June 13, 1944. C. METCALFE ET AL 2,351,443

PUSH BUTTON MECHANISM FOR TUNING RADIO RECEIVERS

Filed Nov. 25, 1939 3 Sheets-Sheet 1

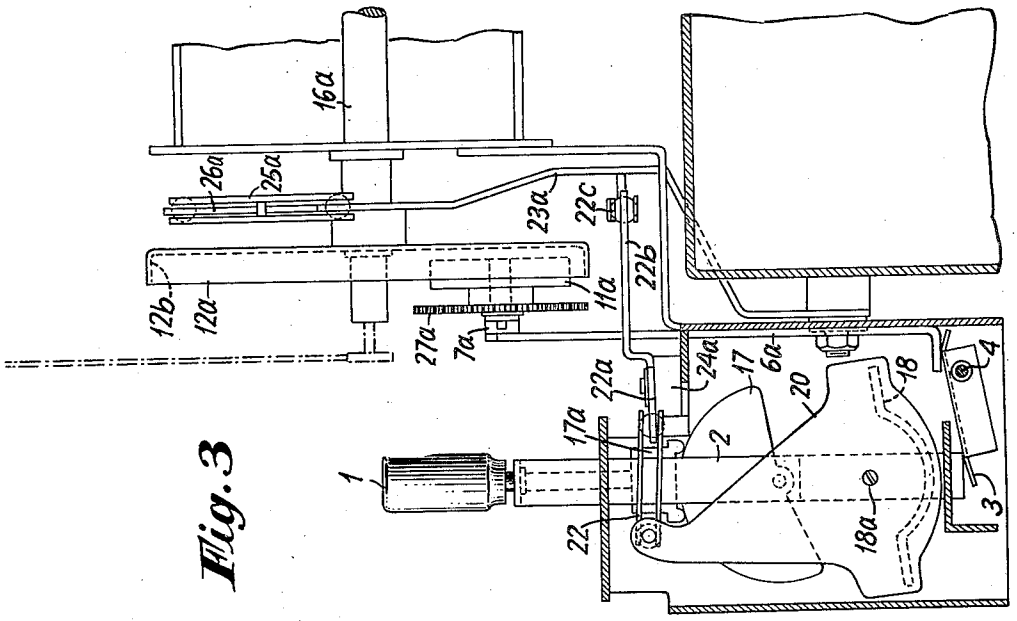


Fig. 3

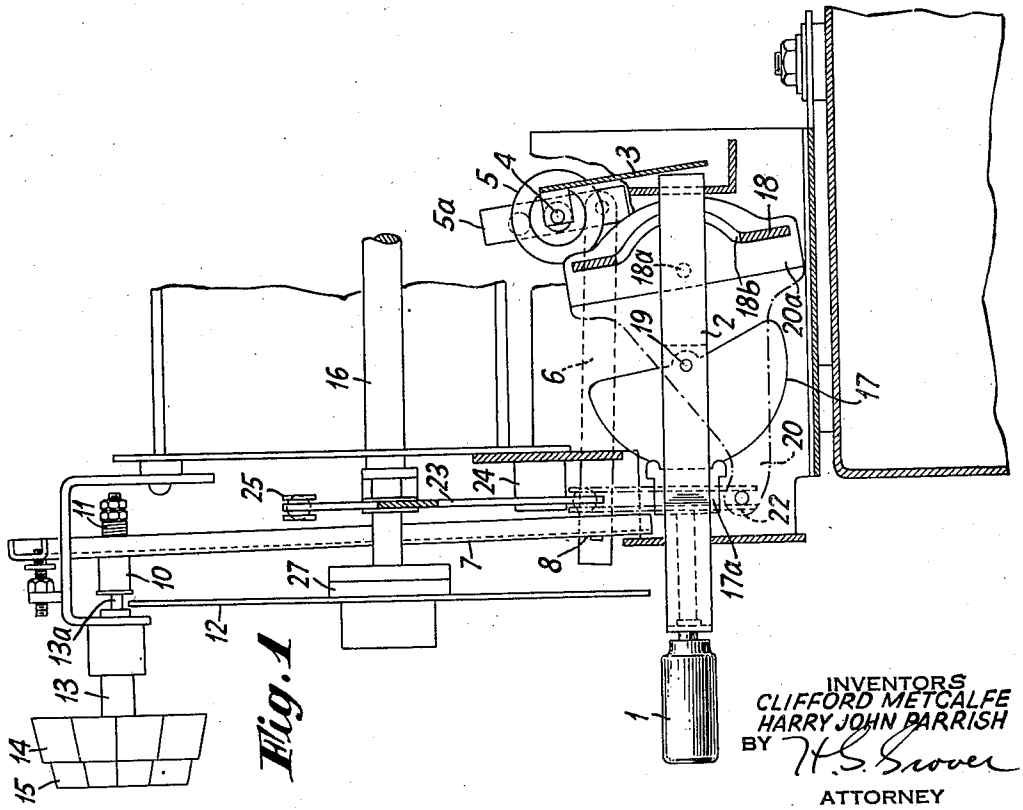


Fig. 1

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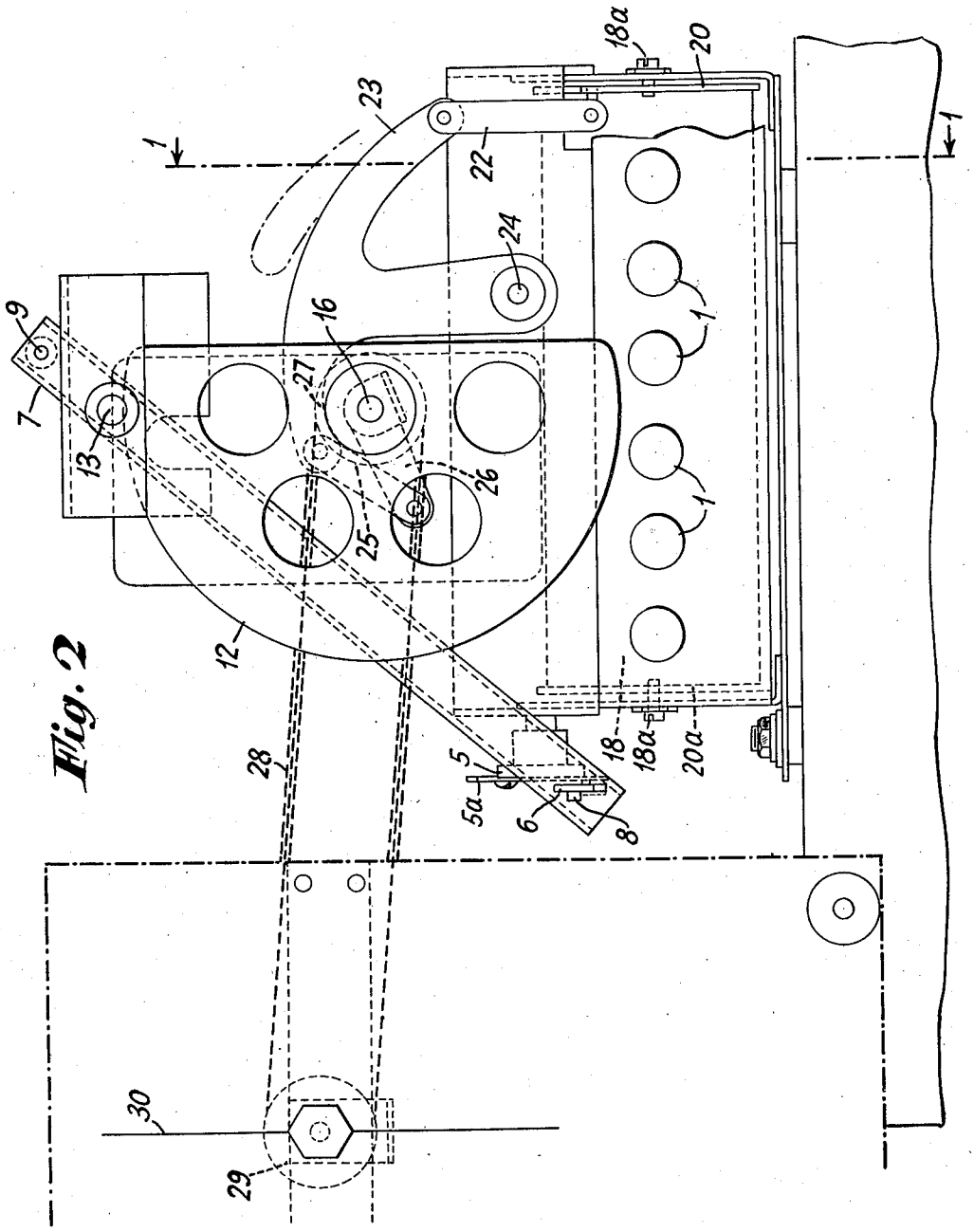


Fig. 2

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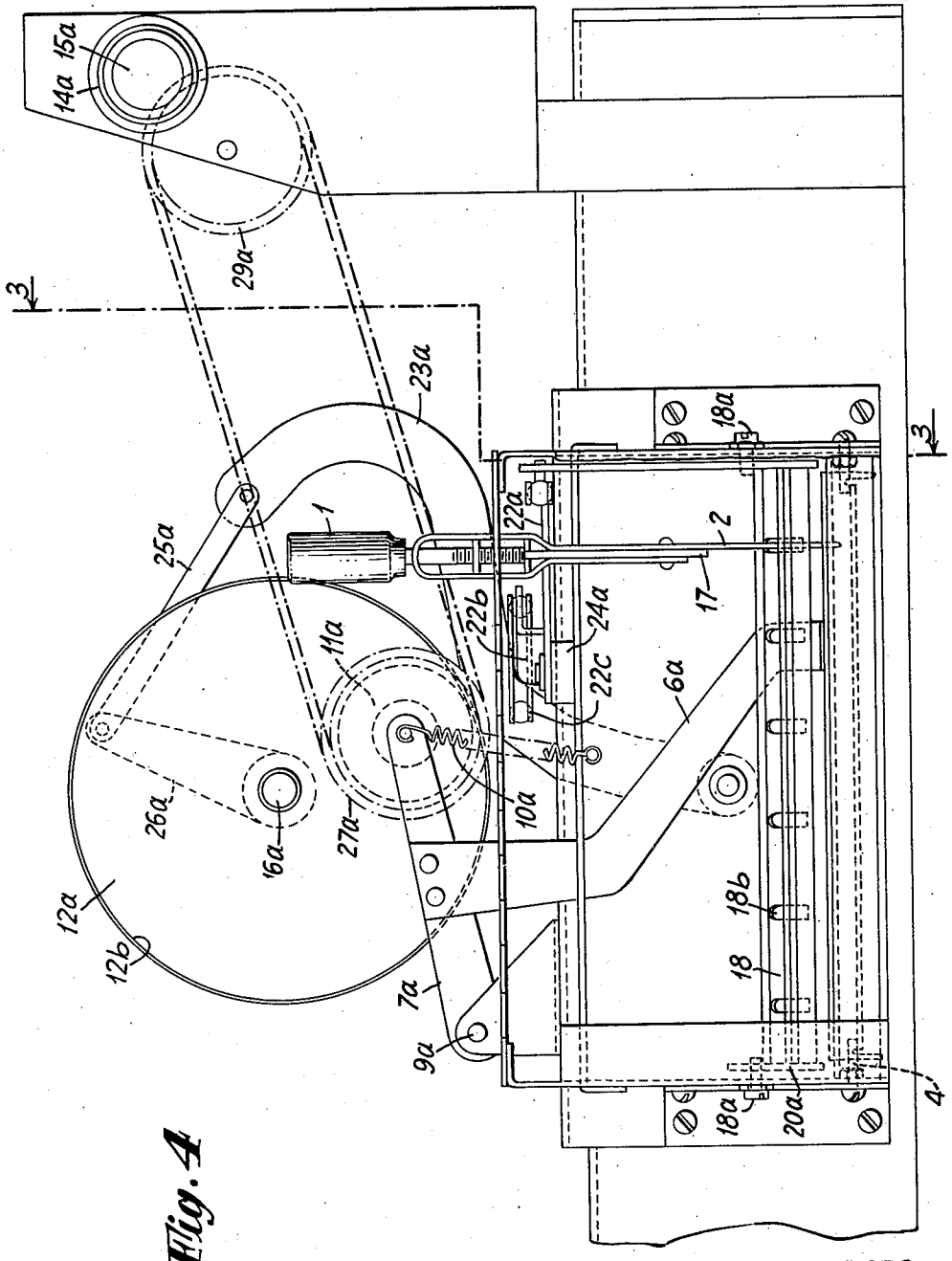


Fig. 4

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PUSH BUTTON MECHANISM FOR TUNING RADIO RECEIVERS

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In Great Britain November 26, 1938

2 Claims. (Cl. 74—10)

The present invention relates to improvements in push button tuning mechanisms for radio receivers which also have manual tuning, and particularly but not exclusively to radio receivers comprising mechanical push button tuning mechanisms, that is to say to the type of mechanisms in which operation of a push button causes the tuning device of the receiver to be moved directly through the medium of a suitable linkage or coupling to predetermined station reception positions as distinct from the type of mechanism in which operation of the tuning is effected by an electric motor.

Heretofore in radio receivers having push button tuning mechanisms the manual means are also operated on operation of the push button tuning mechanism and in view of the usual reduction gearing associated with the manual tuning means an extra load is placed on the motor or in the case of mechanical push button mechanisms the push buttons are found to be difficult to depress owing to the constraint resulting from the manual tuning means.

It is the object of the present invention to provide an improved radio receiver with a view to avoiding these disadvantages.

According to one feature of the present invention there is provided a radio receiver comprising a push-button tuning mechanism and a manual tuning device wherein means are provided operated on depression of any of the push-buttons for rendering the manual tuning device in-operative, said manual tuning device being rendered operative again on said push button ceasing to be depressed.

According to another feature of the present invention there is provided a radio receiver comprising a manual tuning device and a mechanical push button tuning mechanism, the tuning element of the receiver being driven for manual tuning through the medium of a coupling device and wherein on depression of a push button said coupling device is adjusted to an inoperative position by a mechanical connection between said push button and said coupling device, so that the manual tuning means is rendered inoperative, so as to remove the constraint to the push button tuning mechanism which would otherwise exist, said coupling device being rendered operative to drive said tuning element on said push button ceasing to be depressed.

A radio receiver incorporating the present invention may be tuned by utilising the push-button mechanism for setting the radio receiver to the required station, the manual tuning device thereafter being used to obtain fine setting of the tuning means, if required.

In order that the present invention may be clearly understood and readily carried into effect, it will now be described with reference to the accompanying drawings which illustrate embodiments of the present invention by way of example, and in which:

Figures 1 and 2 illustrate respectively end-on and front views of a radio receiver incorporating one embodiment of the present invention, Figure 1 being a section on the line 1—1 of Figure 2.

Figures 3 and 4 illustrate respectively end-on and front views of a radio receiver incorporating another embodiment of the present invention, Figure 3 being a section on the line 3—3 of Figure 4. Similar parts in the Figures 1 to 4 are indicated by the same reference numerals.

The embodiments described herein are radio receivers incorporating the invention together with mechanical push button tuning device, wherein operation of a push button causes the tuning device of the receiver to be moved directly through the medium of a suitable linkage to predetermined station reception positions.

In the embodiment illustrated in Figures 1 and 2 a series of push buttons 1 are carried on arms 2 slidably mounted in the chassis of the radio receiver at suitably spaced intervals from each other. Any of the push buttons 1 may be readily depressed by finger pressure and so moved against the restraining action of a spring (not shown) which is fixed to a point on the arm 2 and to a point on the chassis, this spring serving to return the push button to its original position after the pressure applied to the push button is removed. When a push button is depressed the arm 2 as a whole is moved to the right in Figure 1, a slight amount of movement of the arm causing the end of the arm to come into contact with a butterfly vane 3 which extends longitudinally along the chassis and has trunnions 4 rotating in bearings suitably disposed on the chassis, further movement of the arm 2 to the right causes the end of the arm 2 to rotate the vane 3. Mounted concentrically about one of the trunnions 4 is a disc 5 and rotation of the plate 3 causes a corresponding rotation of the disc 5, the disc 5 having fixed thereto an arm 5a to the lower end of which is pivoted an end of a link 6, the other end of which passes through a lever 7, and is provided with a lug 8 which bears against the lever 7.

Movement of link 6 to the right in Figure 1, thus causes the lever 7 to move to the right about

a pivot 9 comprising a ball which is adjustable by the screw shown adjacent thereto in Fig. 1.

Manual tuning of the receiver is effected through a coupling device in the form of a low gear friction drive comprising a friction collar 10, rotatably but slidably mounted on the reduced end of 13a of shaft 13 and normally spring pressed by spring 11, disposed between the lever 7 and the end of shaft 13a into engagement with the periphery of a disc 12, mounted on the shaft 16 of the tuning condenser. When the collar 10 is in engagement with the disc 12, the receiver can be tuned manually by the knobs 14 and 15, the periphery of the disc 12 being clamped between the end of shaft 13 and the collar 10. The collar 10 is also connected to the lever 7, so that when the latter is moved as described above the collar 10 is moved away from the disc 12 as shown in Fig. 1, thus breaking the friction drive. Depression of a push button beyond the point where the end of the arm 2 contacts with the butterfly vane 3 thus serves to disconnect the manual tuning device from the main tuning condenser and prevents the radio receiver being tuned by hand, and also allows subsequent automatic tuning of the receiver to be carried out without any contraint thereto being produced by the manual tuning device.

Setting of the receiver under the control of push buttons is effected on further depression beyond the position shown in Fig. 1. The arm 2 of each push button carries a cam plate 17 which is moved into contact with a plate 18 which extends longitudinally along the chassis of the receiver and is pivoted about pivots 18a fixed in the chassis and bearing in end plates 20 and 20a of the plate 18, the various arms 2 each passing through one of a series of slots, one of which is indicated at 18b, formed in the plate 18. The further depression of the push button 1 thus causes the plate 18 to rotate until its faces take up the same inclination to the arm 2 as the opposing [illegible] plate 17.

[illegible]

[illegible]

[illegible]

[illegible]

3 to take up its normal position, so that link 6, through rotation of disc 5, moves lever 7 and the collar 10 now contacts its disc 12, a positive drive for this return movement being provided by the spring 11. Operation of the manual tuning means may then be effected.

Rotation of the shaft 16 of the main tuning condenser causes the pulley 27 which is fixed to the shaft 16 to rotate the same amount, and this rotation of the pulley 27 is transmitted by means of a chain drive indicated at 28 (Figure 2) to another pulley 29 to which is attached a pointer 30 which moves over a scale (not shown), the position of the pointer 30 on the scale indicating the wave length or station to which the radio receiver is tuned.

The inclination of each of the cam plates 17 to the arms 2 are arranged so that the shaft 16 is rotated the required amount to tune the radio receiver to a number of predetermined stations, depression of each of the push buttons serving to tune the radio receiver to one of these predetermined stations. The manual tuning means may be utilised for obtaining fine setting of the tuning means, or may be utilised for tuning the radio receiver to a transmitting station other than those provided by depression of the push buttons.

The embodiment of the present invention illustrated in Figures 3 and 4 utilises similar means to those illustrated in Figs. 1 and 2, but in the embodiment illustrated in Figures 3 and 4 the friction drive for driving the main tuning condenser and which is operated by the manual tuning means, is given a substantially vertical motion to disconnect it from the shaft of the main tuning condenser, in place of a substantially horizontal motion as in the embodiment illustrated in Figures 1 and 2.

Referring now to Figures 3 and 4, depression of a push button 1 moves the associated arm 2 downwards so as to rotate the butterfly vane 3 about its pivot 4 and imparts to the link 6a an upward motion, the link 6a being connected as

[illegible]

In carrying out the present invention, equivalent mechanical means to the means described for disconnecting the manual tuning means while the push button mechanism is being operated may be utilised.

We claim:

1. In radio signalling apparatus provided with a tuning mechanism which is selectively operable by a manual tuning device or by push button tuning means, an elongated member pivoted to turn about its longitudinal axis, a driving connection between said member and said tuning mechanism, push button operated plungers longitudinally movable transversely to said axis between a released position and a maximum depressed position, individually adjustable means on each of said plungers, each of said means cooperating with said elongated member for swinging said elongated member to a predetermined angular position when said means are brought against said elongated member in operating its associated plunger from its released position to its maximum depressed position, an actuating member carried by the tuning mechanism, a manually operable tuning instrumentality, means for frictionally coupling said tuning instrumentality to the tuning mechanism actuating member to thereby provide a driving connection between them, and lever means operated by said plungers for uncoupling the friction means when any one of said plungers is in any position excepting a position which is within a narrow range of positions which includes the released position.

2. In signalling apparatus including a tuning mechanism selectively operable by a manual tuning means or by push button tuning means, an elongated member pivoted to turn about its longitudinal axis, a driving connection between said member and the tuning mechanism, a plurality of plungers each thereof being longitudinally movable transversely to said axis, said plungers being mounted so that one end portion of each plunger passes through said axis, said elongated member being perforated in its central portion to permit said end portions of the plungers to extend therethrough, individual means mounted on each of said plungers intermediate its two ends, each acting upon depression of its associated plunger to swing said elongated member to a predetermined angular position, an actuating member carried by the tuning mechanism, a manually operable tuning knob, a normally spring-pressed member for frictionally coupling the tuning knob and the tuning mechanism actuating member whereby the operation of one will cause a corresponding operation of the other, and means cooperating with the portions of the plungers which extend through the elongated member for making the spring-pressed member ineffectual upon depression of any one of said plungers.

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