

June 6, 1939.

E. J. MASTNEY

2,161,183

PRESELECTOR

Filed Jan. 27, 1938

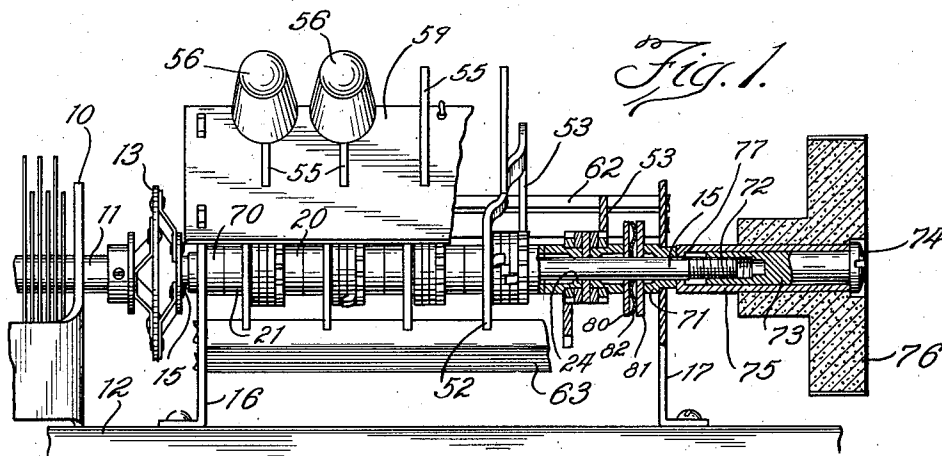


Fig. 2.

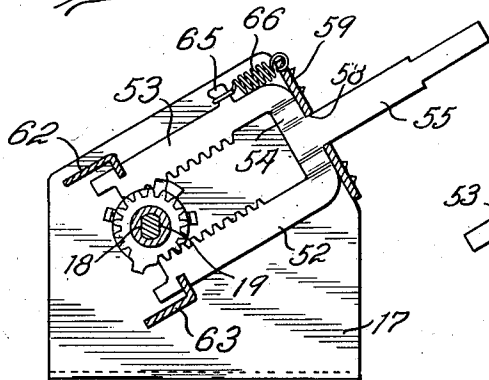


Fig. 3.

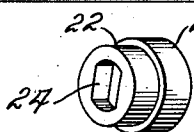
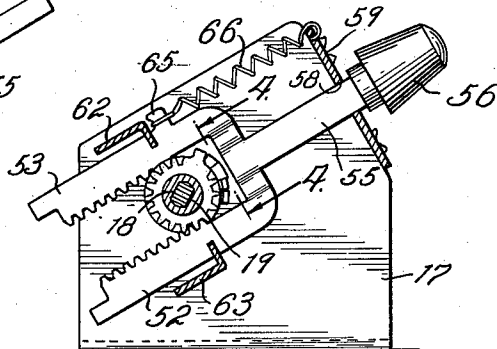


Fig. 6.

Fig. 4.

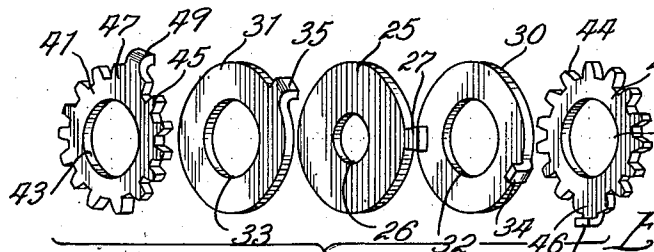
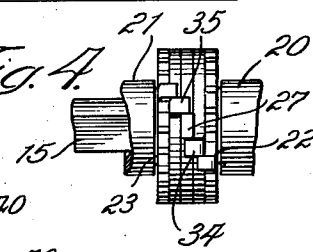


Fig. 5.

Inventor:
Edward J. Mastney.
By: Robert L. Kaley
Att'y.

UNITED STATES PATENT OFFICE

2,161,183

PRESELECTOR

Edward J. Mastney, Berwyn, Ill., assignor to Oak Manufacturing Company, Chicago, Ill., a corporation of Illinois

Application January 27, 1938, Serial No. 187,180

16 Claims. (Cl. 74-10)

This invention relates to a preselector and is an improvement on the preselector disclosed and claimed in the application of Arthur C. Ten Cate, Serial No. 187,176, filed of even date. In the Ten Cate application referred to, there is disclosed a preselecting means wherein a pair of opposed racks operating as a unit, mesh with gears and turn them in opposite directions. These gears are each provided with a finger or other means extending toward each other. Between these gear fingers, an adjustable finger, ordinarily rigid with respect to an operating shaft, is adapted to be turned to a predetermined position. Such a device finds ready application for use in connection with radio receivers or similar devices wherein it is desired to turn a shaft to one of a definite number of predetermined positions.

Since most radio receivers are tuned by gang condensers, and since such gang condensers are operative as a rule over a range of 180 degrees, it is clear that a preselector should preferably be capable of operating over this entire range. While in practice the full 180 degrees on a radio receiver is rarely used as far as a choice of desirable stations is concerned, nevertheless, it may be desirable as a selling feature to provide full 180 degree operation. The device of Ten Cate is adapted to operate over a region of 180 degrees minus one-half the angle subtended by the finger which is rigidly coupled to the shaft. While this angle may be made small, it nevertheless represents a departure from a desired 180 degrees. An object of this invention is to improve upon this construction so that a full 180 degree operation, and even more if desired, may be secured. An additional object is to simplify and improve the mechanism disclosed in the above application. A more general object is to provide a preselector which is simple, cheap, compact and easily operated. Other and additional objects will appear in connection with the description.

Referring to the drawing:

Figure 1 shows an elevation partly in section of the preselecting mechanism, with the shaft and sleeve in section.

Figure 2 is a side view of a preselector unit in a normal position.

Figure 3 shows the mechanism in the depressed position after the unit has been operated upon and before the spring returns it to its normal position.

Figure 4 is a section on line 4-4 showing the washers and gears of one preselector unit.

Figure 5 is an exploded view and shows the washers and gears of one preselector.

Figure 6 is a detail of a sleeve.

Any suitable mechanism upon which the preselecting means may operate may be used and in this particular case, Figure 1 shows a gang condenser 10 having a shaft 11, the entire construction mounted upon a base 12. Shaft 11 is provided with any suitable universal joint 13 which is coupled to the preselector shaft 15 supported by side plates 16 and 17 extending upwardly in spaced relation from base 12. Shaft 15 is preferably cut away at opposite portions to provide flats 18 and 19. Shaft 15 is adapted to have a plurality of separately adjustable preselector units and, since all of them are the same, only one will be described in detail. Thus, one preselector unit comprises a pair of sleeves 20 and 21 disposed over shaft 15. Sleeve 20 has a reduced portion 22, while sleeve 21 has a similarly reduced portion 23, both the said portions facing each other. As clearly indicated in the section of one unit in Figure 1 and also in Figure 6 each sleeve has a cylindrical bore to fit shaft 15 but has its reduced end provided with a non-circular aperture 24. Each sleeve is therefore rotatively locked to shaft 15 but movable longitudinally thereof.

Between sleeves 20 and 21 a washer 25 is disposed having a circular aperture 26 and a finger 27 extending outwardly therefrom. Washer 25 is freely rotatable around shaft 15, but the aperture 26 is too small to permit either of the sleeves or their reduced ends to project therein. Hence, this washer lies between the opposed ends of sleeves 20 and 21. It might be pointed out here-in that the rotary position of washer 25 with respect to shaft 15 may be adjusted by movement of the washer and thereafter fixed by tightening the sleeves against the washer to clamp the same firmly in position. The means for doing this will be described in detail later.

Disposed on each side of washer 25 and freely rotatable around reduced portions 22 and 23 of the sleeves, are sleeve washers 30 and 31 respectively. Both washers are provided with apertures 32 and 33 and bent fingers 34 and 35. These washers are identical and are so disposed that fingers 34 and 35 point inwardly toward center washer 25. As is clearly evident in Figure 4, fingers 34 and 35 extend over just far enough to be in the path of movement of finger 27 of the center washer.

On each side of sleeve washers 30 and 31 are gears 40 and 41 having apertures 42 and 43 equal in size to apertures 32 and 33 of washers 30 and 31. These gears are also freely rotatable

around the reduced portions of sleeves 20 and 21. The length of the reduced portions of sleeves 20 and 21 is so adjusted with respect to the combined thickness of all of the gears and washers of each unit that when the sleeves are jammed together to grip washers 25, the gears and sleeve washers will just freely turn around the sleeves and have a minimum of side play.

Gears 40 and 41 are identical in all respects and as shown are provided with gear teeth 44 and 45 extending for almost the entire circumference of the gear. However, the angle corresponding to several of the teeth, in this instance approximately three teeth, is taken up by solid tongues 46 and 47 which terminate in bent fingers 48 and 49. These fingers, as clearly shown, are bent inwardly at right angles to the plane of the gears just as in the case of the sleeve washers and are just long enough to engage the sides of sleeve washer fingers.

In order to operate each unit, a pair of racks 52 and 53 are provided. These racks have their ends joined by a U-shaped member 54 which is provided with a handle 55 and which may carry a knob 56. Handle 55 extends through slot 58 in a top plate 59 supported by side plates 16 and 17. Racks 52 and 53 are supported by guide members 62 and 63. These members are suitably slotted and are adapted to maintain racks 52 and 53 in position. Rack 52 is offset from rack 53. In this particular instance, rack 52 is adapted to engage gear 41, while rack 53 is adapted to engage gear 40. Since these racks engage gears on opposite sides of the center of rotation, it is clear that these gears will be rotated in opposite directions at equal speeds. Obviously, different sized racks and gears could be used if desired in case unequal speeds were desired. Rack 53 has a finger 65 around which the end of a spring 66 is disposed. The other end of spring 66 is anchored to plate 59. Thus, spring 66 tends to pull up the racks in the position shown in Figure 2.

When the racks are forced downwardly into the position shown in Figure 3, the gears are rotated in opposite directions and the various fingers are engaged. Thus, gear 40 will turn until its finger 48 engages finger 34 of sleeve washer 30 and then both will turn until finger 27 of center washer 25 is engaged. The three of these will turn, assuming that the other gear and sleeve washer have not reached the corresponding position. Assuming this to be the case, the three will turn until gear 41 and washer 31 are encountered by means of their fingers. When fingers 35 and 49 of these elements are encountered, there will be no tendency to turn washer 25. This is because both sets of fingers on each side of the center washer will engage and urge the washer in opposite directions with equal force. When this point has been reached, it is clear that the pair of racks will not go any further.

Gear 40 will make almost a complete turn before engaging finger 34 of the adjacent sleeve washer 30. The difference between 360 degrees is due to the angle subtended by washer finger 34. Similarly washer 30 will make almost a complete turn before engaging center washer finger 27 on opposite sides thereof. Hence, the sleeve washer and gear on each side of the center washer together will make almost two complete revolutions before the finger 27 is engaged in traveling from one end position to the other. It is clear that center washer 25 may be operated

through a much greater angle than 180 degrees by means of the mechanism shown. In practice, it is preferred to adjust the various gears and washers so that in the selected position as shown in Figure 3 center washer 25 has its finger 27 pointing approximately in line with handle 55 of the racks. For operation of a gang condenser where only a 180 degree range is desired, the gears may be adjusted to the position shown in Figure 2 and the racks 52 and 53 thereupon adjusted to engage said gears. As actually shown, the racks are just large enough and have just enough teeth to operate over a full 180 degrees of range. Hence, for uniformity, all the push buttons 56 will drop to the same bottom position to turn in the desired angle.

Of course, if the condenser shaft or whatever is being operated upon is to have a range greater than 180 degrees, then the racks will be that much longer. In fact, while only one intermediate sleeve washer is provided between each gear and the shaft washer, it is understood that more intermediate sleeve washers may be provided so that a plurality of series operated washers will result, if the range angle is sufficiently great. Since each intermediate sleeve washer adds almost 360 degrees to the operating range of the shaft washer, as many such additional washers may be provided as may be necessary. Furthermore, it should be understood that while bent fingers have been disclosed as the coupling means between the various mechanical elements, other means may be used. The same remark applies to the gears which may be replaced with pulleys or friction rollers.

In order to adjust the various preselector units shaft 15 is provided with an end bushing 70 suitably shouldered and rigidly mounted thereon so that plate 16 acts as an abutment for the various sleeves. A movable bushing 71 is provided to cooperate with side plate 17. Both bushings, of course, are rotatable in their respective side plates. The free end of shaft 15 is threaded at 72 and extends beyond plate 17. Engaging the threaded end 72 of the shaft is a threaded member 73 having an enlarged slotted head 74. Member 73 is disposed within a sleeve 75 which bears against bushing 71. Member 73 is rotatively coupled to flattened shaft 15 but movable lengthwise thereof by having a squared end 77. This sleeve carries a knob 76 which is suitably apertured to permit slotted head 74 to be concealed therein. In order to maintain a spring pressure on the various sleeve assemblies, a pair of large washers 80 and 81 separated by a spring washer 82 is provided between bushing 71 and the adjacent preselector unit. It is clear that by tightening sleeve 73 by means of a screw driver operating on slotted head 74 that sleeve 75 will be pressed by slotted head 74 against bushing 71 and thus tend to press the various sleeves of each of the units tightly against each other.

Knob 76 may be turned manually to turn shaft 15 to any desired position when it is desired to tune the condenser by hand. When it is desired to adjust the various preselector units, slotted head 74 is turned to withdraw members 73 and loosen the pressure on sleeve 75. Hence, the various preselector sleeves are loosened enough to permit the center washer 25 of each unit to slip with respect to shaft 15. When the desired station has been tuned in by knob 76 or the desired shaft position obtained, any preselector unit chosen for that spot has its button 56 depressed to the position shown in Figure 3. Ordinarily, 75

it is desirable to loosen up slotted head 74 just enough so that when push button 56 is pressed down washer 25 will be forced to the position shown in Figure 3. In other words, the washer should have enough friction against the ends of the sleeves due to spring 82 so that no free rotation is possible. In this way, when push button 56 is released, spring 66 will pull the racks back in the position shown in Figure 2 and the various gears and sleeve washers will be withdrawn from the center washer 25 without disturbing the position thereof. When another selector is to be adjusted, knob 76 may be turned to a new position. The washer will turn with the shaft while another unit is being adjusted. In other words, the only time that washer 25 should turn relatively to shaft 15 is when the mechanism is loosened and when push button 56 has been pressed down to force the washer to turn. Otherwise sufficient friction should be maintained so that during subsequent adjustments of other units, the previous adjustments will not be disturbed. After the various preselector units have thus been adjusted, slotted head 74 is tightened against knob 76. This may be done by means of a screw driver applied to slotted head 74 while holding knob 76 by the end. In this manner the various preselector units will be adjusted to grip the center washers of each unit.

What is claimed is:

1. A preselector comprising a shaft adapted to be turned to a preselected position, coupling means rotatively adjustable on said shaft, a first means freely rotatable on said shaft on each side of said coupling means, a second means freely rotatable on said shaft on the outer side of each of said first freely rotatable means, means for mechanically engaging each of said second rotatable means to the adjacent first rotatable means after a predetermined angle of rotation dependent upon the relative rotary positions of said various means, means for mechanically engaging each first rotatable means with said coupling means at predetermined angular positions dependent upon the relative angular positions thereof, and means for simultaneously rotating said second rotatable means in opposite directions.

2. The structure of claim 1 wherein said simultaneously rotating means operates to turn said second rotatable means at equal speeds.

3. A preselector comprising a shaft adapted to be turned to a preselected position, coupling means rotatively adjustable on said shaft, a first means freely rotatable on said shaft on each side of said coupling means, a gear freely rotatable on said shaft on the outer side of each of said first freely rotatable means, means for mechanically engaging each gear with the adjacent first rotatable means after a predetermined angle of rotation dependent upon the relative rotary positions of said gear and said rotatable means, means for mechanically engaging each first rotatable member and said coupling means at predetermined angular positions dependent upon the relative angular positions thereof, and means meshing with said gears for simultaneously rotating said gears in opposite directions.

4. A preselector comprising a shaft adapted to be turned to a preselected position, coupling means rotatively adjustable on said shaft, a sleeve on each side of said coupling means longitudinally movable on said shaft but rotatively locked thereto, a first means freely rotatable on each sleeve disposed on each side of said coupling

means, a second means freely rotatable on said sleeves disposed on the outer side of each of said first freely rotatable means, means for mechanically engaging each of said second rotatable means to the adjacent first rotatable means after a predetermined angle of rotation dependent upon the relative rotary positions of said various rotatable members, means for mechanically engaging each first rotatable means and said coupling means at predetermined angular positions dependent upon the relative positions thereof, and means for simultaneously rotating said second rotatable means in opposite directions.

5. The structure of claim 4 wherein each second freely rotatable means comprises a gear.

6. The structure of claim 4 wherein each sleeve is shouldered at the outer end thereof to maintain the two freely rotatable means against lateral movement.

7. A preselector comprising a shaft adapted to be turned to a preselected position, coupling means including a washer rotatively mounted on said shaft, a sleeve on each side of said coupling means rotatively locked to said shaft but movable longitudinally thereof, a first means freely rotatable on each sleeve disposed on each side of said coupling means, a second means freely rotatable on each sleeve disposed on the outer side of each of said first freely rotatable means, means for mechanically engaging each of said second rotatable means with the adjacent first rotatable means after a predetermined angle of rotation dependent upon the relative rotary positions of said various members, means for mechanically engaging each first rotatable means with said coupling means at predetermined angular positions dependent upon the relative angular positions thereof, means for simultaneously rotating said second rotatable means in opposite directions, and adjustable means for forcing said sleeves toward each other to lock said coupling means in a predetermined position.

8. A preselector comprising a shaft adapted to be turned to a preselected position, a washer having an outwardly extending finger rotatively adjustable on said shaft, an additional washer on each side of said first washer, said additional washers being freely rotatable around said shaft and having means engaging said first washer finger at predetermined points, a gear freely rotatable on the shaft mounted on each side of said additional washer, means carried by each gear for engaging the adjacent additional washer at a plurality of points and means for simultaneously rotating said two gears in opposite directions.

9. The structure of claim 8 wherein a sleeve is provided on the shaft on each side of said first washer and wherein said additional washers and gears are mounted on the sleeve.

10. The structure of claim 8 wherein a sleeve is provided on each sleeve of said first washer with said sleeves rotatively locked to the shaft but movable lengthwise thereof, and wherein the additional washers and gears are mounted on said sleeves and wherein means are provided for exerting pressure on said sleeves to tightly jam the first washer therebetween and lock the same.

11. A preselector comprising a shaft adapted to be turned to a preselected position, a washer having an outwardly extending finger disposed on said shaft and rotatable around said shaft, a sleeve on each side of said washer rotatively locked

to said shaft but movable lengthwise, a sleeve washer freely rotatable on each sleeve disposed on each side of said first washer, said sleeve washers having fingers extending toward the first washer finger and adapted to engage therewith after predetermined angles of lost motion, means mounted on each sleeve on the outer side of each of said sleeve washers, said means being freely rotatable on each sleeve and having fingers adapted to engage the fingers of said sleeve washers after predetermined lost motion angles, means for simultaneously rotating said first named means in opposite directions, and means for forcing said sleeves toward each other to tightly clamp said first washer.

12. The structure of claim 11 wherein said second named means comprises a gear on the outer side of each of said sleeve washers.

13. A preselector comprising a shaft adapted to be turned to a preselected position, a washer having an outwardly extending finger rotatively mounted on said shaft, a second washer disposed on each side of said first washer and freely rotatable around said shaft, and each second washer having a single finger adapted to engage the first washer finger after predetermined lost motion, a gear mounted on the outer side of each second washer and freely rotatable on said shaft, each gear carrying a finger adapted to engage the adjacent second washer finger after predetermined lost motion, and a pair of racks meshing

with said gears and adapted to turn them simultaneously in opposite directions upon movement of said racks.

14. A preselector comprising a shaft adapted to be turned to a preselected position, a washer having an outwardly extending finger freely rotatable on said shaft, a sleeve on each side of said washer rotatively locked to said shaft but longitudinally movable, a sleeve washer freely rotatable on each sleeve disposed on each side of said first washer, each sleeve washer having a finger adapted to engage the first washer finger after predetermined lost motion, a gear freely rotatable on said sleeve mounted on the outer side of each sleeve washer, and each gear having a finger adapted to engage the adjacent sleeve washer finger after predetermined lost motion, a pair of racks operating as a unit meshing with said gears and upon movement adapted to turn said gears simultaneously in opposite directions, and means for forcing said sleeves tightly together to clamp said first washer in adjusted position.

15. The structure of claim 14 wherein said last named means is adjustable and includes a spring for urging said sleeves toward each other to permit adjustment of said first washer with respect to said shaft.

16. The structure of claim 14 wherein said sleeves are shouldered to maintain the gear and sleeve washer against lateral movement.

EDWARD J. MASTNEY.