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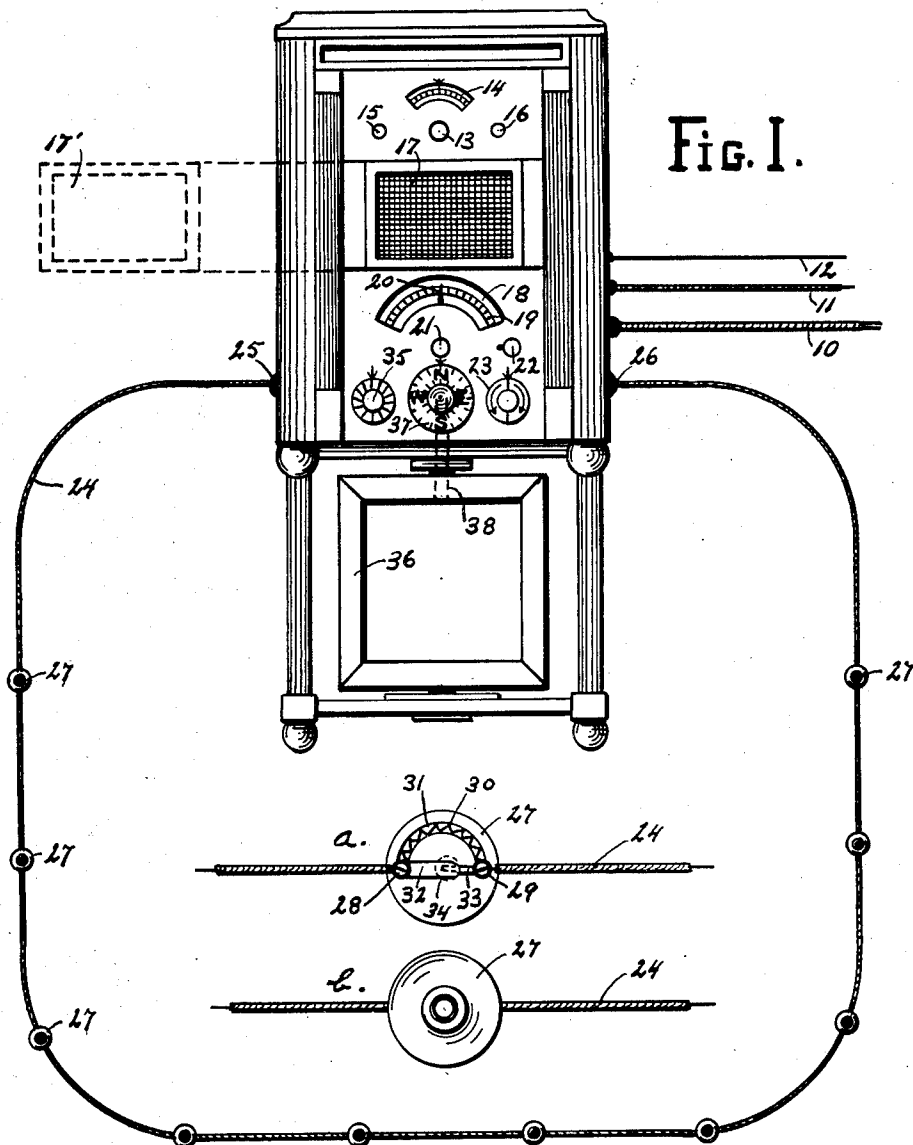
N. M. HOPKINS

1,990,489

APPARATUS AND METHOD OF RADIO VOTING

Filed April 9, 1931

3 Sheets-Sheet 1



INVENTOR.

Nevil Monroe Hopkins

Feb. 12, 1935.

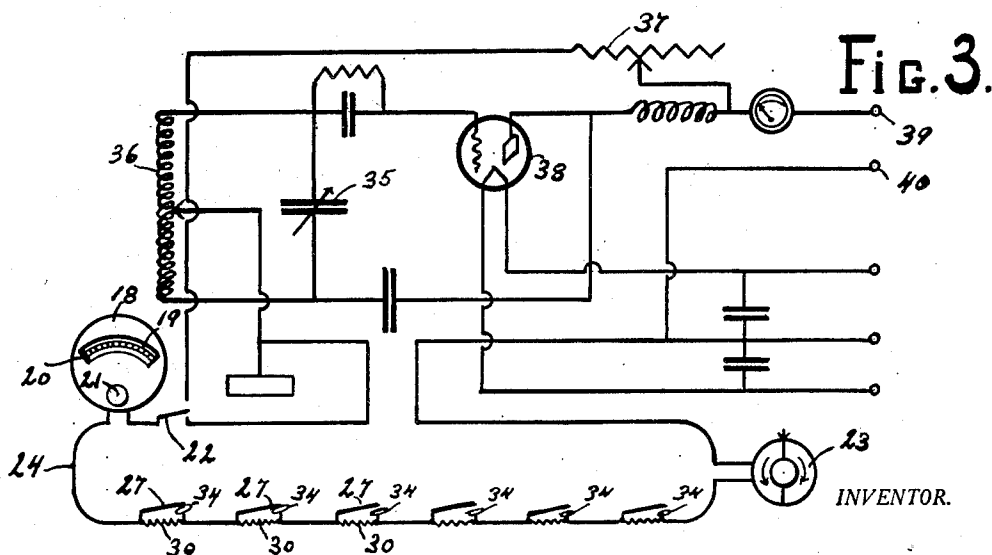
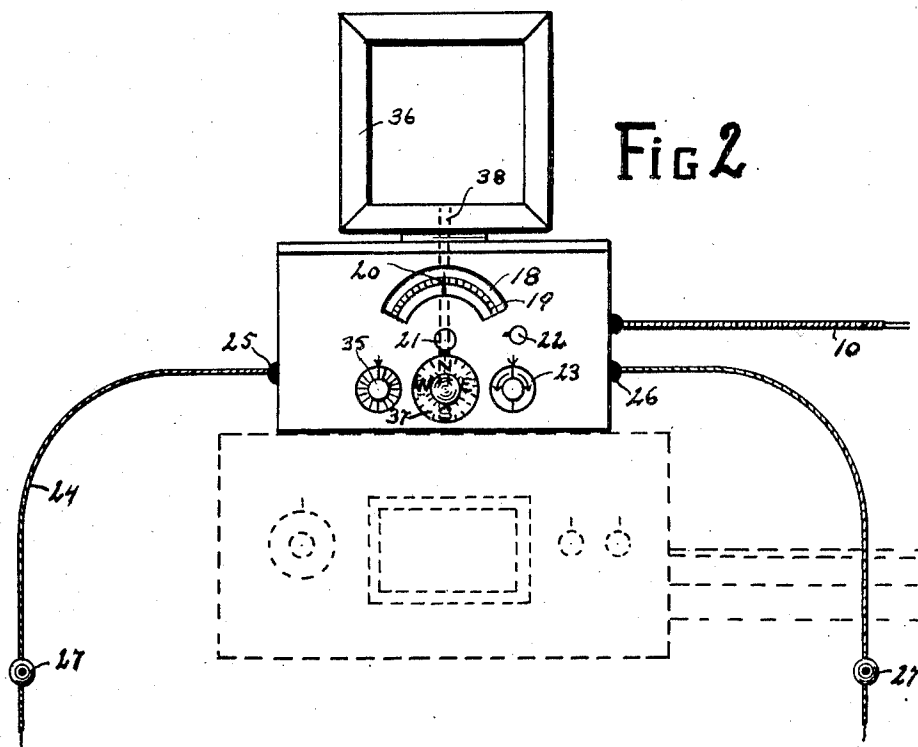
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APPARATUS AND METHOD OF RADIO VOTING

Filed April 9, 1931

3 Sheets-Sheet 2



David M. Hopkins
INVENTOR.

Feb. 12, 1935.

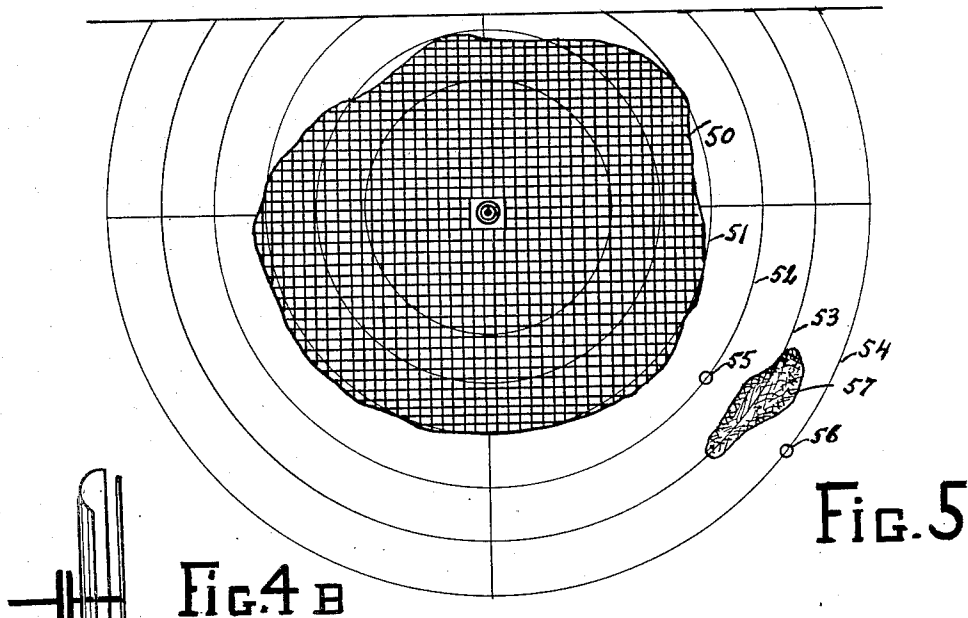
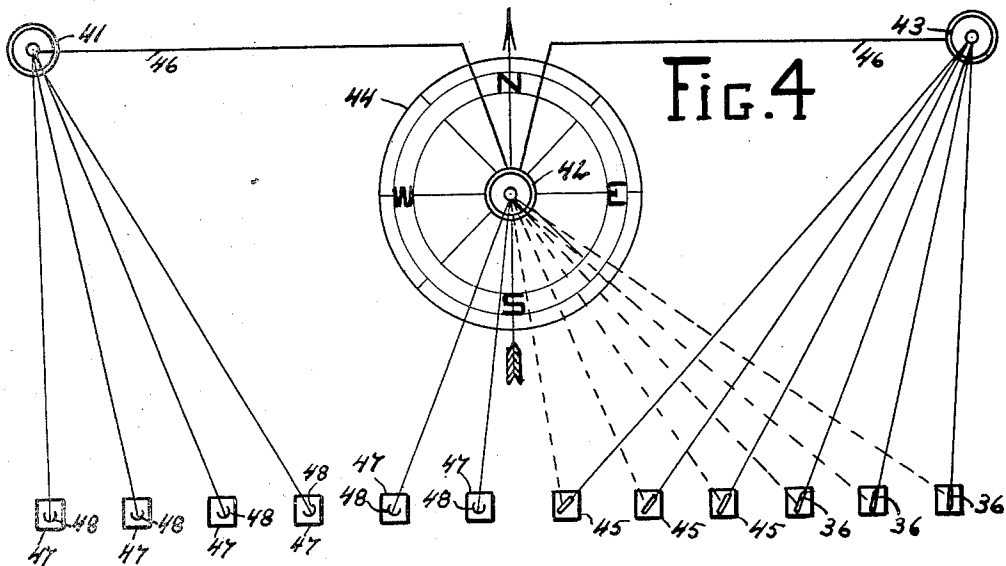
N. M. HOPKINS

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APPARATUS AND METHOD OF RADIO VOTING

Filed April 9, 1931

3 Sheets-Sheet 3



INVENTOR.

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UNITED STATES PATENT OFFICE

1,990,489

APPARATUS AND METHOD OF RADIO
VOTING

Nevil Monroe Hopkins, New York, N. Y.

Application April 9, 1931, Serial No. 528,829

13 Claims. (Cl. 250—2)

This invention relates to the generation and the direction through space to a common receiving center of a plurality of independently produced radio waves, generated at or substantially at the same frequency of oscillation, and has for a general object the concentration of energy at substantially the same time from a plurality of independent and separate sources, at a common radio center adapted to receive and integrate them for a diverse variety of new and useful purposes.

It is also an object of this invention to include supervision of the adjustment of a plurality of scattered independent radio transmitters for the substantially simultaneous generation and direction of a plurality of independently produced radio waves to a common radio broadcasting center, in a way to insure their energy being received at substantially equal value. These adjustments may be accomplished by taking charted voltage readings and other data, including structural interference, distances, etc., etc., from radio broadcasting maps, and in standardizing or calibrating the power output of each transmitter accordingly, or else by measuring the power of incoming signals from the broadcasting center as received at the numerous scattered zones where the plurality of transmitters are located. This may be accomplished through the agency of a tunable exploring loop and a portable vacuum tube voltmeter, for example. By drawing electric current from a 110 volt D. C. or A. C. city lighting system a substantially steady and constant source of power for my new multiple individual scattered transmitters is assured.

It is also an object of this invention to generate and direct such a plurality of independently produced radio waves from separate zones, not only of the so termed long wave variety, but also of the so termed short wave, and ultra short wave variety in conformity with the present rating of radio engineers, to a common center and to use there the collected and integrated energy in certain new and useful ways.

It is an object of this invention, therefore, not only to generate and direct the heretofore conventional long waves of radio energy of substantial equal effectiveness in my present invention, but to take full advantage at this time of the almost unbelievable distances which may be spanned in space with amazingly small amounts of energy, and to collect and use the energy from a great number of isolated and independent sources of propagation.

The long distance projection of the recently

adopted short waves for purposes of communication, the small amount of power required, the cheapness and small upkeep of the transmitter, the splendid behaviour in daylight as well as at night, the freedom from static influence, the precision of reflection and ease of beam projection, all happily contribute to the working out of my new and useful plan for the simultaneous concentration and integration of radio energy at a common radio center in securing new and useful results.

There is at the present time no system, plan or ways and means, outside of the mail, telephone and telegraph, for bringing the thousands, and hundreds of thousands and millions of individuals of the scattered "unseen audiences" in radio, in touch with the great and increasing number of broadcasting interests, not only in sound programs, but in television programs, and it is a special object of this invention to produce apparatus, ways and means for closer, quicker and more practical touch between the producers of sound and picture entertainments and their unseen and practically unheard from audiences.

With my new system a broadcasting station may put any question simultaneously up to its great radio audience and then say—"All vote now". At this signal the plurality of radio waves are generated and reflected by the individuals of the unseen audience, and a resonantly tuned receiver with a ballistic galvanometer, for example, at the common radio center, integrates the plurality of incoming energy waves.

It will thus be seen that it is an object of this invention to provide signaling and voting means, whereby the millions of individuals who own radio receiving sets, may not only "listen in" and/or "see in" to broadcast programs, but may express their opinions, wishes and views upon any subject to the directors of the broadcasting interests upon the stating of a question by the broadcasting director and the following request by him to "Vote now". It will also be appreciated that I provide rapid and economic ways and means to enable single individuals scattered widely, and with only low power transmitters, in a town, city, county or state, or even national and international territory, to indicate practically simultaneously their sentiments, upon national and international "hook-ups", upon the propounding of a question and then a "Vote now" request which may be flashed.

It is also an object of this invention to not only secure a vote from an unseen audience upon any subject, proposition, or theme, but to enable a

broadcaster to analyze the unseen audience into classes, such as doctors, lawyers, clergymen, engineers, politicians, merchants, men, women, etc., etc.

5 It is also an object of this invention to enable a broadcasting center to estimate, or count the number of individuals comprising an unseen audience by a suitable calibration of the individual transmitters for example.

10 It is not only an object of this invention to provide apparatus for a "Yes" or "No" vote, but for a graduated vote. In other words, an individual may vote a "Yes" according to the intensity of his feelings upon any subject, depending upon how
15 hard he or she presses the button or key of the transmitter.

Insomuch as my multiple individual radio transmitter also lends itself to recording votes locally as well as at a distance, as will be seen
20 and appreciated as the description proceeds and the drawings are studied, it is also an object of this invention to provide for a "Yes" or "No" positive or negative expression of favor or disfavor of a plurality of assembled individuals, as for example, those grouped about a radio receiver in
25 a room or auditorium.

It is also an object of this invention when used for assembly voting as well as for broadcast voting, to provide apparatus for unobtrusive or secret
30 voting. Ten persons, for example, may be seated around an instrument equipped with my system and each in possession of a push button which may be operated out of sight of the neighboring voters.

35 In a copending United States Patent application, Serial Number 521,419, filed March 10, 1931, entitled "Assembly voting systems" and in another United States Patent application, Serial Number 525,404, filed March 26, 1931, entitled "System of
40 radio voting", I have illustrated and described certain apparatus and systems, more or less of the nature of the present invention.

It is an object of this invention, therefore, to provide cooperative apparatus, for, and to improve, expand and extend the field touched upon
45 in a broader and more accurate and effective manner.

With these and certain other important objects in view which will become apparent as the present description proceeds and the drawings are studied,
50 the invention consists in the various parts and principles, combinations of parts and principles, all as hereinafter described and particularly pointed out in the claims.

Referring to the accompanying drawings forming a part of this specification, in which like numerals designate like parts in all the views:

Figure 1 represents a front view in elevation of one design of one of my new broadcast radio-voting units for conventional wave lengths, or
60 those of the standardized broadcasting systems of today. Here I plan to listen in and to vote back upon the same wave length as established by any particular broadcasting station.

65 In the present illustration the voting transmitter is equipped with push buttons for ten assembled individuals and with local vote indicator, and therefore the present model is adapted for both local assembly and distant record of the
70 replies to questions either locally or distantly put. I have shown here in combination with my multiple individual transmitter and local recorder, a sound receiving radio over which questions from the broadcasting station and the signal to vote
75 are orally put, but I may also use in combination

with such a unit, a television receiver in connection with which questions and the subsequent signal to vote may be put in writing or printing.

Here 10 is a source of electric power for operating both the radio receiver and my transmitter, and this electric power may be either of alternating or direct current system. 11 is the aerial for the receiving set and 12 the ground wire therefor.

13 is the selection or tuning knob of the receiving set which moves the conventional dial (14) and
15 15 and 16 are the intensity and other controls common to modern standard radio receivers, and 17 is the mouth of the loud speaker, while the dotted rectangular frame 17' at the left of the drawings represents an alternate or added tele-
20 vision screen.

I have shown simply in conventional form the outward appearance of a radio receiver, a super-heterodyne, for example, with its concealed vacuum tubes, coils, transformers, condensers, etc.,
25 etc., at the back of the upper section of the cabinet, and since these elements and their connections are standardized and well known to radio engineers, it is not deemed necessary to illustrate them here. Just below the mouth of the loud
30 speaker (17), in a shielded section and therefore isolated electrically and electromagnetically, is my Hartley type of oscillator transmitter, not shown here, but illustrated in a following figure. Located also in the lower shielded section is my
35 local vote indicator (18) with its large, long and clear scale (19) over which the broad black pointer (20) sweeps, and which may be resiliently adjusted, galvanometer or dynamometer fashion, by means of the thumb and finger knob (21).
40 Instead of this particular galvanometer or dynamometer method of controlling the sensitivity of this indicator (18) I may elect to mount a resistance control rheostat upon the shaft of the thumb and finger knob (21) and include the
45 winding in series with the instrument (18) in order to secure various degrees of sensitivity. I have not shown any figures upon the scale (19) of this instrument, but a preferred numbering would be from 0 to 100; therefore the instrument would
50 read direct into percent. This instrument is electrical in nature and of the electro-dynamometer type for example. It is here shown reading half-scale or 50 because, let us say only five of the ten individuals which may be present are operating
55 their respective push buttons. If only five persons were present to use the transmitter and to vote, electrical resistance would be cut out of the instrument circuits by means of the thumb and finger knob (21) for example, so as to secure a
60 full scale deflection and therefore a 100 percent vote when all five individuals voted by pressing their respective buttons. Also in series with a coil of the indicator (18) is a selective switch (22) for placing one of two circuits at will respectively
65 into communication with a source of electric current, and the rheostat (23) is also in series for controlling the strength of the electric current, and for completing the entire circuit as may be selected by the switch (22) there is provided an
70 insulated single conductor (24) which is plugged at both ends into receptacles 25 and 26 at the opposite sides of the radio cabinet.

27 indicates the push buttons to be operated by the individuals voting. These push buttons
75 arranged in series with the single conductor, contain individual resistances, all equal in ohms, and all resistances in series, as will be made clear by the enlarged view at "a" where one of them is shown with its cover and push button removed.

Here the screws (28 and 29) not only bind the ends of the sections of the conductor (24) but also the ends of the resistance wires (30) which is disposed semi-circularly of the push button and in the little groove (31). Here at the center is the spring contact maker (32) adapted to be pushed down and to make contact with the fixed or rigid contact maker (33) below it.

It will now be evident that each individual in possession of a section of the circuit conductor (24) and push button connected in series therewith may secretly and unobtrusively push his or her individual button and thereby cut out of the circuit a definite and equal amount of the calibrated and fixed resistance (30) and thereby admit more current from the source of supply to either one of two circuits, depending upon the position of the switch (22). In one circuit only the local indicator (18) is affected, and in the other circuit the Hartley oscillator transmitter as well as the indicator (18) is affected as will be made clear by a study of the diagram of Figure 3. By placing one or more small carbon buttons between the spring contact making member (32) and the fixed or rigid contact making member (33) as shown in the small dotted circle (34), I enable each individual person present to not only vote "Yes" by pressing his or her push button, but to vote according to the intensity of his or her feelings upon any matter, depending upon how hard the push button is pressed. The harder the push button or series of push buttons are pressed, the higher will be the reading upon the scale of the indicator (18) for showing the local vote and, if the switch (22) is thrown to connect the Hartley oscillator transmitter, the stronger will be the radio wave generated and projected and the higher will be the reading upon the receiving and integrating instrument of the common radio center or broadcasting station. At "5" is an enlarged view of one of these assembled push buttons.

With further reference to the main drawing in Figure 1, 35 is the thumb and finger knob of the tuning dial of my multiple individual transmitter for tuning the rotatable transmitting loop (36) to the wave length or frequency of the broadcasting station with which one is in audible or television communication. This tuning dial (35) may, or may not be geared or otherwise connected mechanically to the tuning dial (13) of the super heterodyne radio receiver, I may elect to interconnect those dials mechanically, or I may simply mount the respective two variable tuning condensers upon the same dial shaft and thereby make my reception and transmitting resonance automatic. This would enable me to receive a question and a request to vote upon a broadcasting station's normal wave length and to vote directly back upon the same wave length at the signal "Vote now".

37 is a large dial marked with compass bearings and adapted to revolve the rotatable transmitting loop (36) of the Hartley oscillator, by means of the shaft shown in dotted lines at 38. Furthermore I may elect to interconnect all these dials in such a manner as not only to secure automatic resonance between receiver and transmitter, but to secure the proper pointing direction of the edge of the transmitting loop (36) so as to be in the most efficient position to send radio energy to the particular broadcasting station with which one is at the time in communication. This system would make my receiver completely automatic for receiving a question and in voting there-

on for any particular voting station after once it was set, in accordance with the compass bearing of the broadcasting station with respect to the voting station. Also upon the installation of one of my voting transmitters by a qualified service man, not only the direction of the station could be shown and marked upon the dial (37), but the dial (23) controlling the power rheostats could be set to transmit a signal or radio wave equal, or substantially equal, to all the other receiving and voting sets in any zone. This phase will be more fully set forth in connection with a subsequent figure.

Figure 2. Represents an outline front view of one design of one of my separate multiple individual transmitters. This type of transmitter radio voter is intended to be supplied to an individual already possessing a radio receiving set, and I have shown in the figure my transmitting radio voter in association with an individual's separate receiving set, the latter being merely indicated here in dotted lines.

Figure 3. Shows in diagram from a layout or hook up of apparatus of one design of one of my combination multiple unit local vote and radio remote vote casting transmitters.

The oscillator is of the Hartley design and shuntfeed type. With a VX-210 vacuum tube, this transmitter should send vote waves a distance of many miles, depending upon the location of the transmitter and the sensitivity of the receiver. Such a transmitter operated upon 110 volt power, is capable of sending a "Yes" vote wave several thousand miles if desired. Here the electro-dynamometer local vote indicating instrument is shown at 18 and the individual push buttons at 27, with the calibrated resistances, 30, and the little carbon buttons for intensity or graded voting, which I may or may not employ as shown at 34. Here the switch (22) is shown in association with its local indicator circuit as previously described, and its broadcasting circuit respectively. Here 36, although indicated conventionally as fixed in the diagram, is in reality the rotatable transmitting loop. This in my actual apparatus can be equipped with three "pig tails" or three slide rings or their equivalents. 35 is the important tuning dial condenser. 37 is a variable resistance for adjusting the resistance of the local voting circuit to be equal to the value of the radio voting circuit when the current flows through the vacuum tube (38). Here 39 is the positive terminal of the high voltage source of electric power operating the oscillator and 40 the negative terminal of the said high voltage source of electric power. The other terminals, condensers, reactors and resistances, etc., and their functions are so well known in the Hartley oscillator to radio engineers as to make any detailed description here unnecessary.

At the lower right hand corner is the variable power control rheostat previously mentioned at 23. It is through the agency of this resistance that the output power of the transmitter may be governed.

Since some of my radio voting transmitters are farther from the receiving station than others, and since some may lie in the zone of interfering buildings or other radio wave absorbing masses, it is desirable to adjust those in the less favorable positions to send out stronger vote waves, than those more favorably located. In other words, it is desirable to have all of my voting transmitters send to the common receiving center, waves of equal or sub-

stantially of equal strength. This may be accomplished by the service man when he sets up a voting transmitter by measuring the voltage of incoming signals from the broadcasting station by means of a portable tuned loop and vacuum tube voltmeter, and in adjusting the rheostat (23) accordingly. With the cooperation of the broadcasting stations, and with properly qualified and equipped service men, my voting transmitters may all be installed in widely differing and scattered zones, all adjusted to send in to the common receiving center energy waves of substantially the same energy value. The voting apparatus illustrated and described in the foregoing is primarily designed for long wave operation, and I desire at this time particularly to take full advantage in my system of the new short waves and possibly also of the ultra short waves. I shall, therefore, to the best of my ability endeavor to set some kind of a band if not a line of demarcation. It appears to be generally understood today that the short waves are those of the length of 200 meters and below. The ultra short waves appear at this writing to be waves of 5 meters length or less. Long waves, on the other hand, extend from about the 200 meter length as given above to something of the order of 24,000 meters. The very long waves have found application in trans-ocean communication and the ultra-short waves have so far only been used experimentally or else in very recent and limited practical applications. It is now believed by many physicists that the ultra-short wave spectrum is very close if not merging into the heat wave lengths.

"Beam transmission" of energy through the agency of short waves and ultra short waves has attracted much attention and has been put into practice by the present inventor in connection with his lecture hall or assembly voting and he now wishes to expand this application of radio voting to remote vote casting. In my systems, therefore, I may radiate my voting energy upon comparatively long waves, such as are now used by broadcasting stations, or I may elect to use short waves or even ultra short waves.

Figure 4. Represents in diagram three independent broadcasting stations, 41, 42 and 43, with a compass (44) showing the lay of the land, so to speak. Here 45 represent installations of my voting transmitter showing how the loop transmitters, 36, are all turned angularly to secure most efficient communication with the broadcasting station (43) and the dotted lines show how they may be turned to secure best results with the broadcasting station, 42.

46 is a telephone, telegraph or other suitable line of direct communication to show that a plurality of voters may do direct business with a plurality of broadcasting stations, or, to simplify matters, to do direct business with only one—a chosen cardinal one upon a zoning map, and have the other broadcasting stations take part by wire. Thus it will be appreciated by the present figure and the foregoing description how there may be installed a plurality of voting transmitters with marked compass dials to pick out any broadcasting station in a section of the country for direct voting contact. The voting installations, 47, on the left of the drawings are especially equipped to employ short wave and/or ultra-short wave vote transmission as diagrammatically represented by the plurality of beam reflectors, 48. These beam reflectors are represented as directing beam energy votes from Hert-

zian or other suitable tuned antenna from the associated short wave oscillators.

Figure 4B shows merely in a schematic way a partial side view of a Hertzian antenna with a reflector at the back for propagating and directing short and ultra-short radio waves, in contradistinction to the tuned loops which I have illustrated and described in connection with the conventional long wave practice.

Figure 5 represents a master broadcasting station substantially in a center portion of a city 50 with concentric circles 51, 52, 53, 54 indicating radial zones based upon a radio voltage survey, wherein the zone shown at 51 may have a 20 millivolt potential per meter, the zone at 52 may have a 19 millivolt potential per meter, the zone at 53 an 18 millivolt potential per meter, and the zone at 54 a 17 millivolt potential per meter. 55 and 56 represent suburban voters upon my radio voting system and the voter at the zone 56 as may be seen, is not only farther away from the central broadcasting station at the center of the city 50 than the voter 55, but the voter at the zone 56 lies behind the hill 57 which because of conducting mineral in the soil, for example, absorbs some of the radio energy which attempts to pass in a direction either from the broadcasting center to the voter, or from the voter to the broadcasting center.

Here at the zone 56 the millivolt potential per meter may be unduly low and in this case the rheostat upon my transmitter is set to allow the transmitter to draw more electric power, from the source as described and illustrated, and consequently to send out a stronger wave.

Since the types of circuits employed in short wave transmitters for radio work in general are more or less similar to many of the well known designs of oscillator circuits, and therefore familiar to radio experts, I do not deem it necessary to illustrate and describe them here. The same remarks also apply and hold true with short wave receivers, and suffice it to say therefore that, in the place of using tuned loops and grounded antenna for short and ultra-short waves, I have secured good results with Hertz antenna which do not require any ground connections for my sending and receiving.

Since I have proven experimentally in the open field and in the woods, that radio waves of energy produced and directed from a scattered plurality of independently operated but similarly tuned transmitters are all received with cumulative or additive effects, upon a regenerative detector amplifier receiver, I do not believe it to be necessary to illustrate and describe commercial transmitters in association with a commercial broadcasting station here, beyond the mere diagrammatic outline.

In this connection suffice it to say that I have constructed a plurality of independent and portable vacuum tube oscillators, battery driven, making use of type 230 vacuum oscillator tubes, all mounted on separate portable bases with independent multiple and individual, carbon-button pressure contactors or switches in the "B" battery circuits so as to modify as well as to cut on and off, or substantially cut on and off the respective oscillators which were substantially of the well known Hartley design. A current rheostat for current control, was also included in each circuit. The independent battery-operated multiple individual transmitters were carried about and set up in the woods, where trees and small buildings were upon all sides, the plu-

ality of independent transmitters being placed at various distances from a central receiving and sending station which consisted of a regenerative detector and amplifier detector with the output tube biased as a vacuum tube volt meter. The receiver was battery-operated also and a milli-ampere meter was connected in the plate circuit of the output tube.

Through the agency of the transmitter at the miniature central station which I placed in the woods, and portable vacuum tube volt meters, as well as neon tube testing sets for the short wavelength and ultra-short wave length, I was able to adjust the respective battery currents by means of the individual rheostats in the scattered plurality of transmitters in different zones in the woods embracing various distances and comprising trees etc., etc., so as to cause substantially the same deflection upon the milli-ampere meter at the central station when the respective independent scattered transmitters were put into operation. One after the other of the transmitters, were put into operation and a complete integration was secured upon such electrical indicators as milli-ampere meters, ballistic galvanometers, etc., etc., when placed in the circuit of the receiver. When all of the many transmitters were simultaneously operated a completely integrated result was obtained. When a plurality of persons less than the total number of persons simultaneously pressed their push button contactors, the plurality of associated transmitters propagated radio waves which were received and properly integrated in true percentage at the receiving station. On the other hand, with the carbon buttons interposed as hereinbefore mentioned, the increased power due to increased pressure upon the individual push buttons was also clearly shown upon the indicating instrument at the central station.

I believe from the foregoing that the present illustrations and descriptions of my invention, and especially in connection with the illustrations and the descriptions contained in my two previously filed and herein referred to patent applications, will enable anyone skilled in the art and science of radio engineering to put this invention into commercial practice. It is possible furthermore, that those skilled in radio science may further develop and vary the plan as well as the apparatus for radio voting as herein set forth and to find additional and extended uses for this system as described without departing from the spirit of this invention and therefore, it is not desired to be limited by the foregoing except as may be demanded by the claims.

Having described my invention, I claim:

1. A radio voting system comprising a central radio station; a plurality of individual independent stations, means whereby the plurality of individual stations may be simultaneously asked a question; means whereby the plurality of independent stations may simultaneously transmit radio waves; and means for integrating the radio waves sent from the several transmitters to the central station.

2. A radio voting system comprising a central radio station; a plurality of individual independent stations disposed in varying zones from the central station, all of the independent stations similarly tuned, the independent stations of one zone differing in power from those of another zone; means whereby the plurality of individual stations may be simultaneously asked a question; means whereby the plurality of independent sta-

tions may simultaneously transmit radio waves; and means for integrating the radio waves sent from the several transmitters to the central station.

3. A radio voting system comprising a central radio station; a plurality of individual independent stations disposed in zones of unlike radio reception, all of the independent stations similarly tuned, the independent stations of like radio reception having similar transmitting power; means whereby the plurality of individual stations may be simultaneously asked a question; means whereby the plurality of independent stations may simultaneously transmit radio waves; and means for integrating the radio waves sent from the several transmitters to the central station.

4. A radio voting system comprising a central radio station; a plurality of individual independent stations; means whereby the plurality of individual stations may be simultaneously asked a question; means whereby the plurality of independent stations may simultaneously transmit radio waves, each station with an amount of power proportionate to the number of persons voting through said station; and means for integrating the radio waves sent from the several transmitters to the central station.

5. A radio voting system comprising a central radio station; a plurality of individual independent stations; means whereby the plurality of independent stations may be simultaneously asked a question; means whereby the plurality of independent stations may simultaneously transmit radio waves, said means including devices at each station operable by a plurality of voters; and means for integrating the radio waves sent from the several transmitters to the central station.

6. A system of voting including a main broadcasting station and a subsidiary station the former adapted to present to the audience of the latter a question to be voted upon; a circuit and means therein controlled by the individuals of said audience to affect the reading of an energy responsive indicating device at said subsidiary station in full view of and readily readable by the entire audience, said device adapted to correctly integrate in terms of percentage of population of audience the total vote cast; and means at the subsidiary station to transmit to the main station radio wave energy in proportion to the votes cast.

7. A system of voting including a main broadcasting station and a subsidiary station the former adapted to present to the audience of the latter a question to be voted upon; means at the broadcasting station for receiving radio wave energy from said subsidiary station, said means including a device adapted to indicate the total potential vote cast in terms of 100 per cent; a circuit and means therein controlled by the individuals of said audience to affect the reading of an energy responsive indicating device at said subsidiary station in full view of and readily readable by the entire audience, said device adapted to correctly integrate in terms of percentage of population of audience the total vote cast; and means at the subsidiary station to transmit to the main station radio wave energy in proportion to the votes cast.

8. A system of voting including a main broadcasting station and a subsidiary station the former adapted to present to the audience of the latter a question to be voted upon; a circuit and a plurality of resistances therein said resistances

individually controlled by the individuals of said audience to affect the reading of an energy responsive indicating device at said subsidiary station in full view of and readily readable by the entire audience, said device adapted to correctly integrate in terms of percentage of population of audience the total vote cast; and means at the subsidiary station to transmit to the main station radio wave energy in proportion to the votes cast.

9. A system of voting including a main broadcasting station and a subsidiary station the former adapted to present to the audience of the latter a question to be voted upon; a wired circuit and a plurality of resistances normally connected therein, a resistance for each potential voter, said resistances adapted to be individually cut out of said circuit by the individuals of said audience to affect the reading of an energy responsive indicating device at said subsidiary station in full view of and readily readable by the entire audience, said device adapted to correctly integrate in terms of percentage of population of audience the total vote cast; and means at the subsidiary station to transmit to the main station radio wave energy in proportion to the votes cast.

10. A system of voting including a main broadcasting station and a subsidiary station, the latter including an audience, said stations adapted to present to said audience by television a question to be voted upon; a circuit and means therein controlled by the individuals of said audience to affect the reading of an energy responsive indicating device at said subsidiary station in full view of and readily readable by the entire audience, said device adapted to correctly integrate in terms of percentage of population of audience the total vote cast; and means at the subsidiary

station to transmit to the main station radio wave energy in proportion to the votes cast.

11. A system of voting including a main broadcasting station for propounding a question upon which a vote is desired; a subsidiary station adapted to receive and present the question to its audience; a circuit at said subsidiary station including an energy responsive integrating instrument and a plurality of devices each of which is adapted to influence the rate of current flow in said circuit, a device for and under the control of each potential voter of said audience, said instrument adapted to indicate a 100 per cent reading upon the casting of a unanimous vote; and means at the subsidiary station to transmit to the broadcasting station the result of the unanimous vote or any division thereof.

12. A system of voting including a main broadcasting station for propounding a question upon which a vote is desired; a subsidiary station adapted to receive and present by television the question to its audience; a circuit at said subsidiary station including an energy responsive integrating instrument and a plurality of resistances, a resistance for and under the control of each potential voter of said audience, said instrument adapted to indicate a 100 per cent reading upon the casting of a unanimous vote; and means at the subsidiary station to transmit to the broadcasting station the result of the unanimous vote or any division thereof.

13. The method of voting which consists in propounding a question by wave emanations to an unseen audience; creating radiant energy transmissions in accordance with the vote cast on said question; and collecting said transmissions.

NEVIL MONROE HOPKINS.