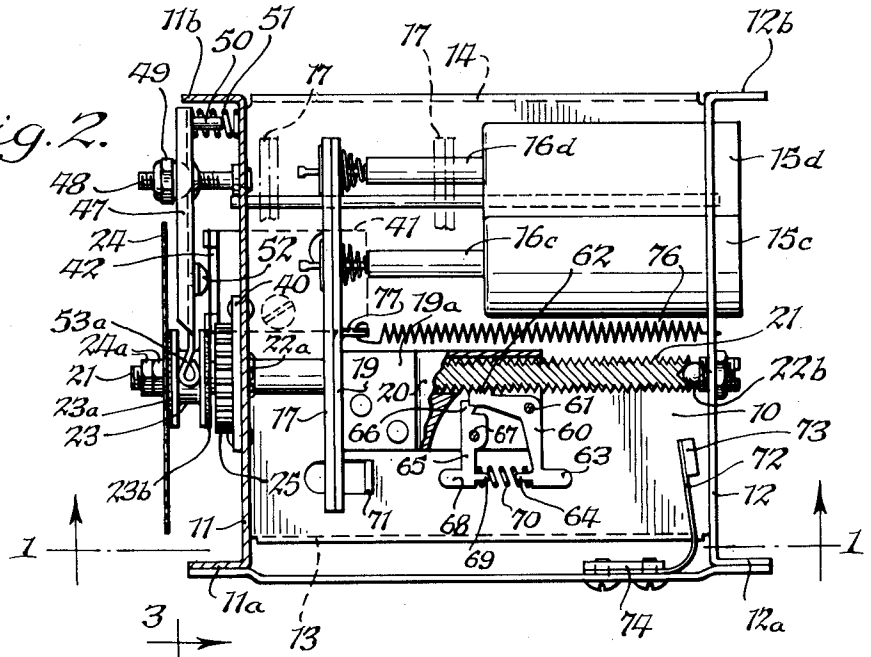
June 27, 1950 C. F. CARLZEN 2,512,714

SCREW AND NUT GEARING

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Fig. 2.



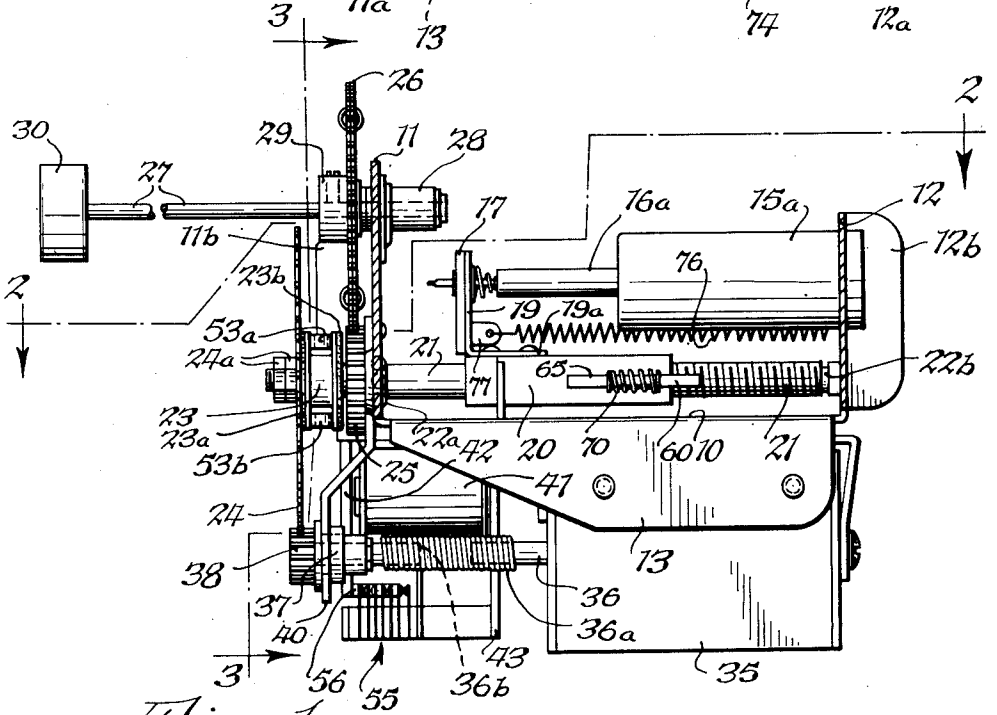


Fig. 1.

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Fig. 3.

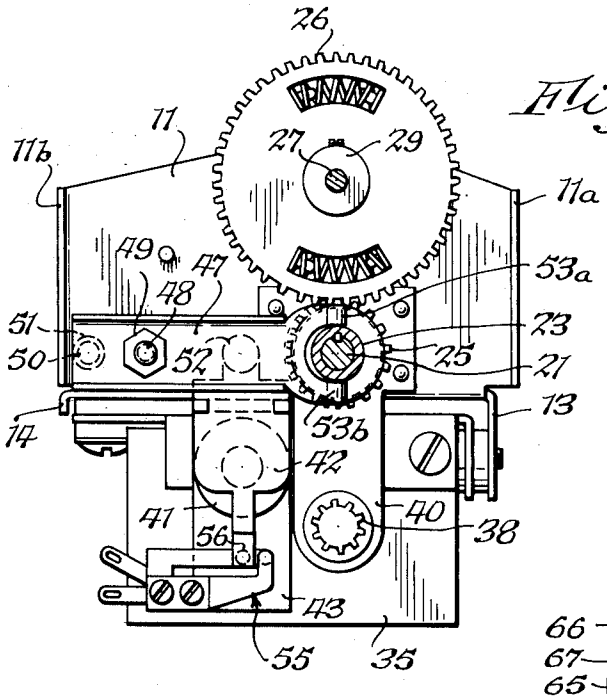


Fig. 5.

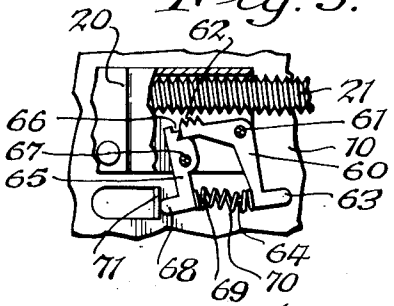


Fig. 4.

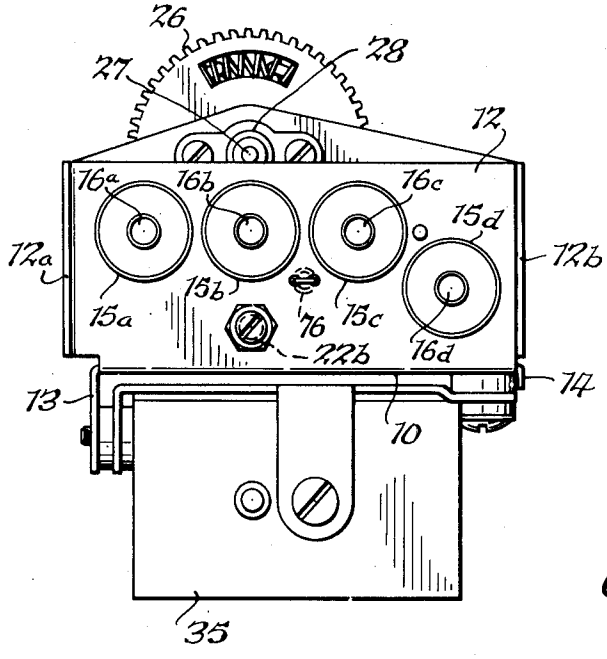
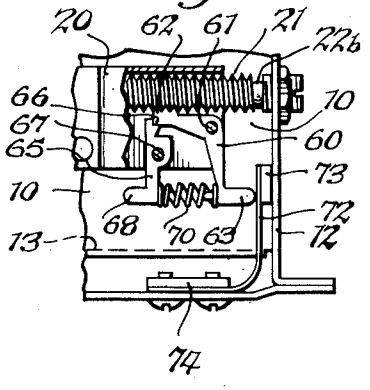


Fig. 6.



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UNITED STATES PATENT OFFICE

2,512,714

SCREW AND NUT GEARING

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Application September 16, 1947, Serial No. 774,254

4 Claims. (Cl. 74—424.8)

1

This invention relates to tuning mechanisms for radio receivers, and more particularly to motor operated tuning mechanisms, and is of particular utility in what are known as "signal-seeking" receivers, although it will be understood that it may be advantageously applied in other types of motor driven receivers.

In receivers of the type in which my invention is particularly useful, the motor tuning is always in the same direction, the receiver being tuned progressively across the spectrum in one direction until it reaches the end of the tuning band, at which time the tuning mechanism is quickly returned to the end of the band and again tunes slowly across. No tuning is done on the return trip of the tuning mechanism. In addition to this, a manual drive is provided, but the manual drive operates to tune the receiver in either direction.

Among the objects of my invention may be mentioned the following:

To provide mechanism of the class described with improved and simplified mechanism for the motor drive, and in particular, mechanism for providing for tuning always in the same direction with quick return of the tuning mechanism from the end of its travel to the beginning.

It is a further object of this invention to provide an improved clutch mechanism for engaging either the motor or manual drive without any attention or without any action on the part of the operator.

It is a further object of this invention to provide a mechanism of the class described which is relatively cheap to manufacture and simple to assemble, requiring no high precision operations and utilizing for the mechanical parts principally only punch press and screw machine products.

Still other objects and advantages of my invention will be apparent from the specification.

The features of novelty which I believe to be characteristic of my invention are set forth with particularity in the appended claims. My invention itself, however, both as to its fundamental principles and as to its particular embodiments, will best be understood by reference to the specification and accompanying drawing, in which

Fig. 1 is a side elevation of the tuning mechanism in accordance with my invention, partly in section on lines 1—1 of Fig. 2,

Fig. 2 is a section thereof on lines 2—2 of Fig. 1,

Fig. 3 is a front elevation partly in section on lines 3—3 of Fig. 1,

Fig. 4 is a rear elevation thereof, and

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Figs. 5 and 6 are detail plan views on a larger scale, showing the release mechanism effecting the quick return of the tuning mechanism to starting position when it has reached the end of its travel.

The entire mechanism is assembled upon base plate 10, having up-turned end portions 11 and 12. The outer extremities of end portions 11 and 12 may be bent over as at 11*a* and 11*b* and 12*a* and 12*b*, and the side portions of base plate 10 may be bent downwardly as at 13 and 14.

In the present instance, the tuning is of the permeability type, the various coils (not shown) being mounted within shielding cans 15*a*, 15*b*, 15*c*, and 15*d* mounted on rear end plate 12, and the coils being tuned by permeability cores or slugs 16*a*, 16*b*, 16*c*, and 16*d*, movable into and out of the coils to vary the inductance thereof in the well known manner.

The cores may be ganged for operation by being attached to insulating bridge 17 by the usual screw and nut and spring assemblies well known in the art and not per se a part of this invention. Insulation bridge 17 is mounted upon metallic bracket 19, having a lower angular extension 19*a* secured to carriage 20. By means of mechanism which will be further described in detail, in tuning, carriage 20 is moved to the right and left between the limits shown in dotted lines in Fig. 2, to cover the spectrum of the receiver. Movement of carriage 20 is effected by worm shaft 21 mounted in end plates 11 and 12 for rotation and provided with front ball bearings 22*a* and rear ball bearing 22*b*.

Shaft 21 carries at its front end clutch member 23 free to move longitudinally on shaft 21, but keyed against rotation. Clutch 23 has front clutch face 23*a* and rear clutch face 23*b*, and in its forward position engages gear 24 free to rotate on shaft 21 but secured on shaft 21 by nuts 24*a* to prevent its coming off of said shaft and in its rear position engages gear 25 free to rotate on shaft 21.

Gear 25 is in turn engaged by scissors gear 26 mounted on shaft 27 secured to front end plate 11 by bushing 28 and clamping collar 29. The forward extremity of shaft 27 may be provided with manual knob 30.

The motor drive is provided by motor 35 mounted below main plate 10 and having its shaft 36 extending forwardly and surrounded by spring 36*a*, which also surrounds and engages stub shaft 36*b*, passing through supporting plate 40 secured to front end plate 11, and is provided with bushing 37 and at its forward extremity with gear

38 engaging gear 24. Spring 36a acts as a universal joint.

Mounted below end plate 10 is solenoid 41 which actuates armature 42 when the solenoid is energized. In the position shown in Fig. 1 the solenoid is energized and the armature is in its retracted position. As a part of the solenoid assembly there is provided bracket 43 extending downwardly from the solenoid and carrying a number of switch contacts 55 actuated by arm 56 extending from armature 42. The circuits controlled by these contacts are not per se a part of this invention and are therefore not shown or described.

The clutch is operated by clutch operating arm 47 pivotally mounted on threaded stud 48 carried by end plate 11 and provided with an adjustable pivot bearing 49. The upper end carries stud 50 surrounded by spring 51, biasing the upper end of clutch operating lever 47 outwardly. The clutch operating lever 47 is bifurcated at its other end and terminates in two arms 53a and 53b engaging in the reduced center portion of clutch 23.

As will be seen, when the solenoid is not energized, spring 51 maintains clutch operating lever 47 at the counter-clockwise extremity of its rotation, thereby engaging clutch face 23b with gear 25, which in turn is engaged with gear 26, the manual drive gear. When the solenoid is not energized, therefore, the manual drive gear is engaged, the motor drive gear is disengaged and any desired adjustment of tuning may be made in either direction by manual tuning knob 30.

When, however, the solenoid is energized and armature 42 moved inwardly toward solenoid 41, clutch operating lever turns slightly clockwise against the bias of spring 51 under outward pressure on button 52 which is engaged by an upward extension of armature 42, which is pivoted at a point between the pole face and button 52 and engages clutch face 23a with motor drive gear 24, which in turn engages gear 38 driven by the motor. Thus, when the solenoid is energized, the motor will drive gear 38, in turn driving gear 24, and through clutch 23, driving worm 21.

Worm 21 passes through an unthreaded opening in carriage 20. Mounted within a slot in carriage 20 there are provided a pair of pawls 60 and 65. Pawl 60 is pivoted as at 61 and has gear teeth 62 for engaging the thread of worm 21. Pawl 60 also has at its outer extremity a portion 63 arranged to strike at the right-hand extremity of its travel, as will be hereafter described.

Pawl 65 is provided at its inner end with notch 66 arranged to engage the inner end of pawl 60 and hold it in position. Pawl 65 is pivoted at 67 and is provided with outwardly extending extremity 68 arranged to strike the up-struck finger 71 on base plate 10 when the tuning mechanism reaches the end of its travel. The two pawls are biased away from each other at their outer ends by means of spring 70 surrounding projections 64 and 69 of the respective pawls.

Mounted adjacent end plate 12 on cross plate 75 there may be provided spring 72 carrying cushion block 73, the outer end of spring 72 being secured by plate 74 and screws. Carriage return sping 76 is provided, having one end secured to finger 77 extending from plate 19 and its other end secured to end plate 12 in any suitable manner. The operation of the quick return is quite simple and will be readily understood from what has already been said, and by reference to Figs. 5 and 6.

Assuming that the tuning occurs from the low frequency end toward the high frequency end of the spectrum when the switch (not shown) controlling motor operation is closed and solenoid 41 energized, motor 35 operates driving gear 38, in turn driving gear 24 and through clutch face 23a rotating worm shaft 21. Pawl 60 being in engagement with the worm threads, the carriage will be moved to the left in Figs. 1 and 2 in a direction to withdraw the cores from the coils and thereby increase the frequency to which the receiver is tuned.

When the carriage reaches the left-hand extremity of its travel, pawl projection 68 strikes finger 71, rotating pawl 65 counter-clockwise by an amount sufficient to permit pawl 60 to rotate slightly counter-clockwise to the position shown in Fig. 5, withdrawing teeth 62 from worm 21.

Returning spring 76 then quickly pulls the carriage to the right-hand extremity of its travel, whereupon pawl finger 63 strikes spring 72, rotating pawl 60 slightly clockwise and engaging teeth 62 with the threads of worm 21. Spring 70 then rotates pawl 65 slightly clockwise, engaging notch 66 against pawl 60, as shown in Fig. 6. As soon as the teeth of pawl 60 engage worm 21, the carriage will again start to move to the left if the motor is operated.

While this operation has been described with the motor driving the tuner, it will be understood that the same quick return is effected when the manual drive is in operation, but whereas in motor operation the carriage moves only in one direction, for tuning with the manual drive the carriage can be moved either way. While I have not shown or described any dial and pointer for indicating the setting of the tuner, it will be understood that any suitable mechanism well known in the art may be utilized.

In the specification I have explained the principles of my invention and the best mode in which I have contemplated applying those principles, so as to distinguish my invention from other inventions; and I have particularly pointed out and distinctly claimed the part, improvement, or combination which I claim as my invention or discovery.

While I have shown and described certain preferred embodiments of my invention, it will be understood that modifications and changes may be made without departing from the spirit and scope thereof, as will be clear to those skilled in the art.

I claim:

1. In mechanism of the class described, in combination, a frame, a carriage mounted on said frame for movement thereon, a worm mounted in bearings on said frame, said carriage having a movable first finger thereon movable into and out of engagement with the threads of said worm, said first finger being biased out of worm engaging position, and a second movable finger engaging said first finger in a plurality of positions, on one of which said second finger holds said first finger in engagement with said worm, and in another of which said second finger holds said first finger limiting movement thereof in a direction away from said worm, and spring means biasing said second finger into constant engagement with said first finger.

2. In mechanism of the class described, in com-

bination, a frame, a carriage mounted on said frame for movement thereon, a worm mounted in bearings on said frame, said carriage having a movable first finger pivoted thereon, and movable into and out of engagement with the threads of said worm, said first finger being biased out of worm engaging position, and a second movable finger pivoted on said carriage and engaging said first finger in a plurality of positions, in one of which said second finger holds said first finger in engagement with said worm and in another of which said second finger holds said first finger limiting movement thereof in a direction away from said worm, said fingers being pivoted on parallel spaced apart axes, and a spring engaging said fingers for resiliently holding their inner ends in contact.

3. In mechanism of the class described, in combination, a frame, a carriage mounted on said frame for movement thereon, a worm mounted in bearings on said frame, said carriage having a movable first finger pivoted thereon, and movable into and out of engagement with the threads of said worm, said first finger being biased out of worm engaging position, and a second movable finger pivoted on said carriage and engaging said first finger in a plurality of positions, in one of which said second finger holds said first finger in engagement with said worm, and in another of which said second finger holds said first finger limiting movement thereof in a direction away from said worm, said fingers being pivoted on parallel spaced apart axes, said fingers having portions extending outwardly from said pivots, and a compression spring urging the outer ends of said fingers apart.

4. In mechanism of the class described, in combination, a frame, a carriage mounted on said frame for movement thereon, a worm mounted in bearings on said frame, said carriage having a movable first finger pivoted thereon, and movable into and out of engagement with the threads

of said worm, said first finger being biased out of worm engaging position, and a second movable finger pivoted on said carriage and engaging said first finger in a plurality of positions, in one of which said second finger holds said first finger in engagement with said worm and in another of which said second finger holds said first finger limiting movement thereof in a direction away from said worm, said fingers being pivoted on parallel spaced apart axes, and a spring engaging said fingers for resiliently holding their inner ends in contact, said fingers having portions extending outwardly from said pivots, and a pair of stops at opposite ends of said frame respectively and engaged by the respective fingers at the ends of carriage travel, engagement of one of said stops with said first finger rotating said first finger into engagement with the threads of said worm, and engagement of said second finger with its respective stop rotating said second finger away from said first finger to permit disengagement of said first finger from the threads of said worm.

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