picture containing distance information may be viewed on said long persistence screen, a partially reflecting and partially transmitting mirror pivotally mounted adjacent to said short persistence screen, and means for tilting said mirror about its pivot axis in synchronism with said scanning in elevation.

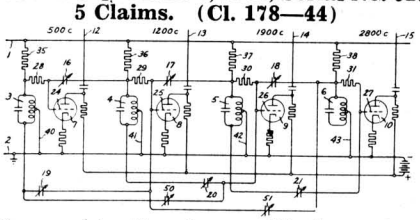
2,519,029

SELECTIVE SYSTEM

Robert B. Dome, Bridgeport, Conn., assignor to General Electric Company, a corporation of New York

Application September 7, 1945, Serial No. 615,030

5 Claims. (Cl. 178—44)



1. The combination, in a multi-channel system, a channel on which may appear oscillations of a

plurality of frequencies, a plurality of parallel-resonant circuits connected across said channel each tuned to a corresponding one of said frequencies, each tuned circuit having a decoupling resistance in series therewith, whereby oscillations of the frequency to which any tuned circuit is tuned appear thereon with large intensity and oscillations of another of said frequencies appear thereon with less intensity and in phase displaced from the phase of oscillations of the same frequency on said channel, an output electron discharge device having a grid circuit energized from each tuned circuit and arranged to respond to said oscillations of large intensity, each of said grid circuits including a series resistance, and means to prevent response of said output device to said oscillations of less intensity, said last means including reactive means to supply to the input of said output device oscillations of the frequency of said oscillations of less intensity from that other one of said circuits tuned to said frequency, said reactive means and said series resistance together forming a phase-shifting network arranged to supply oscillations from said other circuit in phase to oppose said oscillations of less intensity.

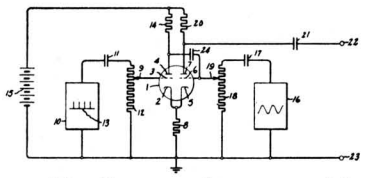
2,519,030

MIXER CIRCUIT

Robert B. Dome, Bridgeport, Conn., assignor to General Electric Company, a corporation of New York

Application October 29, 1946, Serial No. 706,447

3 Claims. (Cl. 250—27)



1. In combination, a mixer comprising a pair of electron discharge devices, each comprising an anode, a cathode, and a control electrode, said cathodes being connected through a common resistance to a point of fixed potential, a pair of sources of signals of variable intensity connected respectively between said point and respective ones of said control electrodes, whereby undesired capacitance between one of said control electrodes and its associated cathode causes a potential of said one electrode to vary undesirably with variation in the intensity of signals supplied to the other of said control electrodes, and means comprising a capacitance connected between said one electrode and the anode associated with said other electrode for neutralizing said undesired capacitance.

2,519,057

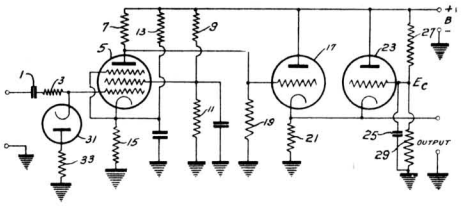
AMPLITUDE LIMITER CIRCUITS

David G. C. Luck, Princeton, N. J., assignor to Radio Corporation of America, a corporation of Delaware

Application July 25, 1946, Serial No. 686,182

4 Claims. (Cl. 178—44)

4. In a voltage limiter system, a pair of electron discharge tubes each including at least an anode, a cathode, and a control grid; a source of anode supply voltage with its positive terminal connected directly to both of said anodes, a common load resistor connected from both of said cathodes to the negative terminal of said source; means for applying a signal including an A.-C. component between one of said control grids and said negative terminal; means for deriving an output signal from across at least a portion of said



common load resistor; and means for biassing said other control grid to a potential substantially positive with respect to the minimum peak value of said first-mentioned signal and substantially negative with respect to the average value of said signal.

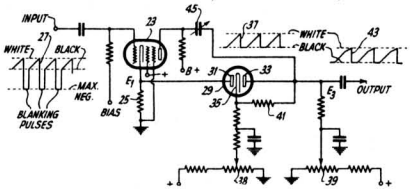
2,519,238

BIASED DIODE WAVE SHAPING CIRCUIT

Vernon J. Duke, Rockville Centre, and Elmer D. Goodale, New Rochelle, N. Y., assignors to Radio Corporation of America, a corporation of Delaware

Application April 5, 1947, Serial No. 739,636

11 Claims. (Cl. 178—44)



1. A signal wave shaping circuit comprising in combination a source of push-pull signal waves, a serially connected rectifying element connected to one side of said source of signal waves, said rectifying element having a resistance element connected in parallel therewith, means for applying a predetermined bias potential across said rectifying element, and a neutralizing condenser having substantially the same capacity as the capacity of said rectifying element, said neutralizing condenser connected between the load terminal of said rectifying element and the side of said push-pull source of signal waves other than the side to which is connected said rectifying element.

2,520,220

ELECTRON DISCHARGE DEVICE AND ASSOCIATED CAVITY RESONATOR

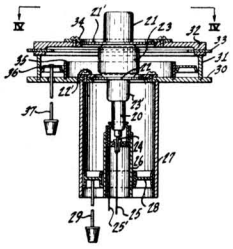
Leon S. Nergaard, Princeton, N. J., assignor to Radio Corporation of America, a corporation of Delaware

Application January 24, 1945, Serial No. 574,283

18 Claims. (Cl. 315—39)

1. An electron discharge device having a cathode, grid and an anode, a coaxial line resonator coupled between said grid and said cathode, and means extending between the walls of said resonator for tuning said resonator, and a drum-shaped second resonator coupled between said grid and anode and having a surface of revolu-

tion and having wall portions of different diameter surrounding a portion of said electron discharge device, the ends of said electron discharge device extending beyond the ends of said drum-shaped resonator, and movable means contacting the walls of said second resonator for varying



the effective axial length of one of said wall portions to vary the resonant frequency of said second resonator, both of said wall portions of said second resonator being spaced laterally from said electron discharge device.

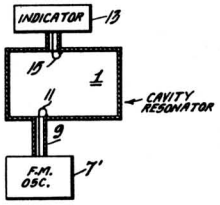
2,520,602

MICROWAVE MODE CHANGER AND INTEGRATOR

Ernest G. Linder, Princeton, N. J., assignor to Radio Corporation of America, a corporation of Delaware

Original application April 30, 1947, Serial No. 745,029. Divided and this application February 27, 1948, Serial No. 11,483

3 Claims. (Cl. 175—183)



1. In combination, a cavity resonator having at least one internal dimension exceeding a wavelength at an operating microwave frequency, means for introducing frequency-modulated microwaves into said resonator to provide rapidly varying microwave moding therein, and a wave detector coupled into said resonator, said detector having a time constant substantially greater than the period of variation of microwave moding in said resonator to provide detected signals characteristic of the integrated value of signals of a plurality of said modes in said resonator.

2,520,603

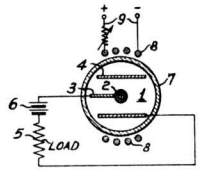
METHOD OF AND MEANS FOR UTILIZING CHARGED-PARTICLE RADIATION

Ernest G. Linder, Princeton, N. J., assignor to Radio Corporation of America, a corporation of Delaware

Application September 25, 1948, Serial No. 51,206

13 Claims. (Cl. 171—330)

1. The method of utilizing a source of radioactive charged-particle radiation for creating an electron beam comprising: exposing to said radiation a secondary-emission charged-particle radiation responsive material in a confined gaseous medium, subjecting said source and secondary particles to a magnetic field to deflect said source particles against said material at oblique angles and to deflect said secondary particles successively against said material to provide further secondary emission particles and to extend the paths of said secondary particles beyond the mean free path for ionization by collision with the molecules of the medium to provide further particles, and impressing on said medium an electrostatic field to accelerate said particles into a beam.



5. Apparatus for creating a charged-particle beam including: a radioactive source providing charged-particle emission, means disposed in a region adjacent said source that are secondary-emission charged-particle radiation responsive to said source, said source and said responsive means being disposed in a confined gaseous medium, means for impressing a magnetic field on said source particles to deflect said source particles against said responsive means at oblique angles and to deflect said secondary particles successively against said material to provide further secondary emission particles and to extend the paths of said secondary particles beyond the mean free path for ionization by collision with the molecules of the medium to provide further secondary charged particles, and means for accelerating said particles into a particle beam.

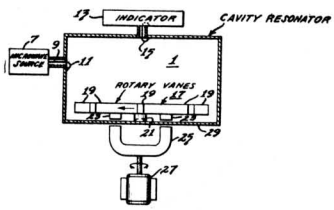
2,520,604

MICROWAVE MODE CHANGER AND INTEGRATOR

Ernest G. Linder, Princeton, N. J., assignor to Radio Corporation of America, a corporation of Delaware

Application April 30, 1947, Serial No. 745,029

6 Claims. (Cl. 178—44)



1. In combination, a cavity resonator including a movable element enclosed therein, the proportions of said element and its rate and path of motion providing variation of microwave moding in said resonator with substantially no variation in the tuning of said resonator, means for varying continuously the position of said element within said resonator, and an output circuit coupled into said resonator, said circuit having a time constant substantially greater than the period of variation of microwave moding in said resonator to provide output signal energy characteristic of the integrated value of signal energy of a plurality of modes in said resonator.

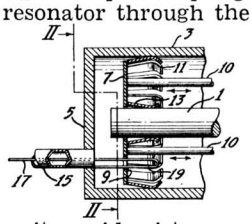
2,520,614

VARIABLE COUPLING DEVICE

Robert L. Sproull, Princeton, N. J., assignor to Radio Corporation of America, a corporation of Delaware

Application February 26, 1946, Serial No. 650,369
2 Claims. (Cl. 178—44)

1. A constant coupling wide-frequency-band tunable microwave resonator including a coaxial line section, means including a movable piston having an aperture therethrough disposed within and substantially conforming to said section and comprising with said line section said tunable resonator, and a U-shaped coupling loop extending into said resonator through the wall of said



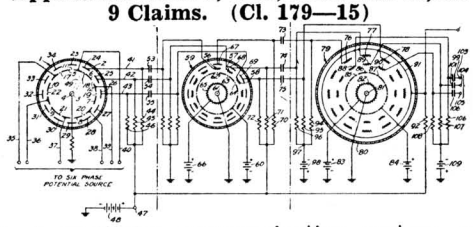
resonator opposite said piston and having a U-shaped portion of said loop extending through said aperture in said piston for microwave coupling to said resonator, whereby adjustment of said tuning piston varies the resonant frequency of said resonator and the coupling coefficient to said resonator of said coupling loop in predetermined relative sense and degree.

2,521,229

ELECTRONIC TIME DIVISION CHANNEL SCANNING SYSTEM

Henry J. Koch, Belleville, N. J., assignor to National Union Radio Corporation, Orange, N. J., a corporation of Delaware

Application June 8, 1949, Serial No. 97,792
9 Claims. (Cl. 179—15)



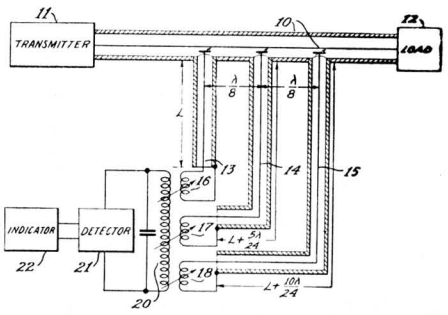
1. A multiplex communication system, comprising, an electron tube having a central electron-emitting cathode, a plurality of separate anodes concentrically surrounding the cathode, means to develop the electrons from the cathode into a beam originating at the cathode and terminating successively at said anodes, means to develop a beam-rotating field to cause said beam to sweep said anodes to develop regularly recurrent pulses at said anodes successively, means to derive from said regularly recurrent pulses another set of switching control pulses synchronized therewith another electron tube having a central electron-emitting cathode and a surrounding anode, a first set of separate grids surrounding the cathode of said other tube, a second set of separate grids in said other tube and surrounding the first set of grids and in radial alignment therewith, a plurality of signal input channels connected respectively to the grids of the first set, a single output channel connected to said anode of said second tube and means to apply said derived pulses respectively and recurrently to said second sets of grids to control successively the conductivity between each grid of the first set and said single anode.

2,522,563

STANDING WAVE DETECTOR

Daniel Blitz, Princeton, N. J., assignor to Radio Corporation of America, a corporation of Delaware

Application January 16, 1946, Serial No. 641,596
5 Claims. (Cl. 178—44)



5. In an electric energy transmitting system, the combination of a transmission line, a transmitter, a resistive load as a terminus of said line, said load being matched with the impedance of said line, a resonant circuit, a detector, two conducting lines connected to said transmission line one quarter of a wave length apart and coupled to said circuit to produce two signals from said transmitter 180° out of phase, the line nearer said transmitter having a length l and the other line having a length

$$l+\frac{\lambda}{4}$$

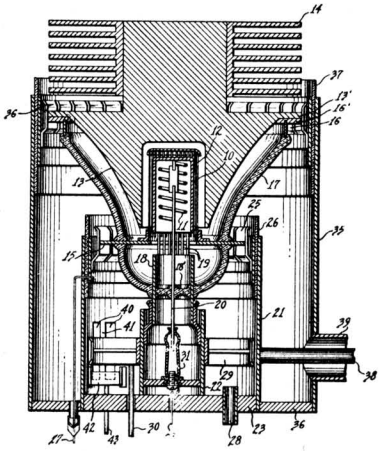
to form equal signal paths from said load, whereby a mismatched load causes said resonant circuit to operate said detector.

2,522,836

ELECTRON DISCHARGE DEVICE AND ASSOCIATED CAVITY RESONATOR CIRCUIT

Leon S. Nergaard, Princeton, N. J., assignor to Radio Corporation of America, a corporation of Delaware

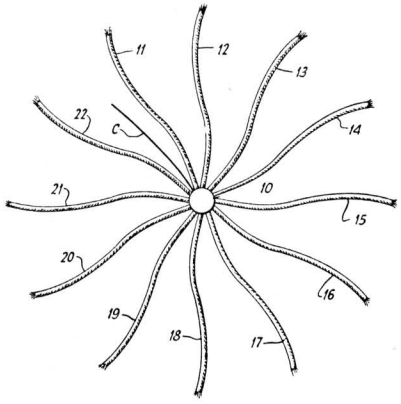
Application October 21, 1944, Serial No. 559,700
10 Claims. (Cl. 315—39)



1. An electron discharge device having a cathode, grid and anode, a cavity resonator coupled between said grid and cathode and a second cavity resonator coupled between said grid and anode, said resonators having a common wall,

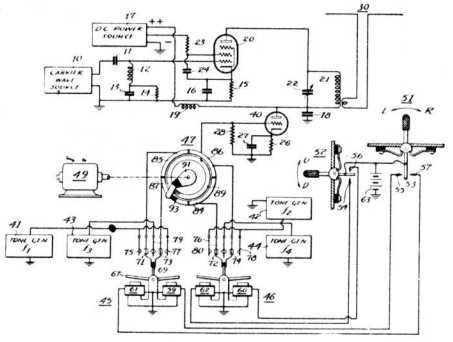
said wall having an aperture therein and a conductor extending across said aperture, and means slidably supported over said aperture for movement along said conductor for varying the size of said aperture and the effective length of said conductor to vary the coupling between said resonators.

2,522,879
GROUND SYSTEM
Nils E. Lindenblad, Port Jefferson, N. Y., assignor to Radio Corporation of America, a corporation of Delaware
Application August 24, 1946, Serial No. 692,891
1 Claim. (Cl. 174—6)



A portable ground system including a plurality of flexible conductors adapted to be laid on the surface of the ground in a star arrangement, each of said conductors comprising a heavy link chain covered with a woven conductive braid, all of said conductors being connected together at a central location and means for connecting transducer apparatus to said conductors.

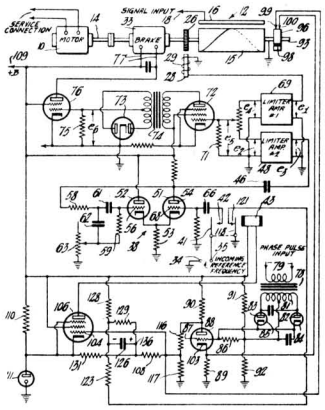
2,522,893
REMOTE-CONTROL SYSTEM
Ellison S. Purington, Gloucester, Mass., assignor, by mesne assignments, to Radio Corporation of America, New York, N. Y., a corporation of Delaware
Application April 5, 1945, Serial No. 586,781
10 Claims. (Cl. 250—2)



1. A remote control system comprising a plurality of alternating current regenerators, each productive of a different frequency, a radiant energy transmitter including means for modulating a carrier wave, means including a driven multiplex distributor and a keying device for automatically connecting selected ones of said generators in repeated sequences to said modulating means, said keying device including means to vary the sequence of the generator connections, a receiver comprising selective means for discriminating between the respective frequencies of the signals originated at said transmitter and detecting means for each of said different frequencies coupled to said discriminating means for producing voltages corresponding in time sequence to the sequence of modulation of said carrier wave by the alternating currents, and phase displacing means in combination with detecting means for combining said voltages to produce a chosen remote control effect.

2,522,919
FACSIMILE PHASING SYSTEM
Maurice Artzt, Princeton, N. J., assignor to Radio Corporation of America, a corporation of Delaware
Application January 27, 1948, Serial No. 4,581
3 Claims. (Cl. 178—69.5)

1. In a facsimile system, a scanner having a moving part to be operated co-phaseally with the moving part of another scanner, a variable speed driving motor for said moving part, a substantially constant frequency power source, means responsive to said power source to cause said motor to provide substantially constant speed, switching means operated by said motor, signal responsive means effectively in series with said switching means, a magnetic relay responsive to simultaneous closure of said switching

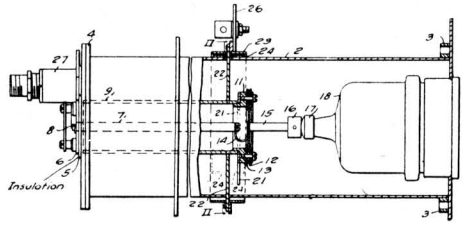


means and operation of said signal responsive means to alter the frequency of said source.

2,523,128
CAPACITATIVELY TUNED CONCENTRIC LINE RESONATOR
Angus A. Macdonald, Catonsville, and Roger E. Mathieu, Baltimore, Md., assignors to Westinghouse Electric Corporation, East Pittsburgh, Pa., a corporation of Pennsylvania
Application March 13, 1948, Serial No. 14,786
3 Claims. (Cl. 178—44)

1. A variable reactor of the concentric line type comprising a cylindrical sheath, a concentric tube within said sheath affixed thereto

by an end wall, capacitor-plates supported at one end of said tube, and cooperating capacitor-plates supported on an annular member engaging the exterior surface of said sheath and



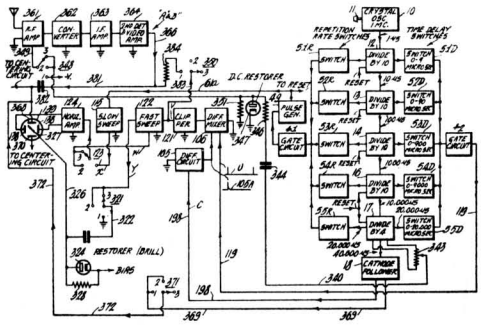
rotatable about the central axis thereof to vary the capacitance between said capacitor-plates.

2,523,244

NAVIGATION SYSTEM WITH COUNTER CIRCUITS FOR PULSE TIMING AND DELAY

John D. Woodward, Sewell, N. J., assignor to Radio Corporation of America, a corporation of Delaware

Application June 18, 1948, Serial No. 33,846
13 Claims. (Cl. 343—103)



1. Apparatus for determining the time interval between two time-spaced pulses, said apparatus including a pulse coincidence indicator, means comprising a chain of counters for producing an adjustably-delayed pulse, means for applying said delayed pulse to said coincidence indicator for bringing said two time-spaced pulses into coincidence, means comprising count-selecting means connected to said chain of counters for determining the amount of delay of said adjustably-delayed pulse, and means for indicating said time interval as a function of the adjustments of said count-selecting means.

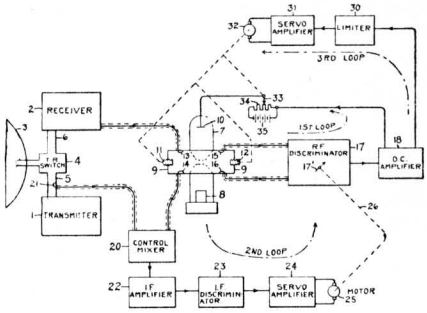
2,523,537

FREQUENCY CONTROL SYSTEM

Harry F. Mayer, Baldwinsville, N. Y., assignor to General Electric Company, a corporation of New York

Application May 21, 1949, Serial No. 94,613
6 Claims. (Cl. 343—13)

1. A frequency control apparatus for a radar system of the type including a transmitter, a superheterodyne receiver, and an oscillator supplying said receiver with a voltage of a local frequency for converting signals of the transmitted frequency to an intermediate frequency, said oscillator having a first and a second frequency control element and being adapted to respond quickly, over a narrow frequency range, to signals applied to said first element, and to respond



slowly, over a wide frequency range, to signals applied to said second element, comprising a first frequency control loop having a tuneable discriminator connected to said oscillator for providing a control voltage varying in accordance with the deviation of said local frequency from the center frequency of said discriminator and means for applying said control voltage as a signal to said first element, a second frequency control loop for varying the center frequency of said discriminator in accordance with the deviation of said intermediate frequency from a predetermined value, and a third frequency control loop operating from the control voltage from said discriminator to provide a signal to said second element, said third loop having a longer time constant than said first loop.

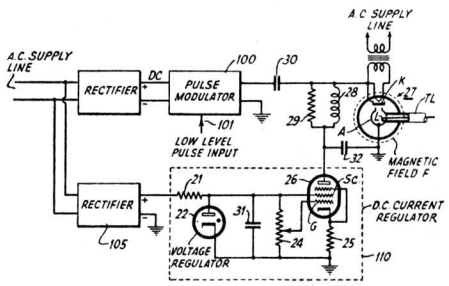
2,523,684

STABILIZED OSCILLATOR SYSTEM

Orville E. Dow, Port Jefferson, N. Y., assignor to Radio Corporation of America, a corporation of Delaware

Application July 13, 1946, Serial No. 683,295
13 Claims. (Cl. 250—36)

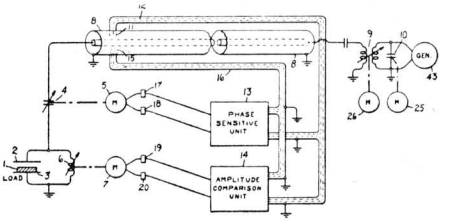
1. In combination, a magnetron having a cathode and an anode, a connection from said anode to ground, means for supplying pulses of negative polarity relative to ground to said cathode, a parallel combination of a resistor and an inductor having one terminal connected to said cathode and another terminal connected through a by-pass condenser to ground, a D. C. current regulator having a vacuum tube having an anode and a cathode, a lead from said last anode to said other terminal, and a resistor connecting the cathode of said vacuum tube to ground, whereby said D. C. current regulator is in series with the



D. C. path of said magnetron but not in series with the pulsed D. C. current.

2,523,791
AUTOMATIC TUNING SYSTEM
Julius Vahle and Paul D. Heath, Syracuse, N. Y., assignors to General Electric Company, a corporation of New York
Application November 26, 1948, Serial No. 62,173
8 Claims. (Cl. 219—47)

1. A tuning system for a load supplied with hign frequency energy by a transmission line, comprising means for deriving a signal proportional to and in phase with the voltage in said transmission line, means for deriving a signal proportional to and out of phase with the current in said transmission line, a variable reactance in series with said load, means utilizing said two signals for deriving the phase angle between the current and voltage in said transmission line, means responsive to said phase angle deriving means for varying said series reactance to adjust said phase angle to a preselected value, a variable reactance in parallel with said load, means for determining the ratio of transmission line



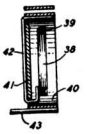
impedance to load impedance, and means responsive to said ratio determining means and operative simultaneously with said series reactance varying means for varying said parallel reactance to adjust said ratio to a predetermined value.

SECTION III. TUBES

III-A. Receiving.

2,515,337
METAL TO GLASS SEAL AND METHOD OF PRODUCING SAME
James E. Clark, Williston Park, Victor L. Ronci, New York, and John W. West, Jackson Heights, N. Y., assignors to Bell Telephone Laboratories, Incorporated, New York, N. Y., a corporation of New York
Application June 24, 1947, Serial No. 756,706
9 Claims. (Cl. 250—27.5)

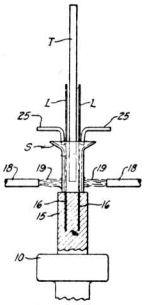
6. A shielded getter assembly for mounting in a discharge device and adapted to be heated by high frequency induction currents, comprising a closed hollow ring member containing a supply of vaporizable material, a metallic band shield of circular configuration surrounding said ring



member having the ends in overlapping and spaced relation to form an incomplete loop, a disc shield covering said ring member, and a wire support extending from said band shield and supporting said disc and ring member therefrom.

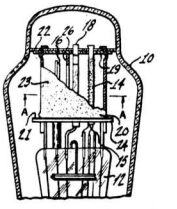
2,515,706
METHOD OF SEALING METAL TO GLASS
Alfred Greiner and Elliot Q. Adams, Cleveland Heights, Ohio, assignors to General Electric Company, a corporation of New York
Application October 16, 1943, Serial No. 506,530
2 Claims. (Cl. 49—81)

1. The step in the process of sealing wire of readily oxidizable refractory metal of the group consisting of tungsten and molybdenum and alloys thereof directly in a portion of a hard glass tube containing an easily reducible component and having an internal diameter many times larger than the diameter of the wire which comprises flowing carbon dioxide gas over the



surfaces of the wire and the glass tube while fusing them together.

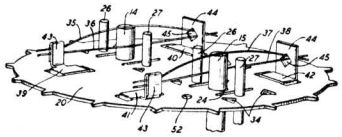
2,516,675
ELECTRODE STRUCTURE FOR GAS DISCHARGE DEVICES
Gerald G. Carne, Rockaway, N. J., assignor to Radio Corporation of America, a corporation of Delaware
Application February 5, 1947, Serial No. 726,608
3 Claims. (Cl. 250—27.5)



1. An electron discharge device comprising a sealed envelope, a gaseous medium within said envelope, an anode electrode mounted within said envelope, an electron emitting electrode

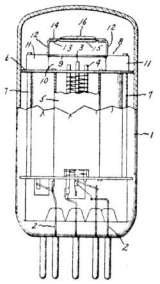
spaced within said envelope from said anode electrode, a non-emitting control electrode mounted between said anode and said electron emitting electrodes, a tubular metal shield within said envelope enclosing all of said electrodes, said shield having an apertured portion extending between said anode and said control electrode, said shield having a rough coating of nickel metal particles sintered to the outer surface thereof to minimize electron emission between any portion of said shield and said anode electrode.

2,518,308
ELECTRON DISCHARGE DEVICE UNIT MOUNTING
Warren Gronros, Basking Ridge, and Edmund A. Veazie, Summit, N. J., assignors to Bell Telephone Laboratories Incorporated, New York, N. Y., a corporation of New York
Application September 14, 1948, Serial No. 49,184
9 Claims. (Cl. 250—27.5)



1. An electron discharge device comprising an electrode mount including a sleeve cathode and spacer discs at opposite ends supporting said cathode, a pair of bowed spring members having intermediate portions engaging the side and end of said cathode, and anchoring clips on opposite sides of said cathode supporting said spring members on one of said spacer discs, one of said clips rigidly fixing one end of each of said spring members and the other having a retaining slot therein for said spring members.

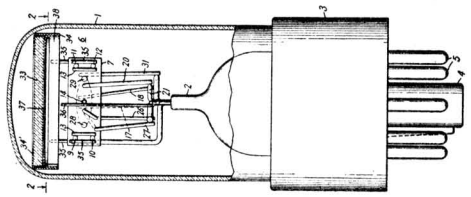
2,523,016
GETTER SUPPORTING STRUCTURE
Laszlo U. Hamvas, Schenectady, N. Y., assignor to General Electric Company, a corporation of New York
Application December 30, 1948, Serial No. 68,098
2 Claims. (Cl. 250—27.5)



1. In an evacuated electron discharge device of the type having a vitreous envelope enclosing a plurality of metallic elements, one of said metallic elements constituting an electrical shield for other of said elements, a pair of metallic arms secured to said one of said elements and positioned between said one element and said envelope, and a metallic getter holder connected to said arms and extending therebetween to form therewith and with said one element a short-circuited electrically conductive path, said arms forming paths of low thermal conductivity between said getter holder and said one of said elements.

III-B. Cathode Ray and Photo-Electric.

2,513,908
ELECTRIC DISCHARGE DEVICE OF THE INDICATOR TYPE
Francis M. Bailey, Scotia, N. Y., assignor to General Electric Company, a corporation of New York
Application July 24, 1945, Serial No. 606,830
11 Claims. (Cl. 250—27.5)

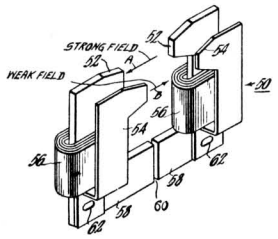


2. An electric discharge device comprising an elongated cathode, an anode spaced from said cathode and having an extended surface including a material which fluoresces when bombarded by electrons, a space charge electrode electrically insulated from said anode and interposed between said cathode and said anode, and a pair of elongated control electrodes mounted in end-to-end relation in a direction transverse with respect to the direction of the spacing between the anode and cathode and between said cathode and said space charge electrode.

2,515,305
ELECTROMAGNET
Joseph Kelar, Lancaster, Pa., assignor to Radio Corporation of America, a corporation of Delaware
Application January 24, 1946, Serial No. 643,095
8 Claims. (Cl. 175—21)

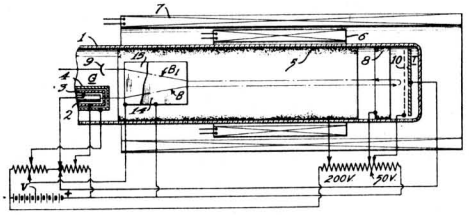
1. An electromagnet assembly comprising a pair of coils, a pair of core sections respectively passing through said pair of coils, one end of each core section of said pair being so designed that the two ends together form a pair of pole pieces for said assembly, the remaining ends of said pair of core sections being arranged to extend toward one another in such a manner as to es-

tablish an air gap therebetween, and a second pair of pole pieces for said assembly, said second



pair of pole pieces being respectively secured to the said remaining ends of said pair of core sections, and disposed to lie in a plane substantially parallel to the plane of the pole pieces formed by said one end of each core section of said pair.

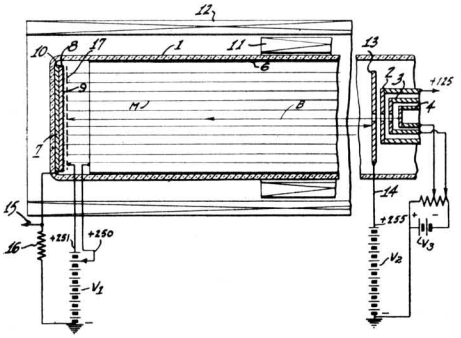
2,520,240
CATHODE-RAY TUBE
Leslie E. Flory, Princeton, N. J., assignor to Radio Corporation of America, a corporation of Delaware
Application September 5, 1946, Serial No. 695,015
3 Claims. (Cl. 315—11)



1. A television pick-up tube system, comprising an evacuated envelope containing a cathode ray beam gun having cathode, grid and anode electrodes, a target spaced from the gun, a fine mesh screen facing said gun adjacent said target and a second anode electrode for producing a field for accelerating electrons, means for producing a magnetic focusing field between the gun and the target and a voltage source connected to produce potentials at said electrodes, said target and said screen, the potentials produced at said target and said cathode being substantially the same and the voltage between said screen and said target producing throughout the space therebetween a decelerating field having electrostatic lines parallel to the magnetic lines of said focusing field.

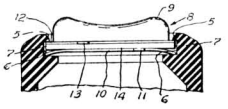
2,520,244
TELEVISION PICKUP TUBE
Harley A. Iams, Princeton, N. J., assignor to Radio Corporation of America, a corporation of Delaware
Application September 5, 1946, Serial No. 695,013
2 Claims. (Cl. 315—10)

1. A television pick-up tube system comprising an evacuated envelope containing a cathode ray beam gun having cathode, grid and anode electrodes, a target having a photo-sensitive surface, said target having substantially the potential of said cathode, a second anode electrode and a fine mesh screen between the second anode electrode and the target, said screen being sufficiently close to the target to prevent formation of ion spots at the center thereof, means for producing a uniform magnetic field between the gun and the target and a voltage source connected to said electrodes, said target and said screen to maintain accelerations of the beam electrons beyond said



second anode electrode and up to the plane of said screen and deceleration of the electrons substantially to zero velocity in the space between said screen and said target.

2,522,987
PHOTOELECTRIC CELL STRUCTURE INCORPORATING A LENS
Gaylord B. Buck, II, Cleveland Heights, Ohio, assignor to General Electric Company, a corporation of New York
Application August 7, 1947, Serial No. 767,207
2 Claims. (Cl. 88—23)



1. A light sensitive cell of the barrier layer type of rectangular shape and having a laminated structure including a rectangular shaped lens over its light sensitive surface, said lens being approximately 1.52 inches long and approximately 0.72 inch wide and the light receiving surface thereof having a transverse concave cylindrical center portion having a radius of approximately 1 inch and transverse convex cylindrical end portions having a radius of 0.25 inch.

2,523,005
METHOD OF STABILIZING PHOSPHORS
Herman C. Froelich, Cleveland Heights, Ohio, assignor to General Electric Company, a corporation of New York
No Drawing. Original application May 14, 1942, Serial No. 442,993. Divided and this application May 2, 1946, Serial No. 666,776
1 Claim. (Cl. 117—33.5)

A method of improving the brightness of a thermally synthesized luminescent composition of a metal silicate as matrix and divalent manganese as an activator, which method comprises. after application of the composition to the interior surface of an envelope and after heating to a temperature sufficient to burn out a binder for said composition, heating said composition in an atmosphere comprising hydrogen to reduce

to divalent form the higher valent superficial and uncombined manganese compounds to stabilize the resultant composition by causing the divalent manganese compounds so reduced to re-enter said matrix in solid solution.

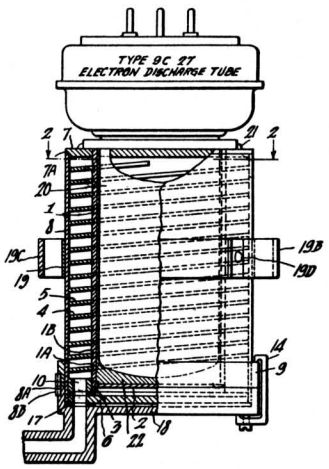
2,523,026
ALUMINA-BASED PHOSPHOR
Shannon Jones, East Cleveland, Ohio, assignor to General Electric Company, a corporation of New York
No Drawing. Application February 4, 1949, Serial No. 74,717
5 Claims. (Cl. 252—301.4)

4. An alumina-based phosphor consisting of the reaction product of firing at a temperature of about 1100–1400° C. about one mol of alumina, 0.1 to 0.75 mol of lithium oxide, 0 to 0.4 mol of silica and .0004 to .016 mol of ferric oxide.

III-C. Transmitting.

2,513,828
HEAT DISSIPATING JACKET
George L. Usselman and Lloyd L. Young, Port Jefferson, N. Y., assignors to Radio Corporation of America, a corporation of Delaware
Application August 28, 1947, Serial No. 771,008
3 Claims. (Cl. 250—27.5)

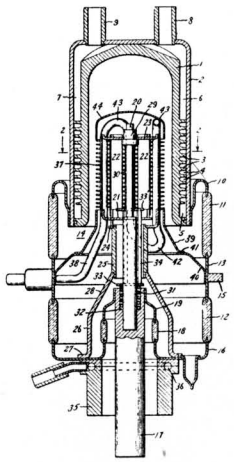
1. A fluid cooling system for an electron discharge device of the type having an external metallic anode, comprising two tubular metallic members concentrically arranged, one of said tubular members adapted to be soldered directly to the outside surface of the metallic anode of said electron discharge device, a double spiral fluid path arranged adjacent the anode of said electron discharge device and within said tubular members to provide adjacent ascending and descending fluid streams, metallic end closure members located at each end of said tubular members, and fluid inlet and outlet members located at



one end of said closure members and in fluid communication with said double spiral fluid path.

2,513,920
FLUID-COOLED ELECTRIC DISCHARGE DEVICE
Kenneth C. De Walt, Scotia, N. Y., assignor to General Electric Company, a corporation of New York
Application August 14, 1947, Serial No. 768,697
5 Claims. (Cl. 250—27.5)

1. A fluid-cooled grid electrode structure comprising a cylindrical conductive sleeve forming a portion of an envelope wall and providing an externally accessible grid terminal, a conductive structure supported from said sleeve including a second cylindrical sleeve of smaller diameter than said first-mentioned sleeve and positioned in coaxial relation with respect thereto, a conductive structure supported from said second sleeve and

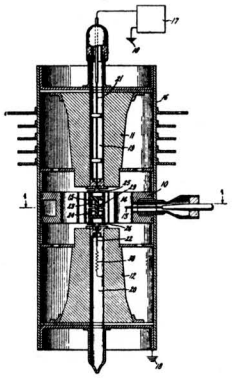


providing a cylindrical array of supports for a grid conductor, a grid conductor wound upon said supports, said conductive structure having passages provided therethrough for cooling fluid and conduits extending through said first-mentioned sleeve and communicating with said passages to provide externally accessible inlet and outlet fluid connections.

2,513,933
COLD CATHODE MAGNETRON
Anatole M. Gurewitsch, Schenectady, N. Y., assignor to General Electric Company, a corporation of New York
Application March 28, 1946, Serial No. 657,716
5 Claims. (Cl. 250—27.5)

1. An electron discharge device comprising a cathode of the cold emission type comprising

juxtaposed members electrically insulated from each other and forming a gap of high electric field intensity, an electrode in electron receiving relation to said cathode, means connected to said electrode and to one of said cathode members for applying an operating voltage between said electrode and one of said cathode members,



a relatively high impedance connecting said electrode to another of said cathode members whereby said operating voltage is applied to said impedance and said gap in series to induce an electrical discharge at said gap.

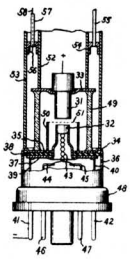
2,514,925

HIGH-FREQUENCY ELECTRIC DISCHARGE DEVICE AND SYSTEM THEREFOR

James E. Beggs, Schenectady, N. Y., assignor to General Electric Company, a corporation of New York

Original application November 9, 1942, Serial No. 464,998. Divided and this application March 12, 1947, Serial No. 734,082

28 Claims. (Cl. 315—39)



1. A high frequency resonant system comprising an hermetically sealed electric discharge device having a plurality of enclosed electrodes including an anode, a cathode, and a control grid, a transverse conductive member supporting said anode and constituting an externally accessible terminal therefor, a second transverse conductive member constituting an externally accessible high frequency terminal for said cathode and said grid, an insulating wall structure sealed between and positioning said conductive members in insulated spaced relation and defining therewith an enclosure for said electrodes, means within said enclosure supporting said grid between said anode and said cathode, said means connected at one end to said grid and at the other end to said second transverse conductive member, a dielectric hermetic seal between said cathode and said second conductive member, a portion of said cathode, said seal, and said second conductive member constituting a grid-cathode by-pass capacitor, and a pair of co-axial conductive cylinders having cylindrical walls directly abutting on said conductive members externally of said device and constituting an inter-electrode resonant cavity for said device.

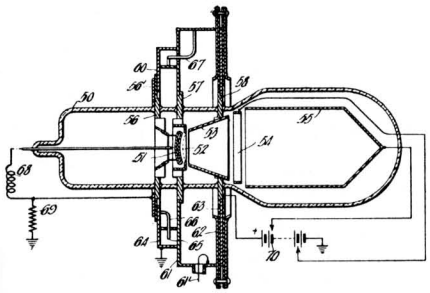
2,515,997

ELECTRON DISCHARGE DEVICE AND ASSOCIATED CIRCUITS

Andrew V. Haeff, Washington, D. C., assignor to Radio Corporation of America, a corporation of Delaware

Original application December 8, 1944, Serial No. 567,226. Divided and this application November 14, 1947, Serial No. 785,934

5 Claims. (Cl. 315—6)



1. An electron discharge device having an envelope containing a cathode having radially extending conducting and supporting means extending through the envelope, a grid electrode having radially extending conducting and supporting means extending externally of the envelope, an output electrode positioned adjacent the cathode having conducting means extending radially from the output electrode, all of said radially extending means being sealed through the wall of the envelope, and an electron collector, a cavity resonator having a wall including an element capacitively coupled to the wall of the cavity resonator, said element contacting the radially extending conducting means of said output electrode, said cavity resonator having a wall electrically connecting the cavity resonator to said grid conducting and supporting means, a cavity resonator connected to the grid and capacitively coupled to the cathode, and a transmission line electrically coupling said cavity resonators.

2,515,998

ELECTRON DISCHARGE DEVICE

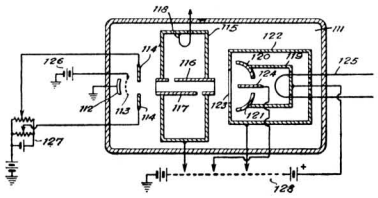
Andrew V. Haeff, Washington, D. C., assignor to Radio Corporation of America, a corporation of Delaware

Original application April 24, 1942, Serial No. 440,297, now Patent No. 2,433,044, dated December 23, 1947. Divided and this application November 19, 1947, Serial No. 786,905

4 Claims. (Cl. 315—5)

1. An electron discharge device having a cathode electrode means for providing a beam of electrons, a cavity resonator having oppositely disposed apertures through which the path of said beam lies, deflecting electrodes positioned within the cavity resonator and supported from and electrically connected to opposite walls of the

cavity resonator adjacent said apertures, whereby the path of said beam of electrons passes between said deflecting electrodes, and an output electrode system for receiving said beam of electrons



including a pair of oppositely disposed collectors between which said beam of electrons is deflected and a Lecher wire system connected to said collectors.

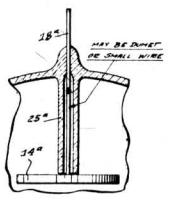
2,518,848

ELECTRODE SUPPORT

Jens J. Aakjer, Roselle, and William J. Knochel, East Orange, N. J., assignors to Westinghouse Electric Corporation, East Pittsburgh, Pa., a corporation of Pennsylvania

Application January 10, 1947, Serial No. 721,428
13 Claims. (Cl. 250—27.5)

9. An electrical device comprising a vitreous envelope, a vitreous tube with one end sealed thereto and extending inwardly therefrom, a relatively flexible lead with only small clearance in said tube, sealed through said envelope and tube at the point of union, and an electrode on the inner end of said lead, said tube at its inner end being formed with a portion having an interior



diameter closely corresponding with the diameter of said lead, whereby the support of said electrode is rigidified by said tube closely limiting movement of the encircled lead.

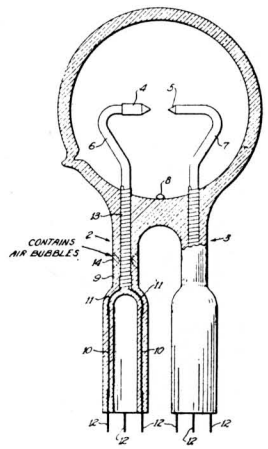
2,518,944

ELECTRIC DISCHARGE DEVICE SEAL

William Joseph Scott, Rugby, England, assignor to General Electric Company, a corporation of New York

Application February 2, 1949, Serial No. 74,146
In Great Britain February 13, 1948
5 Claims. (Cl. 250—27.5)

2. An electric discharge device designed for operation at elevated temperatures and comprising a quartz envelope, an ionizable gaseous atmosphere in said envelope capable of emitting electro-magnetic radiations when excited by an electric discharge and a stem protruding from said envelope comprising a conductor which oxidizes at elevated temperatures and a quartz tube hermetically united around said conductor with a portion of the conductor exposed to the outside atmosphere, an annular portion of said tube between said envelope and the portion thereof hermetically united with said conductor including



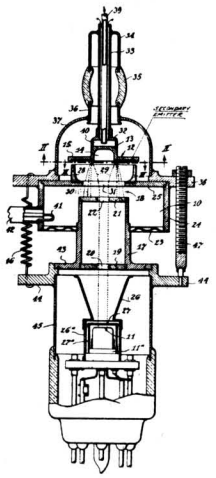
quartz containing air bubbles to substantially reduce the transmission of radiation along the stem and thereby minimize the oxidation of the exposed portion of said conductor.

2,518,954

ELECTRON DISCHARGE DEVICE

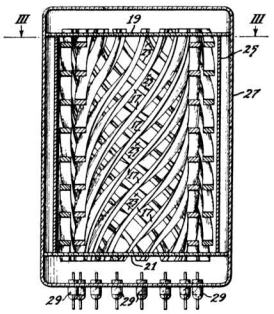
Howard L. Steele, Jr., Bloomfield, N. J., assignor to Westinghouse Electric Corporation, East Pittsburgh, Pa., a corporation of Pennsylvania

Application February 12, 1948, Serial No. 7,767
10 Claims. (Cl. 250—27.5)



1. An electron discharge device comprising a resonator, means adjacent said resonator for producing and passing primary electrons through said resonator, an opposed electrode at the opposite side of the resonator from said electron producing means, said electrode having a non-emissive area in line-of-sight from said electron producing means and having a secondary emitting surface outside of said line-of-sight, and electron deflecting means between said resonator and surface for deflecting primary electrons from the non-emissive area to the emissive surface of said electrode in approach of said electrons toward the said electrode.

2,519,172
CONTROL OF ELECTRON DISCHARGE DEVICE OF AREA SELECTION TYPE
George W. Brown, Cranbury, N. J., assignor to Radio Corporation of America, a corporation of Delaware
Application August 30, 1946, Serial No. 694,041
8 Claims. (Cl. 250—27.5)

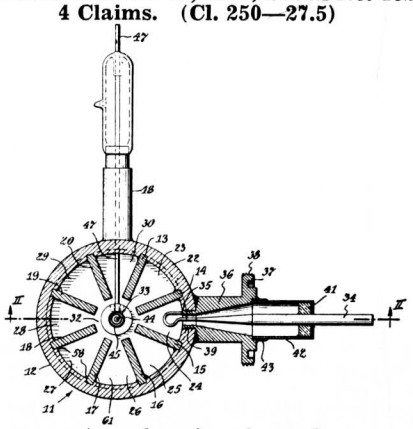


1. In an electron discharge device having a plurality of grid wires for controlling the passage of electrons between a selected pair of adjacent wires by the application of the same predetermined potential to said adjacent wires, a plurality of leads affording external connection to said grid wires, each lead being connected to more than one grid wire, there being n leads and

$$\frac{n(n-1)}{2}$$

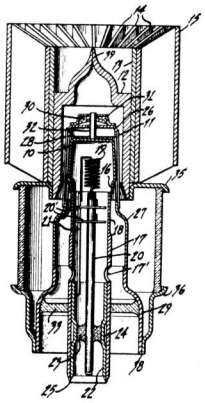
grid wires controlled thereby.

2,520,955
TRAPEZOIDAL CAVITY MAGNETRON
Ernest C. Okress and Ilia E. Mouromtseff, Montclair, N. J., assignors to Westinghouse Electric Corporation, East Pittsburgh, Pa., a corporation of Pennsylvania
Application October 15, 1942, Serial No. 462,132
4 Claims. (Cl. 250—27.5)



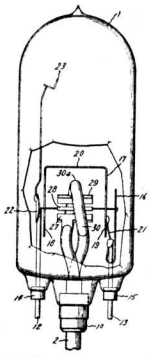
1. A magnetron housing formed as an outer generally cylindrical hollow conductive portion having longitudinal grooves from which flat sided partitions project inwardly defining a central cathode cavity communicating with chambers generally sector shaped in section on a plane perpendicular to the axis and disposed thereabout, a cathode assembly disposed in said cavity, leads from said cathode assembly projecting through said hollow cylindrical portion to outside of said housing, an output lead extending into said housing in a generally radial direction, curved backward and united to the inner surface of said housing, and a conductor casing in contact with and projecting from said housing and disposed coaxial with respect to said lead.

2,521,364
ELECTRON DISCHARGE DEVICE FOR HIGH FREQUENCY
Cecil E. Haller, Lititz, Pa., assignor to Radio Corporation of America, a corporation of Delaware
Application January 4, 1946, Serial No. 638,965
15 Claims. (Cl. 250—27.5)



1. An electron discharge device having an elongated hollow tubular cathode assembly closed at one end by an inverted cup-shaped cathode tapered inwardly toward its closed end, an elongated grid assembly positioned over said cathode assembly and coaxial therewith, said grid assembly including a cup-shaped grid tapered to conform to said cathode and positioned over said cup-shaped cathode and closely spaced therefrom, said grid assembly having a skirt-shaped conducting support of outwardly flared construction and a seal of insulating material extending between said cathode assembly and said skirt-shaped conducting support adjacent but spaced from the end of said skirt-shaped conducting support opposite said grid.

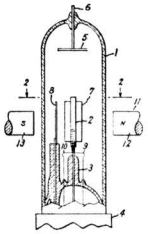
2,521,556
MAGNETRON
Donald A. Wilbur, Troy, N. Y., assignor to General Electric Company, a corporation of New York
Application November 20, 1946, Serial No. 710,962
19 Claims. (Cl. 250—27.5)



18. An electrical discharge device of the magnetron type comprising a spiral coil constituting

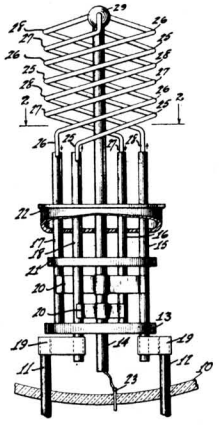
a resonant circuit, a cathode positioned within said spiral coil, and a plurality of electrodes positioned adjacent to the inner periphery of said spiral coil, each of said electrodes being conductively connected to a different point on said spiral coil.

2,522,209
MAGNETICALLY CONTROLLED ELECTRIC DISCHARGE DEVICE
James D. Cobine, Niskayuna, N. Y., assignor to General Electric Company, a corporation of New York
Application January 19, 1949, Serial No. 71,731
5 Claims. (Cl. 250—27.5)



1. An electric discharge device comprising a sealed envelope containing a gaseous medium and enclosing a longitudinally extending cathode, a plurality of signal anodes located in spaced relation around said cathode and an ionization maintaining anode spaced from said cathode and said signal anodes, input connections to said cathode and said ionization maintaining anode for supplying voltage therebetween to ionize said gaseous medium, and a rotating magnetic field producing means surrounding said envelope for providing a substantially uniform transverse magnetic field which rotates around said cathode through each signal anode consecutively to vary the electrical characteristics of said ionized gaseous medium between said cathode and said signal anodes.

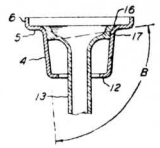
2,522,419
FILAMENT STRUCTURE
Arthur Kyle Wing, Jr., Nutley, N. J., assignor to Radio Corporation of America, a corporation of Delaware
Application October 19, 1946, Serial No. 704,355
8 Claims. (Cl. 250—27.5)



1. A filament structure for thermionic tubes comprising four substantially identical coaxial helices threaded one within the other with their turns juxtaposed and each having a turn lying substantially alongside a turn of a neighboring helix, a support rod extending through said helices, one end of said support rod being connected to adjacent ends to said helices, four inner leads of relatively large cross-section connected to the other ends of said helices for effectively supporting said helices and for providing good electrical connection thereto, alternate ones of said inner leads being connected electrically for providing current flow in the same direction in alternate ones of said helices, and two lead-ins connected to said inner leads whereby induction effects on each helix is neutralized and the current in the several helices is maintained substantially the same.

2,522,990
METHOD OF MAKING GLASS-TO-METAL SEALS
Paul O. Cartun, Cleveland Heights, Ohio, assignor to General Electric Company, a corporation of New York
Original application February 16, 1945, Serial No. 578,306. Divided and this application August 27, 1946, Serial No. 693,356
2 Claims. (Cl. 49—81)

1. The method of sealing a vitreous tube to an externally flanged, substantially cylindrical, open-ended metal cap which comprises flaring a vitreous tube at one end to a greater size than the cylindrical portion of said cap at its flanged end, inserting the flared tube through the cap, fusing and sealing the vitreous flare to the corner of the flange, and while said flare is thus soft, shifting said tube and flare into the cap away from

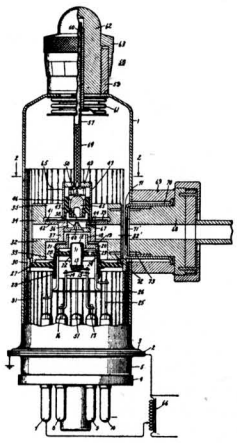


the flange and thus extending the seal of the flare over a wider zone of the cylindrical inner surface of the cap from which the exterior surface of the flare diverges at an angle greater than an acute angle.

2,523,031
TUNABLE ULTRA HIGH FREQUENCY TUBE WITH REFLECTOR ELECTRODE
James M. Lafferty, Schenectady, N. Y., assignor to General Electric Company, a corporation of New York
Application June 30, 1945, Serial No. 602,604
2 Claims. (Cl. 315—5)

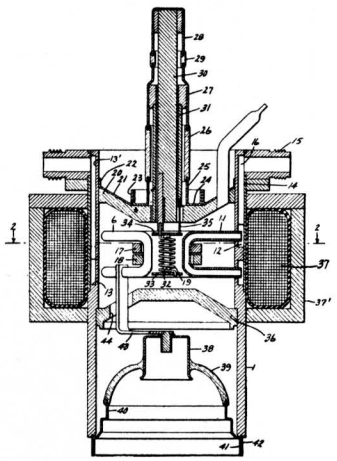
1. A high frequency electrical discharge device of the velocity modulation type comprising a cavity resonator including oppositely located walls one of which is movable, said walls each having an aperture therein, a reflecting electrode positioned opposite the aperture in said movable wall, a cathode located on the opposite side of said resonator opposite the aperture in the other of said walls, an envelope for said device enclosing said resonator, an operating member,

means connecting said operating member with said reflecting electrode and said movable wall to move said wall and reflecting electrode simultaneously, and means supported on said envelope and engaging said member for adjusting



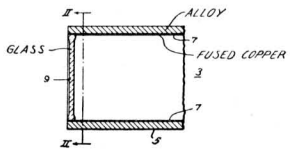
the position of said reflecting electrode and wall to control the operating frequency of said device.

2,523,049
WATER-COOLED MULTICIRCUIT MAGNETRON
Richard B. Nelson, Schenectady, N. Y., assignor to General Electric Company, a corporation of New York
Application October 2, 1946, Serial No. 700,758
11 Claims. (Cl. 315—40)



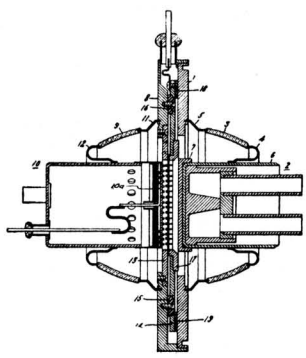
11. In an electric discharge device of the magnetron type comprising a generally cylindrical envelope, an anode structure supported within said envelope intermediate the ends thereof and including a plurality of circumferentially displaced resonator structures, a closure at one end of said envelope including a concentrically located terminal and a sealing member interposed between said terminal and the wall of said envelope and housed within said envelope, and a conductor coupling said central terminal with said anode structure and providing with the wall of said envelope a concentric transmission line section.

2,523,155
GLASS-TO-METAL SEALING
William E. Shoupp, Wilkinsburg, Pa., assignor to Westinghouse Electric Corporation, a corporation of Pennsylvania
Application May 24, 1944, Serial No. 537,022
17 Claims. (Cl. 178—44)



1. The method of producing a vacuum-tight seal between a copper coated alloy member and a boro-silicate glass, the alloy being comprised of approximately 30% nickel, 18% cobalt and the remainder iron, which includes heating the copper coated member in a hydrogen atmospnere to a temperature at which the copper becomes substantially fluid, and thereafter fusing the glass to the copper coated member.

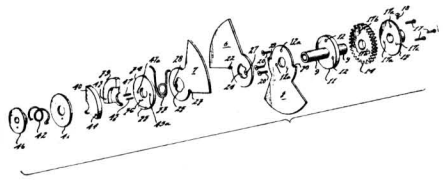
2,523,750
ELECTRIC DISCHARGE DEVICE CONSTRUCTION
Ralph J. Bondley, Scotia, N. Y., assignor to General Electric Company, a corporation of New York
Application October 1, 1947, Serial No. 777,349
10 Claims. (Cl. 250—27.5)



1. An electric discharge device comprising an envelope, a first grid member, a second grid member, said second grid member having a radially extending non-active portion said first grid member including structure surrounding substantially all the effective surface of the nonactive portion of said second grid member to form with said second grid member a capacitor.

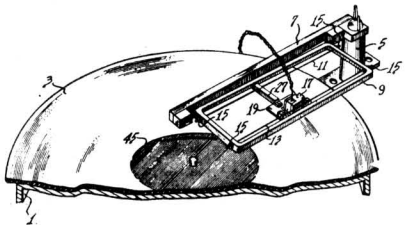
SECTION IV. SOUND AND SOUND-PICTURE RECORDING AND REPRODUCING APPARATUS

2,513,702
MULTIPLE BLADE LIGHT INTERRUPTING SHUTTER
Dallas R. Andrews, Collingswood, N. J., assignor to Radio Corporation of America, a corporation of Delaware
Application September 28, 1948, Serial No. 51,568
8 Claims. (Cl. 88—19.4)



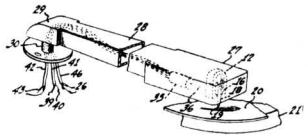
1. A shutter mechanism comprising a shaft, three blades on said shaft, one of said blades being fixedly attached to said shaft, means for separately and individually pivoting each of said other blades at points separated from the axis of said shaft and from each other and on axes parallel with the axis of said shaft, said two other blades being rotatable on said pivot points between a position 120° apart and an overlapping position, said shutter mechanism being in balance when said other two blades are in overlapping position and in a position 120° apart, and tensioning means between and contacting said shaft and said two blades for urging said blades to their position 120° apart.

2,515,273
SLIDABLY SUPPORTED PICKUP HEAD
René Snepvangers, Haddon Heights, N. J., assignor to Radio Corporation of America, a corporation of Delaware
Application October 31, 1944, Serial No. 561,244
16 Claims. (Cl. 274—13)



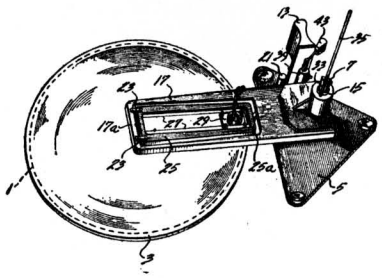
1. In phonographic apparatus, the combination of means for supporting a record in playing position, a pick-up device adapted to cooperate with said record, a relatively rigid frame member pivotally mounted at one side of said record support and movable to a position overlying said record, and a pair of parallel, yieldable guide members on said frame member slidably supporting said pick-up device for movement over said record.

2,516,338
FEEDBACK CONTROL SYSTEM FOR RECORDING CUTTERS AND THE LIKE
Harry F. Olson, Princeton, N. J., assignor to Radio Corporation of America, a corporation of Delaware
Application March 30, 1948, Serial No. 17,878
10 Claims. (Cl. 179—100.4)



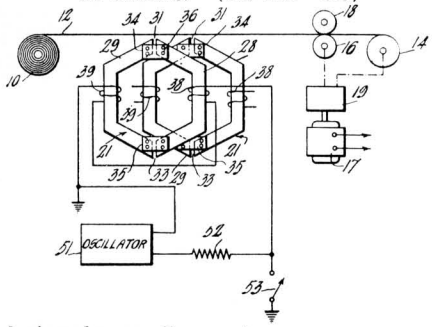
1. The combination with a recording device having a vibratory recording element, of an electronic variable resistance device having a vibratory control element of relatively low mass reactance mechanically connected directly with said recording element, an output circuit for said resistance device for deriving a voltage therefrom in response to operation of said control element by said recording element, a signal input circuit for said recording device and a feedback connection between said last named circuit and the output circuit for said variable resistance device.

2,516,534
TRANSDUCER SUPPORTING STRUCTURE
René Snepvangers, Haddon Heights, N. J., assignor to Radio Corporation of America, a corporation of Delaware
Application November 23, 1944, Serial No. 564,742
16 Claims. (Cl. 274—23)



16. A device for supporting a phonograph signal translating unit in operative relation to a phonograph record which comprises a base structure, a supporting member extending laterally from said base structure in one direction, a mounting member pivotally carried by said supporting member along an axis spaced from said base structure and extending from said axis in the opposite direction, said mounting member being at all times freely suspended at the end thereof which is remote from said axis, said supporting member being mounted for swinging movement in a plane normal to the plane of pivotal movement of said mounting member on said supporting member, and means on said mounting member for supporting said unit thereon.

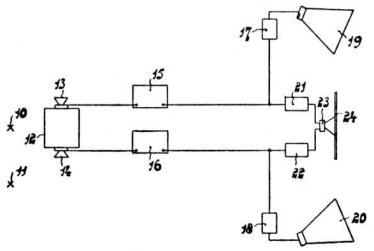
2,517,808
IMAGE RECORDING AND REPRODUCING APPARATUS
George C. Sziklai, Princeton, N. J., assignor to Radio Corporation of America, a corporation of Delaware
Application December 22, 1948, Serial No. 66,748
10 Claims. (Cl. 178—6.6)



1. A signal recording system comprising means for moving a recording medium of substantial width in a predetermined direction, a plurality of recording devices, means to position said devices substantially parallel to each other and progressively at an angle to the direction of movement of the recording medium for cooperation with the recording medium, an image signal source, and an electronic distributor for progressively distributing the image signal from said source to said devices whereby to distribute a record of said image signal in accordance with a predetermined pattern over at least a portion of the area of said recording medium.

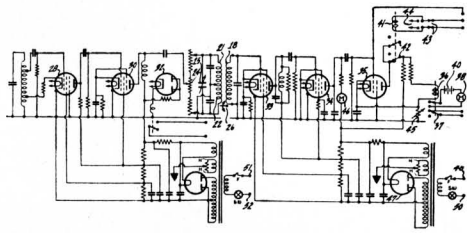
2,520,798
DEVICE FOR THE STEREOPHONIC TRANSMISSION OF SOUND
Kornelis de Boer, Eindhoven, Netherlands, assignor to Hartford National Bank and Trust Company, Hartford, Conn., as trustee
Application May 2, 1947, Serial No. 745,374
In the Netherlands November 27, 1940
Section 1, Public Law 690, August 8, 1946
Patent expires November 27, 1960
4 Claims. (Cl. 179—1)

1. A device for the stereophonic transmission of sound comprising a plurality of sound receivers, an acoustic obstacle separating said receivers, said obstacle having a diameter of at least 14 cms., a plurality of separate high-frequency range reproducing devices, a low-frequency range reproducing device arranged between at least two of said plurality of devices, means connecting one of said receivers with one of said plurality of devices and with said low-frequency range reproducing device, means connecting another of said receivers with another of said plurality of devices and with said low-frequency range reproducing device, and means in said connections for separating the high-frequency and low-frequency ranges at a point not higher than 1200 cycles/sec. and above 600 cycles/sec., whereby an excessive stereophonic action of the device as a whole is compensated for by the absence of stereophonic action for the low portion of the high-frequency range which shows stereophonic action.



SECTION V. MEASURING AND TESTING APPARATUS

2,513,745
METAL DETECTOR
James H. Reynolds, Indianapolis, Ind., assignor to Radio Corporation of America, a corporation of Delaware
Application December 13, 1944, Serial No. 568,045
9 Claims. (Cl. 175—183)

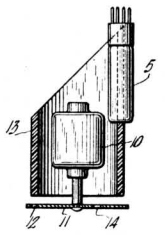


1. A system for detecting metal particles comprising the combination of an oscillation network including means for producing a magnetic field, a detector network including means responsive to said magnetic field, means for energizing said networks, said field-producing and said field-responsive means being adjusted in the absence of a particle to pass a predetermined voltage to said detector network, an indicator, and means in said detector network, responsive only to a signal impressed on said predetermined voltage by a metal particle moving to cause fluctuations of said magnetic field, to actuate said indicator.

2,514,619
STROBOSCOPIC DEVICE
Warren A. Anderson, West Brighton, N. Y., assignor to Radio Corporation of America, a corporation of Delaware
Application April 26, 1946, Serial No. 665,303
1 Claim. (Cl. 88—14)

Apparatus for producing a stroboscopic indication, comprising a translucent cylindrical-walled

member which transmits light in a directive manner, the base face of said member being normal to its axis and its other end face lying in a plane at an angle of substantially 45° to said axis, an apertured motor-driven disk mounted coaxially with respect to said member, covering its base face,



and having an aperture radially distant from the center of the disk an amount approximately equal to the mean radius of the cylinder so that through it the transmitted light may be observed, and means of the flashing lamp type situated within a recess in said other end of the cylinder and extending along the cylindrical wall of said member, the light being reflected from the 45° end face of the member to cause a ring of light to emerge from behind the circular orbit of said aperture.

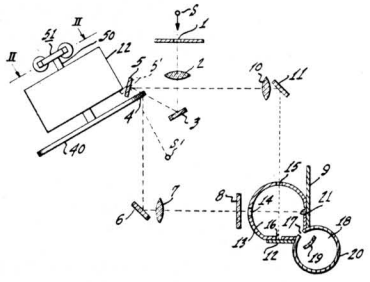
2,515,762

COMMUTATOR FOR SPECTROPHOTOMETER INDICATOR CIRCUIT

Glenn L. Dimmick, Haddon Heights, N. J., assignor to Radio Corporation of America, a corporation of Delaware

Application February 11, 1947, Serial No. 727,901
2 Claims. (Cl. 88—14)

1. In apparatus for indicating light values, including a device having a light sensitive element, said device being capable of producing an electrical current output proportional to the intensity of light received by said element, a rotatably mounted light chopper comprising a disc having on a surface thereof at least two reflecting portions spaced apart on the periphery of said surface such that closely spaced pulses of light are produced when said disc is rotated, said disc also having a light transmitting portion, means for rotating said light chopper at a predetermined rate, means for directing light to said light chopper, means for directing light reflected from said reflecting portions to said light sensitive element along a path including a test sample, means for directing light transmitted through said light transmitting portion to said element along another path, means for amplifying the current output



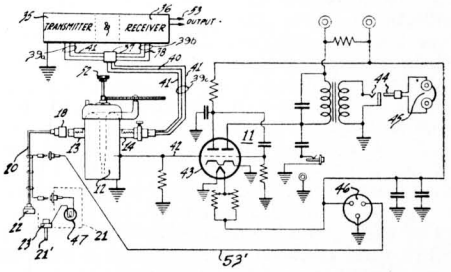
of said device, said amplifying means being adapted to pass a predetermined band of frequencies including the frequency of current output produced in said device by the light pulses received by said element from said reflecting portions, means for indicating the value of the current amplified by said amplifying means, circuit means associated with said amplifying means for setting the overall gain of said amplifying means in response to light directed to said element along said other path, and commutator means rotating in synchronism with said light chopper for applying the current output of said amplifying means to said indicating means only during the time light is being received by said element from said reflecting portions.

2,516,060

RADAR TEST-EQUIPMENT

Donald W. Levenson, Camden, N. J., assignor to Radio Corporation of America, a corporation of Delaware

Application May 21, 1946, Serial No. 671,199
2 Claims. (Cl. 343—5)



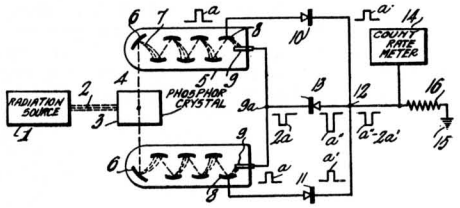
1. Apparatus for testing a pulse radar system of the type including a transmitter, a receiver and indicator to receive and indicate reception of reflected signals originating at said transmitter, an antenna, and coupling means coupling said antenna to said transmitter and to said receiver to radiate signals generated by said transmitter and to supply picked up signals to said receiver, said apparatus comprising a cavity resonator, an attenuator including a coupling element mounted on said resonator and extending a calibrated variable distance into the cavity of said resonator to apply determinable amounts of energy to and pick up determinable amounts of energy from said resonator, means to couple said attenuator to said transmitter and receiver to apply controllable amounts of energy from said transmitter to said resonator through said attenuator and to apply controllable amounts of energy from said resonator through said attenuator to said receiver to actuate said receiver and indicator whereby to obtain a measurement of the sensitivity of said receiver from the setting of said calibrated element, a fixed coupling element mounted on and extending into the cavity of said resonator to pick up energy from said resonator, and a detecting and indicating network connected to said fixed coupling element to indicate energization of said resonator and, hence, of said transmitter independently of and concurrently with operation of said receiver.

2,517,404

SCINTILLATION TYPE RADIATION DETECTOR AND COINCIDENCE CIRCUIT THEREFOR

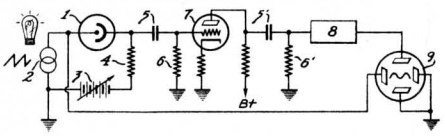
George A. Morton, Princeton, N. J., assignor to Radio Corporation of America, a corporation of Delaware

Application April 1, 1949, Serial No. 84,818
14 Claims. (Cl. 250—83.3)



1. In an electronic apparatus including a pair of electronic energy responsive devices, a plurality of non-linear resistive conductors, a pair of electron amplifiers and a third electronic energy responsive device, the method of energizing the said third responsive device only when said pair of devices are energized simultaneously comprising: dividing the outputs of said pair of amplifiers, passing one each of said divided outputs through respective non-linear resistive conductors, combining the others of said divided outputs in opposite polarity to said first-mentioned outputs, and passing the combined other outputs thereof through a third non-linear resistive conductor, combining the outputs of said conductors into a coincidence output and applying said coincidence output to said third responsive device.

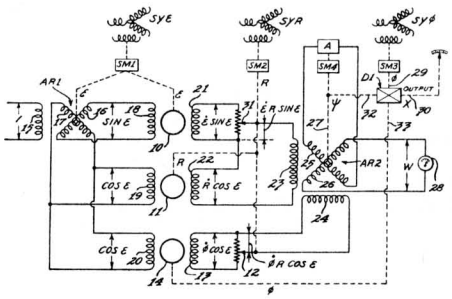
2,519,154
ELECTRONIC SPECTROSCOPE
Alfred C. Schroeder, Feasterville, Pa., and George C. Sziklai, Princeton, N. J., assignors to Radio Corporation of America, a corporation of Delaware
Application September 21, 1945, Serial No. 617,856
4 Claims. (Cl. 88—14)



1. The method of determining the color content of light which includes the steps of directing the unknown light of an electrically responsive photo-sensitive element, impressing a first voltage of a sawtooth wave form on said light-sensitive element, altering the rate of increase of different portions of said sawtooth voltage in accordance with the color sensitivity of said light-sensitive element to produce a second voltage having a wave form which is dependent on said color content, twice differentiating said second voltage, and impressing said differentiated voltage upon an indicating device which gives an indication of the color content of said light.

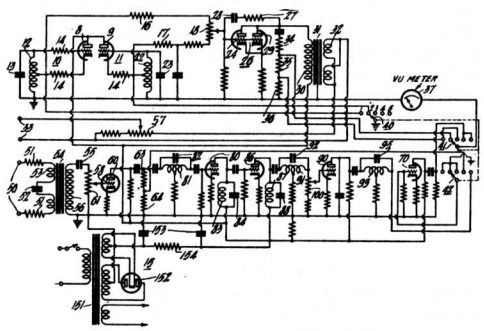
2,519,180
WIND DATA COMPUTER
William K. Ergen, Moorestown, N. J., assignor to Radio Corporation of America, a corporation of Delaware
Application June 14, 1947, Serial No. 754,737
4 Claims. (Cl. 235—61)

4. In a device for continuously producing an effect representative of the direction and velocity of wind in response to shaft positions representative of the slant range, elevation angle and azimuth angle of an object free to move in said wind, means to convert said elevation angle and slant range shaft positions into a first potential representative of the product of the differential of the elevation angle, the sine of the elevation angle and the slant range, means to convert said elevation angle and slant range shaft positions into a second potential representative of the product of the differential of the slant range and the cosine of the elevation angle, means to convert said elevation angle slant range and azimuth shaft positions into a third potential representative of the product of the differential



of the azimuth angle and the cosine of the elevation angle, an angle resolver having two stator windings disposed to provide fields in quadrature with each other and a rotor having two rotor windings disposed in quadrature with each other within said stator winding fields, means to impress on one of said stator windings the difference between said first and second potentials, means to impress said third potential on the other of said stator windings, means to position said rotor so that one of said rotor windings has no potential induced in it from said stator winding fields whereby the potential induced in the other of said rotor windings is representative of the wind velocity, and means to add the azimuth angle shaft position to the angular position of said rotor to provide a sum angle equal to the wind azimuth.

2,520,766
INTERMODULATION METER
Jarrett L. Hathaway, Manhasset, N. Y., assignor to Radio Corporation of America, a corporation of Delaware
Application June 18, 1947, Serial No. 755,503
13 Claims. (Cl. 179—171)

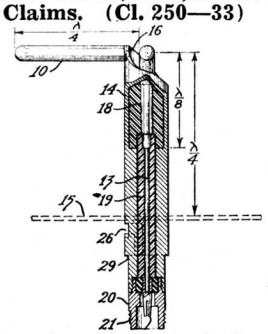


1. A distortion measuring instrument including a source of high frequency wave energy and a source of wave energy of lower frequency, means for combining predetermined amounts of energy from each of said sources, means for applying said combined energies to the input of a de-

vice under test, means adapted to be coupled to the output of said device and responsive only to wave energy frequencies in a narrow frequency range adjacent to and on both sides of said high frequency source, means for determining the amplitude of wave energy at the output of said wave responsive means, a filter network coupled to said wave responsive means for discriminating against wave energy of frequencies in a narrower frequency range adjacent to and including the frequency of said high frequency source and means for determining the ratio of wave energy at the output of said filter to the wave energy at the output of said wave responsive means.

SECTION VI. ANTENNAS

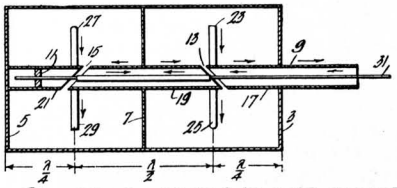
2,514,020
V-DIPOLE ANTENNA
Robert S. Wehner, Port Jefferson, N. Y., assignor to Radio Corporation of America, a corporation of Delaware
Application November 16, 1945, Serial No. 629,168
6 Claims. (Cl. 250—33)



3. A broad-band antenna including a pair of radiators lying in a V formation in a plane parallel to a conductive ground sheet and at a distance equal to one quarter of the operating wavelength therefrom, a coaxial supporting line extending from said ground sheet and having an outer shell conductor connected at the end remote from said ground sheet to one of said radiators and an inner conductor connected to the other radiator of the adjacent ends of said radiators, the transverse dimensions of said radiators having values at which a substantially constant input impedance is maintained over a wide band of operating frequencies with a low input capacity, the angle between said radiators having a value lying between ninety and one hundred degrees at which the effect of radiating currents on the outer surface of said supporting line is a minimum, the ratio of the inner diameter of said shell conductor to the diameter of said inner conductor being different for a distance of one-eighth wavelength near the outer end of said transmission line from the ratio over the rest of said line, the ratio of diameters having a value at which the impedance of the end of said transmission line is matched to the impedance of said antenna at the adjacent ends of the radiators.

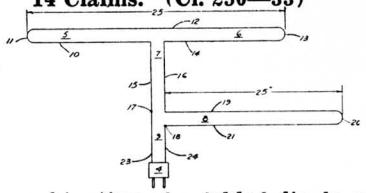
2,514,821
ANTENNA SYSTEM
Oakley M. Woodward, Jr., Princeton, N. J., assignor to Radio Corporation of America, a corporation of Delaware
Application September 29, 1945, Serial No. 619,401
8 Claims. (Cl. 250—33.65)

5. A radio antenna system including a transmission line comprising one continuous conductor and a second conductor parallel thereto and provided with a series of gaps spaced longitudinally thereof; a plurality of dipoles each disposed adjacent one of said gaps and each comprising two



radiator elements connected to said second conductor respectively on opposite sides of the respective gap, and a third conductor parallel to said line and connected to said second conductor at points midway between said gaps.

2,514,992
COMPACT TELEVISION RECEIVER ANTENNA
Charles R. Edelsohn, Cincinnati, Ohio, assignor to Avco Manufacturing Corporation, Cincinnati, Ohio, a corporation of Delaware
Application October 15, 1949, Serial No. 121,547
14 Claims. (Cl. 250—33)

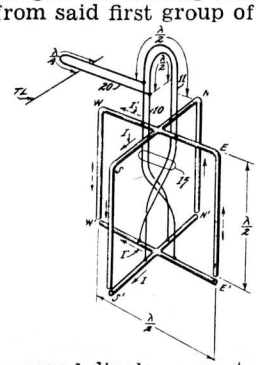


3. The combination of a folded dipole antenna broadly resonant throughout the upper standard television broadcast band extending from 174 to 216 megacycles, a two-conductor transmission line coupled in balance to said dipole, a pair of output terminals one of which is integral with one conductor of said line, and a closed-circuited section interposed between the other conductor and the other terminal, said section having an electrical length of one-half wave substantially at the center of said upper band.

2,516,706
ANTENNA SYSTEM
Edmund A. Laport, Glen Ridge, N. J., assignor to Radio Corporation of America, a corporation of Delaware
Application May 23, 1947, Serial No. 750,145
5 Claims. (Cl. 250—33)

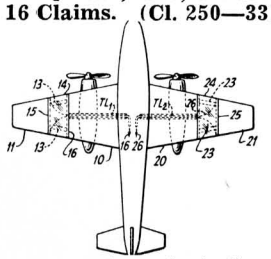
3. An antenna system including a vertical conductive mast, a group of dipole radiators arranged in cruxiform and supported on said mast, a second group of dipoles arranged in cruxiform and supported on said mast at a distance equal to a half of the operating wavelength from the first mentioned dipoles, means for feeding said first group of dipoles with radio frequency energy in

a phase quadrature relationship whereby a rotating horizontally polarized field is radiated, conductors arranged for feeding said second group of dipoles from said first group of dipoles, and a



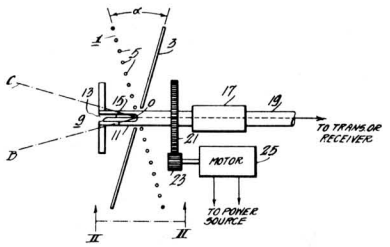
vertically arranged dipole connected to the outermost end of each of the dipoles of said first group whereby said vertically arranged dipoles radiate a vertically polarized rotating field.

2,518,843
AIRCRAFT ANTENNA
Robert S. Wehner, Port Jefferson, N. Y., assignor to Radio Corporation of America, a corporation of Delaware
Application April 25, 1947, Serial No. 743,962
16 Claims. (Cl. 250—33)



1. An antenna system including the wing structure of an airplane having a conductive outer surface extending over the wings thereof, each of said wings having a transverse electrical discontinuity thereacross forming electrically separate inboard and outboard portions of each wing, and means for applying high frequency energy across said discontinuities, the wingspread to operating wavelength ratio being more than 0.3.

2,522,562
ANTENNA SYSTEM
Daniel Blitz, Princeton, N. J., assignor to Radio Corporation of America, a corporation of Delaware
Application April 21, 1945, Serial No. 589,603
9 Claims. (Cl. 250—33.65)

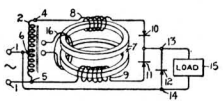


1. An antenna system comprising two reflectors each comprising a plurality of parallel conductors, and an antenna element, said element having, respectively with each reflector, a radiation pattern with a directive axis inclined at an angle with respect to the other said axis and intersecting therewith substantially at said element, the conductors of one reflector being arranged with the projections thereof in a plane normal to the bisector between said axes normal to those of the other reflector conductors in the same plane.

SECTION VIII. MISCELLANEOUS

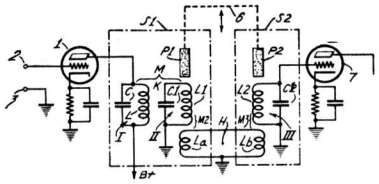
VII-A. Amplifiers.

2,516,563
MAGNETIC AMPLIFIER FOR INDUCTIVE LOADS
William L. O. Graves, Ballston Spa, N. Y., assignor to General Electric Company, a corporation of New York
Application April 19, 1948, Serial No. 21,784
3 Claims. (Cl. 321—43)



1. In a magnetic amplifier for producing amplified direct voltage variations across a load which correspond to changes in a D.-C. input signal, the combination of output terminals to which the load may be connected, A.-C. supply connections and rectifying means connected to the output terminals with the polarities arranged to permit unidirectional current flow through the load and to oppose current flow in the opposite direction, a saturable magnetic element having reactor windings connected in series with said A.-C. supply connections and rectifying means, input terminals, a signal winding on said magnetic element connected to said input terminals, and an additional rectifier connected in parallel with such load and having a polarity to oppose flow of such unidirectional current through said additional rectifier.

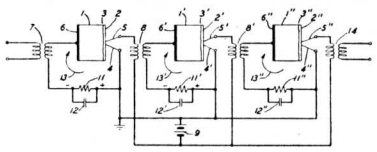
2,517,741
PERMEABILITY-TUNED VARIABLE-FREQUENCY AMPLIFIER
Ralph A. Varone, Audubon, N. J., assignor to Radio Corporation of America, a corporation of Delaware
Application June 21, 1945, Serial No. 600,728
7 Claims. (Cl. 179—171)



1. A tunable amplifier system coupled to a source of signals having a predetermined range of operating frequencies and providing substantially constant band-width and gain over said range of operating frequencies comprising a resonant circuit fixed-tuned to a frequency above the highest frequency of said range having a rising gain characteristic with tuning of the system to higher frequencies, a pair of coupled tunable circuits, at least one of which is coupled to the first resonant circuit, having a declining gain characteristic with tuning of the system to higher frequencies, and a pair of simultaneously adjustable ferro-magnetic cores for tuning said pair of circuits through said range of operating frequencies, and for progressively increasing the coefficient of coupling between said coupled circuits with tuning of said circuits to lower frequencies and vice-versa.

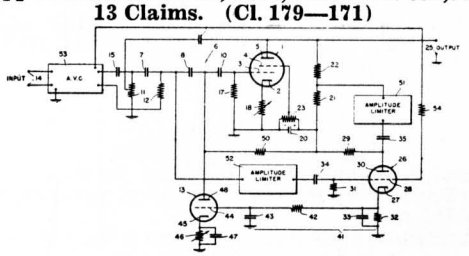
2,517,960
SELF-BIASED SOLID AMPLIFIER
Harold L. Barney, Madison, and Robert C. Mathes, Maplewood, N. J., assignors to Bell Telephone Laboratories, Incorporated, New York, N. Y., a corporation of New York
Application April 23, 1948, Serial No. 22,854
18 Claims. (Cl. 179—171)

1. The combination with an amplifier comprising a semiconductive body and at least three metallic electrodes making direct electrical contact with said body, signal input terminals connected with two of said electrodes and a potential source connected with one of said two electrodes and with a third electrode, of means for adjusting the bias potential of the other of said two electrodes which comprises a resistor connected



between said other electrode and a point whose potential is fixed by said potential source.

2,523,294
SELF-TUNING AMPLIFIER
Clyde E. Hallmark, Fort Wayne, Ind., assignor, by mesne assignments, to Farnsworth Research Corporation, a corporation of Indiana
Application March 16, 1946, Serial No. 654,948
13 Claims. (Cl. 179—171)



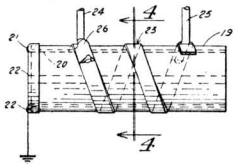
9. A self-tuning amplifier comprising a vacuum tube having input and output electrodes, a resistor capacitor network loosely coupled between said electrodes, said network providing a 180 degrees phase shift between said electrodes at a certain frequency, means for impressing an input wave on said input electrode, means for deriving an output wave from said output electrode, means for automatically adjusting the frequency for which said network provides a 180 degrees phase shift including a variable resistance tube forming part of said network, means including a phase comparator coupled to said electrodes for developing a control signal in response to changes of the phase difference between said input wave and said output wave, means for keeping substantially constant the amplitude of the waves fed to said phase comparator, and means for adjusting said variable resistance tube in accordance with said control signal to such a value as to shift the frequency for which said network introduces said 180 degrees phase shift to that of said input wave.

VII-B. Oscillators.

2,514,337
RADIO-FREQUENCY TANK CIRCUIT
John Drysdale Reid, Cincinnati, Ohio, assignor to Avco Manufacturing Corporation, Cincinnati, Ohio, a corporation of Delaware
Application January 11, 1949, Serial No. 70,332
1 Claim. (Cl. 250—36)

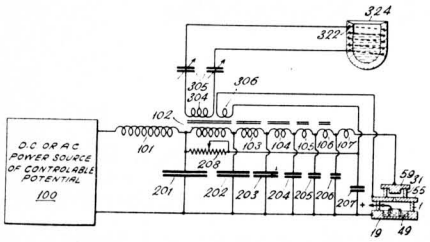
In a Colpitts oscillator the combination of an electron tube having anode and cathode and grid electrodes; a tank circuit unit comprising: a hollow dielectric tubular support member, a split metallic plate deposited on the interior of said support member, means for effectively connecting said plate to said cathode, an inductor wound on the exterior of said support member and including leads adapted to be coupled to said anode and grid electrodes, said plate and a portion of said inductor providing capacitance between said control electrode and said cathode, said plate and the remaining portion of said inductor providing

capacitance between said anode and said cathode, said inductor and said capacitances constituting



the frequency-determining circuit of said oscillator; and capacitive means for individually coupling said leads to said anode and grid electrodes.

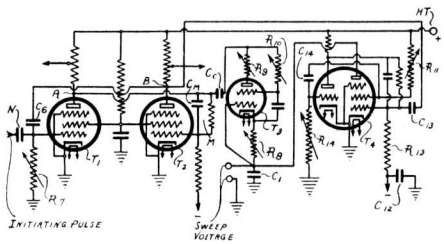
2,522,871
MERCURY ARC OSCILLATOR CIRCUITS
Clarence W. Hansell, Port Jefferson, N. Y., assignor to Radio Corporation of America, a corporation of Delaware
Application March 9, 1945, Serial No. 581,871
16 Claims. (Cl. 250—36)



2. A high frequency oscillator circuit including a tube having a gaseous discharge path between electrodes including a cathode, a barrier anode, and an anode, apparatus including a power supply source connected to said anode and cathode for causing the gaseous discharge path to be established and interrupted abruptly, an inductive load circuit coupled to said oscillator, and means for preventing the development of high peak potential impulses due to the effect of the sudden changes of current in said gaseous discharge path, including a capacitor connected between said anode and barrier anode and an inductor connected between said barrier anode and cathode, said capacitor absorbing said peak potential impulses and said inductor serving to discharge said capacitance during periods between said peak potential impulses.

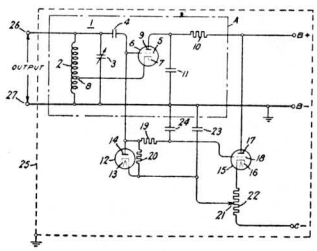
2,522,957
TRIANGULAR SIGNAL GENERATOR
William A. Miller, Port Jefferson Station, N. Y., assignor to Radio Corporation of America, a corporation of Delaware
Original application June 27, 1942, Serial No. 448,804. Divided and this application February 6, 1946, Serial No. 645,911
1 Claim. (Cl. 250—27)

A generator of non-sinusoidal waves comprising a charge storage element, a multivibrator circuit having one degree of freedom for producing flat top pulses in response to an input pulse, a constant current circuit connected between said storage element and one point on said multivibrator circuit at which said flat top pulses are adapted to appear, and another multivibrator circuit connected effectively in series with said storage element for discharging said storage element at a substantially uniform rate, said last



multivibrator circuit having an adjustable element associated therewith for controlling the rate of discharge.

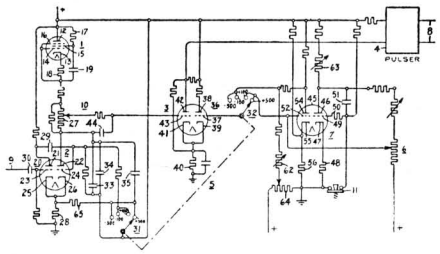
2,523,051
REGULATED OSCILLATOR
Donald E. Norgaard, Scotia, N. Y., assignor to General Electric Company, a corporation of New York
Application October 1, 1947, Serial No. 777,331
1 Claim. (Cl. 250—36)



In combination an oscillation generator comprising a frequency determining circuit, an electron discharge device comprising a control electrode, a feed-back connection between said circuit and said control electrode for sustaining oscillations in said generator, means for applying a unidirectional bias potential to said control electrode for controlling the amplitude of the oscillations comprising a rectifier, said rectifier comprising a cathode and an anode, a load impedance connected between said cathode and anode, a second electron discharge device comprising a cathode, an anode and a control grid, a filter network, means for connecting said rectifier anode to said control grid through said filter network, a source of negative unidirectional potential, a potentiometer connected between said electron discharge device cathode and through said source of negative potential to a point of reference potential, means for connecting said rectifier cathode to a tap on said potentiometer, a source of positive unidirectional potential, and means for connecting said electron discharge device anode through said positive potential source to said point of reference potential.

2,523,763
SWEEP GENERATOR
Don M. Jacob, Schenectady, N. Y., assignor to General Electric Company, a corporation of New York
Original application January 30, 1945, Serial No. 575,309. Divided and this application April 30,

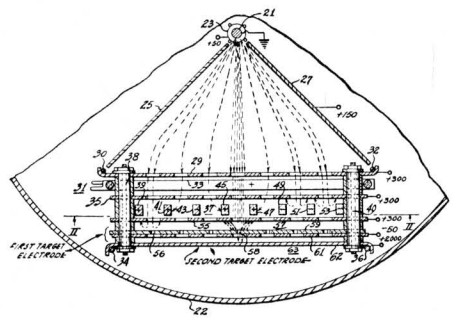
1948, Serial No. 24,151
9 Claims. (Cl. 250—36)



1. A sweep generator comprising a source of direct current potential, a capacitor, one side of said capacitor being connected to the positive terminal of said source of potential, an electron discharge device comprising a cathode, an anode and a control electrode, a resistor connected to said cathode, said control electrode being connected to an intermediate point on said resistor, and the anode-cathode path of said device and said resistor being connected in series across said capacitor, the anode of said device being connected to the positive terminal of said source, switching means connected between the other side of said capacitor and the negative terminal of said source of potential for causing said capacitor to charge when said switching means is electrically conductive and to discharge through said resistor and anode-cathode path when there is no electrically conductive circuit through said switching means whereby the potential on said other side of said capacitor rises substantially linearly thereby causing a change in potential of said resistor.

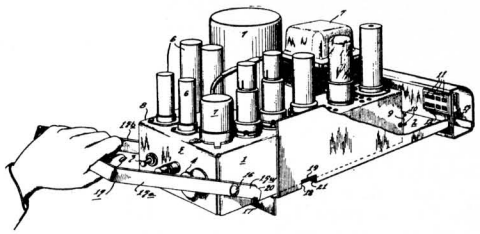
SECTION VII. CIRCUITS OF GENERAL APPLICATION

2,513,743
ELECTRON STORAGE DEVICE WITH GRID CONTROL ACTION
Jan A. Rajchman, Princeton, N. J., assignor to Radio Corporation of America, a corporation of Delaware
Application January 15, 1947, Serial No. 722,194
10 Claims. (Cl. 250—27.5)



1. In an electron storage system, the combination of an electron discharge device comprising a source of electrons; first and second target electrodes; a collector electrode adjacent said first target electrode; electrodal means for directing electrons from said source toward one or more distinct elemental areas of said first target electrode; electrode means and an input connection therefor for charging said elemental areas to either one of two predetermined potentials, one of said potentials being cathode potential and the other being the potential of said collector electrode; each of said elemental areas having an aperture therethrough for permitting electrons to pass through a given elemental area of said first target electrode and strike said second target electrode when said elemental area is under electron bombardment and is at collector potential.

2,514,246
RADIO CHASSIS OF THE PLUG-IN TYPE
Robert N. Knox, Erlton, N. J., assignor to Radio Corporation of America, a corporation of Delaware
Application September 30, 1947, Serial No. 777,020
1 Claim. (Cl. 175—298)

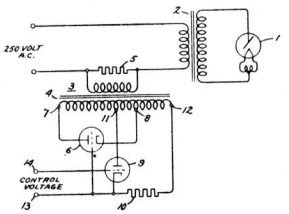


In combination a rectangular chassis, a shelf for supporting said chassis provided with an aperture spaced from its front edge, said chassis being removably mounted on said shelf, cooperating electrical contacts, one of said contacts being mounted on the rear face of said chassis and the other of said contacts being mounted at the rear of said shelf, a pivot on the side of said chassis spaced from its lower edge, a lever rotatably mounted on said pivot, said lever having a notch in one end thereof, said notch engaging the front edge of said aperture when said lever is rotated in one direction about its pivot, whereby continued movement of said lever in said direction forces said chassis into mounted position and said contacts into firm engagement, a cam surface on said lever opposite said notch, said surface engaging the back edge of said aperture when said lever is rotated in the opposite direction whereby continued movement of said lever in said opposite direction withdraws said chassis from mounted position and forces said contacts out of engagement.

2,514,667
MAGNETIC ALLOYS
Ethan A. Nesbitt, Chatham, N. J., assignor to Bell Telephone Laboratories, Incorporated, New York, N. Y., a corporation of New York
No Drawing. Application August 5, 1948, Serial No. 42,731
4 Claims. (Cl. 75—126)

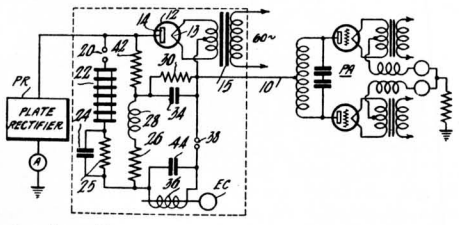
1. A permanent magnet alloy consisting of from 2 per cent to 10 per cent cobalt, from 14 per cent to 21 per cent molybdenum, and from 3 per cent to 6 per cent chromium, the remainder being iron except for incidental impurities.

2,514,935
VARIABLE IMPEDANCE APPARATUS
Charles W. Clapp, Scotia, N. Y., assignor to General Electric Company, a corporation of New York
Application August 12, 1949, Serial No. 110,005
4 Claims. (Cl. 323—86)



1. In combination, a circuit having in series connection a load, a source of alternating current and a primary winding of a transformer, and means for adjusting the impedance presented by said primary winding comprising a secondary winding of said transformer inductively coupled to said primary winding, an electron discharge device connected across a portion of said secondary winding, a voltage divider comprising a resistor and an auxiliary electron discharge device connected in series across another portion of said secondary winding, said first discharge device having a control electrode connected to the common connection of said auxiliary discharge device and said resistor, and a control voltage connected to the control electrode of said auxiliary discharge device to regulate the impedance connected to said secondary winding.

2,515,677
DIRECT CURRENT LIMITER AND COUNTER CIRCUIT
George L. Usselman, Port Jefferson, N. Y., assignor to Radio Corporation of America, a corporation of Delaware
Application May 23, 1947, Serial No. 750,109
8 Claims. (Cl. 235—92)



1. A circuit arrangement including a series protective device across which appear high potential pulses of short duration when short circuit currents flow through said device, at least one series spark gap coupled to said device, and adapted to break down when said pulses appear, and a condenser adapted to be charged by current flowing through said gap, a second normally charged condenser, a counter having an actuating coil coupled to said second condenser, and switching means connected in series with said first and second condensers and responsive to the appearance of said pulses to permit charging of said first condenser and thereby also to permit a discharge of said second condenser through said actuating coil to operate said counter.

2,515,800
PHONOGRAPH RECORD CONTAINING POLYVINYL ACETAL RESINS, ETHYL CELLULOSE, AND SOFT, LOW MELTING POINT RESINS
Edward M. Sadowski and Eugene D. O'Mahony, Indianapolis, Ind., assignors to Radio Corporation of America, a corporation of Delaware
No Drawing. Application August 1, 1946, Serial No. 687,712
5 Claims. (Cl. 260—17)

1. A phonograph disc record made up of a composition comprising a ratio of 3–10 percent ethyl cellulose, 0.5–5 percent of a polyvinyl resin from the class consisting of polyvinyl formal, polyvinyl acetal and polyvinyl butyral, 15–24 percent of the gasoline insoluble, aromatic hydrocarbon soluble resinous extract of pinewood, 0.5–3 percent of a plasticizer, and from 60–75 percent of a filler.

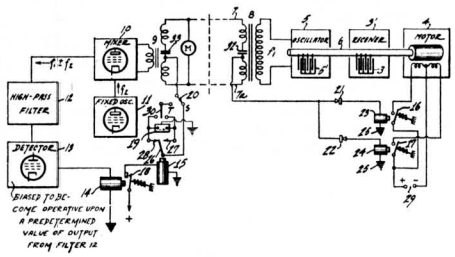
2,515,801
PLASTICS MOLDING COMPOSITIONS
Edward M. Sadowski, Indianapolis, Ind., assignor to Radio Corporation of America, a corporation of Delaware
No Drawing. Application August 6, 1946, Serial No. 688,702
9 Claims. (Cl. 260—17)

1. A moulding composition suitable for making phonograph records comprising 3–10 percent ethyl cellulose, 1–10 percent polyvinyl acetate, 15–24 percent of a thermoplastic resinous material having a softening point of between 75° and 170° C. which is highly fluid when molten, 0.5–3 percent of a plasticizer for said ethyl cellulose and said polyvinyl acetate, and 60–75 percent of a filler.

2,515,850
AUTOMATIC FREQUENCY SCANNING SYSTEM
John E. Benson, Sydney, New South Wales, Australia, assignor to Amalgamated Wireless (Australasia) Limited, Sydney, New South Wales, Australia, a company of New South Wales
Application March 10, 1945, Serial No. 581,989
In Australia March 3, 1944
Section 1, Public Law 690, August 8, 1946
Patent expires March 3, 1964
12 Claims. (Cl. 318—282)

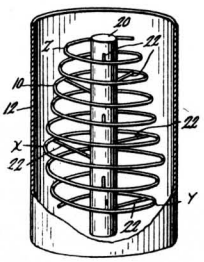
1. A system for continuously varying the angular position of a rotatable member through a predetermined arc of movement, comprising a reversible driving means coupled to said rotatable member, a first oscillator whose output frequency

is dependent upon the angular position of said rotatable member, a further oscillator having a fixed frequency output, means for combining the output frequencies of both of said oscillators to produce a beat frequency which continuously



varies between two predetermined limits, a high pass filter through which said variable beat frequency is passed, means for rectifying the beat frequency passed by said filter, and means for utilizing the resulting D. C. component to control the direction of rotation of said reversible driving means.

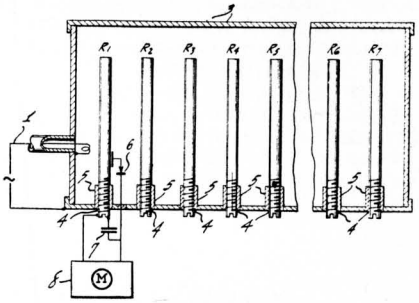
2,515,874
TRANSFORMER
Cyril N. Hoyler, Princeton, N. J., and Rudolph A. Bierwirth, Chicago, Ill., assignors to Radio Corporation of America, a corporation of Delaware
Application September 17, 1946, Serial No. 697,432
4 Claims. (Cl. 175—359)



1. A current transformer comprising a single primary coil of a plurality of spirally wound spaced turns and a single-turn secondary sheet surrounding said primary coil over its entire length and spaced therefrom, the spacing between the turns of said primary coil and said secondary increasing from an intermediate point toward both ends, an insulating form extending longitudinally of and within said primary coil, and stand-off studs positioned along the length of said insulating form and secured to the individual turns of said primary coil for supporting the same, adjacent insulating studs being circumferentially spaced from one another by a distance which is an appreciable fraction of the circumferential distance of a single turn of said primary coil.

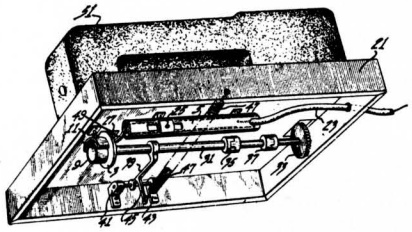
2,516,056
METHOD FOR TUNING CASCADE TUNED CIRCUITS
Eugene O. Keizer, Princeton, N. J., assignor to Radio Corporation of America, a corporation of Delaware
Application February 26, 1946, Serial No. 650,371
9 Claims. (Cl. 178—44)

1. A method of tuning a series of cascade circuits to a desired high frequency, comprising adjusting a source of high frequency oscillations to



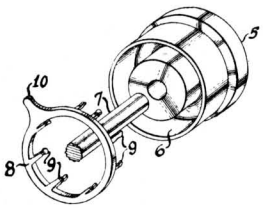
said desired frequency, tuning the first circuit in said series to maximum resonance with said oscillations, tuning the second circuit to a point such that the resonance of the first circuit is a minimum, tuning the third circuit such that the resonance of the first circuit has returned to a maximum and continuing the process throughout the remaining circuits, tuning each even numbered circuit such that the output of said first circuit is a minimum and tuning each odd numbered circuit such that the output of said first circuit is a maximum.

2,516,324
CONSTANT POTENTIAL GRADIENT DIELECTRIC HEATING DEVICE
Joseph E. Joy, Collingswood, N. J., assignor to Radio Corporation of America, a corporation of Delaware
Application February 15, 1946, Serial No. 647,725
4 Claims. (Cl. 219—47)



4. Apparatus for bonding together a plurality of dielectric parts of varying thickness, comprising a plurality of spaced, continuously rotating electrodes adapted for receiving and continuously advancing said parts therebetween, a source of high frequency electrical energy, at least one of said electrodes being yieldingly urged toward the other and separable from the other in response to the thickness of said parts, and means coupling said electrodes to said source, said means including an inductance device and a variable capacitor electrically connected in parallel with said electrodes capable of varying the rate at which energy is supplied to said parts, said variable capacitor comprising a generally cylindrical extension of the said yieldingly urged electrode adapted to rotate continuously with said electrode and a generally curved plate cooperating with and spaced from said cylindrical extension whereby variations in thickness of said parts in the region of said electrodes cause variations in the relative spacing of said cylindrical extension with respect to said curved plate so as to control said rate.

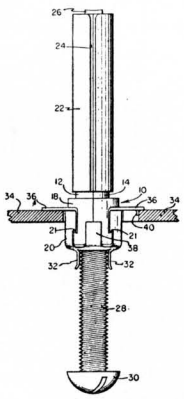
2,516,771
INDICATOR DEVICE
Marcus B. Herscher, Camden, and Raphael F. Bov, Oaklyn, N. J., assignors to Radio Corporation of America, a corporation of Delaware
Application November 8, 1947, Serial No. 784,830
8 Claims. (Cl. 116—124.2)



5. In combination a knob having a cylindrical protrusion from one face thereof, and a pointer, said pointer comprising a ring-like body portion and a plurality of circumferentially spaced tongues integrally attached to said ring-like body portion, one of said tongues extending radially from said ring-like body portion to provide an indicator element, and the remainder of said tongues extending in a substantially axial direction from said ring-like body portion and frictionally engaging the inner surface of said cylindrical protrusion, the said pointer being rotatably adjustable with respect to the said knob.

2,516,981
TRIMMER CONDENSER
Emery L. Hall, Chicago, and Louis W. Schreiner, Des Plaines, Ill., assignors to Belmont Radio Corporation, Chicago, Ill., a corporation of Illinois
Application February 19, 1948, Serial No. 9,364
4 Claims. (Cl. 175—41.5)

1. An adjustable capacitor of the tubular type including in combination a conductive threaded screw, a dielectric tube having internal threads for receiving said screw, said dielectric tube including a plurality of molded longitudinal sections, and a longitudinally split resilient metallic sleeve embracing said sections of said dielectric

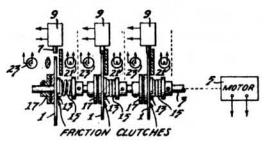


tube for holding said sections and said screw in assembled relation, said screw being adjustable within said tube to provide a capacitor of varying value depending upon the relative positions of said screw and said sleeve.

2,517,014
PLASTICS MOLDING COMPOSITIONS
William P. Miller and Stephen D. Ransburg, Indianapolis, Ind., assignors to Radio Corporation of America, a corporation of Delaware
No Drawing. Application August 6, 1946, Serial No. 688,704
5 Claims. (Cl. 260—27)

1. A phonograph record made up of a moulded composition in which the basic resinous ingredients consist of 2 to 20 percent polyvinyl acetate and 8 to 15 percent of another thermoplastic resinous material having a softening point of 75° to 170° C. which has the further characteristic of being highly fluid when molten, said another resinous material being at least one of the class consisting of shellac, rosin, rosin esters, hydrogenated rosin, wood tar pitches, coal tar pitches, asphalts, coumarone-indene resins, phenolic resins in the A stage, phenolic resins in the B stage, and the resinous residue made by the process which comprises, (1) extracting pine wood with a coal tar hydrocarbon, (2) evaporating the coal tar hydrocarbon and other volatile constituents of the extract from the extract to produce a solid residue, (3) extraction rosin from said residue with a light petroleum hydrocarbon, (4) separating the rosin extract from the remaining residue which is substantially insoluble in light petroleum hydrocarbons, and (5) recovering the remaining resinous residue, said composition also comprising 0.5 to 3.0 percent of a plasticizer and the remainder filler.

2,517,102
READING AID FOR THE BLIND
Leslie E. Flory, Princeton, N. J., assignor to Radio Corporation of America, a corporation of Delaware
Application November 29, 1946, Serial No. 713,175
14 Claims. (Cl. 179—1)

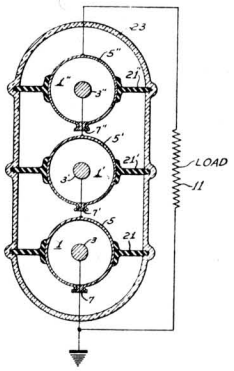


1. In a device of the character described, a plurality of tone generators for producing respectively distinctive audio frequency oscillatory vibrations, and control means for causing said generators to become successively operative in a predetermined time sequence, said control means comprising relatively movable control and responsive elements, said control element having recorded thereon two separate series of coded indicia and said responsive element being separately responsive to each series, said responsive element being connected to initiate operation of each said generator only in response to a unique combination of one indicia of each of said series.

2,517,120
METHOD OF AND MEANS FOR COLLECTING ELECTRICAL ENERGY OF NUCLEAR REACTIONS
Ernest G. Linder, Princeton, N. J., assignor to Radio Corporation of America, a corporation of Delaware
Application June 25, 1946, Serial No. 679,081
12 Claims. (Cl. 171—330)

1. The method of utilizing a source of radioactive charged particle radiations for primarily generating electrical energy comprising collecting said charged particle radiations on a surface region adjacent to said source to establish a potential with respect to said source and deriving an electric current in response to said potential.

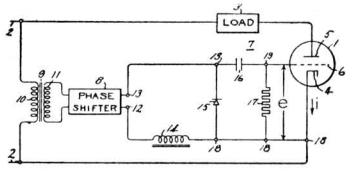
5. Apparatus for primarily generating electrical energy including a source of radioactive material providing charged particle cold high energy emission, electrode means disposed in a region adjacent to said source for collecting said emitted particles to establish a potential with respect to said source, source connection means in-



sulated from said electrode means, and means connected to said source connection means and to said electrode means for deriving a load current in response to said potential.

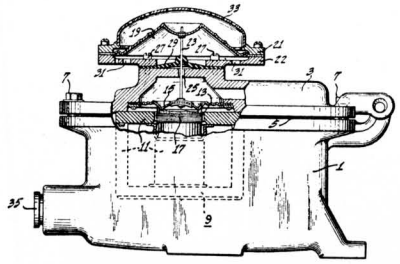
2,517,131
ELECTRIC CIRCUIT
Earl L. Phillipi, Schenectady, N. Y., and C. Ronald Smith, Seattle, Wash., assignors to General Electric Company, a corporation of New York
Application December 16, 1949, Serial No. 133,284
2 Claims. (Cl. 315—352)

1. In a firing circuit, an electron discharge device having a cathode, an anode and a control electrode, a unidirectional conducting device, means to impress alternately forward and inverse voltages on said device, said forward voltage causing periodic pulses of current to be conducted by said device, said current pulses tending to decay to zero upon reversal of said voltage from forward to inverse, inductive means to delay said decay and cause occurrence thereof during the period when said inverse voltage is impressed on said device, a capacitance connected to form a series combination with said cathode and said control electrode, said combination being sub-



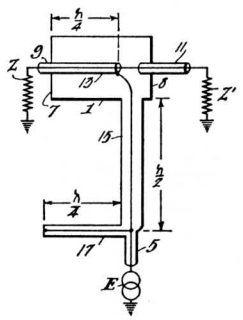
jected to a voltage responsive to the voltage impressed on said unidirectional conducting device, charging of said capacitance being effected by said inverse voltage, and means including a resistance to discharge said capacitance during the period when said forward voltage is impressed on said device.

2,517,138
IMMERSIBLE ELECTRODYNAMIC LOUD-SPEAKER
John D. Seabert, Indianapolis, Ind., assignor to Radio Corporation of America, a corporation of Delaware
Application June 29, 1944, Serial No. 542,745
9 Claims. (Cl. 179—115.5)



3. In signal translating apparatus, the combination of a fluid-tight casing having a hinged cover provided with an opening, an electromechanical converter including a first vibratory member within said casing, a second vibratory member outside of said casing, said hinged cover including supporting means for each of said vibratory members, a perforated auxiliary housing for said second vibratory member on said cover for exposing both sides of said last named member to the ambient, means coupling said first and second vibratory members for movement in unison, said coupling means comprising an element passing through said opening, a flexible seal over said opening and around said element in fluid-tight relation therewith for preventing the passage of fluid between the exterior and interior of said casing, the flexibility of said seal permitting substantially unhampered movement of said element and said members, and means for limiting inward movement of said flexible seal when said apparatus is subjected to abnormal, external fluid pressure.

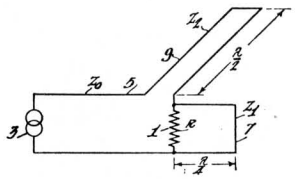
2,517,968
LINE BALANCE CONVERTER
George H. Brown, Princeton, N. J., assignor to Radio Corporation of America, a corporation of Delaware
Application January 17, 1945, Serial No. 573,217
5 Claims. (Cl. 178—44)



1. A line balance convertor comprising a coaxial line section one-quarter wavelength long, the ends of the inner conductor of said section constituting balanced line terminals, a conductive sleeve surrounding said line section and connected at one end to the outer conductor of said section, a half wavelength coaxial line section with one end of its outer conductor connected

to said sleeve and its inner conductor connected to the free end of the outer conductor of said quarter wavelength line section, the other ends of the inner and outer conductors of said half wavelength line constituting unbalanced line terminals, and a short-circuited quarter wavelength line section connected across said unbalanced terminals.

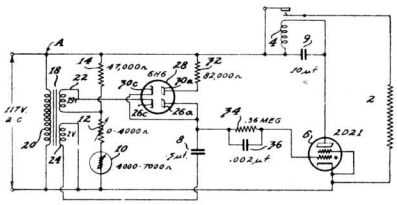
2,517,969
REACTANCE COMPENSATION SYSTEM
George H. Brown, Princeton, N. J., assignor to Radio Corporation of America, a corporation of Delaware
Application March 30, 1945, Serial No. 585,671
3 Claims. (Cl. 178—44)



1. A line balance convertor including an unbalanced-to-ground circuit comprising a coaxial transmission line, a tubular conductor substantially one half wavelength long surrounding the final half wavelength portion of said line and connected to the outer conductor of said line at a point one half wavelength from the end thereof, a second tubular conductor one end of which surrounds the final quarter wavelength portion of said first-mentioned tubular conductor and is connected thereto at a point substantially midway of the length thereof a cylindrical quarter wavelength conductor which is surrounded by the other end of said second tubular conductor and is connected at one of its ends to the end thereof and which has a diameter equal to the outside diameter of the first-mentioned tubular conductor, said coaxial line, said cylindrical conductor, and said first and second tubular conductors being concentric about a common axis, the other end of said cylindrical conductor being adjacent to and facing the end of said final portion of said first-mentioned tubular conductor, and a balanced-to-ground circuit comprising one conductor connected to the end of the inner conductor of said coaxial line of said adjacent end of the cylindrical conductor and another conductor connected to the adjacent end of said first-mentioned tubular conductor.

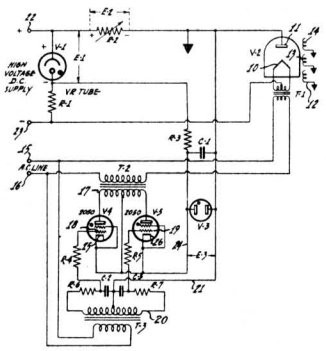
2,518,108
TEMPERATURE SENSITIVE CONTROL FOR ELECTRIC BLANKETS
Raymond A. York, Pitman, and Harry J. Woll, Audubon, N. J., assignors to Radio Corporation of America, a corporation of Delaware
Application June 21, 1947, Serial No. 756,138
5 Claims. (Cl. 219—46)

1. An apparatus comprising a source of A.-C. current, current switching means connected to said source through the anode-cathode path of a grid controlled electron discharge device, means controlling the potential of said grid, said controlling means including a temperature responsive resistor in heat transfer relation to a medium adapted to be heated, means applying a first A.-C. potential across said resistor, said first potential being variable in response to the temperature of said resistor, means applying in series with said first potential a second A.-C. potential of predetermined value and opposite in sign to said first A.-C. potential, means rectifying the potential which is the resultant of said first and second A.-C. potentials, means applying said resultant potential to said grid such that said grid is negative, means applying an additional positive D.-C. potential to said grid in opposition to said rectified resultant potential, said additional potential



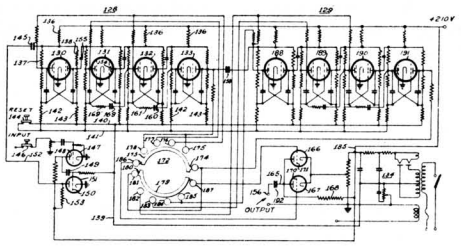
being sufficiently high to maintain said discharge device conductive when said first A.-C. potential is within a predetermined range of numerical values above and below that of said second A.-C. potential, and also being sufficiently low to permit the lowering of the potential on said grid below a value necessary to maintain said discharge device conductive when said first A.-C. potential is outside said range.

2,519,173
REGULATING DEVICE
Spurgeon H. Buder, Merchantville, N. J., and William H. Eichelberger, Denver, Colo., assignors to Radio Corporation of America, a corporation of Delaware
Application June 12, 1946, Serial No. 676,167
5 Claims. (Cl. 315—107)



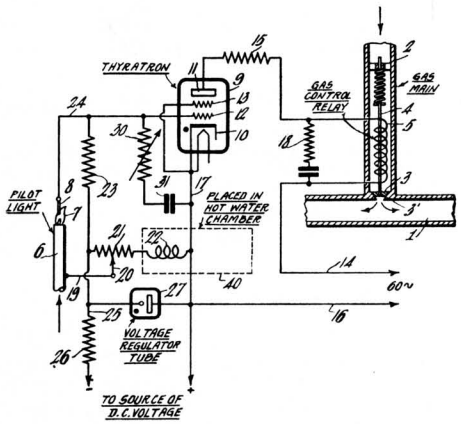
1. In a device for regulating the output current of an electron discharge device having a cathode coupled to be heated to a source of heating current, the combination of means for producing opposed unidirectional potentials one of which has a constant value and the other of which has a value proportional to said output current, a variable impedance connected between said cathode and said source of heating current, means to control the value of said variable impedance, and means to continuously impress the resultant of said opposed potentials upon said control means to vary the value of said variable impedance and the heating current supplied to said cathode in accordance with fluctuations in said resultant potentials.

2,519,184
CONTROL SYSTEM
Igor E. Grosdoff, Princeton, N. J., assignor to Radio Corporation of America, a corporation of Delaware
Application April 5, 1946, Serial No. 659,704
2 Claims. (Cl. 250—27)



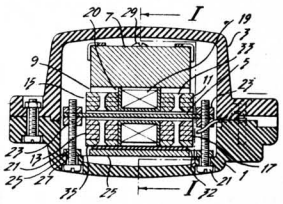
1. The combination of first and second counters each having an input lead and an output lead and each including four trigger circuits so interconnected that its cycle of operation is completed in response to the application of ten pulses to its input lead, means coupling the output lead of said first counter to the input lead of said second counter, unitary switching means connected to said first and second counters to select from said counters pairs of potentials each pair of which is more negative only in response to the application of a different predetermined number of pulses to the input lead of said first counter, and means responsive to each of said pairs of more negative potentials for producing a single output pulse.

2,519,789
ELECTRONIC GAS CONTROL CIRCUIT
Theodore B. Perkins, West Orange, N. J., assignor to Radio Corporation of America, a corporation of Delaware
Application June 19, 1946, Serial No. 677,875
4 Claims. (Cl. 236—21)



1. In a gas heating system including a gas control valve, a thyratron tube having the valve in its plate circuit, a source of alternating current voltage connected in the plate circuit of the thyratron tube to provide rectified current for normally maintaining the control valve in open position, a biasing circuit for the control grid of the thyratron, said biasing circuit being normally closed through a conductive path which includes the hot flame of a pilot light, means for applying a high negative bias to the thyratron control grid in response to the pilot flame being extinguished, said means comprising a source of negative D. C. potential and circuit means for applying said potential to said control grid, and temperature-responsive means in circuit with said grid biasing circuit for applying a high negative bias to the control grid upon the medium being heated attaining a predetermined temperature.

2,519,916
INERTIAL ELECTROMAGNETIC THROAT MICROPHONE
Daniel William Martin, Indianapolis, Ind., assignor to Radio Corporation of America, a corporation of Delaware
Application April 30, 1945, Serial No. 591,070
8 Claims. (Cl. 179—121)

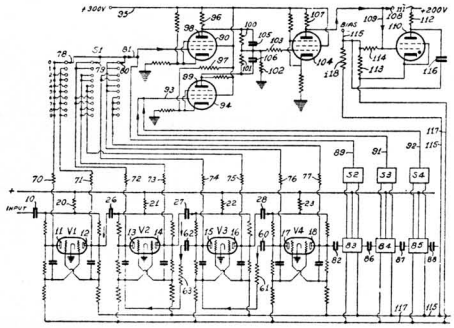


1. In a microphone of the inertia type responsive to voice frequency sound waves for translation thereof into corresponding electric currents, a housing adapted for operative direct contact with a selected speech transmitting portion of the human body, an armature carried by said housing and secured thereto for cophasal vibratory movement therewith, a high inertia member comprising a translating coil surrounding said armature, a magnet and pole pieces disposed in operative balanced magnetic relation to said armature, compliant means attached to said housing at points substantially in a plane with said armature and supporting said coil, magnet and pole pieces for relative vibratory movement with respect to said armature, said pole pieces comprising two pairs of oppositely polarized pole pieces forming air gaps with said armature and being disposed at each extremity of said armature in such manner that rectilinear vibration of said armature relative to said pole pieces induces a substantial voltage in said coil, the arrangement and design of the microphone parts being characterized by substantial dynamic symmetry relative to said armature, whereas rocking movement balances out and induces substantially no voltage in said coil.

2,521,774
PREDETERMINED COUNTER
Warren H. Bliss, Princeton, N. J., assignor to Radio Corporation of America, a corporation of Delaware
Application March 21, 1947, Serial No. 736,214
3 Claims. (Cl. 235—92)

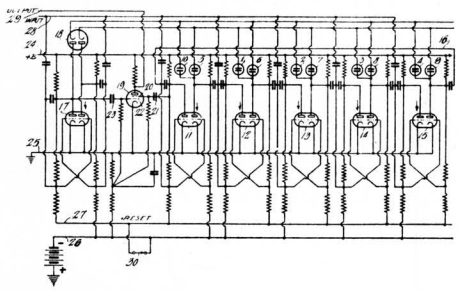
3. The combination of a plurality of decade counters connected in tandem and each including a plurality of trigger circuits of which each includes a pair of triode elements each having a grid, a cathode, and an anode, each of said pairs of triode elements having their grids and anodes cross-connected so that current is conducted either by one or the other of said triodes, means for applying input pulses to the lowest order decade of said plurality of decades, means including three-point switches each having fixed contacts connected to all the anodes of a different

one of said decades for selectively deriving a control pulse which is of the same polarity and value for any number of said input pulses within the counting range of said decades a reset lead for said decades, a gas electron discharge device having anode, cathode and grid electrodes, a capacitor, a resistor having one end connected to said cathode, said reset lead being connected to said cathode to derive an output therefrom, said condenser being connected between said discharge device anode and the other end of said resistor,



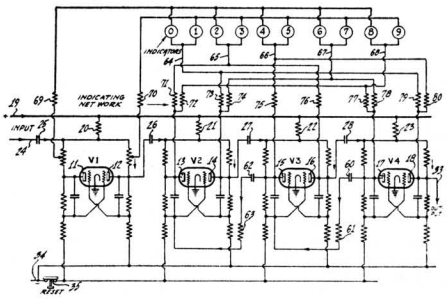
and means to impress said control pulse upon said discharge device grid to render said discharge device conductive to discharge said condenser through said discharge device and to reset said decades to their standby conditions.

2,521,787
COMPUTING SYSTEM
Igor E. Grosdoff, Princeton, N. J., assignor to Radio Corporation of America, a corporation of Delaware
Application March 30, 1944, Serial No. 528,721
6 Claims. (Cl. 235—92)



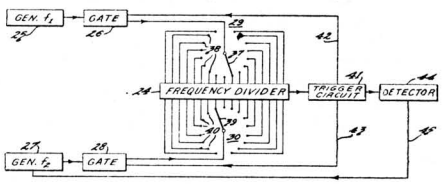
4. The combination of a plurality of trigger circuits each including a pair of electron discharge elements having their grids each cross-connected to the anode of the other so that current conduction is stable in either one or the other of said elements, terminals for simultaneously applying input pulses to all of said trigger circuits, means interconnecting some of said trigger circuits so that their current conductive conditions are successively changed in response to the application of said input pulses, a plurality of pairs of indicators, means connecting said indicator pairs each to the anode of an electron discharge element of a different one of said interconnected trigger circuits, and means including the other of said trigger circuits for selecting said indicators one after the other in response to said input pulses and means responsive to the conductive conditions of said trigger circuits for delivering an output pulse only in response to input pulses of a number which is twice that of the number of said interconnected trigger circuits.

2,521,788
ELECTRONIC COUNTER
Igor E. Grosdoff, Princeton, N. J., assignor to Radio Corporation of America, a corporation of Delaware
Application March 1, 1945, Serial No. 580,446
10 Claims. (Cl. 235—92)



8. The combination of four trigger units each including a pair of electron discharge elements having anode, cathode and grid electrodes, the grids and anodes of each pair of electron discharge elements being cross-connected, means connecting said units in cascade to provide operation of said units except a first of said units by an immediately preceding unit, means coupled to a first one of said units for applying voltage pulses to said first one of said units, and means to couple certain ones of the last three of said units to apply to the second and third of said cascaded units reset pulses during the application of ten voltage pulses to the first one of said units to provide a cycle of operation which is completed in response to ten of said voltage pulses being applied to said first one of said units.

2,521,789
FREQUENCY CONTROL BY ELECTRONIC COUNTER CHAINS
Igor E. Grosdoff, Princeton, N. J., assignor to Radio Corporation of America, a corporation of Delaware
Application February 25, 1948, Serial No. 10,665
5 Claims. (Cl. 250—36)

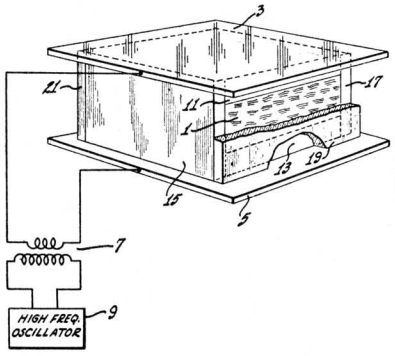


1. The combination of sources of fixed and controllable frequency, a frequency divider having an output lead, first and second division ratio selector means connected to said divider for adjusting the connections of said divider to divide said fixed and controllable frequencies by divisors such that the resultant quotients are in the form of pulses unequally spaced in time only as a result of slight variations in said controllable frequency, control means connected to said output lead and responsive to said pulses for alternately connecting said sources to said divider, and means

connected to said controllable frequency source and responsive to an output potential of said control means for maintaining a substantially constant relation between said frequencies.

2,521,797
ELECTRONIC HEATING METHOD AND APPARATUS
George W. Klingaman, Camden, N. J., assignor to Radio Corporation of America, a corporation of Delaware
Application August 2, 1945, Serial No. 608,581
4 Claims. (Cl. 219—47)

1. In electrical heating apparatus for heating a dielectric mass with the aid of a high frequency electric field, the combination of a pair of spaced R.-F. heating electrodes between which said mass is adapted to be disposed and between which said field may be set up, and dielectric means also interposed between said electrodes within the confines of said field adapted to surround said dielectric mass, said dielectric means being constituted by a plurality of members certain ones of which are disposed in the direction of said field, are made of a material other than said mass and have a parallel heat factor such as to permit attainment of substantially the same temperature as said mass when in said electric field, and certain others of which are disposed in a direction normal to said first named direction, are made of a material other than said mass and have a series heat factor such as to permit attainment of substantially the same temperature as said mass when in said electric field, said par-



allel heat factor being determined from the equation

$$\text{H. F. (parallel)} = \frac{K\ (\text{P. F.})}{Sd}$$

and said series heat factor being determined from the equation

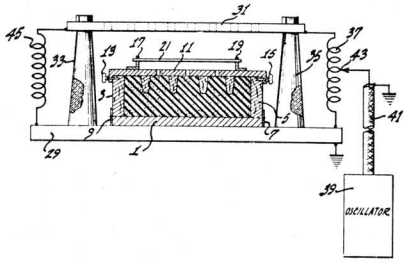
$$\text{H. F. (series)} = \frac{\text{P. F.}}{KSd}$$

where

P. F.=power factor of said members,
K= dielectric constant of said members,
S=specific heat of said members, and
d=density of said members. said members

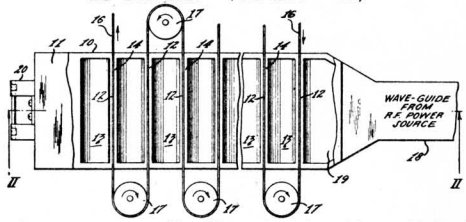
when heated as a result of dielectric losses produced therein by said field, serving to substantially prevent the flow out of the outer regions of said mass of the heat developed therein by said field, and said members having such characteristics, including power factor, dielectric constant, specific heat and density, as to maintain said mass at a substantially uniform temperature throughout when said members and mass are heated by said field.

2,521,808
APPARATUS FOR FORMING HEAT ACTIVATABLE MATERIAL BY DIELECTRIC HEATING
Harry W. Taylor, West Collingswood, N. J., assignor to Radio Corporation of America, a corporation of Delaware
Application May 26, 1947, Serial No. 750,464
5 Claims. (Cl. 219—47)



1. A device for heating a moldable dielectric material comprising a closed mold having opposed top and bottom electrodes of electrically conductive material, the walls of said mold being electrically insulating, a grounded metal plate and a high potential coupling plate mounted in spaced relation to each other, the spacing between said plates being greater than the overall height of said mold whereby a capacity coupling exists between said top electrode and said high potential coupling plate when said mold is placed on said grounded plate between said two plates, means for establishing a high frequency potential difference between said plates, and an inductor connected between said plates, the effective capacity between said high potential coupling plate and said top electrode having such a value as to cause said capacity to resonate with said inductor at a frequency higher than the frequency of said high frequency potential.

2,521,993
RADIO-FREQUENCY HEATING ELECTRODE FOR FILAMENTARY MATERIAL
William N. Parker, Lancaster, Pa., assignor to Radio Corporation of America, a corporation of Delaware
Application April 30, 1948, Serial No. 24,379
13 Claims. (Cl. 219—47)



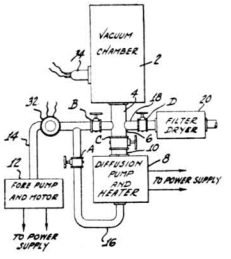
1. An R.-F. application for heating dielectric material and the like, comprising means providing a series of alternate resonant cavities and spaced pairs of electrodes, said pairs of electrodes electrically coupling said alternate resonant cavities, means for passing dielectric material between said pairs of electrodes in substantially parallel sections, and means for applying R.-F. energy to at least one of said series of resonant cavities thereby to energize said electrodes.

2,522,969

AUTOMATIC VACUUM SYSTEM

Perry C. Smith, Moorestown, N. J., assignor to Radio Corporation of America, a corporation of Delaware

Application November 28, 1947, Serial No. 788,542
9 Claims. (Cl. 315—110)



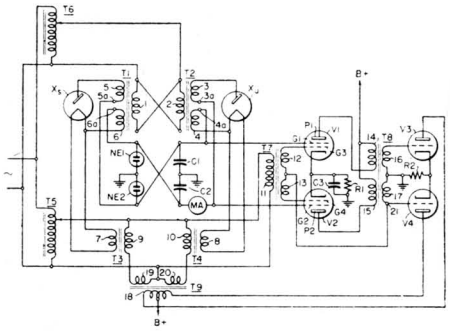
1. A vacuum system comprising an evacuable chamber, a vacuum gage connected to said chamber, means for exhausting said chamber, said exhausting means being responsive to information supplied thereto by said gage, and means within said chamber for performing a work operation, said work means being operative in response to information supplied thereto by said vacuum gage and by said exhausting means.

2,523,247

TUBE CONTROL APPARATUS

Harvey L. Glick, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, East Pittsburgh, Pa., a corporation of Pennsylvania

Application December 17, 1948, Serial No. 65,946
7 Claims. (Cl. 250—94)



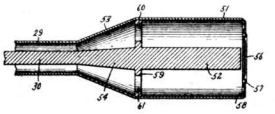
1. Apparatus for controlling the filament voltages of a pair of tubes each having an anode and a filament comprising, in combination, circuit means connecting the anode of one tube to the filament of the other tube and the anode of said other tube to the filament of said one tube to provide a series circuit for the emission currents of said tubes, circuit means electrically connected with said series circuit for applying energizing voltages to said tubes, capacitor means connected across said series circuit and having a common terminal thereof grounded, a control voltage circuit connected to each filament for energizing the filament of each tube, and circuit means electrically connected across said capacitor means to respond to the voltage across said capacitor means for increasing the voltage of one control voltage circuit while decreasing the voltage of the other control voltage circuit.

2,523,286

HIGH-FREQUENCY ELECTRICAL APPARATUS

Milan D. Fiske and Richard B. Nelson, Schenectady, N. Y., assignors to General Electric Company, a corporation of New York

Application May 12, 1945, Serial No. 593,492
13 Claims. (Cl. 250—27.5)



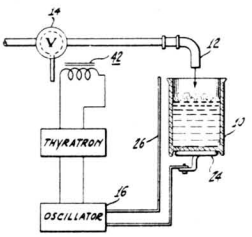
1. A high frequency system comprising a source of high frequency electric oscillations including a space resonant structure, a resonator having a reactive impedance and a flexible wall member for controlling said impedance to determine the natural frequency of said resonator, said resonator being resonant at a predetermined frequency when said flexible wall member is in an intermediate position, a transmission line of the concentric type coupled between said space resonant structure and said resonator, and means adjacent said flexible wall member for controlling the movement of said member to tune said resonator and thereby to reflect a variable impedance at said resonant structure.

2,523,363

METHOD AND APPARATUS FOR FILLING CONTAINERS WITH A PREDETERMINED AMOUNT OF DIELECTRIC MATERIAL

John B. Gehman, Noblesville, Ind., assignor to Radio Corporation of America, a corporation of Delaware

Application January 26, 1945, Serial No. 574,778
12 Claims. (Cl. 226—127)



1. The method of filling a container with pourable dielectric material to a predetermined level, which comprises applying ultra high-frequency energy from a source thereof to a circuit, effectively connecting the container to said circuit, pouring the material into the container whereby to vary the level of the material in the container and to propagate waves of ultra high-frequency energy in said material thereby varying the impedance of said circuit and the electrical condition of said source, and cutting off the supply of material to the container in response to an electrical condition of said source representative of said predetermined level.

2,523,741

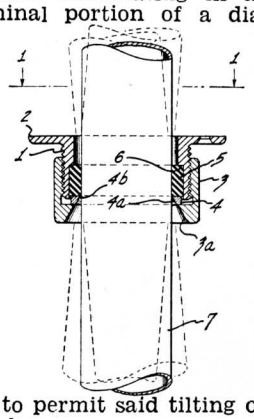
THROUGH BUSHING

William S. Weschler, Camden, and Richard Pierce Corporon, Haddonfield, N. J., assignors to Radio Corporation of America, a corporation of Delaware

Application January 31, 1946, Serial No. 644,610

2 Claims. (Cl. 248—56)

1. A through bushing for supporting a cylindrical object, said bushing comprising a sleeve having a bore extending therethrough of a minimum diameter substantially larger than the outer diameter of said object whereby said object may extend through and be tilted within said sleeve, an annular member constituted of a resilient material disposed within said sleeve adjacent to an end thereof, the internal diameter of said annular member being sufficiently large to accept said object, and an annulus comprising an external bearing for said object yieldably supported upon said resilient member, the internal surface of said annulus terminating in an outwardly tapered terminal portion of a diameter sufficiently large to permit said tilting of said object within said sleeve.



Chester W. Säll

Chester W. Säll