

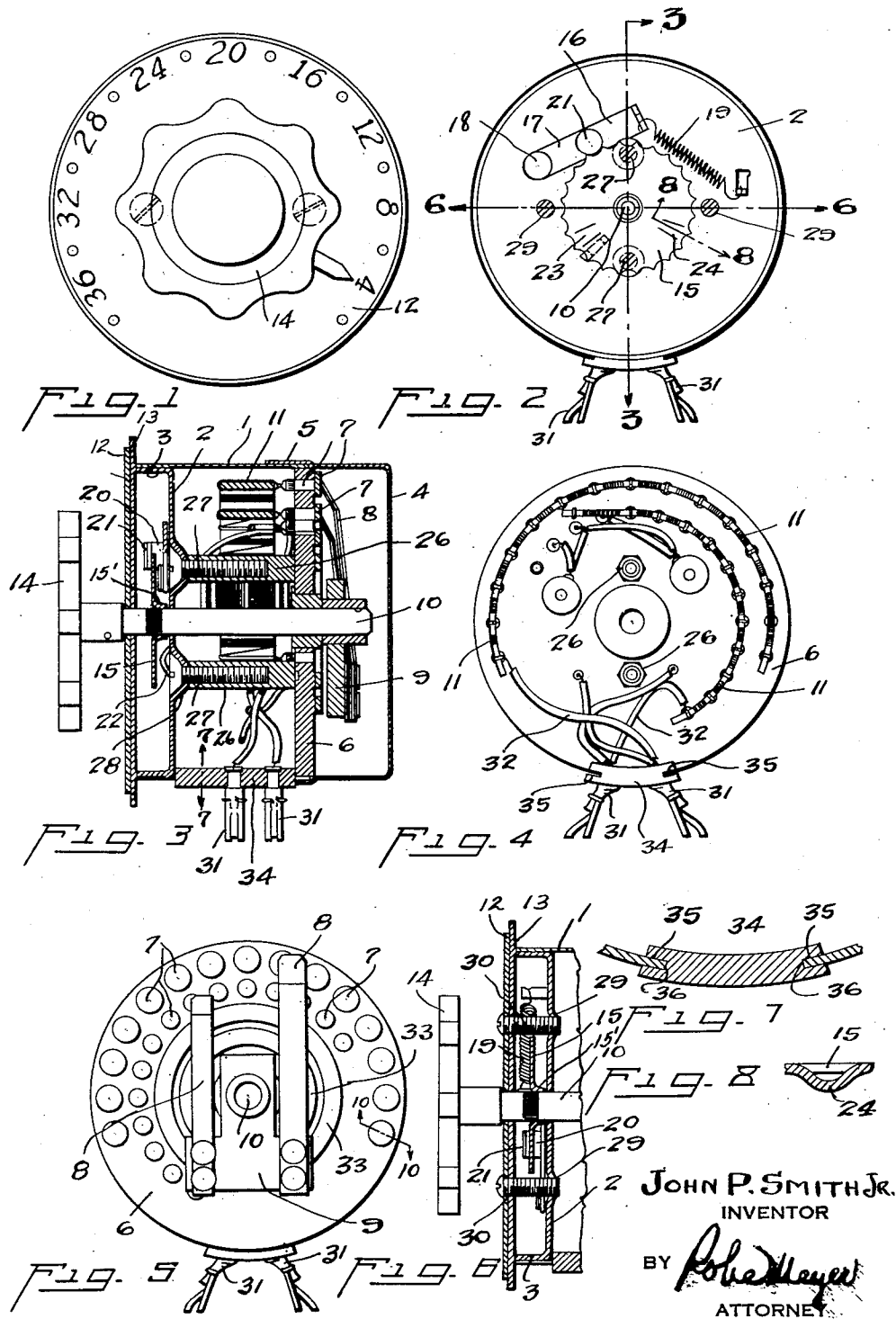
Sept. 7, 1948.

J. P. SMITH, JR
ATTENUATOR

2,449,019

Filed Nov. 11, 1944

2 Sheets-Sheet 1



Sept. 7, 1948.

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2 Sheets-Sheet 2

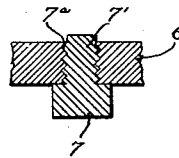
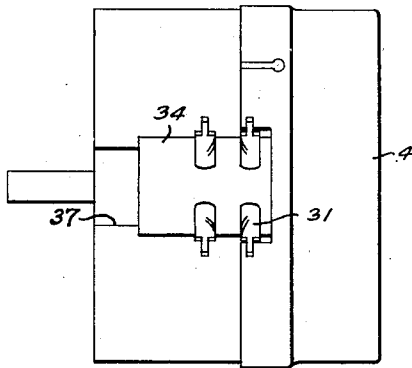


Fig. 10

Fig. 9

Fig. 11

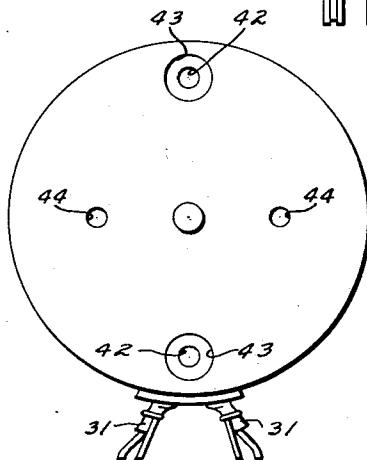
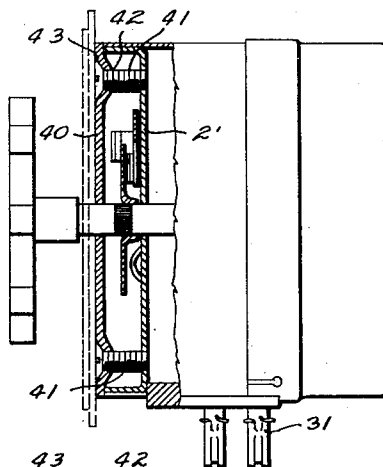


Fig. 12

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2,449,019

ATTENUATOR

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Application November 11, 1944, Serial No. 562,989

4 Claims. (Cl. 201—48)

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This invention relates to attenuators as used in the communications field, and an object of the present invention is to provide an improved construction of attenuators which embodies novel features of construction resulting in a reduction of the manufacturing cost of the device, a simplification of its construction, and provides a structure permitting easy assembly and disassembly with consequent ease of repair or replacement of parts.

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 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 an end view of the improved attenuator.

Figure 2 is an end view of the improved attenuator having the dial and turning knob removed.

Figure 3 is a longitudinal section through the attenuator taken on the line 3—3 of Figure 2.

Figure 4 is an end view of the attenuator showing the reverse side of the switch panel.

Figure 5 is an end view of the attenuator showing the contact panel after the removal of the rear cover plate.

Figure 6 is a fragmentary section through the attenuator taken on the line 6—6 of Figure 2.

Figure 7 is a cross section taken on the line 7—7 of Figure 3.

Figure 8 is a detail section taken on the line 8—8 of Figure 2.

Figure 9 is a side elevation of the improved attenuator.

Figure 10 is a detail section taken on the line 10—10 of Figure 5.

Figure 11 is a side elevation partly in section of a modified form of the attenuator.

Figure 12 is a detail plan view of the cover plate employed in the modified form shown in Figure 11.

Referring more particularly to the drawings, the improved attenuator includes a cylindrical housing 1, one end of which is closed by an indented closure plate 2. The plate 2 is rigidly attached to the inner surface of the cylindrical housing 1 at the outer or forward end of the housing by means of its attaching flange 3. A removable cup-like cover 4 forms a closure for the opposite or contact end of the attenuator, and

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it has a portion of its side wall slightly offset as shown at 5 to provide a frictional overlapping, gripping engagement with the adjacent end of the housing 1.

The attenuator includes the contact plate 6 which is made of suitable insulating material and carries a plurality of spaced contacts 7, as is usual in attenuators, which contacts are engaged by the movable contact fingers 8 of the movable contact or switch structure 9. The movable contact or switch structure 9 is attached to a shaft 10 which extends axially through the housing 1. The individual contacts 7 are connected in the usual manner with the resistance wiring coils 11.

The shaft 10 projects out of the housing 1 through the rigid end closure 2 and through the panel board indicated at 13 and through the indicating dial 12. A turning knob 14 is mounted on the shaft 10 for rotating the shaft to move the movable contact fingers 8 over the series of contacts 7. The shaft 10 has a detent gear 15 mounted thereon for rotary movement with the shaft. The detent gear 15 is in the form of a disc and is mounted on the shaft outwardly of the rigid end closure 2 so that the gear and its co-operating pawl or detent 16 may be reached for repair or replacement by the removal of the turning knob 14 and the dial 12, and the mounting screws 29 which releases the attenuator from the instrument panel 13.

The pawl or detent 16 is in the form of a bar 17 pivotally connected at 18 to the rigid closure 2. A spring 19 which has one end anchored to the rigid closure 2 is connected to the free end of the lever 17. An engagement roller 20 is rotatably carried by a head pin 21 which is in turn carried by a pivoted arm 17. The roller 20 engages in the serrations in the perimeter of the detent gear 15. To arrest the gear 15, shaft 10, and movable contact unit 8 in selecting positions determined on the dial 12 and in accordance with the positions of the contacts 7 carried by the contact plate 6, the rigid closure plate 2 has a stop loop 22 struck outwardly therefrom which is adapted to contact stop loops 23 and 24 which are struck inwardly from the inner surface of the detent 15 to form stops for limiting the rotary movement of the detent, and consequently limiting the rotary movement of the shaft 10 as well as of the movable contact structure 9.

The detent gear 15 has a hub 15' struck therefrom by the formation of the shaft-receiving opening in the gear, and this hub contacting the outer surface of the indented closure plate 2

limits the passage of the shaft 10 through the closure plate 2 and the contact plate 6, forms a bearing on the shaft for the detent gear and insures proper spacing of the gear relative to the cover plate 2. The shaft 10 is accurately cut to length, and when properly positioned leaves just the proper length projecting through the contact plate 6, so that when the movable contact or switch unit 3 is mounted thereon, the proper tension will be applied to the flexible contact fingers 8.

The multiple contact-carrying plate 6, which is formed of insulating material has two hex posts 26 attached thereto which are provided with internally threaded bores. These internally threaded bores receive screws 27, the heads of which engage in sockets 28 formed in the closure head or plate 2 so as to rigidly connect the coils 11 and the contact-carrying plate 6 to the housing 1 to rigidly hold it in position. The rigidly mounted closure plate 2 is also provided with two screw threaded openings 29 which co-operate with screws 30 to connect the dial 12 to the housing 1 and to facilitate the mounting of the attenuator on a panel. Thus all that is required to mount the attenuator on a panel is merely to place the dial 12 against the outer face of a panel with the attenuator against the inner face of the panel and thread the screws 30 into the openings 29 thereby permitting attachment of the attenuator to a panel in its assembled form.

The terminal posts 31 which are connected through suitable wiring 32 to the ring contacts 33 and to the coils 11 are carried by a terminal plate 34. The terminal plate 34 is of insulating material and is provided with longitudinally extending grooves 35 in its edges. The housing 1 is provided with a longitudinally extending slit 36, the edges of which slidably engage in the grooves 35 in the terminal block 34 so that in assembling the attenuator, the entire electrical resistance mechanism which is carried by and assembled on the contact-carrying plate 6 may be slid longitudinally into the housing 1 with the edges of the slot or slit 36 engaging in the grooves in the terminal block 34, thus not only assuring proper location of all of the parts of the electrical resistance assembly with respect to the detent 15, but also serving to rigidly hold the terminal block 34 against lateral movement. The removable cup-like cover 4 is provided with a cut-out portion 37 in its inner edge which, when the cover is mounted in position upon the end of the housing 1, receives the outer end of the terminal block 34, as clearly shown in Figure 9 of the drawings. The contact-carrying plate engages against the outer end of the terminal block 34 and holds the terminal block against longitudinal movement.

From the foregoing description taken in connection with the accompanying drawings, it will be apparent that a construction of attenuator has been devised which embodies many novel features of construction so that the attenuator may be quickly and easily assembled and all of its parts held rigidly in position in such manner that it may be quickly and easily attached to a panel board, and still access to the various parts of the attenuator which are apt to need repair or replacement may be readily had, and also that the construction is materially simplified in such manner that its cost will be reduced. Further, with the present construction, improved protection from dust as well as improved electrical shielding is afforded.

The present invention also embodies an im-

proved manner of attaching the contacts 7 to the contact-carrying plate 6 as is clearly shown in Figure 10 of the drawings. The stem 7' of each of the contacts 7 is provided with spiral threads indicated at 7a which thread into the contact-carrying plate 6 and thus provide firm connection of the contacts and plates, and substantially prevent loosening of such connections as well as providing a simple connection and easy manner of connection of the contacts to the insulation plate.

In Figures 11 and 12 of the drawings, a slight modification of the invention is shown. In this form, a second cover plate 40 is provided which is placed outwardly of the indented cover plate 2' and is attached to the indented cover plate 2' by suitable screws 41. The secondary cover plate 40 has it portions surrounding the screw receiving openings 42 through which the screws 41 extend indented, as shown at 43, to permit the heads of the screws 41 to lie flush with the outer surface of the cover plate 40. The cover plate 40 is also provided with spaced openings 44 for receiving therethrough the screws, corresponding to the screws 30, which are employed to attach the attenuator to the panel board.

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 with the invention defined by the claims.

What is claimed is:

1. In an attenuator, a housing, a closure head rigidly connected to one end thereof, a removable closure cap over the other end of the housing, electrical current resistance means within said housing, said housing provided with a slot cut therein, a terminal plate having terminals thereon connected to said resistance means, said terminal plate having grooves in its edges which slidably receive the edge portions of said housing along said slot, a contact carrying plate in said housing, said contact plate and said rigidly connected head engaging said terminal plate to hold it against sliding movement, a shaft extending axially through said closure plate, into said housing and through said contact plate, a detent gear on said shaft outwardly of said closure plate, and means formed on said detent gear and engaging said closure plate to limit the degree of insertion of the shaft into the housing.

2. In an attenuator, a housing, a contact plate within said housing, a closure plate rigidly connected to one end of said housing, connecting posts carried by said contact plate and provided with threaded bores, screws removably carried by said closure plate and threadably engaging in said posts to hold said contact plate in proper position with said housing.

3. In an attenuator, a housing, a fixed transverse partition within said housing near the front end thereof, a cutout in the housing to the rear of the partition, a terminal plate slidably mounted on the housing in the cutout, a contact plate abutting the rear end of the terminal plate, and screw means rigidly connecting the contact plate to the partition.

4. In an attenuator, a cylindrical housing, a fixed transverse partition within said housing near the front end thereof, a transverse contact head longitudinally spaced from the partition and to the rear thereof, screw means rigidly connecting the contact head to the partition, a rotary shaft having a contact arm for engaging the contact head extending through the partition and to the outside of the housing, a detent gear

rigidly fixed to the shaft adjacent the partition, and means for limiting rotary movement of the detent gear and thus of the shaft and contact arm comprising a pair of angularly spaced abutment members depending from the face of the gear and an abutment member depending from the partition and engageable with the gear abutment members.

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