May 19, 1931. I. F. KINNARD 1,806,295

INTERCHANGEABLE INSTRUMENT CASE

Filed Sept. 12, 1929

Fig. 4.

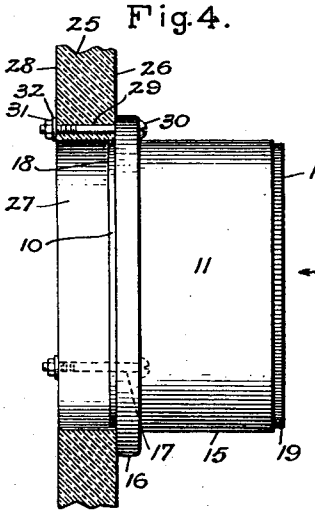


Fig. 5.

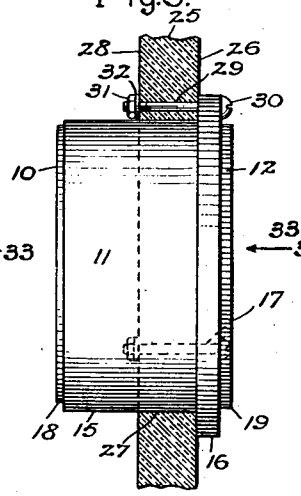


Fig. 6.

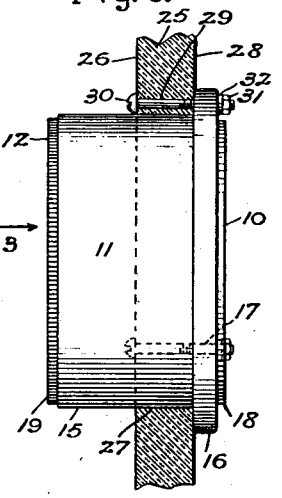


Fig. 1.

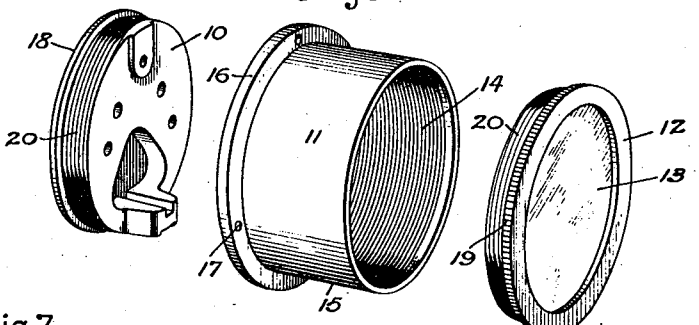


Fig. 7.

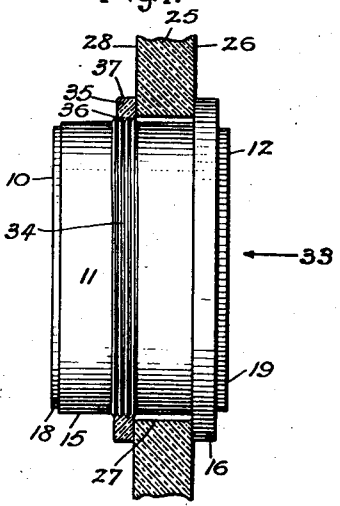


Fig. 2.

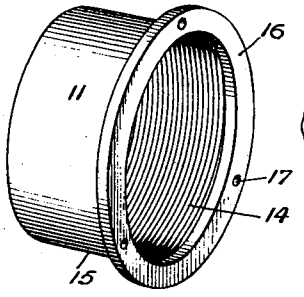
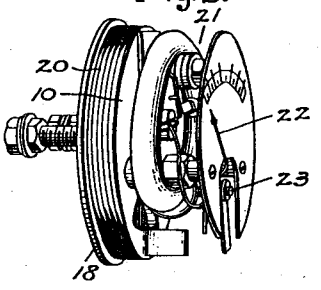


Fig. 3.



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UNITED STATES PATENT OFFICE

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INTERCHANGEABLE INSTRUMENT CASE

Application filed September 12, 1929. Serial No. 392,238.

My invention relates to an instrument case having interchangeable parts to permit mounting on a switchboard panel in any of at least three different ways.

It is often desirable to mount the entire instrument case on the front face of the switchboard panel in order to utilize the space at the back of the switchboard panel for other purposes, this being called surface mounting. Also, it is often desirable to mount the instrument case so that only the flange of the instrument body and the front cover project beyond the front face of the panel. This is called flush mounting and may be used either to conserve the space on the front of the panel or for purely esthetic purposes or for a combination of both. On the other hand, in some cases it may be desirable to mount the instrument body in a manner that is neither surface mounting or flush mounting in order to conserve some of the space on the back of the panel without too greatly trespassing on the space on the front of the panel. This method of mounting I will call compromise mounting. Throughout this application the terms surface mounting, flush mounting, and compromise mounting will be adhered to and will signify the methods of mounting as described in connection with each term. It is obvious that in the manufacture of standard instruments and switchboard panels in large quantities it is practically impossible to know in advance which method of mounting the instrument cases on the switchboard panels will be used. To lower production costs and yet permit any of the described methods of mounting it is evident that it is desirable to manufacture one standard model so constructed that certain parts are interchangeable so as to obtain any of the described mountings. These highly desirable results are accomplished by my invention which will be best understood from the following description considered in connection with the accompanying drawings while the features of my invention which are believed to be novel and patentable are pointed out in the claims appended hereto.

Fig. 1 of the drawing represents a disassembled perspective view of the instrument casing parts; Fig. 2 represents a perspective view of the main body of the instrument casing in a reversed position from that shown in Fig. 1; Fig. 3 represents the rear cover assembled with the internal mechanism of an electrical measuring instrument; Figs. 4, 5 and 6 respectively represent surface, flush and compromise mountings of the instrument casing on a switchboard panel; and Fig. 7 represents a modification of my invention in a flush mounted position on a switchboard panel.

In Fig. 1 which illustrates perspective views of the various parts of a disassembled instrument case, 10 represents the back cover which is adapted to carry the internal mechanism of the instrument as represented in Fig. 3. 11 represents the casing body and 12 represents the front cover in which there is assembled the glass cover 13 to make the instrument pointer visible. Part 11 has an internal thread 14 running the full length of the body but I wish it understood that this full length thread was made for convenience and economy and that my invention will be equally applicable where each end of the casing body 11 has threads of similar shape and gauge but of only sufficient length to accommodate the threaded portions of parts 10 or 12. Part 11 has an outside diameter 15 slightly smaller than the large hole in the panel 25 (see Figs. 5, 6 and 7) and also has a flange 16 larger in diameter than the large hole in the panel and the flange 16 has small holes 17 equally spaced and of approximately the same size and bolt circle as the corresponding small holes in the panel. Part 10 may have a smooth rim 18 since it is not often removed from the casing body after assembly. Part 12 preferably has a knurled rim 19 to insure a good gripping surface so that it can be securely tightened and yet be easily removed from part 11 so as to provide quick access to the internal mechanism of the instrument for adjusting the zero position of the pointer or for other purposes. The diameter of the rim 18 in part 10 is slightly smaller than the diameter of the large hole in the panel 25 (see Fig. 4). Parts 10 and 12 have external threads 20 similar in shape and gauge to the

thread 14 of part 11 and thus part 10 or 12 can be threaded into either end of part 11. Part 12 also has an internal circular surface with a locating shoulder to support and locate the glass cover 13. In the usual measuring instrument there is provided a screw extending through the front cover to the internal mechanism for adjusting the zero position of the instrument pointer.

I have purposely omitted such external zero shifting device. In my invention part 12 may be easily removed from part 11 so as to give access to the zero shifting device situated on the internal mechanism, thus not only simplifying the construction of this device but also providing a more dust-proof instrument casing.

To assist in obtaining a clear conception of my invention I provide the following illustrations: Fig. 2 illustrates another perspective view of the instrument body 11 in a reversed position from that shown in Fig. 1. Fig. 3 illustrates a perspective view of the back cover 10 assembled with the internal mechanism 21 having a pointer 22 which is adjusted to the zero position by the screw 23 which changes the tension of the usual spiral zero restoring spring. Fig. 4 illustrates a surface mounted instrument. This can be readily accomplished by assembling part 10 into that end of part 11 having the flange 16 and assembling part 12 into the other end of part 11. The instrument is then assembled on the front face 26 of the panel 25 so that only the rim 18 projects into the hole 27 of the panel and the remainder of the instrument case projects into the space adjacent to the front surface 26 of the panel.

Fig. 5 illustrates a flush mounted instrument. This can be readily accomplished by assembling part 12 into that end of part 11 having the flange 16 and assembling part 10 into the other end of part 11. The instrument is then assembled on the front face 26 of the panel 25 so that the flange 16 and the cover 12 project into the space adjacent to the front face 26 while the remainder of the instrument case projects through the hole 27 and into the space adjacent to the back face 28.

Fig. 6 illustrates a compromise mounted instrument. This can be readily accomplished by assembling part 10 into that end of part 11 having the flange 16 and assembling part 12 into the other end of part 11. The instrument is then assembled to the panel 25 so that the flange 16 and the cover 10 project into the space adjacent to the back face 28 of the panel and the remainder of the instrument case projects through the hole 27 and into the space adjacent to the front face 26.

In Figs. 4, 5 and 6 the panel 25 has small equally spaced holes 29 of approximately the same diameter and bolt circle as the holes 17 in part 11. The instrument may then be fastened to the panel by bolts 30 passing through the holes 17 and 29, nuts 31 and washers 32. Only two assemblies of bolts, nuts and washers can be seen because I have shown the panel in cross-section. It is evident that any of the described mountings can be obtained with great ease and in each of the mountings the indications of the pointer 22 can be readily observed and in addition the front cover 12 can be easily removed, thus giving access to the internal mechanism for adjusting the zero position of the pointer or for other purposes. The part 10 together with the internal mechanism assembled thereon can be removed without disturbing the body as assembled on the panel. Thus for example an ammeter can be quickly substituted for a voltmeter by merely changing the part 10 with its assembled internal mechanism.

Fig. 7 represents a flush mounted modified form of my invention. Parts 10 and 12 are similar to parts 10 and 12 of Fig. 1. Part 11 is similar to part 11 of Fig. 1 except that I have omitted the holes 17 and I have provided an external thread 34 on the outside diameter 15. I have also provided a ring 35 having an internal thread 36 similar in shape and gauge to the thread 34. The ring 35 has a rim 37 with a diameter larger than the hole 27 of the panel 25. I have also omitted the holes 29 from the panel 25 because the advancement of part 35 on the thread 34 will bring it against the face of the panel 25 and thus secure the body 11 to the panel 25. It can be readily seen that the instrument case can also be fastened to the panel 25 in the compromised mounting. The arrows 33 in Figs. 4, 5, 6 and 7 show the directions in which to face the instrument so as to read the indications of its pointer.

My invention is based on the broad principle of so constructing the various parts of the instrument case that they are interchangeable and thus permit the case to be mounted on the switchboard panel in any of the described mountings. It is preferable but not necessary to have the instrument body of cylindrical shape. While I have described my invention in connection with instruments having an indicating pointer it is evident that my invention is equally applicable to many other devices primarily intended to be mounted on switchboard panels. The invention may even be advantageous for other than switchboard instruments.

In accordance with the provisions of the patent statutes I have described the principles of operation of my invention, together with the apparatus which I now consider to represent the best embodiment thereof. However I desire it understood that these are only illustrative of my invention and that such other modifications as fall fairly within

the true spirit and scope of my invention are intended to be included within the scope of the appended claims.

What I claim as new and desire to secure by Letters Patent of the United States, is:

1. In combination, a supporting panel provided with a hole and having a surface for mounting an instrument thereon, an instrument casing having a main body portion adapted to fit in said hole and provided with openings and similar engaging surfaces at its opposite ends and a supporting flange with two shoulders, back and front cover portions each provided with engaging surfaces fitting the engaging surfaces at either end of the main body portion, and means for securing said instrument to said panel so that either shoulder of said flange rests against said panel surface.

2. An instrument casing having a main body portion provided with openings at its opposite ends and radially extending supporting means at one end, a back cover portion, a front cover portion provided with an observation window, said main body portion having similar engaging surfaces at both ends thereof, and the back and front cover portions having similar engaging surfaces thereon fitting the engaging surfaces on the main body portion whereby said parts may be assembled with the supporting means at the front or rear of the casing.

3. An instrument casing comprising a cylindrical main body portion provided with an external supporting flange at one end and having openings with similar internal threads at opposite ends, a back cover portion adapted to support an instrument on its inner surface, a front cover portion having an observation window, said cover portions having external threaded surfaces fitting the internal threaded surfaces of the main body portion whereby they are interchangeable.

4. An instrument casing having a main body portion provided with means on its external surface for supporting it to a panel and having openings with similar internal engaging surfaces at its opposite ends, and back and front covers for said casing having similar external engaging surfaces fitting the internal engaging surfaces of the man body portion whereby said covers are interchangeable.

5. An instrument case comprising a hollow cylindrically shaped body having a flange provided with a plurality of holes for clamping the said body in a permanent position, the said body having both ends of its internal surface grooved with threads of similar shape and gauge; a back cover for the said body having a flange and means for supporting the internal mechanism of the said instrument and having an external thread similar in shape and gauge to the internal threads of the said body whereby the said back cover can be threaded into either end of the said body; a front cover for the said body having a flange and an internal circular surface with a locating shoulder in the plane of the said flange and having an external thread similar in shape and gauge to the internal threads of the said body whereby the said front cover can be threaded into either end of the said body, and a circular piece of glass adapted to fit against the locating shoulder of the said front cover.

6. An instrument case comprising a cylindrically shaped body having openings at its opposite ends and a flange provided with a plurality of holes to be used in clamping the said body in a permanent position, the said body having adjacent both ends threads of similar shape and gauge; a back cover for the said body having a flange and means for supporting the internal mechanism of the said instrument and having threads similar in shape and gauge to the threads of the said body whereby the said back cover can be threaded into either end of the said body, a piece of transparent material and a front cover for the said body having a flange and means for supporting and locating the said transparent material therein and having threads similar in shape and gauge to the threads of the said body whereby the said front cover can be threaded into either end of the said body.

7. An instrument case comprising a body having an external flange and having openings at its opposite ends with similar engaging means at both ends of said body, means whereby the said body can be secured to some surface so that either shoulder of the said flange rests against the said surface, a cover for the said body having a flange and means for supporting the internal mechanism of the instrument and engaging means whereby the cover can be secured to either end of the said body; transparent means, and another cover for the said body having a flange and means for supporting and locating the said transparent means therein and engaging means whereby the said last mentioned cover can be secured to either end of the said body.

In witness whereof, I have hereunto set my hand this 9th day of Sept., 1929.

ISAAC F. KINNARD.