June 29, 1943. H. J. H. WASSELL 2,323,170

SPOT ADJUSTING MECHANISM FOR RADIO TRANSMITTERS

Filed April 1, 1941

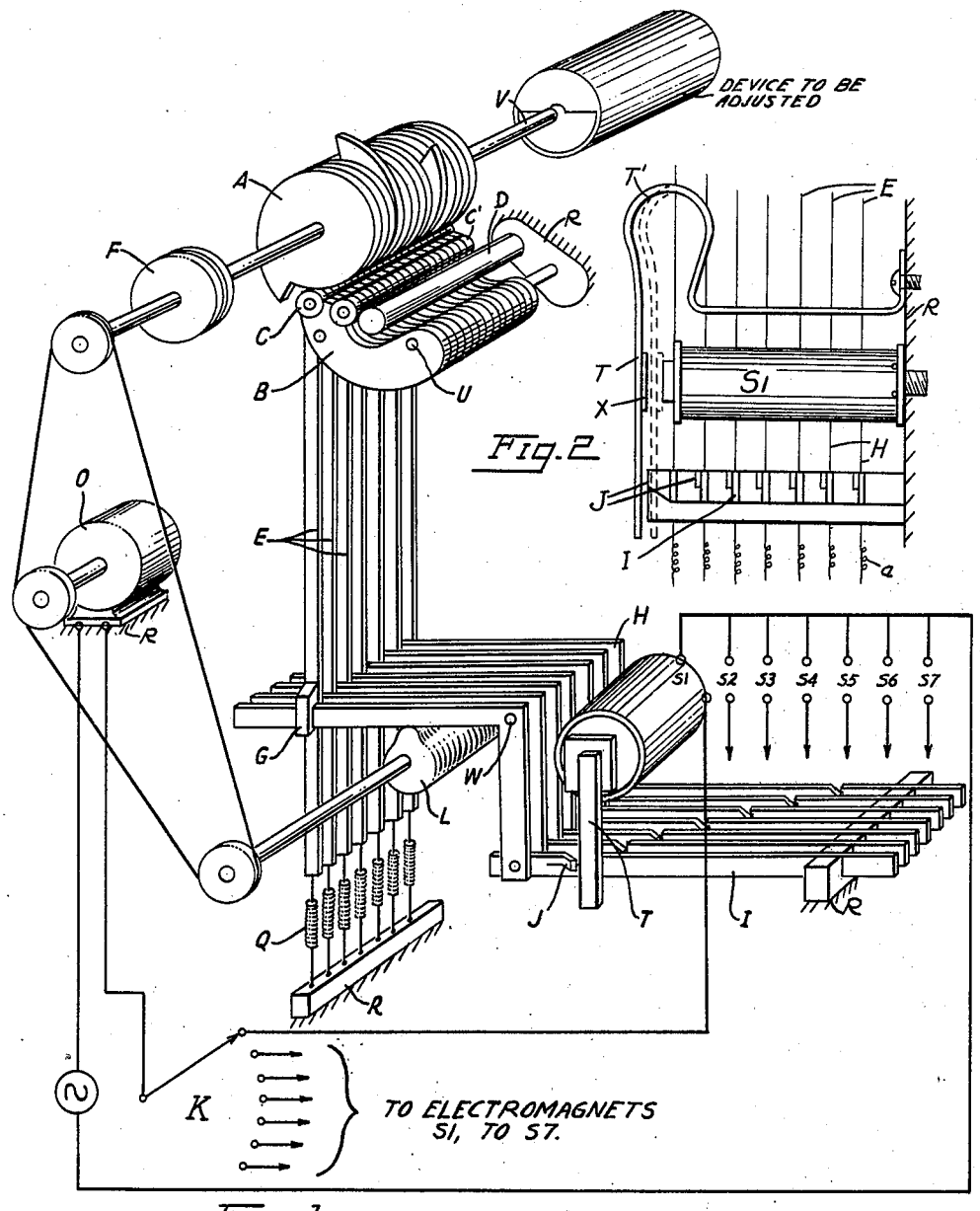


Fig. 2

Fig. 1

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Patented June 29, 1943

2,323,170

UNITED STATES PATENT OFFICE

2,323,170

SPOT ADJUSTING MECHANISM FOR RADIO TRANSMITTERS

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Application April 1, 1941, Serial No. 386,322
In Great Britain April 3, 1940

12 Claims. (Cl. 74—10)

The present invention relates to improvements in "spot" adjusting mechanism. Examples of such use are so-called spot-wave selecting mechanism in radio transmitters, wherein it is desired automatically to adjust the transmitter to transmit any one of a plurality of predetermined frequencies. The invention is not, however, so limited.

According to the invention, a spot-adjusting mechanism comprises a rotatable shaft which is coupled to a device to be adjusted, a plurality of stop-cams mounted on and rotatable with said shaft, said cams being relatively angularly displaced in accordance with different stop-positions, a like plurality of pivoted levers, one for each stop-cam and lying in the path of travel thereof, a draw-rod for each lever, means operable upon said draw-rods whereby to pull said levers out of the path of travel of said stop-cams, and selector means associated with said draw-rods whereby to prevent one of said draw-rods from pulling its associated lever from the path of one of said stop-cams, the arrangement being such that upon operation of said selector means, all levers but a selected one are withdrawn from the paths of all but a selected stop-cam, and the rotatable shaft may be set into rotation and continued until stopped by said last mentioned stop-cam.

In one way of carrying the invention into effect, as illustrated in the accompanying drawing, in which:

Fig. 1 is a perspective view of the general arrangement; and

Fig. 2 is an end elevation showing one of the selecting magnets and armatures.

Referring now to the drawing: there is mounted upon a frame R a motor O, which is coupled to a rotatable shaft V. A plurality of stop-arms or cams A are separately secured and so adjusted as to be able to occupy different relative angular positions in accordance with predetermined requirements and to be fixed in these positions. These stop-cams may, as shown, comprise flat "snail-shaped" plates. Also mounted on or associated with the shaft is a member or members of a device, the position of which is to be adjusted. It or they may be the rotor or rotors of an adjustable condenser or of adjustable condensers. The shaft is flexibly coupled as by a slipping clutch indicated at F to the driving motor O in such a manner that the motor may drive the shaft unless the movement of the latter is positively prevented, when the flexible coupling will slip.

Mounted upon a common fixed pivot U, which is situated at a short distance from and is parallel to the shaft V on frame R, is a number of levers of shallow U-shape, one for and lying in the path of each stop-cam A. The pivot extends through the end of one arm of the U-shaped levers and there are provided on the end of the other arm, two pivoted discs C and C', the periphery of one disc C extending beyond the outside of the arm and that of the other disc extending into the "cup" of the U-shaped lever. The pivots of these two discs C and C' and the fixed pivot U on which the levers are mounted are all situated in a substantially straight line. Fixed to frame R and situated within the arms of the U-shaped levers is a common stop thrust member D which just engages the periphery of the inner disc C' of all levers B when the latter are in their upper positions, thereby to take up any thrust imparted by the stop-cams A to the levers B and thus to prevent thrust of the levers upon their pivot U. The levers B are maintained in their upper positions by means of springs mounted, for example, upon the common fixed pivot U. These springs are not shown in the drawing.

Pivotally attached to each one of the free ends of the U-shaped pivoted levers is a draw-rod E to the remote ends of which is attached a retracting spring Q attached to the fixed frame R of the apparatus which tends to draw the draw-rod E down and thus to move the lever B to which it is attached out of the path of the stop-cam A with which the said lever is associated. A short bracket G extends horizontally from each drawn-rod and rests upon one arm of a bell-crank lever H whereby downward movement of said draw-rods is prevented unless otherwise permitted.

Mounted upon a fixed pivot W, situated at a convenient distance from and parallel to the plane in which the draw-rods E lie, are a number of bell-crank levers H, each having one arm extending under the said bracket G which extends from a draw-rod, so that the bracket rests on said arm. The other arm of each bell-crank lever H extends downwards from the fixed pivot W and, at its extreme end, is pivotally attached to a selector-bar I adapted to slide horizontally under the action of the bell-crank lever.

Extending beneath all the horizontal arms of the bell-crank levers and mounted for rotation, is a cam-drum L which, when in "peak" relationship with the horizontal arms, raises all said arms and with them all draw-rods E and U-

shaped levers B. It also, in this position, displaces all selector-bars I to the left.

Each selector-bar has a catch J punched out from the side of it.

Associated with each selector-bar and mounted on frame R is an electro-magnet S, only one of which is shown, and each electro-magnet S is provided with an armature X to which is attached a resilient tongue T. The resilient tongue T which may be in the form of a loop spring T1 of each electro-magnet S is located just to the right of, and cooperates with the catch J on the associated selector-bar I in such manner as shown by Fig. 2 to prevent, when the electro-magnet is energized, movement in an outward direction (that is a direction to the right, in the drawing, such as to permit retraction of the associated draw-rod) of the selector-bar. This is accomplished by tongue T being drawn in toward the side of the selector-bar I when the electro-magnet S is energized.

Power for driving them may be applied to the adjustable shaft V and the cam-drum L in any convenient manner, but such power is applied either through the intermediary of an energized electro-magnet S or in common with the energization of such magnet, through the intermediary of a starting mechanism, such as, for example, a selector switch K, which is connected in series with a source of current M and each electro-magnet circuit S1 to S7, inclusive.

The sequence of operations is as follows:

An electromagnet S, appropriate to a desired spot position of the adjustable shaft V, is energized by placing switch K in a desired position, and, attracting its armature X, brings the resilient tongue T close to and into the path of the catch J on a selector bar I. The cam-drum then commences to rotate and the cam, passing through its "peak" position, as shown, allows the horizontal arms of all the bell crank levers H (which until now are all in substantially their upper positions) to fall. The horizontal arm of that bell-crank lever H appropriate to the desired stop position cannot fall, however, by reason of the catch J on the selector bar I associated with it, engaging the resilient tongue T on the armature X of the energized electromagnet S. The falling of the horizontal arms of the bell-crank levers H is assisted by the retracting springs Q associated with the draw-rods E which, as stated, have attached to them brackets G resting upon the horizontal arms of the bell crank levers H. At about the time that drive is applied to the cam-drum L, drive is also applied to the adjustable shaft. As, due to a previous adjustment to a stop-position, a stop-cam A, will, at this time, be in engagement with a U-shaped lever B, the flexible coupling F will slip and hold off the drive until, as a result of the lowering of the horizontal arms of the bell-crank levers H, the engaged U-shaped lever B shall be lowered. The downfalling of the horizontal arms of all the bell-crank levers H allows (with the exception of that appropriate to the desired stop position) all the draw-rods E to be drawn down by their several retracting springs Q. The draw-rods E when drawn down remove the ends of the U-shaped levers B from the paths of the stop-cams A so freeing the shaft V which may now rotate until the stop-cam A appropriate to a desired stop position engages the U-shaped lever B also appropriate to that position, which lever will not have been removed from the path of the said stop-cam. When the said stop-cam engages the said U-shaped lever, further rotation of the adjustable shaft is arrested, the drive being withdrawn by reason of slip in the flexible coupling F. Rotation of the cam-drum and of the moving members of the flexible coupling continues until a predetermined selection cycle is completed, when the motor is switched off by switch K. The cam-drum will then be in position somewhat before its "peak" position.

What is claimed is:

1. A spot-adjusting mechanism for adjusting a device comprising a rotatable shaft coupled to said device to be adjusted, means for rotating said shaft, a plurality of stop-cams mounted on and rotatable with said shaft, said cams being relatively angularly displaced in different predetermined stop-positions, a like plurality of pivoted levers, one for each stop-cam and lying in the path of travel thereof, a draw-rod for each lever, means operable upon said draw-rods to pull said levers out of the path of travel of said stop-cams, and selector means associated with each one of said draw-rods to prevent one of said draw-rods from pulling its associated lever from the path of one of said stop-cams, the arrangement being such that upon operation of said selector means, all levers are withdrawn from the paths of all but one selected lever and a corresponding stop-cam, and the rotatable shaft is set into rotation and so continued until stopped by said last mentioned stop-cam.

2. A mechanism as claimed in claim 1 wherein there is also mounted on said rotatable shaft the rotor of an adjustable condenser.

3. A selecting mechanism for adjusting a device comprising a rotatable shaft coupled to said device to be adjusted, a rotatable device for rotating said shaft, a plurality of stop cams mounted on and rotatable with said shaft, said cams being relatively angularly displaced in different predetermined stop positions, a like plurality of pivoted levers, one for each one of said stop cams and lying in the path of travel thereof, flexible coupling means interposed between said shaft and said rotatable device to allow slippage when motion on one of said stop cams is prevented, a draw rod for each lever, means operable upon said draw-rods to pull said levers out of the path of travel of said stop cams, and selector means associated with each one of said draw-rods to prevent one of said draw-rods from pulling its associated lever from the path of one of said stop cams, the arrangement being such that upon operation of said selector means, all levers are withdrawn from the paths of all but one selected lever and a corresponding stop cam, and the rotatable shaft is set into rotation and so continued until stopped by said last-mentioned stop cam.

4. A selecting mechanism for adjusting a device comprising a rotatable shaft coupled to said device to be adjusted, a rotatable device for rotating said shaft, a plurality of stop cams mounted on and rotatable with said shaft, said stop cams being relatively angularly displaced in different predetermined stop positions, a like plurality of pivoted levers, one for each one of said stop cams and lying in the path of travel thereof, flexible coupling means interposed between said shaft and said rotatable device to allow slippage when motion on one of said stop cams is prevented, a like plurality of shallow U-shaped levers, one for each one of said stop cams, said U-shaped levers being mounted a short distance from, and parallel to, said rotatable shaft, and in the path of each stop cam, a draw-rod for each lever, means

operable upon said draw-rods to pull said levers out of the path of travel of said stop cams, and selector means associated with each one of said draw-rods to prevent one of said draw-rods from pulling its associated lever from the path of one of said stop cams, the arrangement being such that upon operation of said selector means, all levers are withdrawn from the paths of all but one selected lever and a corresponding stop cam, and the rotatable shaft is set into rotation and so continued until stopped by said last-mentioned stop cam.

5. A selecting mechanism for adjusting a device comprising a rotatable shaft coupled to said device to be adjusted, a rotatable device for rotating said shaft, a plurality of stop cams mounted on and rotatable with said shaft, said stop cams being relatively angularly displaced in different predetermined stop positions, a like plurality of pivoted levers, one for each one of said stop cams and lying in the path of travel thereof, a flexible coupling means interposed between said shaft and said rotatable device to allow slippage when motion on one of said cams is prevented, a like plurality of shallow U-shaped levers having two arm portions, two pivoted discs for each arm of said lever, the periphery of one disc extending beyond the outside of the arm and that of the other disc extending into the cup portion of said U-shaped lever, the pivots of each one of said discs and the pivot on which the U-shaped levers are mounted, being all situated in a substantially straight line and in the path of each stop cam, a draw-rod for each lever, means operable upon said draw-rods to pull said levers out of the path of travel of said stop cams, and selector means associated with each one of said draw-rods to prevent one of said draw-rods from pulling its associated lever from the path of one of said stop cams, the arrangement being such that upon operation of said selector means, all levers are withdrawn from the paths of all but one selected lever and a corresponding stop cam, and the rotatable shaft is set into rotation and so continued until stopped by said last-mentioned stop cam.

6. A selecting mechanism for adjusting a device comprising a rotatable shaft coupled to said device to be adjusted, a rotatable device for rotating said shaft, a plurality of stop cams mounted on and rotatable with said shaft, said stop cams being relatively angularly displaced in different predetermined stop positions, a like plurality of pivoted levers, one for each one of said stop cams and lying in the path of travel thereof, flexible coupling means interposed between said shaft and said rotatable device to allow slippage when motion on one of said stop cams is prevented, a like plurality of shallow U-shaped levers having two arm portions, two pivoted discs for each arm of said level, the periphery of one disc extending beyond the outside of the arm and that of the other disc extending into the cup portion of said U-shaped lever, the pivots of each one of said discs and the pivot on which the U-shaped levers are mounted, being all situated in a substantially straight line and in the path of each stop cam, a common member engaging the periphery of the inner disc of all of said levers in their upper portions to take up any thrust imparted by said stop cams to the levers, and thus to prevent thrust of the levers upon their pivot, a plurality of springs mounted upon a common pivot for maintaining said levers in their upper portions, a draw-rod for each lever, means operable upon said draw-rods to pull said levers out of the path of travel of said stop cams, and selector means associated with each one of said draw-rods to prevent one of said draw-rods from pulling its associated lever from the path of one of said stop cams, the arrangement being such that upon operation of said selector means, all levers are withdrawn from the paths of all but one selected lever and a corresponding stop cam, and the rotatable shaft is set into rotation and so continued until stopped by said last-mentioned stop cam.

7. A selecting mechanism for adjusting a device comprising a rotatable shaft coupled to said device to be adjusted, a rotatable device for rotating said shaft, a plurality of stop cams mounted on and rotatable with said shaft, said cams being relatively angularly displaced in different predetermined stop positions, a like plurality of pivoted levers, one for each one of said stop cams and lying in the path of travel thereof, flexible coupling means interposed between said shaft and said rotatable device to allow slippage when motion on one of said stop cams is prevented, a like plurality of shallow U-shaped levers having two arm portions, two pivoted discs for each arm of said lever, the periphery of one disc extending beyond the outside of the arm and that of the other disc extending into the cup portion of said U-shaped lever, the pivots of each one of said discs and the pivot on which the U-shaped levers are mounted, being all situated in a substantially straight line and in the path of each stop cam, a common member engaging the periphery of the inner disc of all of said levers in their upper portions to take up any thrust imparted by said stop cams to the levers, and thus to prevent thrust of the levers upon their pivot, a plurality of springs mounted upon a common pivot for maintaining said levers in their upper portions, a draw-rod for each lever, means operable upon said draw-rods to pull said levers out of the path of travel of said stop cams, said draw-rod pivotally attached to the free ends of the U-shaped pivoted lever, a retracting spring attached to the frame of the apparatus to draw said draw-rod down and thus to move the lever to which it is attached out of the path of said stop cam to which said lever is associated, and selector means associated with each one of said draw-rods to prevent one of said draw-rods from pulling its associated lever from the path of one of said stop cams, the arrangement being such that upon operation of said selector means, all levers are withdrawn from the path of all but one selected lever, and a corresponding stop cam, and the rotatable shaft is set in rotation and so continued by said last-mentioned stop cam.

8. A radio transmitter selecting mechanism for adjusting a device comprising a rotatable shaft coupled to said device to be adjusted, a rotatable device for rotating said shaft, a plurality of stop cams mounted on and rotatable with said shaft, said stop cams being relatively angularly displaced in different predetermined stop position, a like plurality of pivoted levers, one for each one of said stop cams and lying in the path of travel thereof, flexible coupling means interposed between said shaft and said rotatable device to allow slippage when motion on one of said stop cams is prevented, a draw-rod for each lever, means operable upon said draw-rods to pull said levers out of the path of travel of said stop cams, a bell crank lever linked to each one of said draw-

rods, a short bracket extending horizontally out from each one of said draw-rods, and resting upon one arm of said bell crank lever, whereby downward movement of said draw-rods is prevented, unless otherwise permitted by said short bracket, and selector means associated with each one of said draw-rods to prevent one of said draw-rods from pulling its associated lever from the path of one of said stop cams, the arrangement being such that upon operation of said selector means, all levers are withdrawn from the paths of all but one selected lever and a corresponding stop cam, and the rotatable shaft is set into rotation and so continued until stopped by said last-mentioned stop cam.

9. A selecting mechanism for adjusting a device comprising a rotatable shaft coupled to said device to be adjusted, a rotatable device for rotating said shaft, a plurality of stop cams mounted on and rotatable with said shaft, said stop cams being relatively angularly displaced in different predetermined stop positions, a like plurality of pivoted levers, one for each one of said stop cams and lying in the path of travel thereof, flexible coupling means interposed between said shaft and said rotatable device to allow slippage when motion on one of said stop cams is prevented, a draw-rod for each lever, means operable upon said draw-rods to pull said levers out of the path of travel of said stop cams, a bell crank lever linked to each one of said draw-rods, a short bracket extending horizontally out from each one of said draw-rods and resting upon one arm of said bell crank lever, a pivot situated at a convenient distance from, and parallel to, the plane at which said draw-rods lie, each one of said bell crank levers having one arm extending under said brackets which extend from a draw-rod, so that the bracket rests upon said arm, the other arm of each bell crank lever extending downwards from the pivot and its extreme end being attached to a selector bar adapted to slide horizontally under the action of said bell crank lever, and selector means associated with each one of said draw-rods to prevent one of said draw-rods from pulling its associated lever from the path of one of said stop cams, the arrangement being such that upon operation of said selector means, all levers are withdrawn from the paths of all but one selected lever and a corresponding stop cam, and the rotatable shaft is set into rotation and so continued until stopped by said last-mentioned stop cam.

10. A selecting mechanism for adjusting a device comprising a rotatable shaft coupled to said device to be adjusted, a rotatable device for rotating said shaft, a plurality of stop cams mounted on and rotatable with said shaft, said stop cams being relatively angularly displaced in different predetermined stop positions, a like plurality of pivoted levers, one for each one of said stop cams and lying in the path of travel thereof, flexible coupling means interposed between said shaft and said rotatable device to allow slippage when motion on one of said stop cams is prevented, a draw-rod for each lever, means operable upon said draw-rods to pull said levers out of the path of travel of said stop cams, a bell crank lever linked to each one of said draw-rods, a short bracket extending horizontally out from each one of said draw-rods and resting upon one arm of said bell crank lever, a pivot situated at a convenient distance from, and parallel to, the plane at which said draw-rods lie, each one of said bell crank levers having one arm extending under said brackets which extend from a draw-rod, so that the bracket rests upon said arm, the other arm of each bell crank lever extending downwards from the pivot and its extreme end being attached to a selector bar adapted to slide horizontally under the action of said bell crank lever, a cam-drum arranged so that in its peak position all of the said horizontal arm portions of each one of said bell crank levers, and with them all of said draw-rods and U-shaped levers, are raised, in which position all said selector bars are displaced, and selector means associated with each one of said draw-rods to prevent one of said draw-rods from pulling its associated lever from the path of one of said stop cams, the arrangement being such that upon operation of said selector means, all levers are withdrawn from the paths of all but one selected lever and a corresponding stop cam, and the rotatable shaft is set into rotation and so continued until stopped by said last-mentioned stop cam.

11. A selecting mechanism for adjusting a device comprising a rotatable shaft coupled to said device to be adjusted, a rotatable device for rotating said shaft, a plurality of stop cams mounted on and rotatable with said shaft, said stop cams being relatively angularly displaced in different predetermined stop positions, a like plurality of pivoted levers, one for each one of said stop cams and lying in the path of travel thereof, flexible coupling means interposed between said shaft and said rotatable device to allow slippage when motion on one of said stop cams is prevented, a draw-rod for each lever, means operable upon said draw-rods to pull said levers out of the path of travel of said stop cams, a bell crank lever linked to each one of said draw-rods, a short bracket extending horizontally out from each one of said draw-rods and resting upon one arm of said bell crank lever, a pivot situated at a convenient distance from, and parallel to, the plane at which said draw-rods lie, each one of said bell crank levers having one arm extending under said brackets which extend from a draw-rod, so that the bracket rests upon said arm, the other arm of each bell crank lever extending downwards from the pivot and its extrme end being attached to a selector bar adapted to slide horizontally under the action of said bell crank lever, a cam-drum arranged so that in its peak position all of the said horizontal arm portions of each one of said bell crank levers, and with them all of said draw-rods and U-shaped levers, are raised, in which position all said selector bars are displaced, selector means including an electro-magnet for each selector-bar, each one of said electro-magnets being provided with an armature, a resilient tongue attached to said armature, said resilient tongue cooperating with each electro-magnet, a catch associated with said selector-bar in such a manner as to prevent movement in an outward direction when one of said electro-magnets is energized, such as to permit retraction of the associated draw-rod of the selector-bar, whereby all of said levers are withdrawn from the paths of all but one lever, and a corresponding stop cam, and the rotatable shaft is set in rotation, and so continued until stopped by said last-mentioned stop cam.

12. In a mechanism for a radio device, the position of which is to be adjusted, a plurality of cams capable of being adjusted in different predetermined angular positions, a rotatable shaft on which said cams are mounted, said shaft

coupled to said device, a plurality of linkages, each one of which is adapted to be actuated by each one of said cams and located in a corresponding position thereto, means for selecting and controlling the position of one of said linkages, a cam-drum for moving the position of all of said linkages, means for rotating said shaft and said cam-drum simultaneously, and means located on each one of said linkages whereby a desired position of said device is secured by a selected cam and its corresponding linkage being retained in a stop position when a predetedmined position is selected by said selecting means.

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