June 29, 1926.

1,590,449

R. SIMPSON

ELECTRICAL METER

Filed March 25, 1925

Fig. 1.

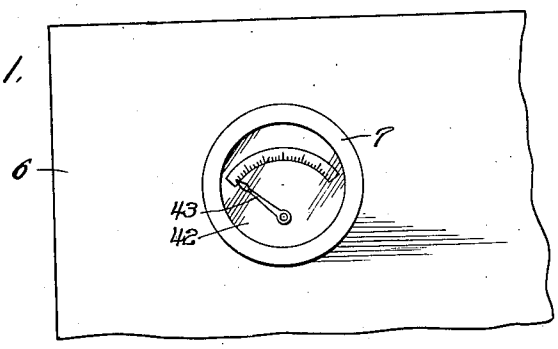


Fig. 3.

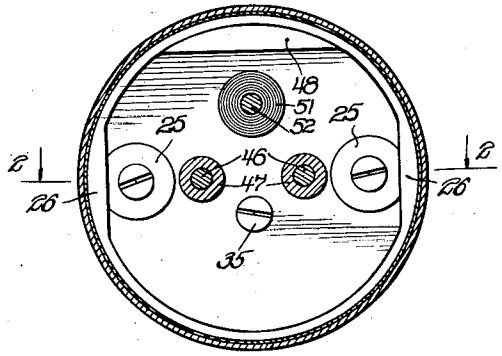


Fig. 2.

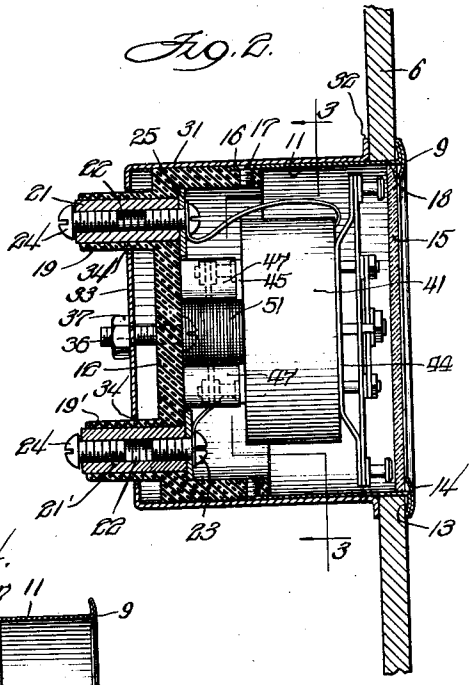
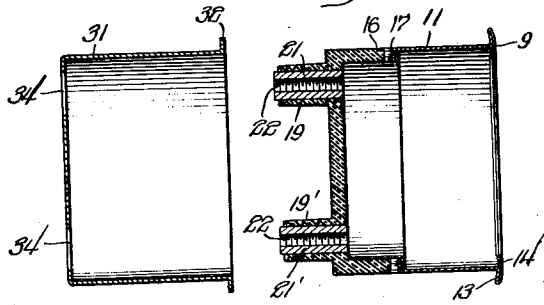


Fig. 4.



Witness:
W. X. Olson

Inventor:
Ray Simpson

By Williams, Bradbury, McCaleb & Hinkle, Attys.

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UNITED STATES PATENT OFFICE.

RAY SIMPSON, OF OAK PARK, ILLINOIS, ASSIGNOR TO JEWELL ELECTRICAL INSTRUMENT CO., OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

ELECTRICAL METER.

Application filed March 25, 1925. Serial No. 18,198.

The present invention relates to electrical meters, and has particular reference to the provision of improved means for mounting small meters on the panels of radio sets, or on supporting panels generally.

One of the objects of the invention is to provide a simple and inexpensive arrangement of mounting parts by which the meter can be mounted in the radio panel without the necessity of drilling accurately centered screw holes, or performing any other operations which would make the mounting of the meter cumbersome and difficult for the radio amateur to perform.

A further object is to provide an improved construction of housing shell for the meter characterized by an improved construction of insulating back and insulated terminal posts for cooperation with the outer clamping shell.

A further object is concerned with an improved manner of mounting the meter elements in the housing shell.

Referring to the accompanying drawing illustrating a preferred embodiment of my invention:

Figure 1 is a fragmentary elevational view of a typical radio receiving set panel showing my improved meter mounted therein;

Figure 2 is a longitudinal sectional view through the meter, illustrating the mounting of the latter in the panel, this view being taken approximately on the plane of the line 2—2 of Fig. 3;

Figure 3 is a transverse sectional view taken approximately on the line 3—3 of Fig. 2, and

Figure 4 is a sectional view through the housing shell and the clamping shell, separated, the meter elements being removed from the housing shell.

The panel of a typical radio receiving set is indicated at 6 in Fig. 1. Electrical meters 7 are often mounted in these panels, these meters being generally voltmeters connected for indicating the filament voltage applied to the filaments of the tubes. It is desirable that the operation of mounting these meters 7 in the panels 6 be simplified as much as possible, both from the standpoint of quick and inexpensive commercial assembly of radio sets and to the end of adapting the instrument to ready mounting by radio amateurs, whose tools for performing such operations are generally limited. The mounting of the present meter only involves the drilling of the necessary hole for exposing the meter dial, there being no necessity for drilling properly registering screw holes or making other attachments to the panel.

The working parts of the meter proper, comprising the magnet, the movable element, the dial, pointer etc., are all assembled within the cylindrical meter housing 9 as shown in Fig. 2. This meter housing or shell comprises a cylindrical metallic shell 11 constituting the front portion of the meter housing and a cylindrical end member 12 of insulating composition constituting the back wall of the meter housing. The metallic shell 11 is formed at its front end with an outwardly turned flange 13, which is then doubled back, forming the inwardly extending flange 14 for retaining the front glass 15 of the meter. The rear edge of the shell 11 is fastened in an annular groove 16 in the front edge of the insulating back 12 by screws 17, the cylindrical outer surfaces of the back 12 and the shell 11 being flush, so that the meter housing can be slipped through the opening 18 drilled in the panel 6. When thus inserted through the opening 18 the front flange 13 functions as a clamping shoulder for clamping engagement with the outer side of the panel around the opening 18.

Projecting from the rear of the meter housing are two bosses 19—19′, of insulating material, preferably formed integral with the end portion 12 which is composed of insulating material. Set in these bosses 19—19′ are metallic sleeves 21—21′, the rear ends of which project slightly beyond the ends of the insulating bosses 19—19′. These sleeves 21—21′ have threaded bores 22, and screwing into the front and rear ends of these bores are screws 23 and 24, respectively. The screws 23 extend through washers 25, the conductors from the meter elements being fastened between these washers and the heads of the screws 23. It will be observed that where the fastening screws 17 tap into the rear insulating member 12 the cylindrical wall of this insulating member is given a greater sectional thickness, as indicated by the diametrically opposite thickened portions 26 in Fig. 3.

The meter housing just described is supported in clamped position in the panel 6 by the outer clamping shell 31. This clamp-

ing shell consists of a cup-shaped metallic shell having a front clamping flange 32 and a closed rear wall 33. The inner diameter of this shell fits snugly over the meter housing 9. After the meter housing has been inserted through the opening 18, this clamping shell 31 is slipped over the meter housing to bring its front clamping flange 32 up against the rear side of the panel 6 around the edge of the opening 18. The rear wall 33 of the clamping shell has the diametrically opposite apertures 34 for permitting the insulating bosses 19—19′ to project from the rear of the clamping shell, these insulating bosses effectively insulating the clamping shell from the connecting terminals 21—21′ A screw 35 is fixedly mounted in the rear wall of the insulating end member 12, preferably to one side of a diametrical line extending between the bosses 19—19′, and the rear wall 33 of the clamping shell 31 has an aperture 36 through which this screw 35 is adapted to pass. A nut 37 threads over the end of this screw and bears against the end wall of the clamping shell. By screwing this nut 37 forwardly, a very heavy clamping pressure can be exerted on the clamping shell 31, so as firmly to hold the meter in the opening 18 solely by the clamping pressure exerted between the flanges 13 and 32. The clamping shell 31 is, of course, held against rotation in the operation of screwing the clamping nut 37 forwardly by the engagement of the bosses 19—19′ in the apertures 34 of the clamping shell.

The meter elements proper comprise the usual U-shaped permanent magnet 41, the movable element (not shown) and the dial 42 and its pointer 43. The dial 42 is supported by the permanent magnet, so that both are removable as a unit. The movable element has bearing support in bearings carried by end plates 44 and 45 which are secured to the pole pieces defining the air gap. The magnet is supported in the housing shell 9 by screws 46—46 which pass through the rear wall of the insulating back 12 and through spacing bushings 47—47 and screw into holes in the end plate 45. These two screws and their spacing bushings give two points of support to the magnet from the insulating back 12. A third point of support for the magnet is afforded by a segment 48 (Fig. 3) which projects inwardly from the circular wall of the insulating back in position to be engaged by the upper rear side of the permanent magnet. As shown in Fig. 2, the magnet is set into the front end of the insulating back, and correspondingly the segmental shoulder 48 is recessed back from the front end of the insulating back. The bobbin of resistance wire 51, usually associated with these meters is mounted between the magnet 41 and the rear wall of the insulating back on a pin or screw 52.

I claim:

1. The combination with a mounting panel having an opening therein, of an electrical meter housing comprising a cylindrical metallic shell at the front end of said housing and a rear end member of insulating material closing the rear end of said housing, a flange on said shell engaging the front of the panel around said opening, terminals projecting from said rear insulating member, insulating bosses protecting said terminals, a clamping shell having openings engaging over said insulating bosses and having a shoulder at its front end engaging the rear side of said panel around said opening, and screw means extending between said insulating member and said clamping shell for forcing said clamping shell into clamping engagement with the rear side of said panel.

2. The combination with a panel having an opening therein, of an electrical meter mounted in said opening comprising a meter housing, said meter housing having a shell flanged at one end, and a back portion closing the rear end of said shell, said flange engaging the front side of said panel around said opening, terminals projecting from the back portion of said meter housing, bosses of insulating material surrounding said terminals, a cup-shaped clamping shell engaging over said meter housing and having a flanged front end adapted to engage the rear side of said panel around said opening, the rear end of said shell having openings therein for receiving the terminals in their insulating bosses, and screw means between said clamping shell and said meter housing for drawing the flanged ends of said shell and said housing into clamping engagement with the opposite sides of said panel.

In witness whereof, I hereunto subscribe my name this 21st day of March, 1925.

RAY SIMPSON.