

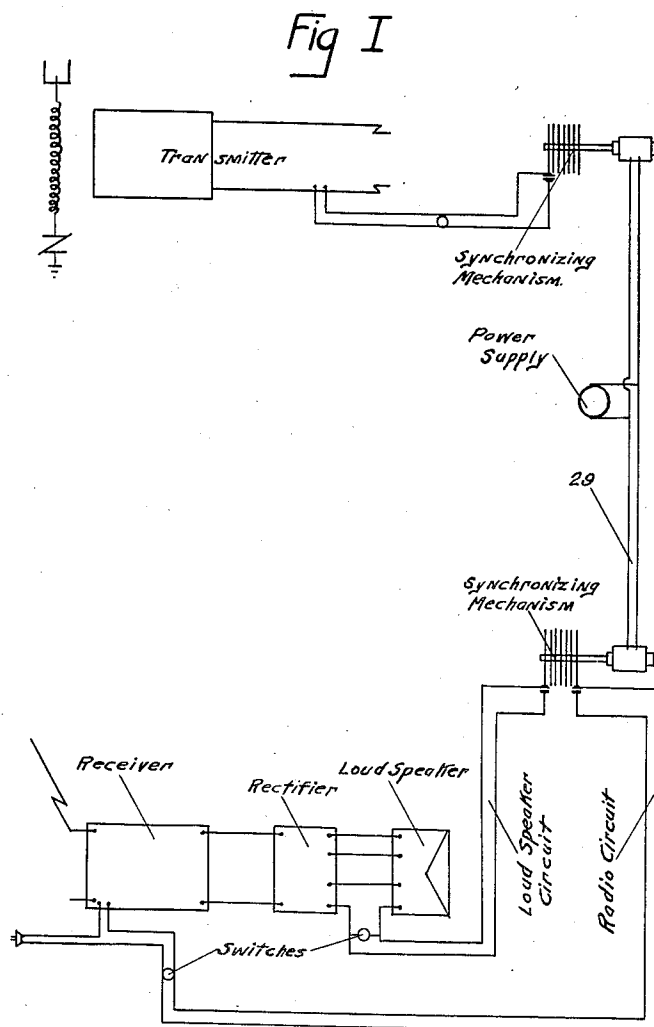
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U. C. TAINTON
COMMUNICATION SYSTEM

2,210,012

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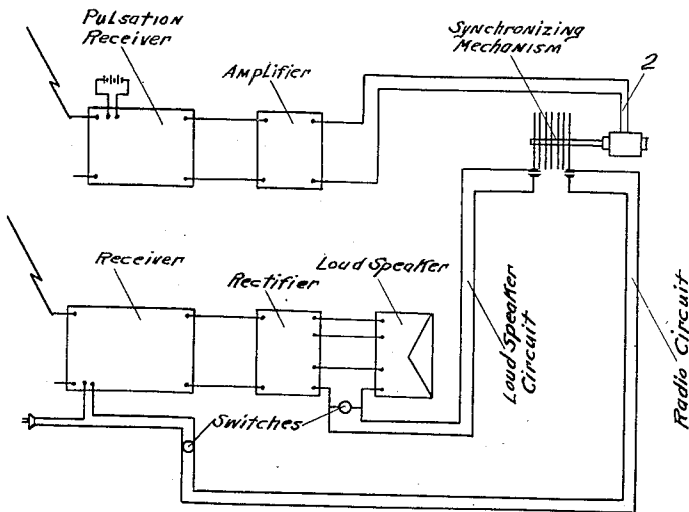
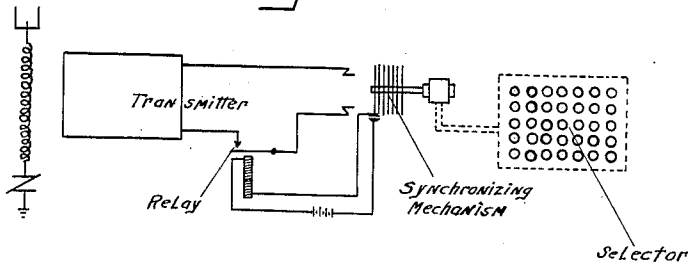
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Fig. 2



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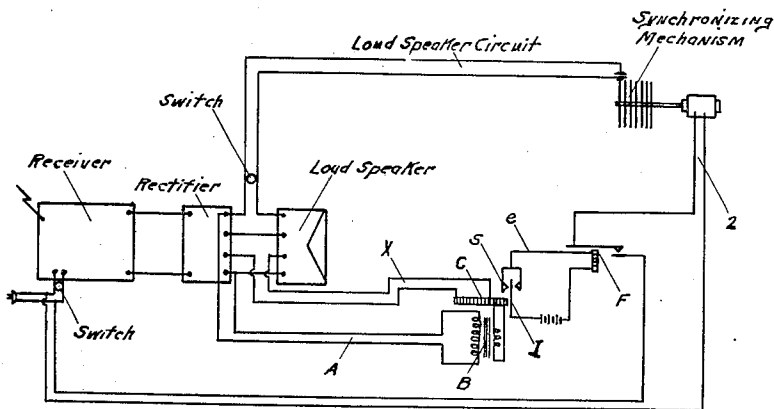
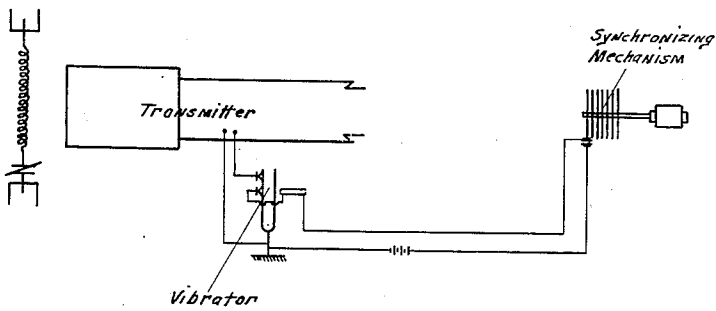
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Fig 3



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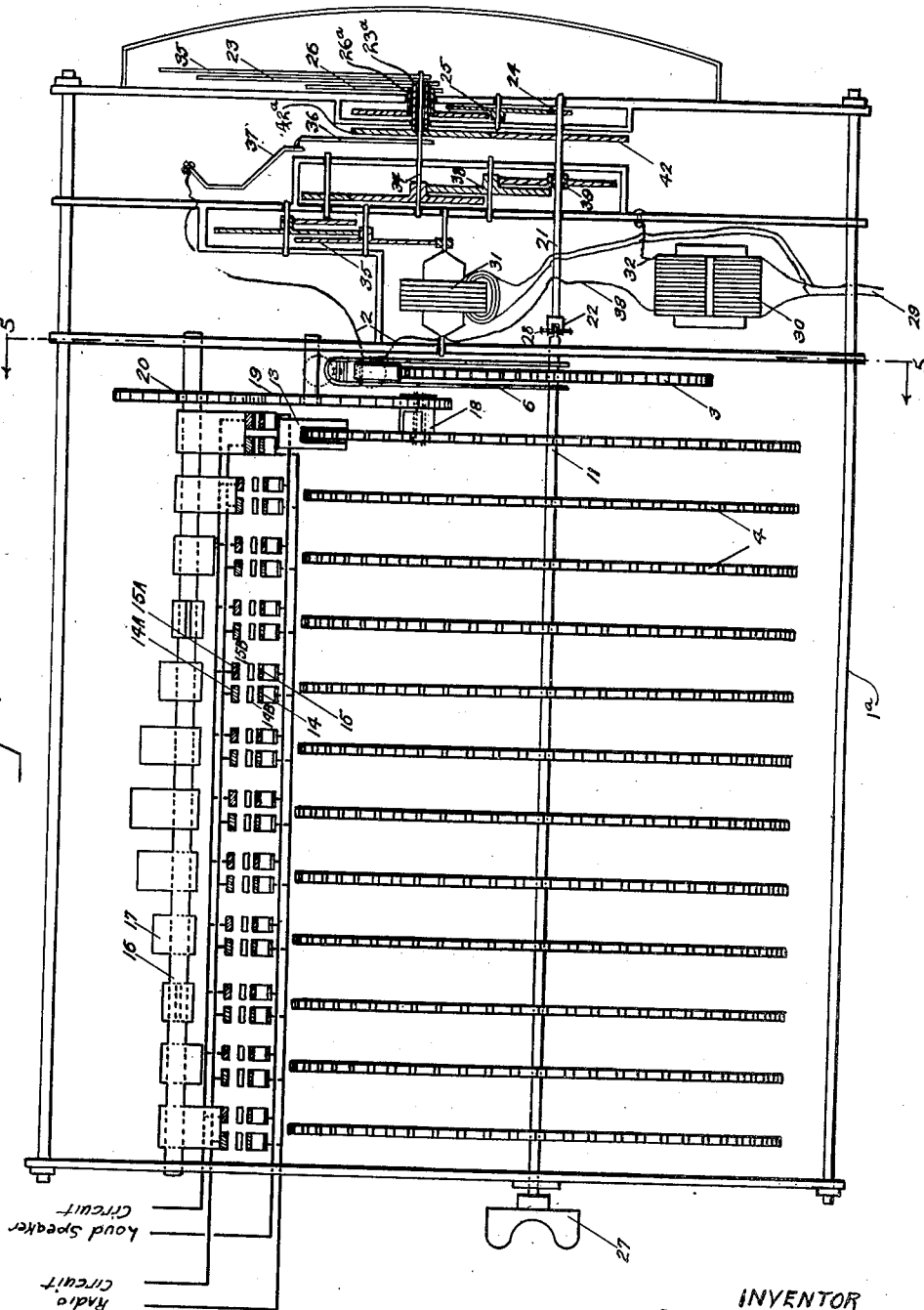
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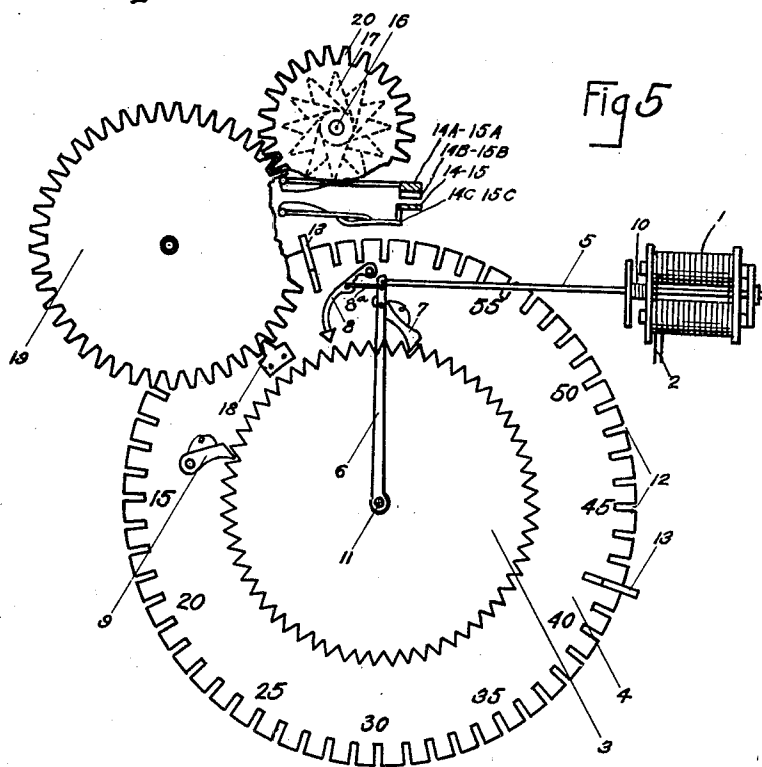
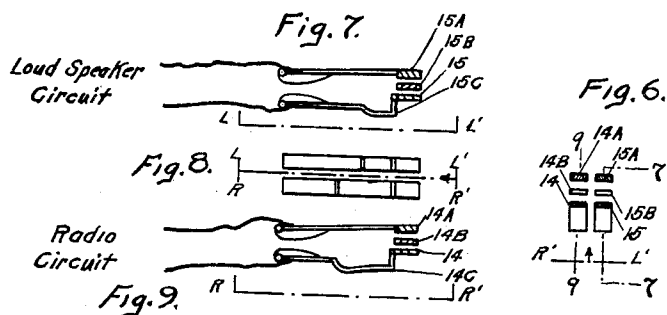
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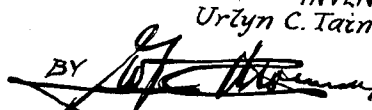
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UNITED STATES PATENT OFFICE

2,210,012

COMMUNICATION SYSTEM

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Application January 27, 1934, Serial No. 703,652

7 Claims. (Cl. 250-6)

This invention relates to a new method and means for the transmission of news by radio.

The invention is characterized by the fact that the transmitting station broadcasts news of different classifications in relatively short, consecutive periods according to a prearranged schedule, and that each receiving set is equipped with a selector mechanism adapted to enable each receiving set to receive only the particular news of the prearranged schedule desired and remain silent during the other broadcasting periods of the said schedule. The selector mechanism receives and is actuated by an impulse from the broadcasting station or by equivalent means at the end of each broadcasting period, which actuating means advances the selector mechanism one step. By a series of adjustable and removable contacts of the selector mechanism specific periods can be selected in advance so that the receiving set goes into operation at the beginning of any desired period of the broadcast and cuts out again at the end of such period.

The invention is designed more specifically for the transmission of news during the day for business offices to the end that each office will have called to its attention only the news that appertains to its particular business, plus what may be called emergency news of such character as to be of general importance. In a specific case news is transmitted from a central broadcasting station to a particular district.

Broadcasting commences at a definite time each day, say 9:00 A. M., and continues through the business day in consecutive periods, of say, one minute each. The change at the end of each period may be effected either through a synchronized system of direct wire connection between the broadcasting station and the receiver sets, as by contact with the same electric distribution system, or the change may be effected by radio waves sent from the broadcasting station and received by the receiver sets having a relay mechanism adapted to make or break the necessary contacts in the receiving set.

As an illustration of the working of the present invention, different classifications of news, as for example, reports of foreign exchanges, prices of various commodities, stock markets, etc., are transmitted at specified times and during definite periods. For example, the report on foreign exchange might be broadcast daily from 9:45 to 9:46 A. M., a report of the stock market opening in New York from 10:30 to 10:32 A. M. and a report on the sugar market from 4:35 to 4:36 P. M. A customer of the news service who de-

sires only these items of information would have the settings of the selector mechanism of his receiving set arranged accordingly. In the ordinary operation of the invention the loud speaker of the receiving set would remain silent except during these periods. In addition it may be arranged that every receiving set in the system will be connected, say once an hour, for a short period, say two minutes. During this period the broadcasting station would ordinarily be silent unless there had been in the preceding hour news of extraordinary business or other interest and of sufficient importance to justify its transmission.

An object of the invention is to provide simple, practical and reliable means for maintaining the receiving sets in time synchronization with the broadcasting station by an electrically wired circuit common to both the broadcasting station and a plurality of radio receivers or by impulses sent out by the broadcasting station at time intervals and received by the radio receivers or by wave or tone vibrations sent out by the broadcasting station at time intervals and received by the radio receivers or by a mechanical or electrical clock to advance the selector and switch mechanism of the radio receivers at time intervals of one minute or other periods and to actuate such selector and switch mechanism step by step and maintain the said mechanism in time synchronization with the broadcasting station.

Another object of the invention is to operate the main portion, the main radio circuits of the receiving set and the loud speaker circuit of the radio receiver in such a manner that the tubes will warm up prior to the broadcasting and also that the news of interest to the particular receiver attendants may be called to their attention by automatically turning on the radio receiver.

With these and other objects in view, the invention consists in the construction and novel combination and arrangement of parts herein-after described, illustrated in the accompanying drawings, and set forth in the claims hereto appended, it being understood that various changes in the form, proportion, and minor details of construction, within the scope of the claims, may be resorted to without departing from the spirit of the invention or sacrificing any of the advantages thereof.

In the drawings:

Figure 1 is a diagrammatic view of a radio broadcasting and reception system employing an electrically wired circuit common to both the broadcasting station and a radio receiver for ac-

tuating the selector and switch mechanism of the radio receiver and for keeping the same in time synchronization with the broadcasting station.

Fig. 2 is a similar view illustrating the manner of actuating the selector and switch mechanism of the radio receiver and maintaining the same in time synchronization with the broadcasting station by means of impulses sent out by the broadcasting station.

Fig. 3 is a diagrammatic view of a radio broadcasting and reception system utilizing wave or tone vibrations for actuating the selector and switch mechanism of the receiver set and for maintaining the same in time synchronization with the broadcasting station.

Fig. 4 is a vertical sectional view of the selector and automatic time switch mechanism.

Fig. 5 is a vertical sectional view of the same taken substantially on the line 5-5 of Fig. 4 showing the selector and automatic switch mechanism in end elevation, a portion of one of the gears being broken away to illustrate the switch mechanism more fully.

Fig. 6 is a detail view partly in section of one of the sets of switches.

Fig. 7 is a detail sectional view taken substantially on the line 7-7 of Fig. 6.

Fig. 8 is an elevation of the switches looking in the direction of the arrow in Fig. 6.

Fig. 9 is a detail sectional view taken substantially on the line 9-9 of Fig. 6.

Referring particularly to the embodiment of the invention illustrated in Figs. 1 and 4 to 9, inclusive, 1 designates an electromagnet which is supplied by wires 2 which may receive their electrical energy for energizing the electromagnet from either amplified impulses or waves or a wire connection and instead of employing an electromagnet, a solenoid or equivalent instrumentality may be provided. A rod 5 connects the electromagnet to a pivoted ratchet arm 6 carrying a spring pawl 7 arranged to engage and actuate the ratchet wheel 3 for moving the same forwardly one step, the distance of one tooth during each energization of the electromagnet. In order to limit the forward rotation of the ratchet wheel to the distance of one tooth during each operation of the mechanism by the electromagnet, the ratchet arm is connected with and actuates a pivoted stop pawl 8 normally arranged out of engagement with the ratchet wheel and adapted to be carried into engagement with the same during each operation of the ratchet mechanism. The oscillation of the ratchet arm 6 moves the stop pawl into and out of engagement with the ratchet wheel 3 which is held against retrograde rotation by a spring actuated check pawl 9. The check pawl 9 which is maintained in engagement with the ratchet wheel by its spring is arranged to permit forward rotation of the ratchet wheel and to form a positive lock for preventing backward movement of the same. The electromagnet when energized moves the ratchet arm 6 forwardly and the backward movement of the ratchet arm to return the same to its initial position when the electromagnet is de-energized is effected by means of a coiled spring 10 located at the inner side of the armature and arranged to move the same outwardly with respect to the coils and cores of the electromagnet.

The ratchet arm 6 which is arranged in substantially a vertical position is pivotally mounted at its lower end on a shaft 11 to which the ratchet wheel 3 and the disks 4 are keyed or otherwise fixed. The actuating pawl 7 which is

preferably located above the ratchet wheel is pivotally mounted on the ratchet arm 6 at the upper portion thereof and the rod 5 is pivotally connected to the upper end of the ratchet arm which is also connected by a short link 8a with the stop pawl 8. The stop pawl 8 which is arranged at a slight inclination is pivotally mounted at its upper end and its lower end is slightly curved and provided with a tapered head for engaging between the tapering teeth of the ratchet wheel. Any suitable form of electromagnet may, of course, be employed, and the ratchet mechanism may be arranged in any other desired manner, as will be readily understood. If electrical energy is supplied to the electromagnet once every minute the ratchet wheel 3 and the disks 4 will advance one position per minute. The actuating pawl, the stop pawl and the check or locking pawl cooperate in producing a positive and definite forward movement of the disks 4. Instead of advancing the ratchet wheel 3 and the disks 4 at minute intervals or time intervals, intervals of any other character may be employed, such as news intervals and the impulses or other means for actuating the selector mechanism of each set will operate or actuate a selector mechanism at the required intervals to maintain the receiving sets in synchronization with the broadcasting station.

When the ratchet wheel 3 and the disks 4 are operated at minute intervals each disk 4 is provided in its periphery with sixty radially arranged slots 12 designed in practice to be labeled from one to sixty to correspond to the minutes in an hour, and the number of disks 4 represent the number of hours through which any individual or number of minutes may be previously selected to operate the switching mechanism of the radio circuits and the loud speaker of a radio receiver. In order to set the switch mechanism to operate for the desired predetermined minutes the selector mechanism of the radio receiver is provided with keys 13 which are adapted to be arranged in the radial slots 12 and it is only necessary to place the keys 13 in the slots which correspond to the said minutes it is desired to operate the receiving set. For example, Fig. 5 shows the keys 13 set in the disks 4 to operate the third and forty second minutes while Fig. 4 shows a key on the first disk 4 operating the switches.

Mounted on insulation above each of the disks 4 are four spring switches, see Figs. 6 to 9, inclusive, switch 14 being the radio circuit minute switch, switch 14A the radio circuit hour switch, switch 15 the loud speaker minute switch and switch 15A the loud speaker hour switch. Interposed between each pair of switches 14 and 14A is a conductor 14B which allows current to pass from switch 14 to switch 14A when both of the switches 14 and 14A are closed and similarly a conductor 15B which is located between each pair of switches 15 and 15A allows current to pass from switch 15 to switch 15A when both switches are closed.

An arcuate contact 140 of the minute radio circuit switch 14 has a sufficiently longer arc than an arcuate contact 15C of the minute loud speaker switch 15 so that the selector key 13 will close the radio circuit one minute in advance of the loud speaker circuit.

Spirally mounted above the hour switches on a shaft 16 are spaced fiber cams 17 which rotate periodically to close and open progressively the hour switches 14A and 15A. The shaft 16 is ar-

ranged parallel to the axis of the disks 4 and a suitable frame or chassis 1^a is provided for the selector mechanism of the radio receiver. Attached to the outer side of the first hour disk 4 is a tooth 18 which engages two teeth of a gear 19 during each revolution of the disks 4. Keyed to the cam shaft 16 is a gear 20 which meshes with the gear 19. The gear 20 has twice as many teeth as there are cams 17 on the cam shaft 16 so that during each revolution of the disks 4 two quick rotative movements timed one minute apart will be imparted to the cam shaft to close and open the hour switches. The cams 17 are arranged to successively operate the hour switches. The first rotative movement will close the hour switches associated with one of the disks 4 and the second rotative movement will open the hour switches of the hour disk which was previously in action or operation for controlling the radio receiver, for instance, the cam 17 which controls the hour switch of the first disk maintains its hour switch closed during the first movement which closes the hour switch of the second disk, and the following minute when the cam shaft 16 is next operated the rotative movement opens the switch of the first disk, but maintains the hour switch of the second disk closed which remains closed for one hour.

This operation of the cam shaft will successively open and close the hour switches associated with each of the disks 4 and the hour switches of the set of disks 4 will be successively operated, as will be readily understood. This method of opening and closing the hour switches provides for quick make and break contacts and produces a smooth continuous operation of the radio receiver and one minute is assured for the filaments of the radio tubes to become heated in advance of the closing of the loud speaker circuit.

Extending forwardly from the shaft 11 of the disks 4 and in line with the said shaft 11 is a shaft or arbor 21 which is connected at its rear end to the front end of the shaft 11 by a coupling 22. Keyed to the shaft 21 is a gear 42 which through a meshing gear 42^a drives a hand 23 which corresponds to the minute hand of a clock. The gear 42^a is loosely mounted on a shaft 34 and the minute hand 23 is secured to a sleeve 23^a suitably mounted on and extending forwardly from the gear 42^a. The shaft 21 also has keyed to it a pinion 24 which through reduction gears 25 drives a hand 26 corresponding to the hour hand of a clock. The hour hand 26 is mounted on a sleeve 26^a extending forwardly from the reduction train of gears 25, as clearly illustrated in Fig. 4 of the drawings. A wing nut 27 which is fastened to the rear end of the shaft 11 is adapted to be used for setting the disks 4 and the minute and hour hands 23 and 26. A removable pin 28 of the coupling 22 may be provided for enabling the disks to be turned without moving the hands 23 and 26.

If the synchronized selector switch mechanism illustrated in Figs. 4 to 9, inclusive, is to be supplied by an electrically wire circuit connected to the broadcasting station as illustrated in Fig. 1 of the drawings, electrical energy is supplied to the synchronized selector switch mechanism through wires 29 which supply a transformer 30 and a synchronized motor 31. One of the secondary wires 32 of the transformer is attached to the chassis 1^a of the mechanism and the other wire 33 is connected to one of the leads 2 of the electromagnet or solenoid 1. The shaft 34 which corresponds to the second hand shaft or arbor of

a clock mechanism is driven by the synchronous motor 31 through a reducing train of gears 35. Attached to the shaft 34 is a hand 35 which corresponds to the second hand of a clock and a contact arm 36 which is mounted on the shaft 34 engages a contact 37 once every revolution of the shaft 34. A wire connection from the contact 37 forms the other lead 2 of the electromagnet or solenoid 1 so that for every revolution of the shaft 34 the circuit is completed to the solenoid or electromagnet 1 and the disks 4 progress one step.

The motion of the shaft 34 is reduced through a reducing train of gears 38 and transmit to the shaft 21 through a friction drive bearing 39. From the foregoing it will be apparent that the number of revolutions per unit time of the shafts 11 and 21 are identical, but that the shaft 11 turns in very quick impulses its motion being produced by the solenoid electromagnet 1 while the shaft 21 turns at a constant speed, this motion being supplied by the synchronous motor 31.

The coupling 22 provides enough play or loose motion between the shafts 11 and 21 to allow the shaft 21 to rotate freely and continuously without being affected by the rotation of the shaft 11 which is rotated entirely by the quick motion of the electromagnet or solenoid 1. However, through the wing nut 27 the shaft 21 may be turned to set the minute hand 23 and the hour hand 26 but not the second hand 35 as the reverse friction of the train of gears 35 and 38 is too great for the friction bearing 39.

Although the synchronous switch mechanism has been described as a step by step operation to correspond to units progressing in time, namely, minute by minute, it is not necessary that the said switch mechanism or similar or equivalent construction be so operated. Each step or notch on the disks 4 or other selector position for the means for operating the contacts may represent different periods of broadcast, such as news periods or news items. By pulsations in quick succession the switch contact operating keys or other selector elements will be brought into position to close the radio switch and one additional pulsation will close the loud speaker circuit when the particular news will be broadcast to the receiver set which will deliver such particular news. The number of different positions possible for the accommodation of the contact operating keys 13 is designed to correspond to the number of news items broadcast, while those positions at which the keys 13 are set to operate will be the news items of interest to the individual radio receiver attendant, subscriber or owner.

In Fig. 1 of the drawings is illustrated diagrammatically the broadcasting and reception system when the synchronous switch mechanism illustrated in Fig. 4 is supplied by an electrical wire circuit connected to the broadcasting station, the electrical energy being supplied to the synchronous switch mechanism through the wires 29 as heretofore described from a central standard power supply furnishing an alternating current of sixty cycles so that the synchronous motor 31 will be operated accurately in the same manner as electrical clocks of the ordinary or usual construction. The receiving set which is illustrated diagrammatically need not be elaborate. Ordinarily, it will operate on only one frequency or wave length and does not require any arrangements for tuning. Furthermore, the receiving sets will not ordinarily be required to pick up stations at a distance as they will be adapted for

the sole purpose of responding to impulses from a relatively near by station. The receiving set is designed to be equipped with appropriate switches which will enable the customer or subscriber to supersede the action of the synchronous switch mechanism so that the receiving set can be switched off or on at any time without interrupting the operations of the synchronous switch mechanism. Both the broadcasting station and the receiving sets, as illustrated in Fig. 1 of the drawings, will be equipped with synchronous switch mechanism operated by the alternating current of the central power supply station so that the broadcasting station and the receiving sets will be maintained in synchronization and the broadcasting station will have the means of ascertaining exactly the position of the synchronizing switch mechanism of the receiving sets. The transmitter of the broadcasting station illustrated in Fig. 1 is connected to the synchronizing mechanism as shown, which produces impulses, while the receiving sets are each connected to a synchronizing mechanism which receives the impulses and operates the main portion of the radio receivers.

In Fig. 2 of the drawings is diagrammatically illustrated the radio broadcasting and reception system when the synchronism of the radio receivers to the broadcasting station is accomplished by pulsations produced by the broadcasting station. The transmitter is connected to a synchronizing mechanism which produces impulses while the receivers are connected to a synchronizing mechanism which receives the impulses and operates the main portion of the radio receivers. The pulsations may be produced in the transmitter by simply making and breaking a secondary circuit which operates a relay to produce the pulsation in the transmitter. As illustrated diagrammatically in Fig. 2, a standard pulsation selector may be employed in connection with the transmitting synchronizing mechanism to produce the desired movement in said mechanism, thus producing conjunctively the correct number of impulses to always maintain the switch mechanism of the receiver in synchronization with the transmitting synchronizing mechanism. The standard pulsation selector which is of the ordinary construction enables the desired number of impulses to be imparted to the synchronizing mechanism of the transmitter by simply pushing a button or equivalent operating means.

A portion of the radio receiver, always in tune with the broadcasting station, is left turned on during the operating period. This portion of the radio receiver is represented in Fig. 2 by the pulsation receiver.

These pulsations are amplified and the amplified electrical energy is transmitted to the synchronizing switch mechanism through the leads 2. The remaining portion of the receiving set is the same as the receiving set of Fig. 1 of the drawings. The receiving sets are plugged into an outlet or socket of a lighting system or current supply in the usual manner.

In Fig. 3 of the drawings is illustrated a radio broadcasting and reception system in which the receivers are controlled by wave or tone vibrations sent out by the transmitting stations. The receivers are so constructed that a different wave or tone will cause a vibrator to oscillate and close a circuit which actuates the synchronizing switch mechanism of the receivers. The receivers employed in this system are turned on during the operating period. The wires A parallel the ampli-

fied circuit ordinarily delivered to the loud speaker. The secondary of the transformer B leads to an electromagnet C which also contains a flux from the rectified current of the circuit of the radio receiver through the wires X. The vibrator I is so designed that a definite wave or tone when amplified and led through the wires A to the electromagnet C will cause the vibrator I to vibrate sufficiently to close a switch S which energizes a relay F through the wire e to energize the solenoid or electromagnet I in the synchronizing switch mechanism through the leads 2. The synchronizing switch mechanism for the system illustrated in Fig. 3 of the drawings is only equipped with loud speaker switches as the radio circuit must be turned on in order to receive the wave tone.

The transmitter is equipped with a mechanical electrically charged vibrator illustrated diagrammatically in Fig. 3 of the drawings, the vibration of which vibrator of the transmitter is, of course, a function of this construction. The vibrator is energized at time intervals by a synchronized switch mechanism, but a standard impulse selector may, of course, be employed in connection with the synchronizing mechanism of the system illustrated in Fig. 3.

While in describing the invention several methods and types of arrangements have been described for carrying out the radio broadcasting and reception system, various other changes in the details of construction, such as the substitution of a mechanical clock for the synchronous motor mechanism, may be employed without departing from the spirit of the invention so long as the broad results sought to be achieved are accomplished by means which operate in accordance with the principles described herein.

What is claimed is:

1. A system for the selective transmission of news comprising means for broadcasting news in consecutive periods according to a definite schedule, and means actuated by the broadcasting station and operated by the same for simultaneously controlling the operation of a plurality of radio receiving sets in accordance with said definite schedule including mechanism at each receiving set independent of the broadcasting station for enabling a selection to be made of the said consecutive broadcasting periods during which such receiving set will operate and in advance of such operation and while said mechanism is responding to each actuating operation of the broadcasting station.

2. A system for the selective transmission of news comprising means for broadcasting news in consecutive periods according to a definite schedule, and means for simultaneously controlling the operation of a plurality of radio receiving sets by means of uniformly similar impulses transmitted to each receiving set at the end of each broadcasting period of said definite schedule including mechanism at each receiving set independent of the broadcasting station for enabling a selection to be made of said consecutive broadcasting periods during which such receiving set will operate and in advance of such operation and while each receiving set responds to each operating impulse of the broadcasting station.

3. A system of selective transmission of news comprising means for broadcasting news in consecutive periods according to a definite schedule, and means, actuated by the broadcasting station and operated by the same, for simultaneously controlling the operation of a plurality

of radio receiving sets, and for maintaining the same in periodic synchronism with the broadcasting means, including mechanism for enabling a selection of broadcast receiving periods to be made at each receiving set, independent of the broadcasting station, in advance of the said consecutive broadcasting periods, during which such receiving set will operate, and while such receiving set responds to each operation of the actuating means of the broadcasting station.

4. A system for the selective transmission of news comprising means for broadcasting news in consecutive periods according to a definite schedule, and means for simultaneously controlling the operation of a plurality of radio receiving sets, in accordance with said definite schedule and for maintaining the receiving sets in periodic synchronism with the broadcasting means, by means of uniformly similar impulses, transmitted to each receiving set at the end of each broadcasting period of said definite schedule, including mechanism at each receiving set independent of the broadcasting station for enabling a selection to be made of the said consecutive broadcasting periods, during which such receiving set will operate in advance of such operation, and while each receiving set responds to the controlling impulses at the end of each period of said definite schedule.

5. In a system for the selective transmission of news, a plurality of radio receiving sets having switch mechanisms operated simultaneously by uniformly similar impulses whereby the operation of the receiving sets may be interrupted or established, and means at each receiving set for setting the switch mechanism independently of the switch mechanism of the other receiving sets so that the said receiving set will be in or out of operation between consecutive impulses

according to a selection made in advance and while the receiving set is responding to said impulses.

6. A system for the selective transmission of news comprising means for broadcasting news in consecutive periods according to a definite daily schedule, and controlling means actuated by the broadcasting station and operated by the same for simultaneously controlling the operation of a plurality of radio receiving sets including mechanism at each receiving set independent of the broadcasting station for enabling a selection to be made of said consecutive broadcasting periods during which such receiving sets will operate and while each receiving set responds to each operation of the controlling means of the broadcasting station, and means for continuously operating the controlling means for effecting a daily repetition of the broadcasting schedule during working hours and for disconnecting the receiving sets during non-working hours.

7. A system for the selective transmission of news comprising means for broadcasting news in consecutive periods according to a definite schedule, and means, actuated by the broadcasting station and operated by the same, for simultaneously controlling the operation of a plurality of radio receiving sets including mechanism at each set, independent of the broadcasting station, for enabling a selection to be made and while the receiving sets are each responding to each operation of the controlling means of the broadcasting station, including switch mechanism synchronized with the set controlling means of the broadcasting station and having means for closing the radio tube circuits prior to closing the loud speaker circuit and for warming up the radio tubes in advance of the receiving period.

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