

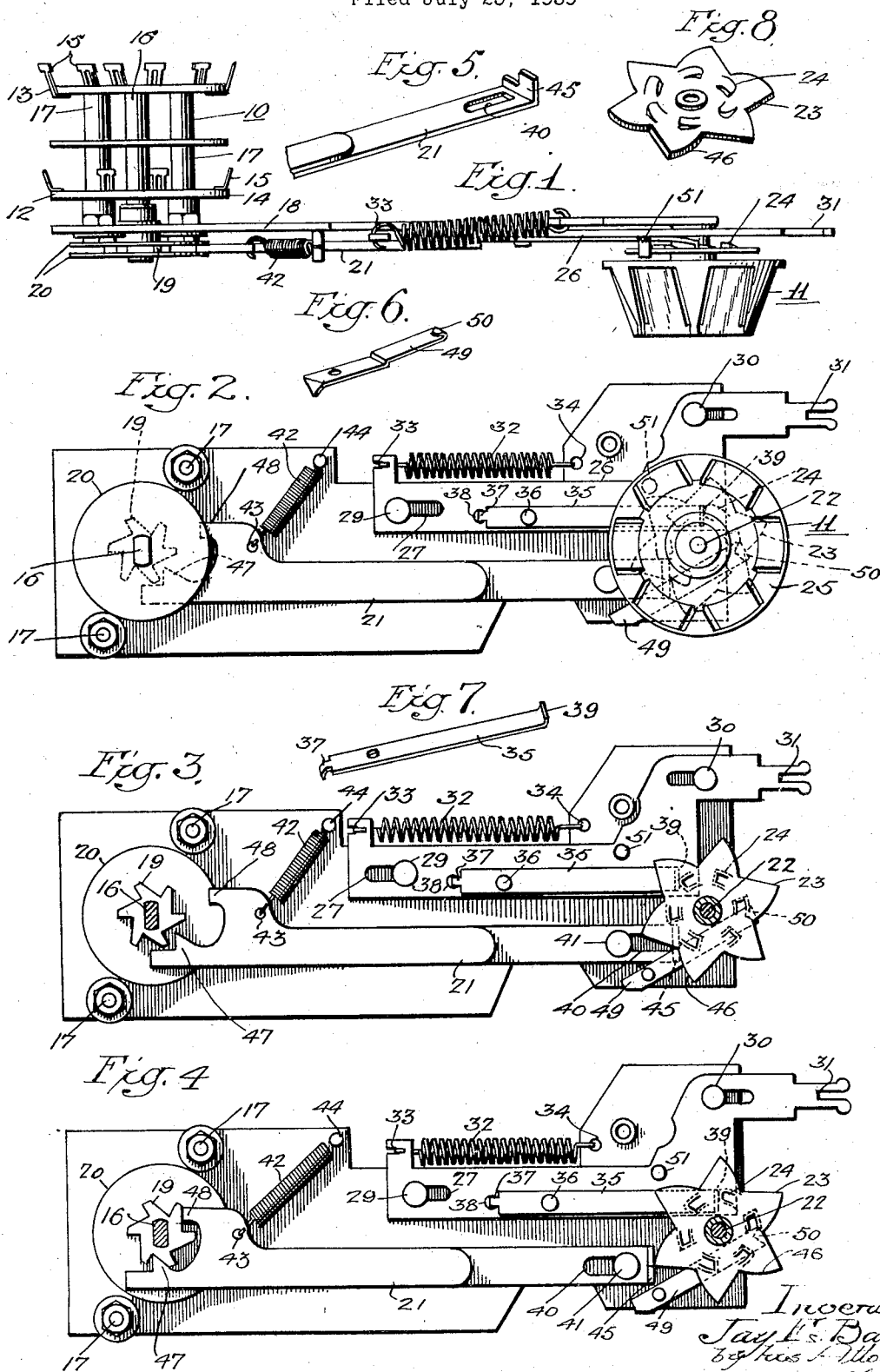
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POSITIONING DEVICE

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UNITED STATES PATENT OFFICE

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POSITIONING DEVICE

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6 Claims. (Cl. 74—125)

This invention relates to positioning devices and, more particularly, to means for actuating two step-by-step devices in correlation with one another, employing a single manual actuator for effecting such actuation.

While the invention is broadly applicable to the step-by-step positioning of two devices whose movements it is desired to correlate, it is particularly useful in radio receivers for actuating a tuning device and a tuning indicator device and, therefore, it will be described herein with particular reference to such usage.

In the copending application of Quinn, Serial No. 286,492, filed July 25, 1939, there are disclosed and broadly claimed means for positioning two step-by-step devices in correlation with one another, such means employing a single manual actuator, and there is also disclosed the specific application of such means to the tuning of a radio receiver by means of a single push-button. The present invention is directed to a specific mechanism of this character, the details of which are also shown in the said Quinn application.

A particular difficulty found to be prevalent with many constructions of switches suitable for use according to the teaching of the said Quinn application is the tendency for the tuning device or the tuning indicator to operate independently of the other device. Such actuation might result, for example, from carelessness on the part of the operator. As an illustration, one form of device which might be used for the purpose of tuning a radio receiver according to the principles of the aforementioned Quinn application may comprise a single manually operable plunger positioned in proximity to the movable members of the tuning unit and the indicating unit, the plunger carrying operating pawls or other members directly on itself for actuating ratchets associated with the said units. Such an assembly is often subject to maladjustment which permits either the tuning unit or the indicating unit to function independently. By the present invention, there is provided a novel device employing a tandem linkage which prohibits such faulty operation.

The principal object of the invention, therefore, is to provide a novel mechanical structure for actuating two devices in step-by-step correlation with one another, employing a single manual actuator.

A more specific object of the invention is to provide a novel mechanism which is particularly adapted for operating a tuning device and a tun-

ing indicator in a radio receiver, utilizing a single manual control for this purpose.

Still another object of the invention is to provide a mechanism having two devices to be positioned, a primary actuating element for positioning one of said devices on its return motion, and a linkage for causing tandem operation of said two devices.

Other objects and features of the invention will appear hereinafter.

In the drawing:

Fig. 1 is a side elevational view of the mechanism provided by the invention;

Fig. 2 is a face view of the mechanism looking at the same from the underside of Fig. 1;

Fig. 3 is a similar view, with certain elements omitted for the sake of clarity, illustrating the parts at a certain stage of operation;

Fig. 4 is a similar view illustrating the parts at a later stage of operation; and

Figs. 5 to 8 are perspective views of certain parts of the mechanism.

Referring to the drawing, and particularly the principal figures thereof, the two devices whose positions are to be controlled are designated generally by reference characters 10 and 11. The device 10 is a multi-section rotary switch adapted to control pretuned circuits of a radio receiver, so that the receiver may be tuned to any one of a plurality of predetermined stations by actuating the switch in step-by-step fashion. Such devices are now well known and require no detailed description. The device 11 is a tuning indicator having provision for carrying suitable indicia representing respectively the stations to which the radio receiver may be tuned by the rotary switch 10. By means of the mechanism provided by the invention, the two said devices are operated step-by-step in correlation with one another by means of a single manual actuator.

It will be understood that the two devices 10 and 11 are representative of any two devices whose position it is desired to control, and the invention is not restricted to the specific devices illustrated or the specific application to the tuning of a radio receiver.

Referring now to Fig. 1, the tuning device 10 comprises a plurality of switch sections, in the present instance two such sections 12 and 13 being employed. Each of these sections comprises a switch structure of the wafer type and includes a stationary insulating plate or ring 14 carrying stationary circularly arranged contacts 15, the inner portions of which are engageable by a rotating contact (not visible) carried

by a common rotatable shaft 16. The stator plates are carried by supports 17 which are mounted on the base plate 18, and the rotatable shaft 16 is suitably journaled in the base plate and extends therethrough. Since switches of the character here illustrated are well known, it is believed that the present illustration will suffice for the purpose of explaining the present invention, particularly since the invention is not concerned with the specific details of the switch structure.

Below the base plate 18, as viewed in Fig. 1, the shaft 16 carries a ratchet 19 (see Figs. 2 to 4), on the opposite sides of which are spaced disks 20 which serve to guide and support an end of a reciprocable bar 21, the purpose of which will be explained presently.

The tuning indicator 11 comprises a shaft 22 which is rotatably carried by base plate 18 in spaced relation to the tuning device. A star wheel 23 is mounted on shaft 22, and on the face or side of the star wheel nearest the base plate 18, there are circularly arranged turned out lugs 24 (see Fig. 8) which serve as a ratchet mechanism in the manner hereinafter described. An indicator drum 25, having suitable provision for carrying indicia thereon, is mounted upon shaft 22 so as to rotate therewith. One suitable indicia holder forms the subject of a co-pending application of Jackson H. Pressley, Serial No. 286,486, filed July 25, 1939.

As shown in Figs. 2 to 4, an actuating member 26 is slidably mounted on the base plate 18, and to this end the said member 26 is provided with slots 27 and 28 accommodating pins 29 and 30 projecting from the base plate. The end 31 of member 26 is adapted to receive a suitable push-button element (not shown), so that the said member may be moved toward the left, as viewed in Fig. 2, by depressing the said push button. A spring 32 has one end secured to member 26 at 33 and has its other end secured to the base plate 18 at 34. This spring serves to maintain the member 26 in the extreme right hand position shown in Fig. 2, and also serves to move the said member to this normal position when the push-button is released following each operation by an operator. A resilient finger 35 (see Fig. 7) is riveted to member 26 at 36 and has a turned end 37 seated in a recess 38 of member 26 so as to prevent rotary movement of the said finger. The opposite turned end 39 of the resilient finger is operatively associated with the turned-out lugs 24 on the star wheel 23, and constitutes an operating pawl for the ratchet means comprising the said lugs. In the normal position of the parts shown in Fig. 2, the end 39 of the resilient finger is disposed between two of the lugs 24, and when the member 26 is moved toward the left to the position illustrated in Fig. 3, the end 39 rides over one of the lugs 24 and is then in a position to push against the said lug and thus advance the star wheel 23 one step when the member 26 is released. In Fig. 4, the parts are shown at the instant that the member 26 is near the end of its return stroke, and it will be noted that the end of finger 35 is in operative engagement with one of the lugs 24.

To assist in clarifying the drawing, in Figs. 3 and 4 the indicator drum 25 and the outer guide disk 20 have been removed.

Referring now to the bar 21, of which mention has been previously made, this element is provided near one end with a slot 40 which accommodates a pin 41 projecting from the base

plate 18. The opposite end of the bar is formed as illustrated and projects within the space between the disks 20. Thus, the bar is reciprocally mounted upon the base plate, and it is normally maintained in its extreme right hand position by a spring 42 having one end secured to bar 21 at 43 and having its other end secured to the base plate 18 at 44. The right hand end of the bar 21, shown more clearly in Fig. 5, is of step-like formation, thus providing the extension 45 in operative association with the teeth of the star wheel 23. Normally, the extension 45 is disposed between two of the said teeth, as shown clearly in Fig. 3. It will be noted that each tooth of the star wheel has a curved edge 46 which serves as a cam to operate the bar 21 through the medium of the extension 45 thereof. When the star wheel is advanced, as mentioned above and as depicted in Figs. 3 and 4, the star wheel tooth to the right of extension 45, as viewed in these figures, cams the bar 21 toward the left until the point of the tooth passes beyond the extension 45, at which time the spring 42 is effective to return the bar 21, causing the extension 45 to enter the space between the said tooth and the next adjacent tooth of the star wheel.

At the opposite end of the bar 21, there is provided a pawl 47 which operates to step the ratchet 19 each time the bar 21 is actuated in the manner above described. There is also provided at the same end of bar 21 a relatively short projection 48 having a flat end adapted to cooperate with a flat edge of each ratchet tooth as illustrated in Fig. 4. As may be seen in Fig. 3, when the bar 21 is moved toward the left from its normal position, the pawl 47 engages the ratchet 19, advancing the same, and shortly after, the extension 48 engages one of the ratchet teeth thus limiting the advancement of the ratchet to one step. In this manner, the ratchet 19 is advanced one step for each actuation of the bar 21.

It will be observed that on the return movement of bar 21 from the position shown in Fig. 4 to the position shown in Fig. 2 the pawl 47 is cammed downward by a tooth on ratchet wheel 19. To permit this angular motion of bar 21, which is desirable to accommodate a long stroke for bar 21 with a relatively small diameter ratchet 19, only one support or guide pin 41 is used; the guide discs 20 and the spring 42 positioned at an appreciable angle to the longitudinal axis of bar 21, serving to support the pawl end of the bar.

It may now be noted that a pin 51 on member 26 prevents movement of the star wheel 23 when member 26 is in normal position, as shown in Fig. 2. Additionally, there is preferably provided a spring finger 49 (see Fig. 6) attached to base plate 18 and having a free end 50 resiliently engaging the star wheel to impose a frictional drag thereon, thus preventing slight movements of the star wheel which would otherwise be permitted by lost motion of the parts. This is of particular advantage in the case of an automobile receiver since the vibrations would tend to oscillate the indicator 25.

It will be noted that the two ratchets on the shafts 16 and 22 have the same number of teeth, and the star wheel 23 likewise has the same number of teeth, so that the two shafts have corresponding positions to which they are advanced by the mechanism illustrated. Thus, the two devices 10 and 11 are operated step-by-step in correlation with one another. As applied to

the tuning of a radio receiver, the mechanism advances the tuning device 10 one step each time the push-button mounted on the end 31 of the member 26, is depressed and, at the same time, it advances the tuning indicator 11 one step. In this manner, the radio receiver is tuned to successive stations and the tuning indicator is positioned accordingly.

While the invention has been described with particular reference to the control of a radio receiver, as previously stated, the invention is broadly applicable to the step-by-step positioning of two devices in correlation with one another. Moreover, it will be apparent that the invention is capable of modification within the scope of the appended claims.

I claim:

1. A positioning device comprising a first rotatable shaft to be positioned; ratchet means on said shaft having a predetermined number of ratchet teeth; a manually-operable pawl for operating said ratchet mean to thereby rotate said shaft step-by-step; a second rotatable shaft to be positioned, said second shaft being spaced from said first shaft; ratchet means on said second shaft having the same number of ratchet teeth as said first ratchet means; a second pawl longitudinally movable and extending between said first and second shafts for operating the ratchet means on said second shaft; and a star wheel having the same number of teeth as the two aforesaid ratchet means and operable by the ratchet means on said first shaft for moving said second pawl longitudinally, the teeth of the two ratchet means and the star wheel being relatively orientated so as to rotate said second shaft in step-by-step correlation with said first shaft.

2. A step-by-step positioning device, comprising a frame member, a member to be rotated, a ratchet wheel on said rotatable member, an elongated driving pawl for said ratchet wheel, resilient spring means supporting one end of said pawl from said frame member in cooperative relation with said ratchet wheel, means supporting the other end of said pawl on said frame member for longitudinal and pivotal movement of the pawl, and means for effecting recurring longitudinal movement of said pawl to step said ratchet wheel.

3. A step-by-step positioning device, comprising a frame member, a member to be rotated, a ratchet wheel on said rotatable member, an elongated driving pawl for said ratchet wheel, resilient spring means supporting one end of said pawl from said frame member in cooperative relation with said ratchet wheel, said spring means being arranged to hold the pawl normally out of driving engagement with the ratchet wheel, guide means for the said end of the pawl, means supporting the other end of said pawl on said

frame member for longitudinal and pivotal movement of the pawl, and means for effecting recurring longitudinal movement of said pawl to step said ratchet wheel.

4. A step-by-step positioning device, comprising a frame member, a member to be rotated, a ratchet wheel on said rotatable member, an elongated driving pawl for said ratchet wheel, resilient spring means supporting one end of said pawl from said frame member in cooperative relation with said ratchet wheel, said spring means being arranged to hold the pawl normally out of driving engagement with the ratchet wheel, guide means for the said end of the pawl, means supporting the other end of said pawl on said frame member for longitudinal and pivotal movement of the pawl, a rotatable driving member spaced from said first rotatable member, and means on said driving member for effecting recurring longitudinal movement of said pawl to step said ratchet wheel.

5. A step-by-step positioning device, comprising a frame member, a member to be rotated, a ratchet wheel on said rotatable member, an elongated driving pawl for said ratchet wheel, resilient spring means supporting one end of said pawl from said frame member in cooperative relation with said ratchet wheel, said spring means being arranged to hold the pawl normally out of driving engagement with the ratchet wheel, guide means for the said end of the pawl, means supporting the other end of said pawl on said frame member for longitudinal and pivotal movement of the pawl, a rotatable driving member spaced from said first rotatable member, and a star wheel on said driving member engaging said other end of said pawl for effecting recurring longitudinal movement of said pawl to step said ratchet wheel.

6. A positioning device, comprising a first rotatable shaft to be positioned, manually operable means to rotate said shaft step-by-step through a predetermined number of positions during one revolution, a second rotatable shaft to be positioned, said second shaft being spaced from said first shaft, ratchet means on said second shaft adapted to advance said second shaft through the same number of positions as said first shaft, a longitudinally movable pawl extending between said first and second shafts for operating the ratchet means on said second shaft, and cam means on said first shaft having a number of cam projections corresponding to the number of said positions for moving said pawl longitudinally, said cam projections and said positions being relatively orientated so as to rotate the second shaft in step-by-step correlation with said first shaft.

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