

Oct. 29, 1935.

L. MOREY

2,019,316

RADIORECEIVER CONTROL

Filed Jan. 4, 1932

2 Sheets-Sheet 1

Fig. 1.

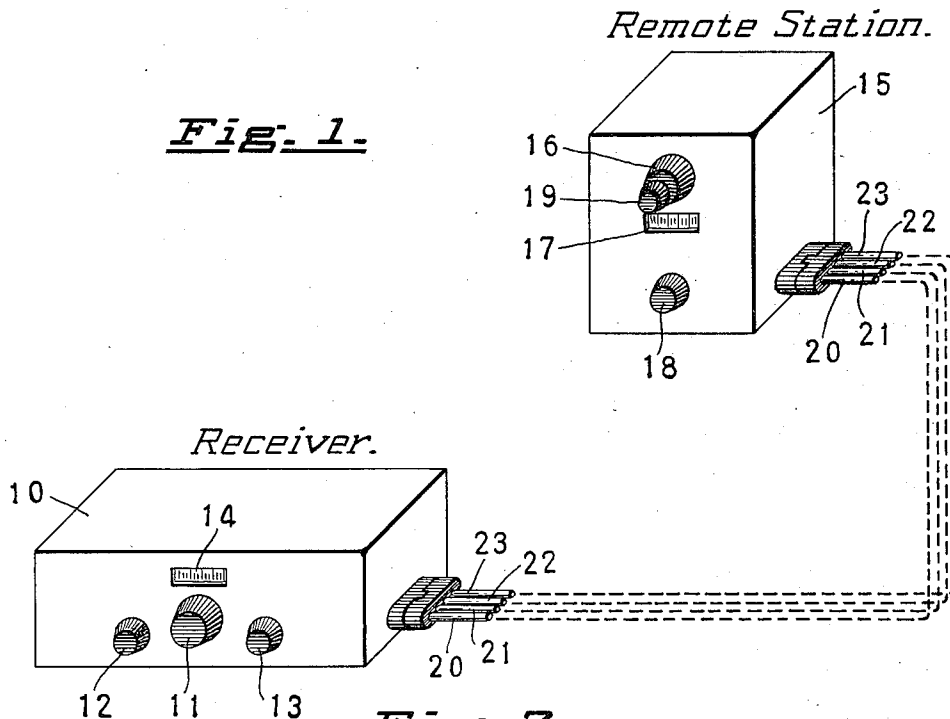


Fig. 2.

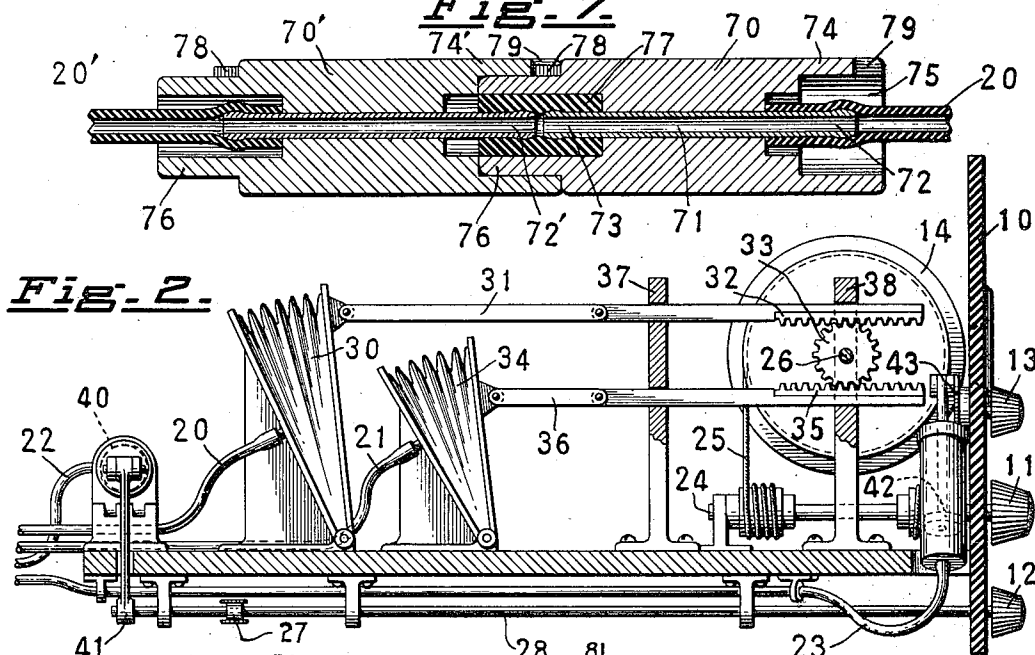


Fig. 3.

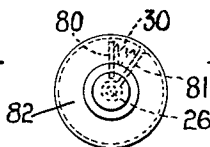
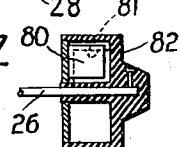


Fig. 4.



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2 Sheets-Sheet 2

Fig. 3.

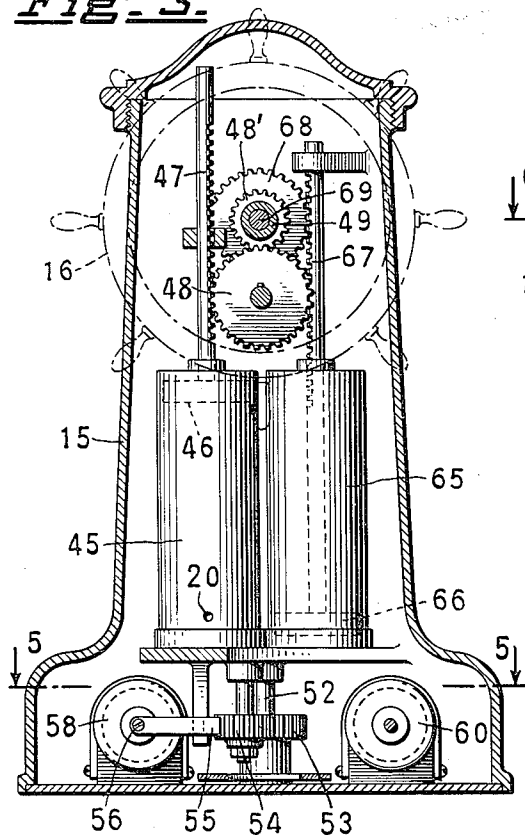


Fig. 4.

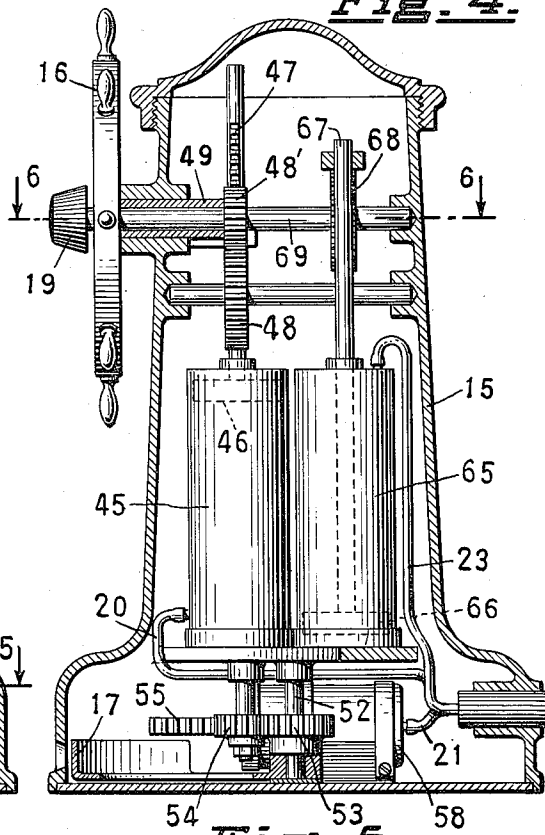


Fig. 5.

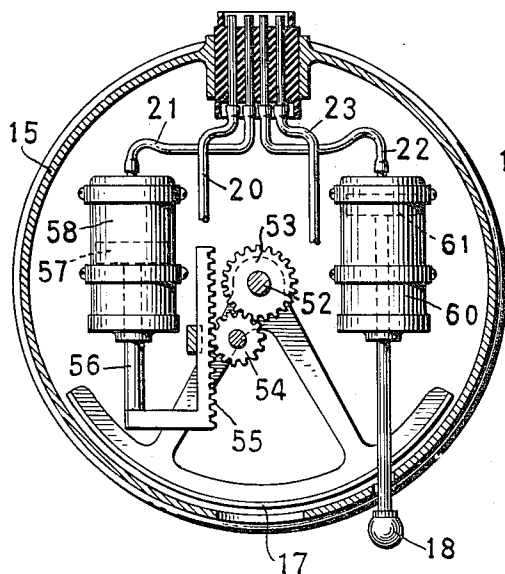
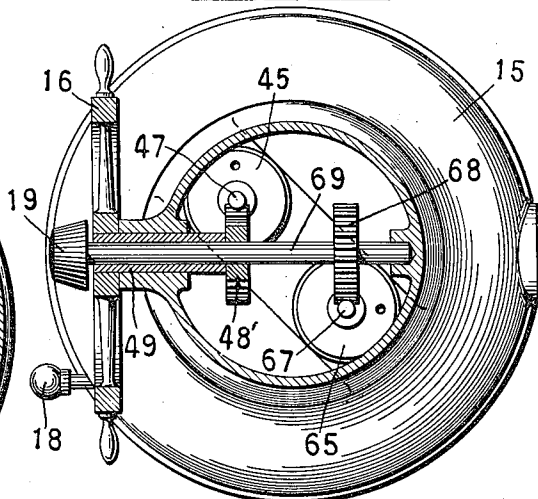


Fig. 6.



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UNITED STATES PATENT OFFICE

2,019,316

RADIORECEIVER CONTROL

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Application January 4, 1932, Serial No. 584,605

2 Claims. (Cl. 250—40)

My invention relates particularly to apparatus for the control of radio receiving apparatus such as so-called broadcast and television receivers. In such apparatus and especially for the purpose of receiving what are commonly termed broadcast programs involving the reproduction of speech and music, it is necessary to provide means for turning the set on and off and for tuning the apparatus to the desired wave length. It is also highly desirable to provide means for regulating the volume of the output. Apparatus for household use as now constructed commonly embodies these elements. There are many cases, however, where it is most desirable to be able to effect these controls and regulations from a point remote from the set itself either in the same room or in another room or even from another floor. Such remote control systems have been proposed involving the use of complicated electrical apparatus utilizing either wire connections or re-

radiation. It is the main object of my invention to provide an extremely simple and inexpensive apparatus for facilitating remote control without the use of wires or electrical radiations.

I have sought to provide apparatus for such remote control which is entirely independent of electrical characteristics and mechanical cables or the like.

I have also sought to provide remote control means which can be applied to any type of broadcast receiver without regard to its electrical characteristics.

In carrying out the invention I utilize pneumatic action with motive devices at the set connected by pneumatic tubes to manually operable applicators. In its preferred form the tuning element of the radio set is adapted to be actuated by a pneumatic bellows or piston device receiving pressure from a manually operable piston at the remote control station. This tuning device in turn actuates a power piston or bellows which moves an indicator at the remote station so as to show the operator at all times the relative position of the tuning device. The on and off switch at the receiver is actuated by a suitable knob or other switch actuating member. This switch is also adapted to be actuated pneumatically by means of a knob or handle at the remote station which controls a piston for providing pneumatic action connected to the movable member of the switch. In a similar manner the volume control of the set is pneumatically actuated from the remote station.

In the drawings I have shown more or less

diagrammatically apparatus for carrying out my invention.

Fig. 1 is a perspective view showing a diagram of a receiver and remote control station connected by pneumatic tubes.

Fig. 2 is a fragmentary sectional view of the parts of a receiver embodying my invention.

Fig. 3 is a vertical sectional view of one form of remote control station for connection to the receiver and actuation of the adjustment parts thereof.

Fig. 4 is another vertical sectional view of the remote control station apparatus taken on a plane at right angles to that of Fig. 3.

Fig. 5 is a horizontal section and plan on the plane of the line 5—5 of Fig. 3.

Fig. 6 is a horizontal section and plan on the plane of the line 6—6 of Fig. 4.

Fig. 7 is a fragmentary longitudinal sectional view showing one form of connection for the pneumatic tubing.

Figs. 8 and 9 are detail views of a modified form of pneumatic action device for rotating a shaft such as the shaft of the tuning element or the volume control or the switch.

The box 10 indicates diagrammatically the cabinet of a receiver of any suitable type having a tuning knob 11, an on and off switch knob 12 and a volume control knob 13. All of these parts are of any suitable character for controlling the set in the usual manner. An indicator scale, dial or drum 14 will ordinarily be provided at the set so that the operator may know to what wave length or station the set is tuned at any given moment.

The remote control station includes a casing provided with a tuning knob 16, an indicating element 17, an on and off switch knob 18 and a volume control knob 19.

This remote control station is connected to the receiver by a series of small pipes or tubing which for convenience in installation are preferably of flexible rubber made up in the form of what may conveniently be termed a pressure conductor having four channels 20, 21, 22 and 23. Such tubing can be very small in diameter, for instance, one-sixteenth of an inch interior diameter. Such tubing will, of course, have a sufficient thickness of wall to withstand ordinary wear and tear. It will be understood, of course, that as the pressure required to operate the apparatus is very small and only momentary that the interior stress produced by the use of the apparatus is very small. This tubing may be incorporated into a single multiple channel housing or a series of individual

tubes may be secured together for convenience in handling.

In the form illustrated in Fig. 2 the tuning knob 11 is on the front end of a shaft 24 which is connected to the indicating drum 14 by a cord 25. This indicating drum is mounted on the shaft 26 of the tuning element, i. e., the condenser or inductance as the case may be. It will be understood, of course, that this is applicable to the tuning of sets involving one or more stages of amplification, etc.

The on and off switch 27 may be of any suitable type actuated by the knob 12 and shaft 28.

The volume control knob 13 is connected interiorly to any suitable form of volume control (not shown).

The bellows or other air compressing device 30 receives its pressure through the pipe 20 and is connected to the tuning shaft 26 through link 31, rack 32 and gear 33.

The gear 33 operates the air compressing device or bellows 34 by means of the rack 35 and the link 36 so that as the tuning shaft and gear 33 are rotated the bellows 34 is operated to provide pressure or suction through the pipe 21 for operating an indicator at the remote station. The two racks 32 and 35 may be guided in supports 37 and 38.

Piston 40 actuated by pressure from the pipe 22 is connected by an arm 41 to the switch actuating shaft 28. Piston 42 actuated by pressure from the pipe 23 is connected to the arm 43 of the volume control mechanism.

In the remote control station 15 is located a cylinder 45 which is connected by pipe 20 to the bellows 30, previously described. This cylinder contains a piston 46 actuated by the rack 47 and gear 48. The hand wheel 16 has a sleeve 49 with a gear 48' meshing with gear 48. When the hand wheel 16 is turned in one direction the piston 46 is forced downwardly and the air in the cylinder 45 compressed so that pressure is applied through the pipe 20 to the bellows 30 which thus rotates the shaft of the tuning device clockwise as viewed in Fig. 2, the amount of rotation depending upon the degree of rotation of the hand wheel 16.

The indicator member 17 is mounted on the shaft 52 and connected by gears 53 and 54 to rack 55, which is carried by the rod 56 of the piston 57 in the cylinder 58. This cylinder is connected by pipe 21 to the bellows 34, previously described, so that as the tuning shaft 26 rotates the bellows 34 is compressed or expanded as the case may be and the pressure in the pipe 21 and cylinder 58 is changed so as to move the piston 57 and the indicator 17 in direct proportion to the movement of the tuning element in the receiver. As the tuning wheel 16 is rotated in one direction or the other it moves the tuning element of the receiver which in turn, through the pneumatic system above described, actuates the indicator at the remote station adjacent the operator.

It will also be understood that this adjustment as affected by the action of the wheel 16 is indicated at the set on the usual dial or drum 14 so that a person at the receiver will also know to what station the receiver is tuned.

In the form shown it will be readily understood that the position of the wheel 16 will in itself serve as an approximate indicator of the position of the tuning member of the set.

In the remote station is also mounted another cylinder 60 connected by pipe 22 to the cylinder

and piston 40. The piston 61 is provided with an external operating handle or knob 18 so that the on and off switch may be actuated pneumatically from the remote station.

At the remote station is also provided another cylinder 65 connected by pipe 23 to the volume control cylinder and piston 42, previously described. The piston 66 is provided with a rack 67 meshing with gear 68 on shaft 69 which has the volume control knob 19. Rotation of the knob 19 actuates the piston 66 and thus pneumatically actuates the volume control of the receiver.

In Fig. 7 I have illustrated a coupling device for coupling together the ends of the tubing 15 or for connecting the ends of the tubing to the receiver box or the remote control casing.

Such a coupling consists of a body member 70 with an interior tubular member 71 having an extension 72 at one end and an extension 73 at the other end. A wall 74 surrounds the end 72 and has within it a recess 75 of a size to receive the extension 76 of another similar coupling device. One of the pipes 20 is adapted to be secured onto the tubular end 72 and the opposite tubular member 73 is adapted to receive the end 20' of an extension or additional section of the same pipe line.

This Fig. 7 shows two of the members such as 70 and 70' with the extension 74' of one surrounding the part 76 of the other and a soft rubber sleeve 77 connecting the tubular ends 73 and 72'. In order to insure coupling of these devices in their proper relation one end may be provided with a lug 78 and the other end in corresponding recess 79 so that the two parts can be united only when the lug and recess properly register.

It will be seen that the pistons, bellows and pipe lines constitute closed systems and it has been found that these can be operated successfully at distances up to more than fifty feet. It is believed that such systems can be operated at much greater distances.

In case there should be any leakage from the system resulting in any uncertainty as to the relative positions of the adjusting knobs in the control station and the movable elements in the receiving set, it is only necessary to disconnect the pipes and reset the adjusting knobs or the tuning element, volume control and switch and then connect the pipes in their original normal position.

The expansible and contractible device 30 may be in the form of a bellows or a soft rubber envelope and it may be arranged in a casing, as shown in Figs. 8 and 9 in which it is located between a stationary wall 80, and the rotatable wall 81, with one of its walls secured to the stationary wall 80 and the other secured to the rotatable wall 81. The wall 81 may be formed as a part of a knob 82 and secured directly on the shaft 26 so that when the power device expands or contracts the knob and shaft rotate with its movable wall.

It is to be understood of course that the apparatus operates on differences of fluid pressures in which we ordinarily speak of pressure as applied to values above atmospheric and vacuum as applied to values below atmospheric pressure.

One great advantage of this invention is its simplicity and cheapness. Another great advantage is its reliability and freedom from interference either mechanical or electrical.

Obviously as there is no electrical connection

between the receiver and the remote station there is no fire hazard and no complications due to the effect of body capacity. The air pipes being of very small diameter, no appreciable effect is produced by compressing the pipe, for instance, by stepping upon it. Ordinarily the pneumatic connections will be flexible and readily installed or moved from place to place. It should be understood, however, that the pipe lines might be permanently installed if desired.

I claim:

1. Remote control apparatus for the tuning element of a radio receiver comprising a casing, manually operable fluid compressing means in the casing, a conduit connecting said means and the receiver, means at the receiver connected to said conduit for adjusting the tuning element of the receiver, fluid compressing means at the receiver actuated by the movement of the tuning element, a conduit connecting said latter means with the remote casing and means in said casing connected to said latter conduit and actuated by pressure therefrom for indicating at the casing the movement of the tuning element in the receiver.

2. In remote control apparatus for a household radio receiver an air compressing and suction device including a stationary cylinder and a re-

ciprocating piston operating therein, a wheel-like member manually rotatable in either direction, unitary means for transforming the rotation of said wheel-like member in one direction into rectilinear motion of said piston in a sense so as to produce pressure at a substantially uniform rate in said cylinder and for transforming the rotation of said wheel-like member in the other direction into rectilinear motion of said piston in the other sense so as to produce suction at a substantially uniform rate in said cylinder, unitary means at the receiver actuated by air pressure so as to give rise to rectilinear motion in one direction until said pressure is reduced substantially to atmospheric value, and actuated by suction so as to give rise to rectilinear motion in the other direction until said pressure is increased substantially to atmospheric value, means at the receiver for transforming said two rectilinear motions in opposite directions into rotary motions in correspondingly opposite directions, a flexible conduit connecting said device with said air actuated member, and means for permitting the adjustment of the tuning element of the receiver independently of the action of the remote control station.

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