April 25, 1950 S. A. HALL 2,505,111

TUNING MECHANISM

Filed March 20, 1946

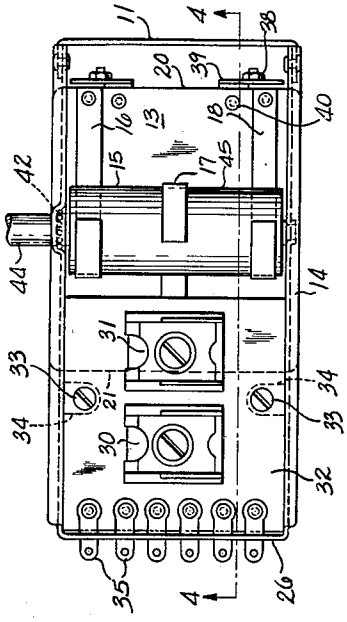


Fig. 3

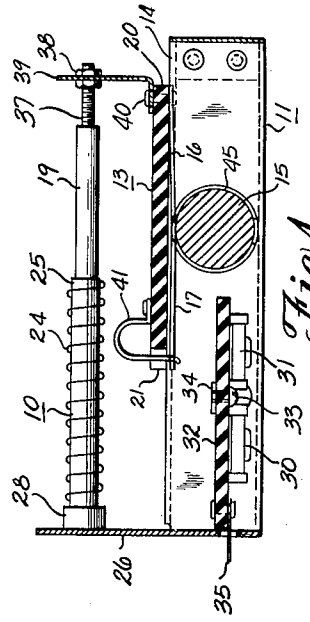


Fig. 4

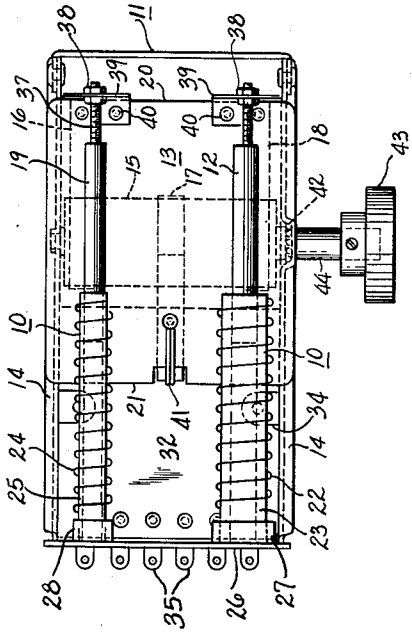


Fig. 1

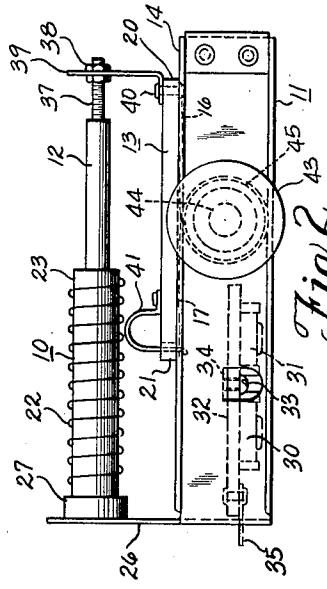


Fig. 2

INVENTOR.
Stanley A. Hall

BY
Hoadley and Frost
atty

Patented Apr. 25, 1950 2,505,111

UNITED STATES PATENT OFFICE

2,505,111

TUNING MECHANISM

Stanley A. Hall, Vancouver, British Columbia, Canada

Application March 20, 1946, Serial No. 655,693

2 Claims. (Cl. 74—10.7)

1

My invention relates in general to tuning mechanisms and in particular to those mechanisms in which a flux conducting member is moved relative to an inductance element by partially coiling and uncoiling band means on a rotatable drum.

An object of my invention is the provision of a device for reciprocally moving a first member with respect to a second member without establishing a backlash in the device.

Another object of my invention is the provision of a device for reciprocally moving a first member with respect to a second member in which a drum is rotated to coil bands thereon for moving said first member.

Still another object of my invention is the provision of a tuning device having a movable element in which a drum having bands cooperating therewith is rotated to move the movable element for tuning the device.

A further object of my invention is the provision of a variable reactor having a flux conducting member movable relative to the inductance elements to vary the reactance of the reactor.

A still further object of my invention is the provision of a manually rotatable drum means and cooperative band means which may be partially coiled onto and uncoiled from the drum means to reciprocally move a flux conducting member relative to an inductance element for varying the reactance of the inductance element.

I have for a still further object of my invention, the provision of a variable reactance in which a first band means extends partially about a rotatable drum in one direction and a second band means extends partially about the drum in the opposite direction to cooperate with the drum to move a flux conducting member relative to an inductance element when the drum is rotated for varying the reactance.

Other objects and a fuller understanding of the invention may be had by referring to the following description and claims, taken in conjunction with the accompanying drawing, in which:

Figure 1 of my drawings is a top view of my preferred tuning mechanism;

Figure 2 of my drawings is a front-elevational view of my preferred tuning mechanism;

Figure 3 of my drawings is a bottom view of my tuning mechanism; and

Figure 4 of my drawings is a cross-sectional view taken along the line 4—4 of Figure 3.

2

In the preferred embodiment of my invention, the reactance 10 is supported by a base 11. The reactance 10 is varied by moving a flux conducting member 12 and a flux conducting member 19 relative to the coils of wire 22 and 24. These flux conducting members 12 and 19 may be reciprocally moved by reciprocally sliding a movable member 13 on the bed 14 of the base 11. In my preferred tuning mechanism, this movable member 13 is reciprocated on the bed 14 by a rotatable drum 15 and flexible bands 16, 17 and 18. The flexible bands 16, 17 and 18 and the rotatable drum 15 cooperate when the drum is rotated in one direction to move the movable member 13 along the bed 14 in a desired direction. The flexible bands 16, 17 and 18 and the rotatable drum 15 cooperate to move the movable member in the opposite direction on the bed 14 when the drum is rotated in the opposite direction.

The reactance 10 comprises in general the first coil of wire 22 coiled on an insulation tube 23, and the second coil of wire 24 coiled on a second insulation tube 25. The first insulation tube 23, which is supported above the base 11 by an upright member 26 and collar 27, has its axis substantially parallel to the plane of the bed 14. The collar 27 extends about one end of the insulation tube 23 and may be welded or otherwise fastened to the upright member 26. Similarly, the insulation tube 25 having the coil wire 24 thereon, is supported by the upright member 26 and a collar 28. The longitudinal axes of those insulated tubes 23 and 25, while being substantially in a plane parallel to the bed 14 of the base 11, are also substantially parallel each with the other.

Adjustable condensers 30 and 21 may be supported within the base 11 by a supporting plate 32. This supporting plate 32 may be constructed of any suitable insulation material and may be fastened by screws 33 to tabs 34, which may be constructed by punching inwardly a portion of the wall of the base 11. The wire coils 22 and 24 and the adjustable condensers 30 and 31 may be connected in suitable electrical circuit onto the electrical contacts 35. These contacts 35 are supported by the supporting plate 32 and extend outwardly through the base 11 for external electrical connection. It is to be understood, that these adjustable condensers and the coils of wire which form the reactance may be connected in any desired circuit connection without departing from the scope of my invention.

The flux conducting members 12 and 19 are reciprocally slidably mounted within the insulation tubes 23 and 25, respectively. In my specification and claims, I will describe only one of these units, as the other unit is similarly constructed. The flux conducting members may be constructed of any suitable material, such for example, as ferrous metals. A threaded portion 37 of the flux conducting member 19 extends longitudinally therefrom on one end. This threaded portion 37 extends through an opening in a bracket 39 and may be secured thereto by nuts 38. The bracket 39 may be constructed of any suitable material and has generally an L-shape with the base of the bracket 39 fastened by a rivet 40 or other suitable means to one end 20 of the movable member 13.

A first end of each of the side bands 16 and 18 is fastened by riveting or other suitable means to the end 20 of the movable member 13 and on opposite sides thereof. These side bands 16 and 18 are coiled partially about the rotatable drum 15 in one direction. A second end of these side bands 16 and 18 is fastened by welding, soldering, or other fastening means to the rotatable drum 15. The bands are preferably constructed of a flexible material, such for example, brass or copper, which will readily coil about the rotatable drum as the drum is manually rotated. As is best illustrated in the Figure 3 of my drawing, the flexible side bands 16 and 18 are fastened on opposite side ends of the rotatable drum 15 and are disposed to engage the substantially cylindrical surface 45 of the drum. One end of the center band 17 is fastened to the manually rotatable drum in a manner similar to the side bands 16 and 18, but is partially coiled about the drum in the opposite direction. The other end of the center band 17 is fastened by a spring 41 to the center of the opposite end 21 of the movable member 13. This center band 17 is disposed to coil substantially intermediate the ends of the rotatable drum 15. The spring 41, although shown as a bent wire riveted to the movable member 13, may be of any other suitable design without departing from the scope of my invention, and prevents any slackness or looseness between the bands and the rotatable drum.

The rotatable drum 15 may be suitably mounted within the base 11 by roller bearing means 42 or other suitable means, whereby it may be manually rotated by a knob 43. This knob 43 may be carried by a shaft 44 which extends outwardly from the rotatable drum 15 and through the base 11. As is best shown in Figure 4 of my drawing, the cylindrical surface 45 of the drum 15 is disposed from the movable member 13 a distance slightly greater than the thickness of the bands 16, 17 and 18.

The major axes of the bands 16, 17 and 18 are substantially perpendicular to the longitudinal axis of the rotatable drum 15. These bands and the drum are thus aligned to permit the bands to be coiled onto the drum without traveling longitudinally thereof. The combination of the two side bands 16 and 18 and the center band 17 coiling onto the drum in opposite directions causes the movable member 13 to reciprocally slide on the bed 14 in substantially a straight line.

In operation, as the knob 43 is turned by the operator in one direction, the side bands 16 and 18 will be coiled onto the rotatable drum 15, and simultaneously the center band 17 will be uncoiled from the rotatable drum 15. The cooperation of these bands 16, 17 and 18 with the rotatable drum will cause the movable member 13 to be moved in a first direction and thereby move the flux conducting members 12 and 19 within the insulation tube and in the first direction to vary the reactance. The bands 16 and 18, when coiled onto the manually rotatable drum 15, move the movable member 13, which in turn operates to uncoil the center band 17 from the drum. When the drum is rotated in the opposite direction, the bands 16 and 18 will be uncoiled from the drum and the center band 17 coiled onto the drum to move the movable member in the opposite direction and thereby move the flux conducting members partially within the insulation tubes 23 and 25. When the drum is rotated in this opposite direction, the center band 17 is coiled onto the drum and moves the movable member 13, which in turn uncoils the side bands 16 and 18 from the drum.

The combination of the two side bands 16 and 18 and the center band 17 coiling onto the drum in opposite directions causes the movable member 13 to reciprocally slide on the bed 14 in substantially a straight line. The movable member 13, thus always being aligned with the bed 14 and thus with the reactance 10, keeps the flux conducting members 12 and 19 substantially in alignment with their respective insulation tubes and coils of wire.

The coiling and uncoiling of these bands 16, 17 and 18, as previously described, onto the drum to reciprocate the movable member 13, also eliminates what is commonly known as "backlash." The drum may be rotated to move the movable member in one direction and then rotated oppositely to move the movable member in the opposite direction without permitting any play or laxness between the movement of the drum and the movement of the movable member 13. Thus, a smooth reciprocal operation or movement of the movable member, and thereby smooth variation of the reactance 10, may be had by the reciprocal manual rotation of the rotatable drum 15.

Although I have described my invention in its preferred form with a certain degree of particularity, it is understood that the present disclosure of the preferred form has been made only by way of example and that numerous changes in the details of construction and the combination and arrangement of parts may be resorted to without departing from the spirit and the scope of the invention as hereinafter claimed.

What is claimed is:

1. A unit for moving a tuning rod relative to an inductance coil, said unit comprising, a frame having opposite side walls defining a pair of spaced parallel runner surfaces, turnable drum means bearing in said side walls and extending therebetween transversely of said runner surfaces, a sled reciprocally slidable on said runner surfaces, said sled having a first and a second end, a tuning rod support means fastened to one of said ends of said sled and extending outwardly therefrom, first band means windably mounted in one direction on said drum means and extending therefrom towards said first end of said sled, second band means windably mounted on said drum means in an opposite direction to the first band means and extending therefrom towards the second end of said sled, first connecting means connecting the first band means to the first end of the sled, second connecting

means connecting the second band means to the second end of the sled, one of said connecting means having resilient properties holding the band means tight and thereby holding said sled in alignment with and against the runner surfaces.

2. A unit for moving a tuning rod relative to an inductance coil, said unit comprising, a frame having opposite side walls defining a pair of spaced parallel runner surfaces, turnable drum means bearing in said side walls and extending therebetween transversely of said runner surfaces, a tuning rod support sled reciprocally slidable on said runner surfaces, said sled having a first end and a second end, first band means windably mounted in one direction on said drum means and extending therefrom towards said first end of said sled, second band means windably mounted on said drum means in an opposite direction to the first band means and extending therefrom towards the second end of said sled, first connecting means connecting the first band means to the first end of the sled, second connecting means connecting the second band means to the second end of the sled, one of said connecting means having resilient properties holding the band means tight and thereby holding said sled in alignment with and against the runner surfaces.

STANLEY A. HALL.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
669,393	Jent	Mar. 5, 1901
712,147	Myers	Oct. 28, 1902
1,405,852	Maag et al.	Feb. 7, 1922
1,686,263	Bristol	Oct. 2, 1928
2,216,370	Kirk et al.	Oct. 1, 1940
2,255,680	Sands et al.	Sept. 9, 1941
2,260,985	Benton et al.	Oct. 28, 1941
2,270,117	Fill	Jan. 13, 1942
2,286,283	Kirk et al.	June 16, 1942
2,338,134	Sands et al.	Jan. 4, 1944