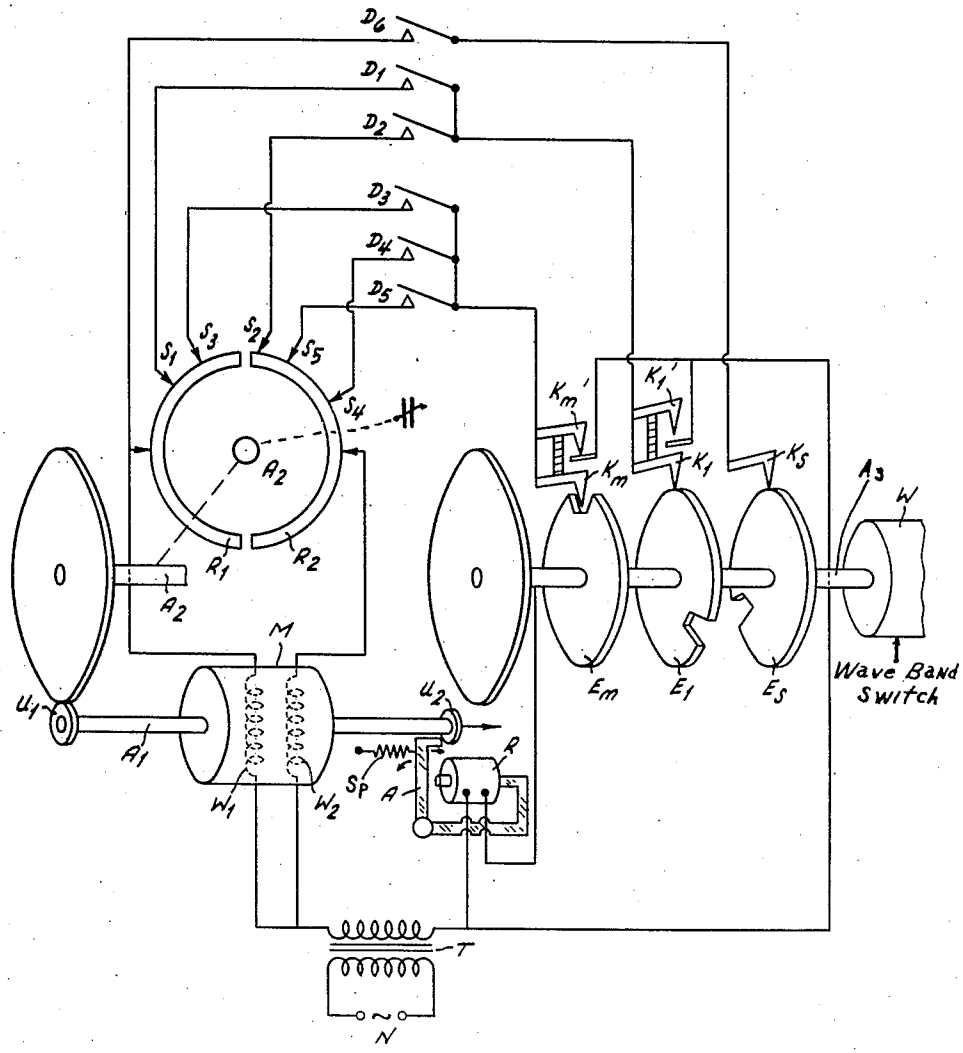
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PUSH BUTTON TUNED RECEIVER WITH MOTOR DRIVE

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PUSH BUTTON TUNED RECEIVER WITH MOTOR DRIVE

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In receivers known in the art comprising push button tuning by motor it was necessary to provide a special wave band switch, and this switch had to be operated by hand when changing from a station contained in one wave band to a transmitter station included in another wave band.

According to the present invention the necessity of operating the wave band switch is avoided; for by actuating a given press button to receive and tune in a certain station there is made not only a circuit adapted to shift the tuning means by motor drive into the required position, but there is also closed another circuit whereby the wave band switch also by motor drive is caused to assume the corresponding switch position.

The particular merit of the invention is that, provided that a drive mechanism with suitable gear is used, it is possible to shift or change-over also a wave band switch comprising a great number of contacts and thus involving a large amount of friction without incurring any undue power expenditure. No complicated relay means demanding much energy are needed.

The circuit organization most simply may be so chosen that the push button switches pertaining to one and the same wave band, for the various sending stations, are connected in series with a common and joint source of potential and a joint contact which is opened only in the corresponding position of the wave band switch. This circuit, say, by the intermediary of a relay, serves to switch in a motor adapted to adjust the wave band switch.

The circuit organization becomes particularly simple if a single motor is provided designed to be locked and coupled either with the tuning means or with the wave hand switch, and if the said relay is used to shift the lock or clutch means in such a way that, upon actuation of a press button switch, the motor sequentially causes the wave band switch and the tuning means into the proper position.

An exemplified embodiment of the invention is illustrated in the drawing. The shaft A_1 of motor M by way of a disengageable friction wheel or a tooth wheel stepdown gear U_1 is coupled with a shaft A_2 which supports the rotors of the rotary condensers and at the same time the customarily bipartite commutator ring R_1, R_2. In sliding and frictional engagement with the circumference of the said rotor ring are the slide contacts S_1 to S_5 being properly spaced apart from one another. The semi-ring R_1 is connected by way of the winding W_1 resulting in clockwise rotation, while the other commutator ring R_2 is connected by way of the counterclockwise rotation winding W_2 of the motor M with a terminal of a voltage source of supply. The latter in the present instance consists of the secondary winding of transformer T. Associated with the primary winding of the said transformer is the A. C. supply line or mains N serving to furnish energy for the operation of the receiver apparatus.

Each of the slide contacts S_1 to S_5 are connected with a stationary contact or terminal of a push button switch D_1 to D_5, respectively. Push button switches D_1 and D_2 serve for adjustment and tuning in of two long wave transmitter stations; press buttons D_3 to D_5 serve to tune in three medium wave stations. A further push button D_6 is provided to effect a change to phonograph record playing.

The switch shaft A_3 of the wave band switch W of the receiver apparatus by the agency of a stepdown gear U_2 (shown disengaged in the drawing) is adapted to be geared also with the motor shaft A_1. The shaft A_3 has three metallic contact disks E_m, E_1 and E_5. In frictional and sliding engagement with the periphery of each of the contact disks is a stationary slide contact K_m, K_1, and K_5, respectively, the latter being subject to spring pressure. Spaced an angle of 120 degrees apart from one another, each of the contact disks has a notch on its circumference. When placed, for instance, on the medium wave band as illustrated the contact K_m is opposite the notch in contact disk E_m with the result that the contact is broken.

The three contact disks, for instance, by way of the metallic shaft A_3 are united with one end of the winding of a relay R. The other end of the said winding is united with the terminal of the secondary winding of transformer T other than the one previously mentioned. The keeper A of the relay R is so mounted that, upon energization of the relay it will cause the shaft A_1 to be shifted toward the right hand side against the retractile force of the spring S_p which acts in axial direction. As a result the gear U_1 is disengaged, while gear U_2 is engaged.

The terminal of the transformer winding last referred to is at the same time united with the fixed poles of two other contacts K_m' and K_1' which are in mechanical coupling relation with the contact springs K_m and K_1, respectively. This connection is so designed that, with closed contact on the contact disk (say, K_1, E_1) the corresponding accessory contact, that is, K_1' in this case is opened, and vice versa. The movable contact pole of K_m' is associated with the

slide contact K_m and at the same time with all movable contact poles of the push button switches D_3 to D_5 belonging to the medium wave band. In a similar manner the movable contact pole of K_1' is united with the slide contact K_1 and both movable contact poles of the long wave push button switches D_1 and D_2.

The drawing shows the receiver apparatus in the position of the switch where medium wave stations are received. For instance, if the push button D_3 is actuated, relay R stays short-circuited by the contact K_m'. The motor whose circuit is closed drives the shaft A_2 in the usual way and thus at the same time the rotary condenser of the receiver set until the slide contact S_3 has come to be engaged with the insulated point between the two halves R_1 and R_2 of the ring.

If, then, it is desired to tune in and receive a long wave station, and if pressure is exerted, say, upon push button D_1, the button D_3 will snap out upon depression of button D_1 and as a result a current is allowed to flow by way of the relay, the contact disk E_1 and the slide contact K_1, the push button switch D_1, slide contact S_1, ring member R_1 and the winding W_1. Hence, not only the motor is excited, but at the same time also the gear U_1 is disengaged and gear U_2 engaged, so the wave band switch will be shifted by the motor until the slide contact K_1 has dropped into the notch of the contact disk E_1 with the result that this contact is released. At the same time contact K_1' is closed. As a consequence, the circuit containing the motor stays closed, though the relay R is circumvented, in fact, this relay is now open-circuited. What thus happens is that the normal mesh with the shaft A_2 is restored so that thereupon the rotary condenser can be caused to assume the desired position.

Upon actuation of the push button switch D_6, in a similar way, the shaft A_3 of the wave band switch is caused to assume a position which corresponds to the switch position of the receiver for phonograph record playing. But after the slide contact K_5 has engaged in the notch of the disk E_5 the motor circuit stays open.

The wave band switch shaft, of course, just like the shaft of the tuning means, could be made manipulable by hand from the outside of the apparatus so that adjustment and tuning to a certain station could be accomplished also by hand, in the customary manner.

The invention could, of course, be carried into effect also in a case where additional switch positions are provided for the wave band switch, say, additional wave bands or the like.

I claim:

1. In a multi-wave band radio receiver provided with motor tuning which is controlled by means of a plurality of selectively operable devices each acting upon operation to effect the movement of a tuning control element to a desired position through operation of the motor, an operable wave band switch means, means adapted to couple said motor to said switching means, and means acting upon operation of one of said selectively operable devices, when the switching means is in a predetermined one of its positions, for rendering said coupling means operative to couple said motor to the switching means, effect the movement of the switching means to another predetermined position through operation of the motor, render the coupling means ineffective upon the attainment of the desired switch position and thereafter effect the movement of the tuning control element to a desired predetermined position thereby tuning the receiver to a particular frequency in one of said wave bands.

2. The arrangement described in claim 1 wherein operation of another one of said selectively operable devices when the switching means is in said last named position renders said coupling means operative to effect a coupling between the motor and the switching means, effect the movement of the switching means to another of its positions through operation of the motor, render the coupling means ineffective to maintain said coupling upon the attainment of the desired switch position and effect the movement of the tuning control element to a desired predetermined position.

3. In radio receiving apparatus provided with motor tuning which is controlled by means of a plurality of selectively operable devices each acting upon operation to effect the movement of a tuning control element to a desired position through operation of the motor, an operable switching means, electromagnetic means acting upon operation to couple the motor to said switching means, means acting upon operation of one of said selectively operable devices for operating the electromagnetic means to effect a coupling between the motor and the switching means and cause the movement of the switching means to a predetermined one of its positions through operation of the motor render the electromagnetic means ineffective to maintain said coupling upon the attainment of said predetermined switch position and thereafter effect the movement of the tuning control element to a desired predetermined position.

4. In the arrangement described in claim 3 an auxiliary selectively operable device, said auxiliary device acting upon operation to render said electromagnetic means operative to effect a coupling between the motor and the switching means and effect the movement of the switching means to another of its positions through operation of the motor, operation of said auxiliary device having no effect upon said tuning control element.

5. In a multi-band receiver, variable tuning means and a drive shaft for moving said tuning means, band switching means and a drive shaft for moving said switching means, a motor having an axially movable shaft adapted through suitable gearing to selectively actuate said drive shafts, means associated with each of said adjustable means for determining the respective positions to which said means are to be actuated, a plurality of selectively operable push-buttons, and circuits interconnecting said push-buttons, position determining means and the motor, said circuits acting upon operation of a push-button to cause said motor to actuate the tuning means and the switching means to their respective predetermined positions corresponding to the operated push-button.

6. In a multi-band receiver, variable tuning means and a drive shaft for moving said tuning means, band switching means and a drive shaft for moving said switching means, a motor having an axially movable shaft adapted through suitable gearing to selectively actuate said drive shafts, adjustable position determining contacts associated with the tuning means, a position determining member including a cooperating circuit closer for each band switch position associated with the switching means, a plurality of

selectively operable push-buttons certain of which correspond to predetermined stations in one band and others of which correspond to predetermined stations in a second band, an electrical connection from each push-button to its corresponding tuning means position determining contact, a common electrical connection from each circuit closer to the several push buttons corresponding to stations in any one band, and other circuit connections between the several position determining means and the motor whereby operation of a push-button will actuate the tuning means and the switching means to their respective predetermined positions corresponding to the operated push-button.

7. In a radio receiver of the type which is provided with an adjustable controlling element and a motor for operating said element, said motor being controlled by means of a plurality of selectively operable devices each acting operation to effect the movement of the controlling element to a desired position through the operation of the motor, a multi-position switch adapted to be operated by said motor, means connected with at least one of said selectively operable devices acting upon operation of said selectively operable device for effecting the operation of the switch to a desired position, and further means, upon operation of one of said selectively operable means, adapted to first effect the operation of the switch to a desired position and thereafter to effect the operation of the control element to a desired position.

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