Dec. 18, 1928. 1,695,479

M. H. BENNETT

CONDENSER

Filed March 26, 1926

Fig. 1.

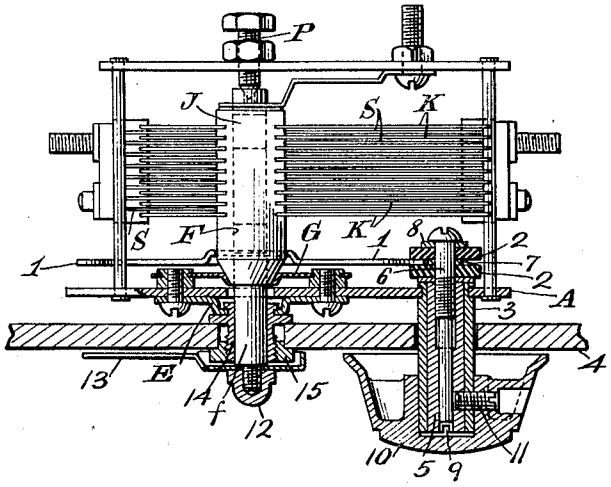


Fig. 2.

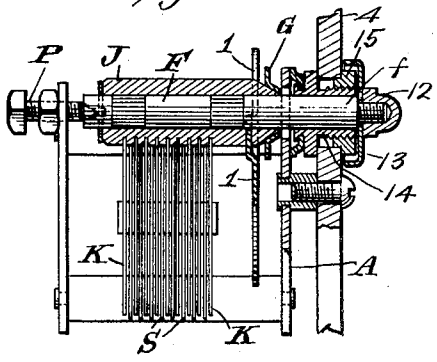
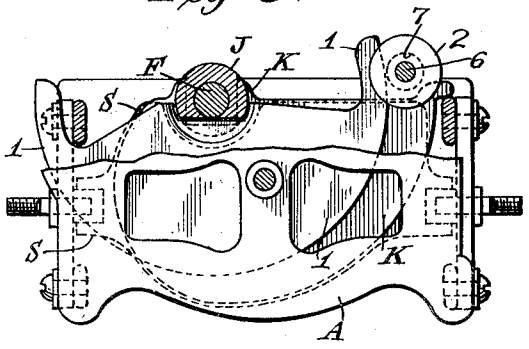


Fig. 3.



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UNITED STATES PATENT OFFICE.

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CONDENSER.

Application filed March 26, 1926. Serial No. 97,529.

This invention relates to improvements in variable condensers, and particularly to means for actuating the rotor of such a condenser.

The object of the invention is to provide, in addition to the ordinary quick operating device, a reliable, durable and readily adjustable slow-motion device for readily making fine adjustments of the rotor. In the art such slow-motion devices have heretofore been refered to as venier drives.

The invention will first be described in connection with the drawings, and then more particularly pointed out.

In the drawings,—

Figure 1 is a section, partly in elevation, of a condenser embodying the invention;

Figure 2, a detail sectional view at right angles to Figure 1; and

Figure 3 a rear elevation of the device.

These drawings show a variable condenser of the general construction disclosed in the application of Bennett and Colina, Serial No. 55,656 filed September 11, 1925, provided with a slow-motion device, thereby embodying the present invention.

The condenser comprises a plurality of stator plates S, suitably held in a framework, a plurality of rotor plates K, and a shaft on which the rotor plates are mounted this shaft being of any desired construction, but most advantageously being built up of a tubular shell J fixed on the spindles F and *f*. The shaft is mounted in suitable bearings, one of which is a cone-pointed step bearing formed by a screw P and the other a yielding bearing plate G having a conical portion to receive the coned portion of the shell J.

To the shaft is fixed a slow-motion driven member, in the present case formed as a segmental plate of sheet metal, as indicated at 1, which has its arc-shaped margin formed concentric with the rotor-shaft.

This slow-motion driven member 1 may be fixed to the rotor-shaft in any suitable way. In the present instance this is done by inserting the sheet metal plate 1 in a slot formed in the shell J of the rotor and then swaging the metal of the shell so that it will securely clamp the plate 1. Instead of swaging, the plate 1 may be soldered to the shell J or it may be secured by both swaging and soldering.

The slow-motion driven member or plate 1 has its peripheral edge arranged to enter between a pair of disks of elastic material, indicated at 2.

Means are provided for rotating these disks 2 so that they will serve as a driving member to move the slow-motion driven member or plate 1, because of the friction between the inner faces of the disks 2 and the plate 1.

In the present example, the means for rotating the disks 2 comprises an outer hollow-shaft 3 arranged to rotate in the front plate A of the condenser framework and also in the receiver front plate, shown in section at 4, Figure 1. The said outer hollow shaft 3 is held against withdrawal from the front plate by forming it with a reduced inner end fitting into an opening in the front plate, the projecting portion of the shaft being swaged or flanged over the inner face of said front plate. Within the outer shaft 3 is an inner shaft 5, in this case tubular, and having its inner end provided with an internal screw-thread into which is screwed a slotted head machine screw 6. This screw passes through central holes in the friction disks 2 and through a spacing washer 7 arranged between the disks 2. A washer 8 may be placed on the screw 6, beneath its head.

The outer end of the tubular inner shaft 5 is provided with a transverse slot, as indicated at 9, for the reception of a screw-driver or the like instrument. By holding the shaft 5 with a screw-driver and turning the machine-screw 6 with another screw-driver, the screw 6 may be screwed into or out of the tubular inner shaft 5 and thereby the elastic friction disks, which are advantageously made of vulcanized india rubber, may be compressed against the spacing washer 7 so that the margins of the inner faces of said disks 2 will be brought closer together to bear with greater friction on the faces of the plate 1, or further apart to bear with lesser friction on said plate 1.

On the outer end of the outer hollow shaft 3 is mounted a suitable device for rotating

the said shaft. In the present instance, this is a knob 10 which has a central opening to receive the two shafts 3 and 5 and is provided with a transverse screw-hole, into which is threaded a screw 11, which when screwed inward to its extreme inward position passes through a transverse hole in the outer hollow shaft 3 and has its inner end projecting into a transverse hole in the inner tubular shaft 5.

It will be seen that, by rotating the knob 10, the friction disks 2 will be rotated, and by their friction against the faces of the segmental plate 1, the latter will be given a rotary, or angular, movement, thereby turning the rotor shaft and with it the rotor plates. Because the diameters of disks 2, as compared with the diameter of the segmental plate 1, is relatively small, the rotor-plates may be given a very fine adjustment, with a relatively coarse adjustment of the knob 10.

If at any time it is desired to increase or decrease the frictional contact between the disks 2 and the plate 1, the screw 11 may be unscrewed, the knob 10 then removed, and the machine screw 6 adjusted in the manner hereinbefore explained. Then the knob 10 may be replaced and the screw 11 screwed back to engage the two shafts.

The rotor shaft may be provided with any suitable means for rotating it directly. In the present example, the front end of the spindle *f* is reduced in diameter and screw-threaded, to receive a cap nut 12, which serves to clamp a pointer 13 to the shoulder of the rotor shaft. The pointer has a central portion provided with a hole to receive the screw-threaded end of the rotor shaft and its pointer end is bent down to run in close proximity to the front plate of the receiver cabinet, which may be provided with suitable graduations with which the pointer may coact to indicate the position of the rotor plates relative to the stator plates.

When the rotor shaft is to be turned quickly from one position to another, it may be turned manually by turning the cap-nut 12 or by moving the pointer by hand. The cap-nut is supposed to be screwed down so tightly that it cannot be unscrewed by hand and hence will serve to rotate the rotor shaft and rotor plates in either direction. If desired, the pointer may be soldered or otherwise fixed to the rotor shaft. When the rotor shaft is turned, the segmental plate 1 also will be moved angularly and the slow-motion mechanism comprising the disks 2, their shafts and the knob 10 also will be rotated.

In the present embodiment of the invention a bearing is provided for the rotor shaft outside the condenser framework and where it passes through the front plate of the receiver. This bearing comprises a bushing 14 carried by the front plate A of the condenser, the bushing being long enough to extend through the front plate of the receiver and having its front end threaded to receive a nut 15. The bushing has a flange to engage the rear face of the receiver front plate, while the nut 15 engages the front of said front plate. In order to carry this bushing from the condenser front plate A, the bushing may be provided with a circumferential groove to receive the edge of the plate E of the condenser, the bushing being made with a reduced end which is inserted into the hole in the plate E after which the inner end of the bushing is swaged or flanged over the inner face of the plate E to permanently secure the bushing to the plate E.

What is claimed is:

1. In an electrical tuning device the combination with a rotor shaft, a slow-motion driven member connected to the rotor shaft, said member having a curved margin concentric with the rotor shaft, of a slow-motion driving mechanism comprising two friction disks of compressible elastic material arranged one on each side of the member to contact with the opposite sides of the latter, a spacing member between the said disks, a screw passing through the disks and spacing member, a shaft into the end of which said screw is threaded, and means for rotating said shaft.

2. In an electrical tuning device the combination with a rotor shaft, a slow-motion driven member connected to the rotor shaft, said member having a curved margin concentric with the rotor shaft, of a slow-motion driving mechanism comprising two elastic friction disks arranged one on each side of the member to contact with the opposite sides of the latter, an outer hollow shaft, an inner shaft, detachable driving means mounted on the outer shaft for driving the latter, removable means for securing the driving means to the outer shaft and connecting the said outer and inner shaft, a spacing member between the said friction disks, and a screw passing through the disks and spacing member and threaded into the end of the tubular inner shaft, whereby upon removal of the detachable driving means, the distance apart of the friction disks may be adjusted.

3. In an electrical tuning device, the combination with a rotor shaft, a slow-motion driving member connected to the rotor shaft, said member having a curved margin concentric with the rotor shaft, of a slow-motion driving mechanism comprising two elastic friction disks arranged one on each side of the member to contact with the opposite sides of the latter, an outer hollow shaft, an inner shaft having a slotted outer end, detachable driving means mounted on

the outer shaft for driving the latter, removable means for securing the driving means to the outer shaft and connecting the said outer and inner shaft, a spacing member between the said friction disks, and a screw passing through the disks and spacing member and threaded into the end of the tubular inner shaft, said screw having a slotted head, whereby upon removal of the detachable driving means, the distance apart of the friction disks may be adjusted.

In testimony whereof, I have hereunto set my hand.

MORRIS H. BENNETT.