April 4, 1944. R. B. FOSTER 2,345,928

CONTROL MECHANISM

Original Filed Dec. 6, 1937

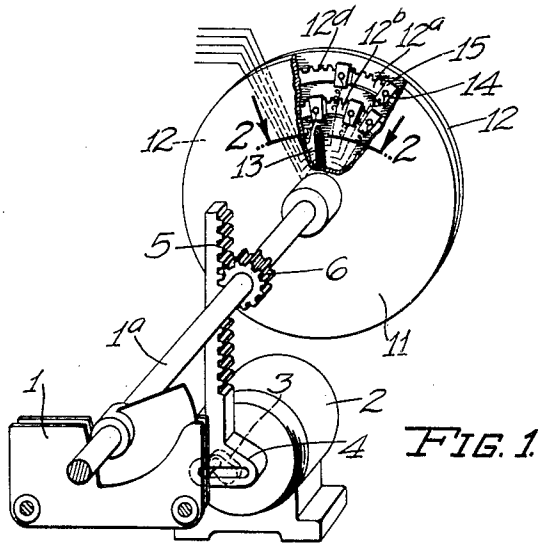


FIG. 1.

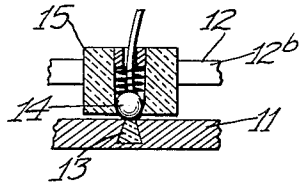


FIG. 2.

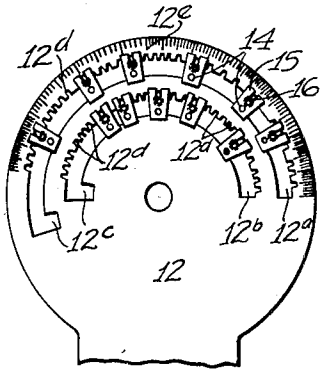


FIG. 3.

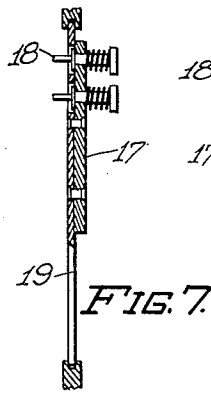


FIG. 7.

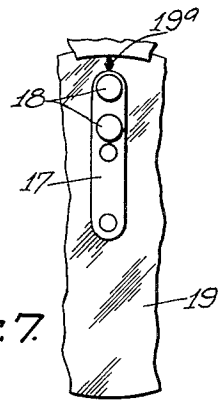


FIG. 6.

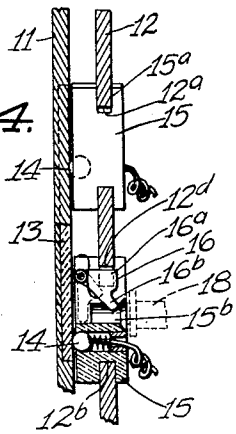


FIG. 4.

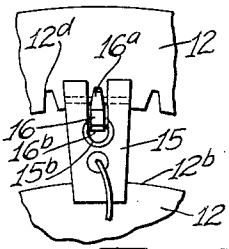


FIG. 5.

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UNITED STATES PATENT OFFICE

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CONTROL MECHANISM

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Original application December 6, 1937, Serial No. 178,220, now Patent No. 2,238,894, dated April 22, 1941. Divided and this application April 21, 1941, Serial No. 389,678

16 Claims. (Cl. 200—6)

My present invention relates to a control mechanism and to an adjustable contact means therefore, more particularly adapted for radio tuning. This application is a division of application Serial No. 178,220, filed December 6, 1937, for Automatic and manual radio control apparatus, resulting in United States Patent No. 2,238,894, issued April 22, 1941.

One of the principal objects of this invention is to provide a simple control mechanism for radio receivers, and other apparatus, and to provide a simple adjustable contact means therefor, whereby any of the broadcast stations of a broadcast band may be obtained by or with only a limited number of contacts, switches, or the like, by the manual adjustment of the contacts, switches, or the like, to correspond to or coincide with the desired station or the adjusted position of the tuning condenser.

It is a further important object of this invention to provide adjustable contacts or switches of this class which may not be easily disturbed or shifted from the desired position and, further, contacts or switches of this class which are self aligning for accurate or sharp tuning.

A still further object of this invention is the provision of a structure of this class whereby other contacts or switches may be easily added to increase the flexibility of the set, that is, to permit a larger number of different broadcast stations to be brought in at one setting, or to prevent frequent adjustment of the switches or contacts to different positions to correspond to the tuning condenser positions.

An important object also of this invention is to provide adjustable contact means for control mechanism of this character and for analogous use, which is simple and economical of construction, in which the contacts may be easily and quickly adjusted, and a means of this class which will not readily deteriorate or get out of order.

With these and other objects in view, as will appear hereinafter, I have devised a control mechanism of this class having certain novel features of construction and arrangement of parts and portions, as will be hereinafter described in detail and particularly set forth in the appended claims, reference being had to the accompanying drawing and to the characters of reference thereon, which form a part of this application, in which:

Fig. 1 is a fragmentary perspective view of a radio tuning condenser and my control mechanism operatively connected thereto;

Fig. 2 is an enlarged sectional view thereof, taken on a plane indicated by a line 2—2 of Fig. 1, but slightly outwardly therefrom;

Fig. 3 is an enlarged rear elevation of the station finding or selecting switch, showing particularly the stationary member thereof;

Fig. 4 is an enlarged sectional elevation thereof, with the section taken through 4—4 of Fig. 3;

Fig. 5 is an enlarged fragmentary elevation showing the mounting of the shiftable contacts on the stationary member of the station finder switch; and,

Figs. 6 and 7 are, respectively, fragmentary front and edge elevations of the means for adjusting the shiftable contacts.

In the drawing, the radio tuning condenser, designated 1, is mounted on a condenser shaft 1a. My control mechanism, which is a station finder switch and which will be presently described, is operatively connected with the shaft, one member of the contact means of the control mechanism being shown as mounted on the shaft. This shaft is also shown as oscillated by a motor 2 through a crank 3 and cross-head 4, the latter reciprocating a rack 5 which meshes with a pinion 6 on the shaft 2.

The station finder switch, or more specifically referred to as the adjustable contact means, consists essentially of a rotary disc 11 and a coaxial stationary disc 12, the rotary disc 11 carrying an insulating strip 13 and the latter a plurality of electric contacts 14 insulated from each other and mounted on individual sliding blocks 15 adjustably carried by the disc 12. These contacts 14 are arcuately spaced to correspond to the broadcast station spaces on the dial (not shown) of the tuning condenser 1. The specific mounting of said contacts and blocks will be described hereafter. The contacts 14 normally and resiliently contact the disc 11, but are sequentially insulated therefrom by the insulating strip 13 as the disc 11 is rotated. The portion of the strip 13 adapted to engage the contacts 14 is narrow, presenting in substance, an edge or hairline, but it is slightly wider than the engaging ends of the contacts 14. Thus, a break in the electric circuit between a particular contact 14 and the plate or disc 11 is made. Unless the particular contact 14, corresponding to the desired condenser position or broadcast station, engages the insulating strip 13, when the radio is turned on, the disc 11 is always connected, through one of the contacts 14.

The adjustable contact means is constructed in a particular manner so that only a small number of contacts 14 may be employed, a num-

ber which is or may be most commonly employed. These contacts are so mounted that they may be readily shifted from place to place to turn on different stations. The structure is also so arranged that other contacts may be easily added so as to increase the flexibility and adaptability of the structure to many circuits.

The stationary disc 12 of this adjustable contact means is provided, in this instance, with a pair of concentric arcuate slots 12a and 12b, the latter positioned radially inwardly from the former, and each provided at one end with an enlarged opening 12c. In the slots are slidably mounted the insulated contact carrying blocks 15. These blocks are segmental with their radially inner and outer edges provided with arcuate grooves 15a which receive the opposite edge portions of the slots, and thus slidably support the blocks 15.

At the inner sides of the blocks are the contacts 16 which may be balls or plungers held resiliently extended from the face of the blocks and thus held in resilient engagement with the rotatable disc 11. These blocks may be automatically but removably locked into position by spring actuated levers 16. One end 16a of each lever is wedge shaped and this portion is adapted to enter a similarly shaped recess 12d at the adjacent edge of one of the slots 12a or 12b. Thus, as the wedge portion enters the recess, the block is automatically and accurately aligned in the slot; and, if the recesses are aligned with and spaced to correspond with the station positions of the condenser, the particular position of the contact carried by the particular block also corresponds with a particular station position of the condenser or marking on the condenser dial.

These blocks are adapted and intended to be shifted to the position desired or most frequently used. This shifting is effected, preferably at the back or side of the radio receiving set, and by a lever 17 which is manually rotatable about an axis coincident with the axis of the disc 11. This lever has spring retractable plungers 18, one for each row of contact blocks 15. This lever may take the form of a transparent rotatable window or it may be mounted on such a window, designated 19. This window may have an index mark 19a which may be drawn over a dial 12e on the disc 12 so as to determine station positions. This dial is calibrated as the condenser dial which is adapted to be used at the front side of the radio set, but, in this instance, is in the reverse order.

If it is desired to shift a contact block to the position desired, one of the plungers 18 is forced inwardly into the block which is nearest the desired position. For this purpose each block is provided with a transverse hole 15b which is chamfered at the outer end for the ready reception of the plunger 18. The free end 16b of the lever terminates in the hole 15b in such a manner that when the plunger 18 is inserted into the hole the locking lever is rocked about its axis and disengaged from the carrying disc 12 and permitted freely to be shifted to the desired position.

If the two broadcast station positions on the condenser are closer than is allowed by adjacent blocks in the same slot or groove 12a or 12b, such two broadcast station positions are determined or obtained by contacts 14 on blocks 15 arranged in radially different slots.

The enlarged portions 12c at the ends of the arcuate slots 12a and 12b permit the introduction of other contact carrying blocks 15 into the slots. Thus, new or additional contacts may be added to the receiving set, as desired.

Though I have shown and described a particular construction, combination, and arrangement of parts and portions of my adjustable contact means, I do not wish to be limited to the same, but desire to include in the scope of my invention the construction, combination, and arrangement substantially as set forth in the appended claims.

I claim:

1. In a control mechanism, a selecting switch comprising a pair of relatively movable switch members, a support for holding the same in relatively movable positions, the one switch member having shiftable switch elements adjustable relative to each other, the other switch-member having means capable of successively engaging said elements, and means for automatically and positively latching each switch element into one of its shifted positions to its supporting switch member.

2. In a control mechanism, a selecting switch comprising a pair of relatively movable switch members, a support for holding the same in relatively movable positions, the one switch member having shiftable switch elements, means for separately shifting each element on its supporting switch member relative to the other switch elements thereon, the other switch member having means capable of successively engaging said elements, means for positively latching each switch element into one of its shifted positions to its supporting switch member, and unlatching means in connection with the switch element shifting means, the unlatching means being so constructed and arranged, that the engagement of the shifting means with a switch element for shifting the latter, automatically unlatches the latter switch element before shifting the same, the unlatching means being also so constructed and arranged that said switch element is automatically latched when released by the shifting means.

3. In a control mechanism, a selecting switch comprising a pair of relatively movable switch members, a support for holding the same in relatively movable positions, the one switch member having shiftable switch elements adjustable relative to each other, the other switch member having means capable of successively engaging said elements, means for positively latching the switch elements into one of their shifted positions, and means in connection with the latching means for automatically and accurately fixing the predetermined adjusted position of each of the switch elements on the switch member upon which it is mounted.

4. In a control apparatus, a selecting switch comprising a pair of parallel, relatively movable plates, a support for holding the same in relatively movable positions, one plate having parallel slots and notches adjacent the slots, the notches of one slot being aligned with the notches of another slot of said plate, a multiplicity of switch elements movably positioned in certain of the slots and adapted to ride upon the edges of the plate forming the slots, and resilient means for latching each switch element to the carrying plate in one notch thereof, the other plate having means capable of successively engaging the switch elements.

5. In a control apparatus, a selecting switch comprising a pair of relatively rotatable plates,

a support for holding the same in relatively movable positions, one plate having movable switch elements shiftable in an arc about an axis, said axis being substantially coaxial with the axis of the relatively rotatable plates, the other plate having means capable of successively engaging said elements, and means for automatically and positively latching each switch element into one of its shifted positions to its supporting plate.

6. In a control mechanism, a selecting switch comprising a pair of relatively rotatable plates, a support for holding the same in relatively movable positions, one plate having movable switch elements shiftable in an arc about an axis, said axis being substantially coaxial with the axis of the relatively rotatable plates, the other plate having means capable of successively engaging said elements, means for separately shifting each element on its supporting plate relative to the other switch elements thereon, means for positively latching each switch element into one of its shiftable positions to its supporting plate, and unlatching means in connection with the switch element shifting means, the unlatching means being so constructed and arranged that the engagement of the shifting means with a switch element, for shifting the latter, automatically unlatches the latter switch element before shifting the same, the unlatching means being also so constructed and arranged that said switch element is automatically latched when released by the shifting means.

7. In a control apparatus, a selecting switch comprising a pair of relatively rotatable plates, a support for holding the same in relatively movable positions, one plate having movable switch elements shiftable in an arc about an axis, said axis being substantially coaxial with the axis of the relatively rotatable plates, the other plate having means capable of successively engaging said elements, means for automatically and positively latching each switch element into one of its shiftable positions to its supporting plate, and means in connection with the latching means for automatically and accurately fixing the predetermined adjusted position of each of the switch elements on the plate upon which it is mounted.

8. In a control apparatus, a selecting switch comprising a pair of parallel relatively rotatable plates, a support for holding the same in relatively movable positions, one plate having parallel arcuate slots, the axis of the slots being substantially coaxial with the axis of the relatively rotatable plates, the slots having notches in one edge, the notches of one slot being aligned with the notches of another slot of said plate, a multiplicity of switch elements movably positioned in certain of the slots and adapted to ride upon the edges of the plate forming the respective slot, and resilient means for positively latching each switch element to the carrying plate in one notch thereof, the other plate having means capable of successively engaging the switch elements.

9. In a control apparatus, a selecting switch comprising a pair of parallel, relatively movable plates; a support for holding the same in relatively movable positions, one plate having a slot extending substantially in the direction of relative movement of the plates, the plate with the slot having notches communicating with the slot, a plurality of switch elements mounted on the latter plate and movable within the slot, and means on each switch element for positively latching the respective switch element in one notch, the other plate having means capable of successively engaging the elements.

10. In a control apparatus, a selecting switch comprising a pair of parallel, relatively movable plates, a support for holding the same in relatively movable positions, one plate having a slot extending substantially in the direction of relative movement of the plates, the plate with the slot having notches communicating with the slot, a plurality of switch elements mounted on the latter plate and movable within the slot, a latch on each switch element for positively latching the respective switch element in one notch, resilient means for resiliently forcing the latch into a latching position, and switch-element shifting means for tripping the latch against the force of the resilient means, said shifting means facilitating the shifting of the respective switch element when its latch has been tripped.

11. In a control apparatus, a selecting switch comprising a pair of parallel relatively movable plates, a support for holding the same in relatively movable positions, one plate having a slot extending substantially in the direction of relative movement of the plates, the plate with the slot having notches communicating with the slot, switch elements mounted on the latter plate and movable within the slot therein, a latch carried by each switch element and adapted to enter a notch for latching the respective switch element with respect to the notch, a movable support movable in the direction of the shiftable switch elements, the movable support and the plate, carrying the switch elements, having cooperating scale and dial elements, and a switch-element shifting member mounted on the movable support and movable toward the path of the switch elements, said shifting member being mounted so as to engage the latch of a switch element for tripping the latch and shifting the respective switch element with the movement of the movable support.

12. In a control apparatus, a selecting switch comprising a pair of relatively rotatable plates, a support for holding the same in relatively movable positions, one plate having movable switch elements shiftable in an arc about an axis substantially coaxial with the axis of the relatively rotatable plates, means for latching each switch element into one of its shiftable positions, a shifting support rotatable coaxially with and relative to the plates, and a switch-element shifting member carried by the shifting support and shiftable toward the path of the movable switch elements, said shifting member being so mounted as to trip one of the latches and engage the corresponding switch element for shifting the same in the slot with the rotatable movement of the shifting support.

13. In a control apparatus, a selecting switch comprising a pair of relatively movable switch members, a support for holding the same in relatively movable positions, one of said members being a plate having a slot extending substantially in the direction of relative movement of said switch members, said plate having notches communicating with the slot, a plurality of switch elements mounted on the plate and movable within the slot, and means on each switch element for positively latching the associated switch element in one notch, the other switch member having means capable of successively engaging the switch elements.

14. In a control apparatus, a selecting switch comprising a pair of relatively movable switch

members, a support for holding the same in relatively movable positions, one of said members being a plate having a slot extending substantially in the direction of relative movement of said switch members, said plate having notches communicating with the slot, a plurality of switch elements mounted on the plate and movable within the slot, a latch on each switch element for positively latching the associated switch element in one notch, resilient means for resiliently forcing the latch into the latching position, and switch-element shifting means for gripping the latch against the force of the resilient means, said shifting means facilitating the shifting of the respective switch elements when its latch has been tripped, said other switch member having means capable of successively engaging the switch elements.

15. In a control apparatus, a selecting switch comprising a pair of relatively movable switch members, a support for holding the same in relatively movable positions, one of said switch members being a plate provided with a slot extending substantially in the direction of relative movement of the switch members, the plate having notches communicating with the slot, switch elements mounted on the plate and movable within the slot therein, a latch carried by each switch element and adapted to enter a notch for latching the associated switch element with respect to the notch, a movable shifting support movable in the direction of movement of the shiftable switch elements, the movable shifting support and the switch member, carrying the switch elements, having cooperating scale and dial elements, and a switch-element shifting member mounted on the shifting support and movable toward the path of the switch elements, said shifting member being mounted so as to engage the latch of a switch element for tripping the latch and shifting the associated switch element with the movement of the shifting support, said other switch member having means capable of successively engaging the switch elements.

16. In a control apparatus, a selecting switch comprising a pair of relatively rotatable switch members, a support for holding the same in relatively movable positions, one of said switch members being a plate provided with movable switch elements shiftable in an arc about an axis substantially coaxial with the axis of the relatively rotatable switch members, means for latching each switch element into one of its shiftable positions, a shifting support rotatable coaxially with and relative to the switch members, a switch-element shifting member carried by the shifting support and shiftable toward the path of the movable switch elements, said shifting member being so mounted as to trip one of the latches and engage the corresponding switch element for shifting the same in the slot with the rotatable movement of the shifting support, said other switch member having means capable of successively engaging the switch elements.

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