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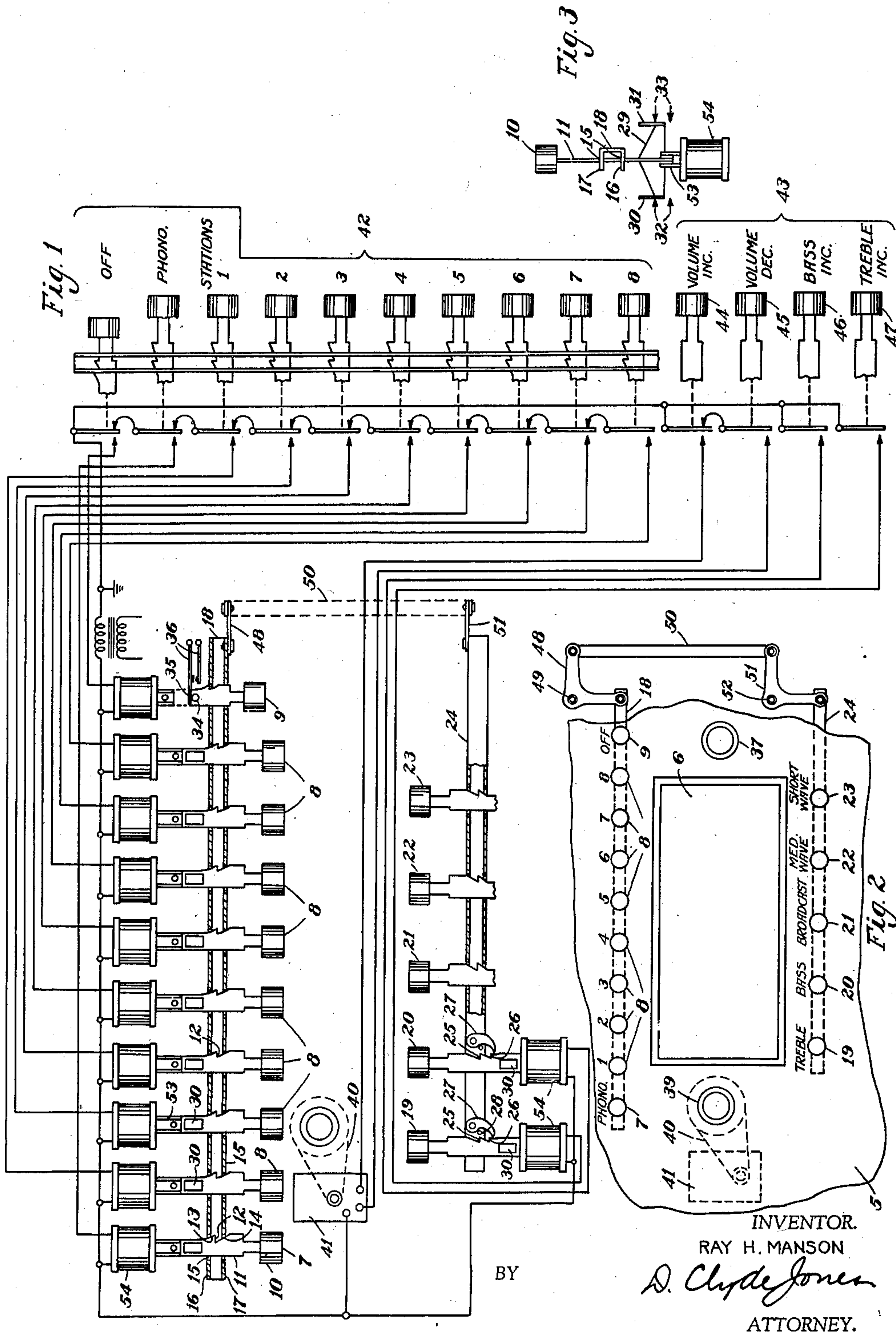
R. H. MANSON

2,241,148

COMBINED RADIO AND PHONOGRAPH CONTROL SYSTEM

Filed June 11, 1938

2 Sheets-Sheet 1



BY

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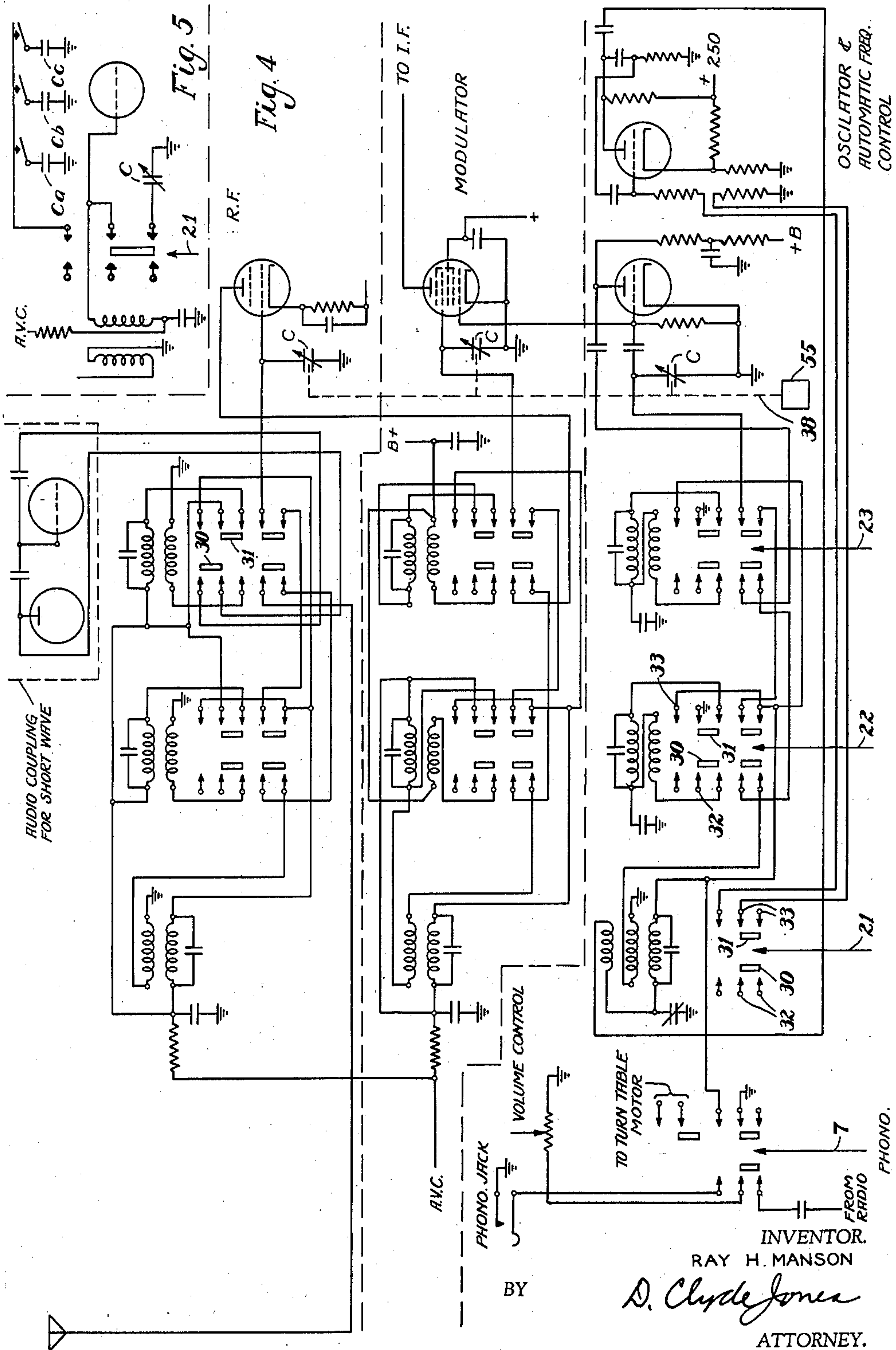
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UNITED STATES PATENT OFFICE

2,241,148

COMBINED RADIO AND PHONOGRAPH
CONTROL SYSTEM

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Application June 11, 1938, Serial No. 213,238

8 Claims. (Cl. 179—100.11)

This invention relates to program reproducing systems and more particularly to a system including a combined phonograph and a radio receiver in which system push buttons are utilized to switch into operation either the phonograph or the radio receiver and to effect the tuning of the receiver to desired stations.

While such radio-phonograph combinations have been arranged for operation by means of keys located thereat as well as by remotely located keys, such arrangements have been confusing to inexperienced operators, since it has been necessary to manipulate a plurality of keys in a given sequence to switch from one type of program reproduction to another. Also in former arrangements if the radio receiver had been controlled by the keys at a remote point and it was desired to operate the radio receiver from the local keys, it was necessary to disable the remote keys. Thus in changing from direct to remote control operation of the radio receiver and vice versa it was frequently necessary to manipulate a plurality of keys or switches before the desired broadcast program could be received.

The present invention has for its purpose a combined radio receiving and phonographic system of the character described, in which but a single switching operation is necessary, not only for disabling the parts of the system unnecessary for any given control, but also for selectively operating the system to reproduce the desired program.

The various features and advantages of the invention will appear from the detailed description and claims when taken with the drawings in which Fig. 1 is a diagrammatic showing of the control portion of a combined radio receiver and phonograph system with local push button keys for selectively operating either the phonograph or the radio receiver, and with similar push button keys located at a remote point for effecting a similar selecting operation;

Fig. 2 is a front elevation of the control panel of the combined phonograph and radio receiver of this invention particularly illustrating the interlocking arrangement of the several keys there shown;

Fig. 3 is a detailed view of a push button key with the switching contacts controlled thereby as well as of a solenoid for effecting a supplemental operation of the key;

Fig. 4 is a schematic showing of a portion of the tuning circuits of a radio receiver to be controlled by the present arrangement, and

Fig. 5 is a fragmentary schematic showing of a modified tuning arrangement.

Referring to the drawings, the numeral 5 generally designates a fragment of a cabinet (Fig. 2) in which an automatic, record changing phonograph and a radio receiver chassis (not shown) are housed. In the front panel of this cabinet, there is mounted a dial 6 bearing legends and cooperating means (not shown) functioning in accordance with the well known practice to indicate on which of several frequency bands the radio receiver is operating and to indicate the tuning of the radio receiving circuits. A plurality of push button keys including a phonograph selecting key 7, eight station selecting keys 8 and an "off" key 9, project in a row or series from the portion of the panel above the dial. Each of these keys as illustrated in Fig. 1 comprises a push button 10 carried by a spring-returned, depressible key stem 11 preferably formed from sheet metal and suitably mounted in a frame-work (not shown). Each key stem is provided in one of its edges with a notch or catch 12 located between adjacent inclined edge portions 13 and 14 of the stem one or both of which portions may be effective to release a depressed key in the manner to be described. The key stems of the series extend through individual pairs of aligned slots 15 suitably spaced in the flanges 16 and 17 of a channel-shaped locking bar 18, the slots in the flange 16 being of a length slightly greater than the maximum width of their related key stems. This bar is normally spring-urged toward the left, as viewed in Fig. 1, but when its flange 16 is engaged by the inclined portion 13 of a key stem being depressed, the bar is forced toward the right until the flange 16 snaps over the catch 12 on the stem of the depressed key to hold this key in its depressed position. From this construction it will be appreciated that the locking bar when moved toward the right, on the depression of a key, will latch this key in its depressed position but will release the catch of any prior operated key so that its spring restores it to its normal outward position.

In addition to the upper series or row of keys, there is provided a second series or row of keys located below the dial. This second series of keys comprises a "treble" key 19, a "bass" key 20, and three band selecting keys 21, 22 and 23. The "treble" key 19 serves to effect the tone control adjustment of the radio receiver whereby the higher frequencies of any program being received, may be varied at the will of the operator,

while the "bass" key 20 effects the control of that portion of the radio receiver whereby the tone of the lower frequencies of the program may be varied at the choice of the operator. The band-selecting keys are effective to switch the radio receiver to any one of three broadcasting bands, namely to the standard broadcast band, to the so-called medium wave band and to the short wave band. This second series of keys is likewise provided with a locking bar 24 which is similar in construction and operation to that already described.

It should be pointed out that the treble and bass keys 19 and 20 are locked in depressed condition in a different manner from the other keys in the two series and when depressed do not shift the locking bar 24 to release other keys. These two keys have two notches or ratchet teeth 25 and 26 provided in their key stems, which teeth are adapted to be engaged respectively by dogs 27 pivotally mounted on the locking bar 24. By this construction three degrees of "treble" and "bass" control can be effected. A pin 28 on the locking bar adjacent each dog is arranged to disengage its dog from the cooperating teeth on the stem of its related key whenever the locking bar is moved toward the right to its releasing position.

As shown in Fig. 3, the key stem of the phonograph key 7 and of the eight stations selecting keys 8 each carry a strip of insulation 29 on the respective ends of which there are mounted conducting pieces 30 and 31. These conducting pieces are respectively located in operative relation to pairs of fixed contactors 32 and 33 of which only two pairs are shown in Fig. 3. By this construction when one of these keys is in its normal or released position the connections between the respective pairs of fixed contactors are open, whereas, when the key is depressed, each conducting piece electrically bridges the related pair of fixed contactors.

The switch controlled by the "off" key 9 differs from the switching arrangement provided for the other keys, since a pin 34 projects from its key stem which pin is engaged by a projection 35 on one contact spring of the pair 36. It will be appreciated that this switching arrangement is shown merely by way of example, since other types of switches of well known construction can be actuated by the pin.

The locking bar 24 as well as of the first mentioned locking bar 18 are so inter-related that the operation of one of these bars effects a like operation of the other. The construction for accomplishing this result is best shown in Fig. 2 whereby the locking bar 18 has pivotally connected to one of its ends a bell crank lever 48 which is rotatably mounted on a fixed pivot 49. The free end of this lever is connected by a link 50 to the corresponding end of a second bell crank lever 51. This second lever which also is mounted for rotation on the fixed pivot 52, has its other free end pivotally connected to the second locking bar 24.

The front panel 5 of the radio receiver as illustrated in Fig. 2 is also provided with a tuning knob 37 for adjusting the common tuning shaft 38 (indicated by dotted line in Fig. 4), of the radio receiver gang tuning condenser C. C to any desired station in the broadcast band. This arrangement is necessary since it will be understood that the eight tuning keys serve only to select eight favorite stations from the numerous stations available in this broadcast band. The front panel of the radio receiver is also equipped with a sec-

ond knob 39 which adjusts the volume control (not shown) in the well known manner. It will be noted from Fig. 2 that the shaft of the volume control device is connected by a belt 40 or other suitable connection to the shaft of a reversible motor 41 which is also adapted to operate the volume control from a remote point as will be hereinafter described.

The present system is also arranged so that the radio-phonograph combination can be selectively controlled from a remote point such as that indicated diagrammatically at the right hand portion of Fig. 1. At this remote station there are provided ten interlocking keys 42 corresponding to and of similar construction to the upper series of keys 7, 8 and 9 located at the radio receiver. These keys, when fully depressed each operate a solenoid associated with a related key of the first mentioned series as will appear hereinafter. However, solenoids are unnecessary for operating keys 42 and their make contacts are closed only when the keys are fully depressed but are open when the key is held in its locked position. In this arrangement the locking of a key in its partially depressed condition is merely for indication of the switching operation that has taken place at the radio phonograph combination. There are also provided at the remote station four non-locking keys 43. Two of these last-mentioned keys include a "volume increase" key 44 which closes a circuit for operating volume control motor 41 in a direction to increase the volume of the reproduced signal and a "volume decrease" key 45 which rotates the volume control motor in the reverse direction to diminish the volume. The two remaining keys include the "bass" increase key 46 which operates the solenoid associated with the "bass compensation" key 20 at the radio receiver and the "treble increase" key 47 which operates the solenoid associated with the treble key 19 at the radio receiver. It will be seen that when the "bass" and "treble" keys of the radio receiver are operated by the solenoids, no adjustment in the intermediate position of these keys can be effected since the dogs of both of these keys will engage the uppermost notches on their key stems when depressed by the solenoids.

The key stem of each of the keys of the first series as well as each of the key stems of the bass and treble keys, is connected to the longitudinally movable core 53 of a solenoid 54 so arranged that when the solenoid is energized electrically by depressing a related key 42, 46 or 47, it will attract its core and thereby depress a given key in the same manner as when the key is manually depressed by forcing its button inwardly.

In Fig. 4 there is illustrated diagrammatically the band switching portion of a conventional radio receiver adapted to receive programs in standard broadcast range as well as in the intermediate range and the short range. The intermediate frequency amplifier, the second detector and audio portion of this receiver, as well as the loud speaker have been omitted. In this showing, the tuning arrangement of the radio frequency stage RF, the oscillator and automatic frequency control unit and the tuning portion of the modulator are illustrated. The three band selecting keys 21, 22 and 23 have their fixed contacts 32 and 33 represented by arrows and their respective movable contactors 30 and 31 by oblongs, the movable contactors being shown in the normal or released position of these switches. These three keys are different from the key illustrated in Fig. 3 in that

two or more movable contactors 30 and 31 may be provided on the key stems, as illustrated diagrammatically by the oblongs in Fig. 4, for cooperation with a plurality of pairs of fixed contacts 32 and 33. Further, certain of the contactors may be staggered as shown in the R. F. stage of the short wave key 23. It is believed to be unnecessary to trace the various circuits completed in the several positions of these switches since such circuits are well known in the art.

The motor 55 (Fig. 4) which functions in the same manner as the tuning knob to adjust the rotor of the gang condenser may have operating circuits similar to those provided for the motor 16 in the Manson et al. Patent #1,926,393 granted September 12, 1933. It will be understood that the solenoids associated with the eight favorite stations selected push buttons will complete circuits similar to those completed by the movable switch 48 and the fixed contactors 49, 50, 56, etc., of the mentioned patent.

The phonograph key 7 shown in the left hand corner of Fig. 4 functions in the well known manner, both to complete the operating circuit for the turntable motor and to connect the phonograph pick up (not shown) to the audio portion of the radio receiver, likewise not illustrated and also serves at the same time to disconnect the radio portion of the radio phonograph combination.

While the invention is shown in Fig. 4 for use with a motor-operated tuning system, it will be understood that the arrangement of the present invention is equally well adapted for use in a system wherein the gang tuning condenser is disabled and so called trimmer condensers are substituted to tune the radio receiver to any one of the eight favorite stations in the standard broadcast band as shown in Fig. 5 wherein there is illustrated a portion of the circuits associated with the standard broadcast band selecting push button 21. From this showing, it will be understood that when this push button key is in its normal position the gang condenser C, C is effective in this network and the trimmer condensers Ca, Cb, Cc, etc. are disabled. However, when this push button key is depressed, the gang condenser is disabled and the trimmer condensers are substituted therefor, so that on the operation of one of the eight solenoids (the contacts controlled by these solenoids only being shown), its associated trimmer condenser will be connected into the tuning circuit network to tune the same to the desired favorite station.

What I claim is:

1. In a radio receiving system, a radio receiver including switches for tuning the same, a bar common to said switches, said bar serving to lock a switch, when operated, in operated position and simultaneously to unlock a previously operated switch, a solenoid having a lengthwise movable core individual to each switch and serving to operate the same, manually operated switches remote from said radio receiver and corresponding to said first mentioned switches, and circuits completed by said remote switches for selectively actuating any desired solenoid to operate any desired switch at said radio receiver.

2. In a radio receiving system, a radio receiver including keys for tuning the same, a push button for depressing each key, a bar common to said keys, said bar serving to lock a key, when depressed, in operated position and simultaneously to unlock a previously depressed

key, a solenoid having a lengthwise movable core individual to each key and serving to depress the same, keys remote from said radio receiver and corresponding to said first mentioned keys, and circuits respectively completed by said remote keys for selectively operating any desired solenoid to depress any desired key at said radio receiver.

3. In a program reproducing system, a radio receiver, a series of keys arranged in two different rows, circuits for controlling and tuning said radio receiver, means including certain of said keys for selectively controlling and adjusting said tuning circuits, locking bar means common to all of said keys, a solenoid having a movable core individual to each of certain of said keys and serving to depress the same, means for selectively operating said solenoids, and means on each key effective when said key is depressed to engage said locking bar means for holding said key in depressed position and for releasing a previously depressed key from its depressed position.

4. In a program reproducing system, a radio receiver and a phonograph including a turntable motor, circuits in said radio receiver for tuning the same to receive desired programs, a source of current for energizing said radio receiver and said phonograph, a series of keys associated with said receiver and said phonograph, one of said keys being effective in its released position to connect said source of current to said radio receiver and to said phonograph and being effective in its depressed condition to disconnect said source of current therefrom, means including another of said keys for controlling the operation of said turntable motor, means including the remainder of said keys for selectively tuning said radio receiver, a locking bar common to said keys, and means on each key effective when said key is depressed to engage said bar for holding said key in depressed position and for releasing a previously depressed key from its depressed position, a solenoid for depressing each key, a second series of keys at a remote point, each key of the second series being individual to a key of the first series, means including circuits selectively controlled by said second series of keys for energizing said solenoids to depress desired keys of said first series.

5. In a program reproducing system, a radio receiver and a phonograph including a turntable motor, circuits in said radio receiver for tuning the same to receive desired programs, a source of current for energizing said radio receiver and said phonograph, a series of keys associated with said receiver and said phonograph, one of said keys being effective in its released position to connect said source of current to said radio receiver and to said phonograph and being effective in its depressed condition to disconnect said source of current therefrom, means including another of said keys for controlling the operation of said turntable motor, means including the remainder of said keys for selectively tuning the circuits of said radio receiver, a locking bar common to said keys, means on each key effective when said key is depressed to engage said bar for holding said key in depressed position and for releasing a previously depressed key from its depressed position, a solenoid individual to each key for depressing the same, a second series of keys at a remote point, each key of the second series being individual to a key of the first series,

means including circuits selectively controlled by said second series of keys for energizing said solenoids to depress desired keys of said first series, a second locking bar at said remote point common to said second series of keys, and means on each of said remote keys effective when a remote key is depressed to lock the same in depressed position and for unlocking a previously depressed remote key, said remote keys in their locked position effecting no control over said last-mentioned circuits but merely indicating the control operations that have been effected by the depression of said remote keys.

6. In a program receiving system, a radio receiver having circuit portions selectively effective to receive programs in at least two different broadcasting bands, means including a range key individual to each band for rendering its circuit portion effective, said range keys being located in one row, manually operated means for tuning one of said circuit portions, means including a plurality of tuning keys for selectively operating the other circuit portion to tune the same to any one of a plurality of programs, said tuning keys being located in a second row spaced from said first row and locking bar means common to all of said keys for locking a key, when depressed, in its depressed condition and for releasing a previously depressed key.

7. In a program receiving system, a radio receiver having circuit portions selectively effective to receive programs in at least two different broadcasting bands, means including a range

key individual to each band for rendering its circuit portion effective, manually operated means for tuning one of said circuit portions, means including a plurality of tuning keys for selectively operating the other circuit portion to tune the same to any one of a plurality of programs, locking bar means common to all of said keys for locking a key, when depressed, in its depressed condition and for releasing a previously depressed key, a solenoid having a movable core individual to each tuning key for depressing the same, operating circuits for said solenoids extending to a remote point, and means at said remote point including a key individual to each solenoid for controlling the operating circuit thereof.

8. In a program reproducing system, a radio receiver having circuits for tuning and for controlling the tone of the same, a series of push button keys for selectively adjusting the tuning of said circuits, locking bar means common to said keys, a tone-control push button key for adjusting the tone control portion of said circuits, means including a pawl for retaining said last-mentioned key in its depressed position, and means on each key of said series effective when a key thereof is depressed to engage said locking bar means for holding said last-mentioned key in its depressed condition and for releasing a previously depressed key of said series and for releasing the pawl of said tone control key.

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