Oct. 30, 1928. 1,690,077

L. G. PACENT

VARIABLE CONTROL DEVICE

Filed June 9, 1923

Fig. 1,

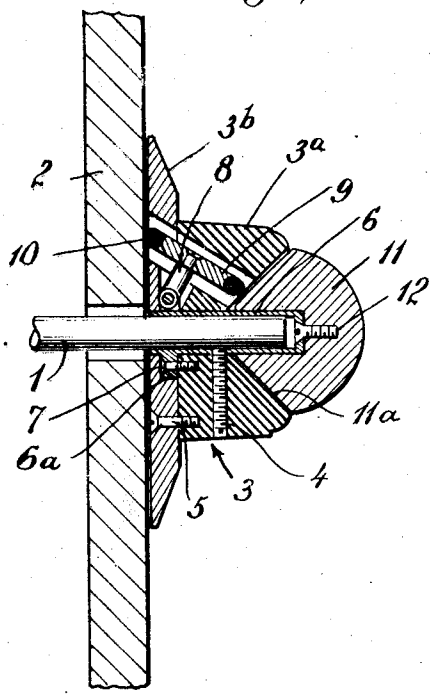


Fig. 2,

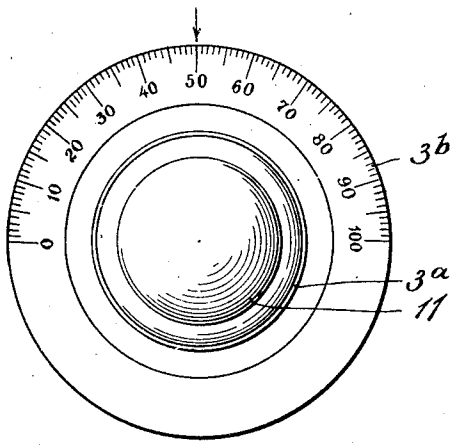


Fig. 3,

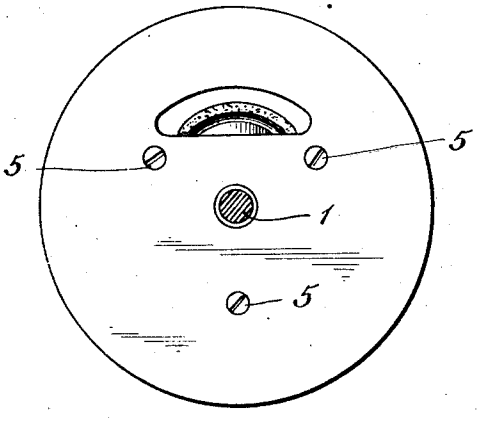
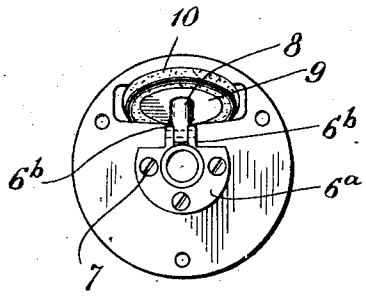


Fig. 4,



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Patented Oct. 30, 1928. 1,690,077

UNITED STATES PATENT OFFICE.

LOUIS G. PACENT, OF WINFIELD, NEW YORK, ASSIGNOR TO PACENT ELECTRIC COMPANY, INC., OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

VARIABLE CONTROL DEVICE.

Application filed June 9, 1923. Serial No. 644,299.

This invention has to do with devices for manually controlling electrical apparatus and more especially high frequency apparatus such as variable condensers, variometers and the like.

The invention relates, more particularly, to what are commonly termed vernier adjustment devices and, specifically, to control knobs and dials provided with instrumentalities for effecting very fine rotary adjustments of the electrical apparatus to which it may be attached.

In radio receiving instruments provided with highly selective circuits adjustments are frequently so critical that it is difficult to tune in desired transmitting stations with the control knobs ordinarily provided. Under these circumstances it becomes desirable to equip the radio receiving instrument with devices designed for effecting micrometric adjustments.

So-called vernier adjustment devices have heretofore been provided particularly in conjunction with variable condensers. The most common of these is the well-known vernier condenser comprising two sets of rotatable plates mounted on concentric shafts and provided with concentric control knobs. One of the sets of rotatable plates usually consists of a single plate which is operable to effect fine capacity adjustments while the other set is operable for coarse adjustments. Other arrangements have been proposed which do not involve separately rotatable elements for the fine adjustments. In so far as it has been possible to ascertain, none of these contemplates the provision of an integral self-contained device which is operable for effecting both coarse and fine adjustments.

The principal object of the present invention is to provide a simple and inexpensive device for effecting micrometric adjustments of ordinary variable electrical apparatus such as variable condensers, variometers, variocouplers and the like which can be connected to the operating shafts of such apparatus and which does not necessitate any alteration of the apparatus or panel on which it is mounted.

The present invention is, in certain respects, an improvement on the variable control device described and claimed in my copending application Serial No. 630,221, filed April 6, 1923.

The preferred embodiment of the invention is characterized by extreme simplicity and comprises two coaxial knobs one of which is fixed to the shaft and the other mounted thereon but free to rotate independently thereof. A wheel having preferably a rubber rim is pivotally attached to the fixed knob and disposed, in part at least, inside thereof. This wheel, which is appropriately referred to hereinafter as a traction wheel, is arranged to frictionally engage the panel and the free knob conjointly, the arrangement being such that rotation of the free knob may rotate the traction wheel which, by reason of its frictional engagement with the panel, revolves about the axis of the shaft and carries the fixed knob with it, thus rotating the shaft. The driving ratio between the free knob and the fixed knob is a predetermined factor and is, in general, of such value that the free knob makes several revolutions for each revolution of the shaft. Thus it will be seen that very fine rotary adjustments of the shaft can be easily effected by rotating the free knob and coarse adjustments can be made by rotating the fixed knob.

It is thought that a clearer understanding of the invention may be had from the following detailed description in conjunction with the accompanying drawing, in which

Fig. 1 is a cross sectional view of a variable control device in accordance with the preferred embodiment of the invention;

Fig. 2 is a front elevation of the device;

Fig. 3 is a rear elevation of the device; and

Fig. 4 is a rear elevation of the fixed knob with the dial part thereof removed in order to show the traction wheel and its support more in detail.

The shaft 1 (Fig. 1) may be connected with any variable electrical instrument such as a variable condenser, variometer or variocoupler, and is shown projecting through a mounting panel 2, on which the instrument to be controlled may be mounted. A knob 3, comprising two parts 3^a and 3^b, is fixedly secured to the shaft by means of a set screw 4. The parts 3^a and 3^b are fastened together by three flat head machine screws 5. The part 3^b is graduated as shown in Fig. 2, and forms the usual dial for indicating the setting of the instrument.

A metal bushing 6 is bored to receive shaft

1 and is provided with an integral flange 6^a which is attached to the knob part 3^a by means of three flat head machine screws 7.

A pair of lugs 6^b, integral with flange 6^a, pivotally support a pin 8 on which the traction wheel 9 is rotatably mounted. The traction wheel is preferably provided with a tire 10 of rubber or other material having satisfactory frictional characteristics.

A second knob 11, referred to as the free knob, is mounted on bushing 6 and secured thereto by the flat head machine screw 12. The free knob is rotatable about the bushing 6 independently of any rotation of shaft 1 or knob 3. It will be noted that the screw 12 does not clamp the free knob against the end of bushing 6 and that the function of this screw is merely to prevent the free knob falling off the bushing.

As is clearly shown in Fig. 1, the free knob 11 has a frusto-conical portion 11^a the surface of which is adapted to engage the tire 10 of traction wheel 9. When thus engaged rotation of the free knob 11 imparts a rotary movement to the traction wheel causing it to revolve about the axis of shaft 1 by reason of its tractional engagement with panel 2. Since the traction wheel is attached to knob 3, revolution of the former will cause the latter to rotate carrying with it the shaft 1. The driving ratio between the free knob 11 and the fixed knob 3 is preferably such that several revolutions of the former are required to effect one revolution of the latter.

According to the preferred arrangement as shown in Fig. 1, there is normally some clearance between either the free knob and the traction wheel or between the traction wheel and the panel, so that it is necessary to press slightly on the free knob in order to cause the traction wheel to effectively engage both the free knob and the panel. It is not necessary, however, to provide this clearance.

In operation the instrument is adjusted to the approximate setting by direct rotation of the fixed knob 3, after which the fine adjustment is obtained by turning the free knob 11, exceedingly fine rotary adjustments being thereby obtainable with no difficulty.

It is realized that a great many modifications and alternative arrangements are possible within the scope and spirit of this invention, and it should not therefore be construed as limited except by the scope of the appended claim.

I claim:

A variable control device comprising an adjusting member engageable with a shaft, a swinging pivot pin pivotally connected with said member at one end, a roller journaled on the free end of said pivot pin and an adjusting knob journaled on said member and engageable with the outer rim of said roller to thereby swing the pivot pin inward to effect engagement of the inner rim of the roller with a stationary surface at the back of the adjusting member.

In testimony whereof I affix my signature.

LOUIS G. PACENT.