

Oct. 11, 1949.

J. P. SMITH, JR
ATTENUATOR ASSEMBLY

2,484,126

Filed May 4, 1948

2 Sheets-Sheet 1

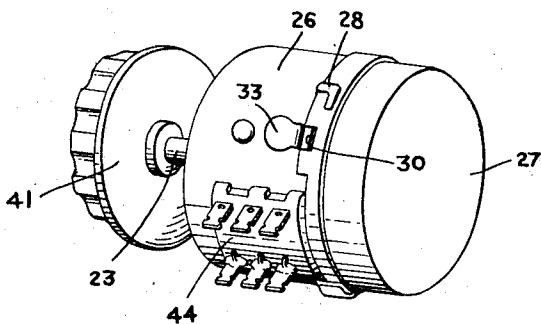


FIG. 1

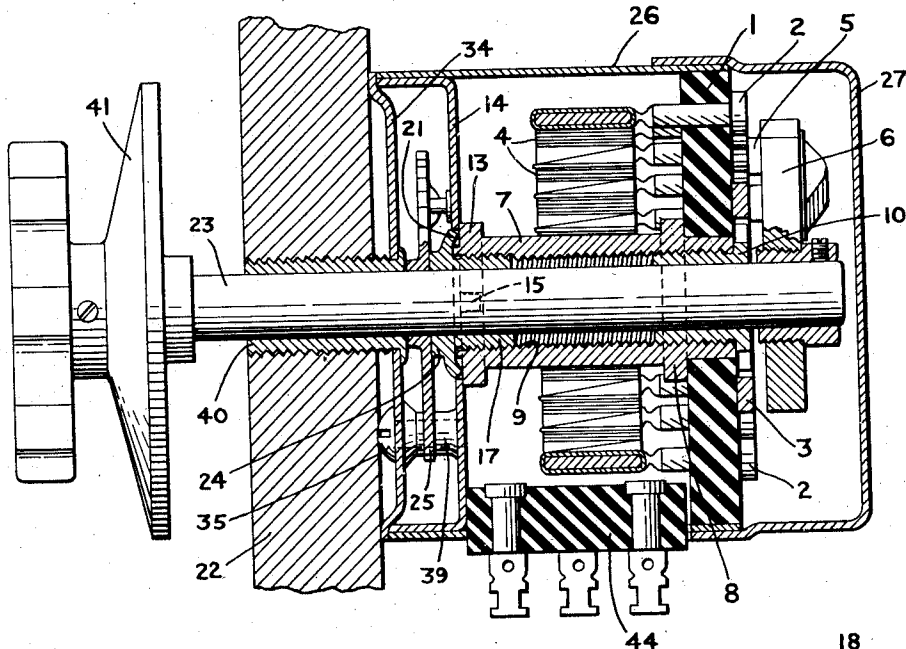


FIG. 2

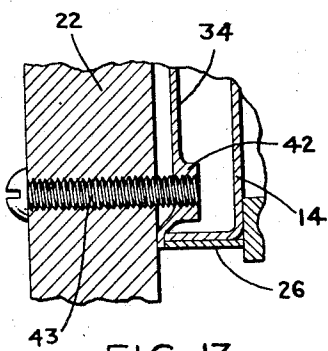


FIG. 13

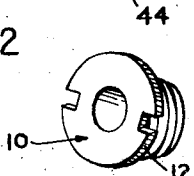


FIG. 4

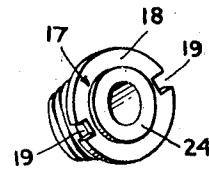


FIG. 5

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2 Sheets-Sheet 2

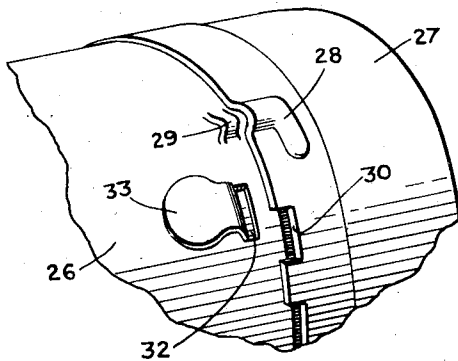


FIG. 10

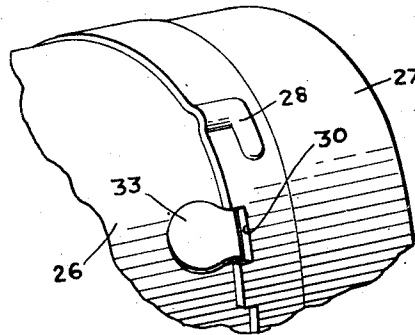


FIG. 11

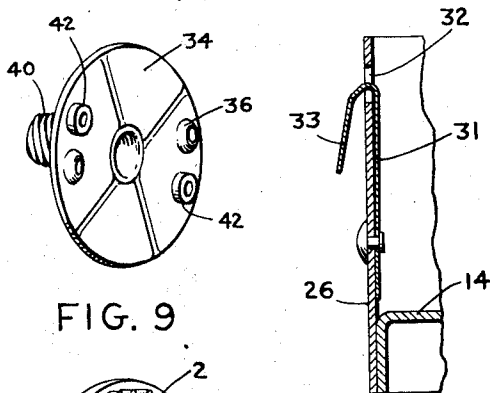


FIG. 9

FIG. 12

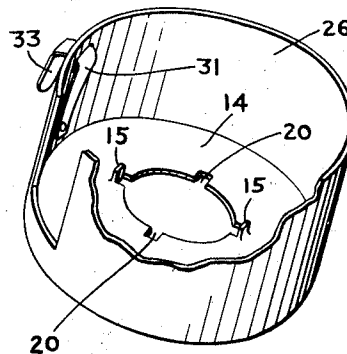


FIG. 8

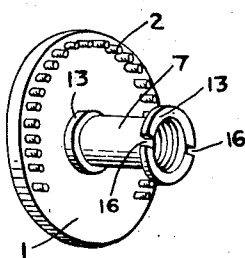


FIG. 6

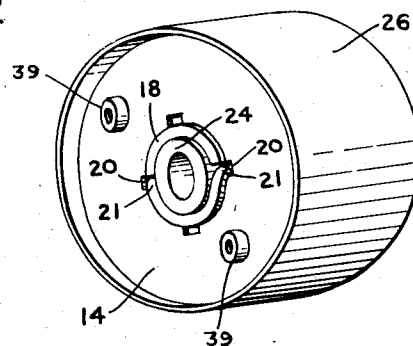


FIG. 7

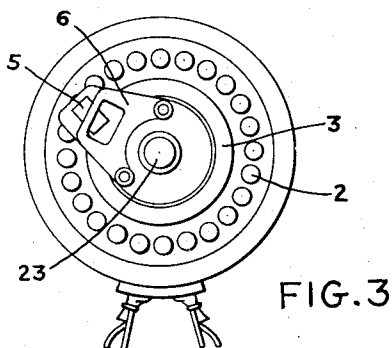


FIG. 3

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ATTENUATOR ASSEMBLY

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14 Claims. (Cl. 200—11)

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This invention relates to attenuators or similar devices employed in the communication field, and an object of the present invention is to provide an improved construction of electrical instruments such as attenuators or the like which embody novel features of construction resulting in a reduction of manufacturing costs, a simplification of the construction of the device, and provides easy assembly and dismantling with consequent ease of repair or replacement of parts, and further permits manufacture of the parts in large quantities of standard sizes and shapes which may be easily and conveniently assembled in attenuators of different degrees of adjustment from stock parts.

Another object of the invention is to provide a novel construction of attenuators or like instruments wherein lubricant contained or self-lubricating bearings for the switch operating shaft are constructed and cooperate with various other parts of the device to accurately and easily lock the contact carrying head in proper cooperative position relative to the scale markings on the panel board of the instrument with which the device is employed.

Further objects of the present invention are to provide a novel type of end plate for the housing by means of which the device may be attached to an instrument panel and to provide a simple, easily-operated positioning and locking means for the removable cover of the housing which encloses the attenuator or other device.

With these and other objects in view, as may appear from the accompanying specification, the invention consists of various features of construction and combination of parts, which will be first described in connection with the accompanying drawings, showing an attenuator assembly of a preferred form embodying the invention, and the features forming the invention will be specifically pointed out in the claims.

In the drawings:

Figure 1 is a perspective view of an attenuator constructed in accordance with the present invention.

Figure 2 is a longitudinal section through the attenuator.

Figure 3 is an end view of the attenuator with a cover cap of the housing removed.

Figures 4 and 5 are perspective views of the self-lubricating bearings employed in the structure.

Figure 6 is a detailed perspective view showing the inner side of the contact carrying head and the shaft-enclosing-sleeve carried thereby.

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Figure 7 is a perspective view of a part of the housing showing the closure plate and the manner of attaching one of the shaft bearings thereto.

Figure 8 is a perspective view partly broken away of a part of the housing and the closure plate.

Figure 9 is a perspective view of the end plate or attachment plate of the instrument.

Figures 10 and 11 are perspective views of fragments of the housing showing the structure for connecting the cover cap to the housing and locking it in position, Figure 10 showing the cap in unlocked position, and Figure 11 showing it in locked position.

Figure 12 is a fragmentary section through the housing showing the cover lock.

Figure 13 is a fragmentary section showing an alternate manner of attaching the instrument to a panel board.

Referring more particularly to the drawings, an attenuator is shown therein but it is to be understood that the features of the invention may be applied to attenuators or analogous instruments without departing from the spirit of the present invention.

The attenuator includes a contact carrying head 1 made of suitable insulating material which has a plurality of spaced contacts 2 and one or more ring contacts 3 carried thereby. The contact carrying head 1, is as usual made of insulating material and the contacts thereon are connected to the resistance coils 4 in the usual manner so that when the contact member 5 of the movable switch 6 bridges the ring 3 and any one of the spaced contacts 2 an electrical circuit is closed through the resistance coil connected to the respective contact which is engaged.

The contact head 1 is mounted upon one end of a connecting sleeve 7. The sleeve 7 has a flange 8 formed thereon and it is internally screw-threaded as shown at 9. A bearing 10 which may be of any of the well known lubricant containing members, that is, it is a self-lubricating bearing, is threaded into the sleeve 7 and its annular flange 12 engaging against the outer side of the contact carrying head 1 clamps the head tightly against the flange 8, securely attaching the contact carrying head 1 to the sleeve 7.

The sleeve 7 extends axially through the ring of resistance coils 4 and has an annular flange 13 formed on its end remote from the flange 8 and spaced from the flange 8 a predetermined required distance to properly space the contact carrying head 1 from the closure plate 14. The clo-

sure plate 14 is provided with an axial opening extending therethrough and has two tongues 15 struck inwardly therefrom which engage in the notch openings 16 formed in the flange 13 to anchor the closure plate 14 to the sleeve 7. A self-lubricating bearing 17 is threaded into the sleeve 7 and it has an annular flange 18 formed thereon which is provided with a plurality of cut-outs 19. When the tongues 15 are properly engaged in the notch openings 16 the cut-outs 20 formed in the closure plate 14 will be so positioned that when portions of the flange 18 adjacent the cut-outs 19 are inwardly upset, as shown at 21 in Figures 2 and 7 of the drawings, the bearing 17 will be locked against movement relative to the closure plate 14 and also against the sleeve 7 and the closure plate 14 and the contact carrying head 1 will be locked against relative movement and in the proper spaced relation with respect to each other and with the contacts 2 positioned according to indications (not shown) on the instrument panel 22 to which the attenuator or other instrument is attached in the manner hereinafter described.

The switch member 6 is mounted upon a shaft 23 for rotation with the shaft and the shaft extends axially through the sleeve 7 being rotatably supported by the self-lubricating bearings 16 and 17. The self-lubricating bearing 17 has an extension 24 formed thereon which provides for the proper spacing of the detent gear 25 of the attenuator.

The closure plate 14 is soldered or otherwise suitably attached to a housing 26, forming a closure for one end of this housing. The end of the housing 25 surrounding the contact carrying head 1 is open and a closure cap 27 is provided for closing this open end. The inner open end of the closure cap 27 overlaps the open end of the housing as clearly shown in Figures 2 and 11 of the drawings, and this overlapping portion is provided with one or more bayonet-slot shaped indentations 28 which cooperate with outstruck portions or guides 29 formed on the housing 26. The overlapping portion of the cover cap 27 has a notch 30 cut therein at a predetermined distance from the closed end of the bayonet-slot shaped indentation 28. A flat locking spring 31 is carried by the housing 26, extends through an opening 32 in the housing and has a bent-down thumb portion 33 therein. The locking spring 31 is tensioned so that when the cover cap is mounted on the housing 26 and turned so that the element 29 will engage in the closed end of the bayonet-slot shaped indentation 28 the locking spring will snap into the cut-out 30 and lock the cover 27 in place.

A connecting end plate 34 is attached to the closure plate 14 by suitable studs or screws indicated at 35 and which extend through the bosses 36 formed on the connection plate 34 into suitable threaded bosses 39 carried by the cover plate.

The connection plate 34 has an externally screw-threaded sleeve 40 carried thereby which is rigidly attached to the connection plate and threads into the instrument panel 22 for connecting the attenuator or other device to the instrument panel. The sleeve 40 aligns axially with the sleeve 7 and the shaft 23 extends through the sleeve 40 as clearly shown in Figure 2 of the drawings having an operating knob 41 mounted on its end outwardly of the panel 22.

The connecting plate 34 has a plurality of internally screw-threaded bosses 42 formed there-

on by means of which the attenuator or other instrument may alternately be attached to the panel 22 by means of studs or cap screws 43 as shown in Figure 13 of the drawings. When the bosses 42 and the bolts 43 are employed for connecting the attenuator to the panel 22 the sleeve 40 may be cut off if desired or necessary.

Any approved type of terminal connecting element, as indicated at 44, may be provided.

It will be understood that the invention is not to be limited to the specific construction or arrangement of parts shown, but that they may be widely modified within the invention defined by the claims.

What is claimed is:

1. In an electrical instrument, a contact carrying head, a rotary shaft, a closure plate, a bearing for said shaft including a flange, said flange provided with cut-out portions, said closure plate provided with cut-outs therein, certain portions of said flange adjacent the cut-outs therein being struck inward into the cut-outs in the closure plate for locking the bearing and closure plate against relative movement, and means connecting said bearing to said contact carrying head whereby the contact carrying head will be locked in position relative to said closure plate.

2. In an electrical instrument, a contact carrying head, an operating shaft, a connecting sleeve surrounding said shaft, a closure plate, a bearing for said shaft extending into said connecting sleeve and clamping said contact carrying head on said connection sleeve, a second bearing for said shaft extending into said sleeve and engaging said closure plate, and means for locking said second bearing and closure plate against relative movement.

3. In an electrical instrument, a contact carrying head, an operating shaft, a connecting sleeve surrounding said shaft, a closure plate, a bearing for said shaft extending into said connecting sleeve and clamping said contact carrying head on said connection sleeve, a second bearing for said shaft extending into said sleeve and engaging said closure plate, and means for locking said second bearing and closure plate against relative movement, and means on said closure plate and engaging said sleeve to prevent relative movement of the connecting sleeve and closure plate.

4. In an electrical instrument, a contact carrying head, an operating shaft, a connecting sleeve surrounding said shaft, an annular flange formed on said connecting sleeve, a bearing for said shaft threaded into one end of said connecting sleeve and engaging said contact carrying head to force it into engagement with said sleeve carried flange, a closure plate, a second bearing for said shaft extending into said connecting sleeve and engaging said closure plate, and means for locking said second bearing and said closure plate against relative movement.

5. In an electrical instrument, a contact carrying head, an operating shaft, a connecting sleeve surrounding said shaft, an annular flange formed on said connecting sleeve, a bearing for said shaft threaded into one end of said connecting sleeve and engaging said contact carrying head to force it into engagement with said sleeve carried flange, a closure plate, a second bearing for said shaft extending into said connecting sleeve and engaging said closure plate, said closure plate having cut-outs therein, said second bearing having portions thereof struck

6. In an electrical instrument, a contact carrying head, an operating shaft, a connecting sleeve surrounding said shaft, an annular flange formed on said connecting sleeve, a bearing for said shaft threaded into one end of said connecting sleeve and engaging said contact carrying head to force it into engagement with said sleeve carried flange, a closure plate, a second bearing for said shaft extending into said connecting sleeve and engaging said closure plate, said closure plate having cut-outs therein, said second bearing having portions thereof struck into said cut-outs to lock said second bearing and closure plate against relative movement, said connection sleeve provided with notch openings therein, and tongues struck from said closure plate and engaging in said notch openings for holding said sleeve and closure plate against relative movement.

8. In an electrical instrument, a contact carrying head, an operating shaft, a connecting sleeve surrounding said shaft, an annular flange formed on said connecting sleeve, a bearing for said shaft threaded into one end of said connecting sleeve and engaging said contact carrying head to force it into engagement with said sleeve carried flange, a closure plate, a second bearing for said shaft extending into said connecting sleeve and engaging said closure plate, said closure plate having cut-outs therein, said second bearing having portions thereof struck into said cut-outs to lock said second bearing and closure plate against relative movement, a connection plate detachably connected to said closure plate, and means on said connection plate for connecting the instrument to an instrument panel.

10. In an electrical instrument, a contact carrying head, an operating shaft, a connecting

11. In an electrical instrument, a contact carrying head, an operating shaft, a connecting sleeve surrounding said shaft, a closure plate, a bearing for said shaft extending into said connecting sleeve and clamping said contact carrying head on said connection sleeve, a second bearing for said shaft extending into said sleeve and engaging said closure plate, and means for locking said second bearing and closure plate against relative movement, a connection plate detachably connected to said closure plate, a threaded sleeve carried by said connection plate for connecting the instrument to an instrument panel, said threaded sleeve aligning with said connecting sleeve and receiving said shaft therethrough.

13. In an electrical instrument, a contact carrying head, an operating shaft, a connecting sleeve surrounding said shaft, a closure plate, a bearing for said shaft extending into said connecting sleeve and clamping said contact carrying head on said connection sleeve, a second bearing for said shaft extending into said sleeve and engaging said closure plate, and means for locking said second bearing and closure plate against relative movement, and means on said closure plate and engaging said sleeve to prevent relative movement of the connecting sleeve and closure plate, a connection plate detachably connected to said closure plate, a threaded sleeve carried by said connection plate for connecting the instrument to an instrument panel, said connection plate having a plurality of internally threaded bosses thereon.

14. In an electrical instrument, a contact carrying head, an operating shaft, a connecting sleeve surrounding said shaft, a closure plate, a bearing for said shaft extending into said connecting sleeve and clamping said contact carrying head on said connection sleeve, a second bearing for said shaft extending into said sleeve and engaging said closure plate, and means for locking said second bearing and closure plate against relative movement, and means on said closure plate and engaging said sleeve to prevent relative movement of the connecting sleeve and closure plate, a connection plate detachably connected to said closure plate, said connection plate having a plurality of internally threaded bosses thereon

for receiving studs for connecting the instrument
to an instrument panel.

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