June 24, 1947. S. KAHN 2,422,908

MEANS FOR MOUNTING A DIAL INSTRUMENT

Filed Nov. 10, 1944 2 Sheets-Sheet 1

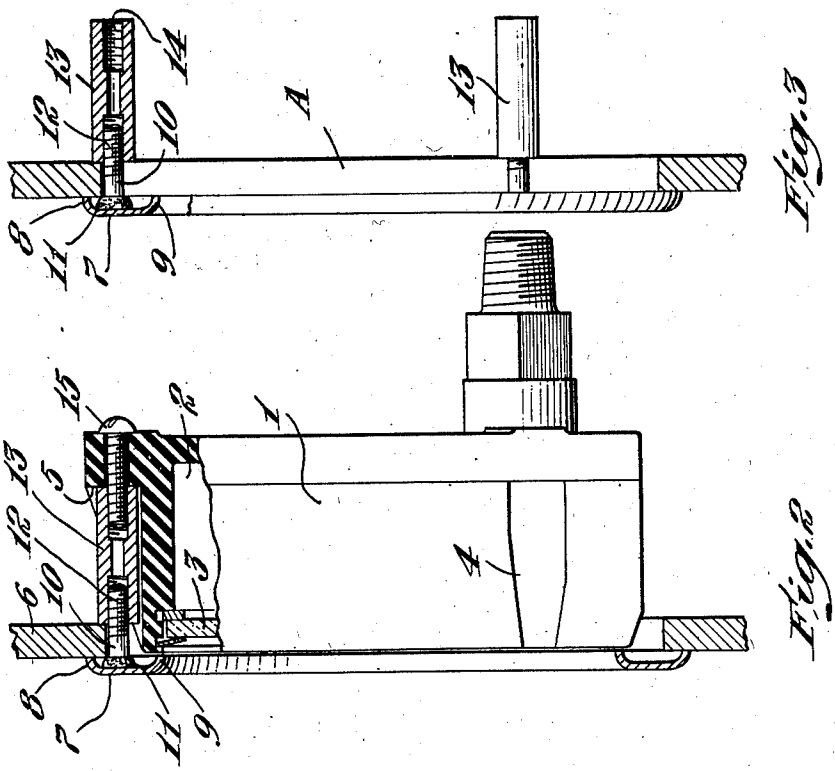


Fig. 3

Fig. 2

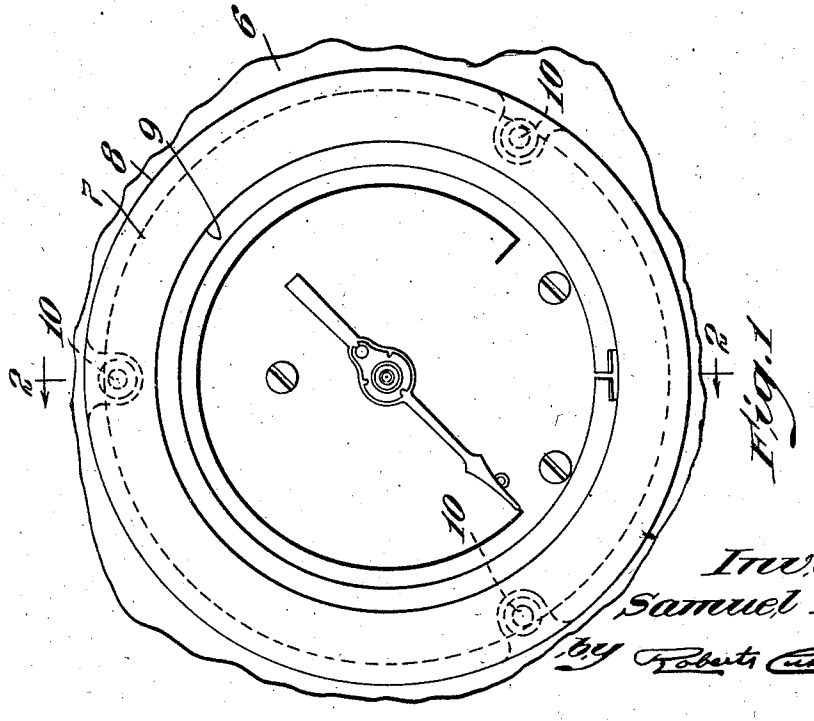


Fig. 1

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MEANS FOR MOUNTING A DIAL INSTRUMENT

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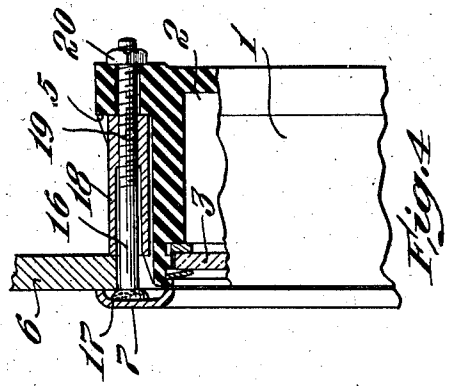


Fig. 4

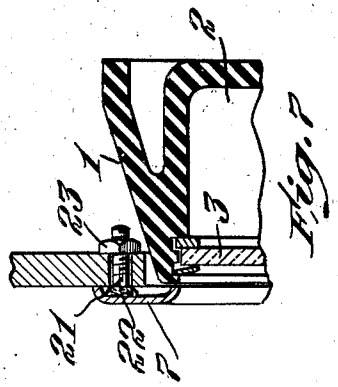


Fig. 7

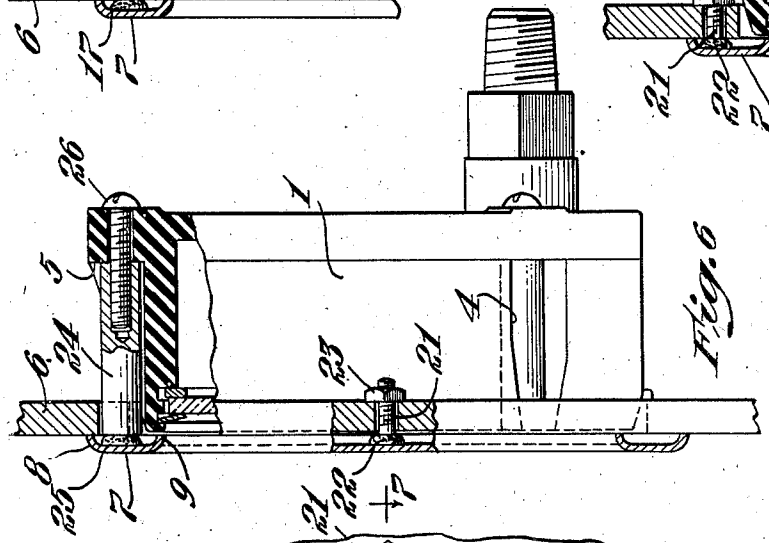


Fig. 6

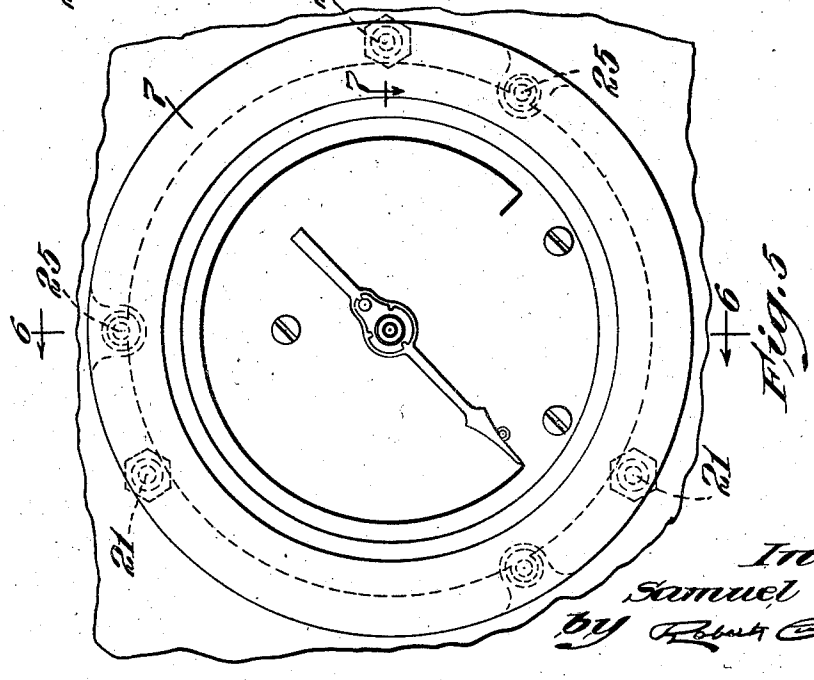


Fig. 5

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UNITED STATES PATENT OFFICE

2,422,908

MEANS FOR MOUNTING DIAL INSTRUMENTS

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Application November 10, 1944, Serial No. 562,859

7 Claims. (Cl. 248—27)

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This invention pertains to dial instruments, for example, pressure gauges, dial thermometers, etc., and relates more especially to improved means for mounting such a device in an opening in an instrument board. Instruments of the type referred to usually comprise a casing which houses the operative instrumentalities, including a movable index element, the casing having a transparent protective front panel of glass through which the index means is visible. Such instruments are usually carefully calibrated by the maker, and the delicate operative parts are protected from injury by the rigid case with its glass front panel. Commonly, the case has a radial attaching flange near its rear wall, although cases of more modern type (such, for example, as disclosed in the patent to Graesser et al. 2,271,423, dated January 27, 1942) have their walls shaped to provide exterior recesses or niches for the reception of the attaching screws or bolts. No particular difficulty is experienced in mounting such instruments on the front of a supporting board, since the attaching bolts may readily be inserted into the holes provided for them in the radial flange (or at the bottoms of the recesses or niches in cases of the more modern type) and no disassembly of the instrument parts is necessary in thus mounting the instrument. However, when the instrument is to be mounted in an opening in a supporting board, with its glass panel substantially flush with the front surface of the board, it has usually been necessary first to remove the glass panel and its retaining or bezel ring in order to permit insertion of the attaching bolts. Such removal of the glass panel exposes the index, dial and other parts of the instrument to possible injury and frequently results in a disturbance of the careful calibration originally made by the manufacturer.

The principal object of the present invention is to provide improved means for mounting such an instrument in an opening in a supporting board, with the front face of the instrument substantially flush with the forward surface of the board, but without necessitating the preliminary removal of the bezel ring and glass panel from the instrument.

Other and further objects and advantages of the invention will be pointed out in the following more detailed description, and by reference to the accompanying drawings wherein

Fig. 1 is a diagrammatic front elevation showing the instrument assembled with the finish ring and mounted upon an instrument board, the latter being shown only in part;

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Fig. 2 is a side elevation partly in vertical section on the line 2—2 of Fig. 1;

Fig. 3 is a view similar to Fig. 2, but omitting the instrument case;

Fig. 4 is a fragmentary view partly in section on the same plane as Fig. 2, illustrating a slight modification;

Fig. 5 is a diagrammatic front elevation, generally similar to Fig. 1, but showing a modified construction;

Fig. 6 is a side elevation, with parts in vertical section on the line 6—6 of Fig. 5, showing the instrument and finish ring mounted on the instrument board; and

Fig. 7 is a fragmentary section substantially on the line 7—7 of Fig. 5.

Referring to the drawings, the numeral 1 designates the case of a dial instrument, for example a pressure gauge, the case here illustrated (by way of example but without limitation) being of the kind more fully described in the above-named patent to Graesser et al., being moulded from plastic material to provide the chamber 2 for the reception of the movement mechanism, the chamber being closed at the front by the transparent panel 3. The outer surface of the case is provided with recesses or niches 4, each having a bottom wall provided with a forward surface 5, the bottom wall of each niche or recess having a bore for the reception of an attaching screw or bolt, as hereafter described.

As here illustrated the instrument is mounted on an instrument board 6 having an opening A (Fig. 3) of a diameter somewhat larger than that of the forward portion of the instrument case. To form an ornamental border for this opening at the front side of the instrument board and to form an anchorage for the instrument case as hereafter described, there is provided a finish ring 7 of such size and width that its outer edge 8 overlaps the edge of the opening A in the instrument board, while its inner edge 9 approximately registers with the edge of the transparent panel 3 of the instrument.

In accordance with the present invention, studs 10, here shown as three in number, spaced symmetrically about the axis of the finish ring 7, and each having a head portion 11 welded or otherwise permanently united to the rear or inner surface of the finish ring, are arranged to extend rearwardly through the opening in the instrument board 6, the axes of these several studs being parallel to the axis of the finish ring. Each of these studs is screw threaded at its rear portion as shown at 12. A tubular, rigid spacer element 13 is associated with each of these

studs, each spacer element being internally screw threaded at its forward portion for engagement with the screw threads on the corresponding stud. Each of these spacers 13 is of such external diameter, at least at its forward end, as to bear against the margin of the instrument board 6 surrounding the opening A. As illustrated in Fig. 3, the finish ring 7 may thus be assembled with the instrument board and held in fixed relation thereto by passing its studs 16 rearwardly through the opening in the instrument board and then assembling the spacer elements 13 with the studs and screwing the spacer elements onto the studs until the forward ends of the spacer elements engage the rear surface of the instrument board, thus firmly clamping the finish ring against the forward surface of the instrument board.

As illustrated in Figs. 2 and 3, each of the spacer elements 13 has internal screw threads 14 at its rear end portion. In assembling the instrument case with the instrument board, and assuming that the finish ring has already been clamped in place, as shown in Fig. 3, the instrument case is advanced forwardly from the rear so that the spacer elements 13 enter corresponding recesses 4 in the outer surface of the gauge case. Screws 15 are then introduced through the bores in the bottom walls of the recesses, the screws 15 engaging the internal screw threads 14 of the spacer elements, and being tightened until the rear ends of the spacer elements bear firmly against the bottom surfaces 5 of the several niches or recesses. The spacer elements are of such length that when the parts are thus assembled, the front face of the instrument bears the desired relation to the plane of the front surface of the instrument board, for example, the front of the instrument case may be flush with the front surface of the instrument board or support 6. The instrument is thus firmly clamped in position in proper coaxial relation to the finish ring 7. The operation of mounting the instrument on the panel board as thus described does not necessitate any disassembly of the instrument itself, nor the removal of its forward glass panel 3 and thus may be accomplished without in any way disturbing the calibration of the instrument. Conversely if at any time it be desired to remove the instrument from the panel board, for inspection, adjustment or the like, this is done very simply merely by removing the screws 15, leaving the finish ring 7 in place.

In a slight modification of the above arrangement, as shown in Fig. 4, the finish ring 7 is provided with studs 16 (generally similar to the studs 10) having heads 17 which are welded or otherwise permanently united to the rear or inner surface of the ring 7, but in this instance each of these studs 16 is sufficiently long to extend completely through its spacer element 18 and through the bore in the bottom wall of the recess of the gauge case and to a point to the rear of the rear wall of the case. In this instance the spacer element 18 is not provided with screw threads at its forward portion, the stud 16 passing freely through this forward portion, but the spacer element is screw threaded at its rear part for engagement with screw threads 19 on the rear end of the stud 16. The spacer is screwed onto the stud until its forward end engages the rear surface of the bore 6, thus holding the finish ring 7 in place. The instrument case is then advanced forwardly from the rear so that the rear

ends of the studs 16 pass through the bores in the bottom walls of the recesses and a nut 20 is then screwed onto the rear end of each stud 16 thus firmly clamping the instrument in place.

In Figs. 5, 6 and 7 a further modification is illustrated, wherein the finish ring 7 is substantially as above described, but in this instance is furnished with posts or studs 24 having heads 25 welded to the rear side of the finish ring, the posts or studs 24 themselves constituting the spacer elements and being made of suitable length for engagement with the bottom surfaces 5 of the recesses or niches in the gauge case. In this instance the studs or posts 24 are internally screw threaded at their rear ends only, and each receives a screw 26 which passes through the bottom wall of the corresponding recess 4 in the gauge case so as to secure the instrument to the studs or posts 24.

In this instance, in order to secure the finish ring 7 to the instrument board 6, the finish ring is provided with a plurality of short studs 21 each having a head 22 which is welded or otherwise permanently united to the rear or inner surface of the finish ring, these studs 21 being screw threaded at their rear portions and passing through apertures formed in the instrument board 6, the studs receiving nuts 23 by means of which the finish ring is firmly clamped directly to the instrument board. The axes of the studs 21 are at a radial distance from the center of the finish ring greater than the radius of the opening in the instrument board, so that they may pass through independent bores formed in the instrument board bordering the opening which receives the instrument case.

In this latter arrangement the finish ring is secured to the instrument board by the studs 21 and may remain in place even though the instrument be removed, but in this instance the spacer elements constituted by the studs 24 are fixed to the finish ring and in mounting the instrument it is unnecessary to manipulate any parts other than the screws 26.

While certain desirable embodiments of the invention have been illustrated by way of example, it is to be understood that the invention is not necessarily limited to these precise embodiments, but is to be regarded as broadly inclusive of any and all equivalent arrangements.

I claim:

1. The combination with a dial instrument having a case provided with a transparent front panel and having a part provided with a forwardly directed abutment surface and with an aperture whose axis is perpendicular to the plane of the transparent panel, attaching means designed to secure the instrument case in an opening in a support with the transparent panel substantially flush with the forward surface of the support, said attaching means comprising a ring of a diameter greater than that of the opening in the support and designed to engage the forward surface of the support bordering the opening, an elongate stud fixed at its forward end to the ring, tubular spacers each internally screw threaded at both ends, each spacer being of an external diameter such that when engaged with its stud its forward end bears against the rear surface of the support thereby to clamp the ring against the front surface of the support, each spacer having a rear surface designed to engage a surface of the instrument case thereby to locate the forward face of the case in desired relation to the plane of the front surface of the support, and

screws designed to pass through openings in corresponding parts of the case and to engage the internal threads at the rear ends of the spacers, thereby detachably to secure the case to the ring.

2. In combination with a finish ring designed to border an instrument-receiving opening in a support, a plurality of elongate studs each permanently united at its forward end to the ring and projecting rearwardly from the latter, the studs being so arranged as to pass through the marginal portion of the opening in the support, said studs having screw-threaded portions, rigid tubular spacer members, each internally screw threaded for engagement with one of the studs, each spacer being of an external diameter such that when engaged with its stud its forward end bears against the rear surface of the support thereby to clamp the ring against the front surface of the support, each spacer element having a rear end surface designed to contact a surface of an instrument case, and each spacer being of such length as to locate the case with the front face of the latter in desired relation to the plane of the front surface of the support, and means for detachably securing the instrument case to said studs.

3. In combination with a finish ring designed to border an instrument-receiving opening in a support, a plurality of elongate studs each permanently united at its forward end to the ring and projecting rearwardly from the latter, the studs being so arranged as to pass through the marginal portion of the opening in the support, said studs having screw-threaded portions, tubular spacers each internally screw threaded for engagement with one of the studs, the forward end portion of each spacer being of an external diameter such that when engaged with its respective stud said forward end bears against the rear surface of the support thereby to clamp the ring against the front surface of the support, each spacer having a surface designed to contact a surface of the instrument case and being of such length that when so engaged with the instrument case the front face of the latter is disposed substantially in the plane of the front surface of the support, the studs being of sufficient length to extend completely through the respective spacers and through a part of the instrument case, and nuts engageable with the rear ends of the studs for detachably securing the case to the studs.

4. In combination with an instrument case, a finish ring designed to border an instrument-receiving opening in a support, elongate studs permanently attached at their forward ends to the ring and projecting rearwardly from the ring and of such length as to extend to the rear of the support, means engageable with said studs to clamp the ring against the forward surface of the support, and a second set of studs each also secured at its forward end to the ring and each having an abutment surface for engagement with an element of the instrument case, and means for detachably uniting the instrument to said latter studs.

5. In combination with an instrument case, a finish ring designed to border an instrument-receiving opening in a support, studs permanently attached at their forward ends to the ring and extending rearwardly therefrom, said studs being at a radial distance from the axis of the ring greater than the radius of the opening in the support and being designed to pass through bores in that part of the support which borders the opening, each stud being screw threaded for engagement with retaining means by which the ring may be clamped against the front surface of the support, a second set of studs each permanently secured at its forward end to the ring and extending rearwardly from the latter, said latter studs being at such radial distances from the axis of the ring that they may pass through the opening in the latter, said latter studs having screw threads at their rear end portions for the reception of retaining means operative detachably to secure the instrument case to said latter studs.

6. In combination with an instrument case, a finish ring designed to border an instrument-receiving opening in a support, studs permanently attached at their forward ends to the ring and extending rearwardly therefrom, said studs being at a radial distance from the axis of the ring greater than the radius of the opening in the support and being designed to pass through bores in that part of the support which borders the opening, each stud being screw threaded for engagement with retaining means by which the ring may be clamped against the front surface of the support, a second set of studs each permanently secured at its forward end to the ring and extending rearwardly from the latter, said latter studs being at such radial distances from the axis of the ring that they may pass through the opening in the latter, said latter studs having abutment surfaces at their rear ends for contact with surfaces of the instrument case and being of such length as to locate the instrument case with its front face substantially flush with the forward surface of the support, and means for detachably securing the instrument case to said latter studs.

7. In combination with a flangeless instrument case including a transparent front panel and retaining means for the panel, the case having forwardly facing abutment surfaces adjacent to its rear face, a finish ring designed to border an instrument-receiving opening in a support, means for securing the ring to the support in coaxial relation with the opening in the latter, said securing means including a plurality of elongate studs having their forward ends rigidly and permanently secured to the ring, the studs projecting rearwardly from the ring and being of such length as to extend beyond the rear surface of the support, rigid spacer elements of predetermined and invariable length coaxial with certain at least of said studs and having their rear ends contacting the respective forwardly facing abutment surfaces of the case thereby accurately to locate the transparent front panel of the case substantially flush with the front surface of the support, and means operative removably to secure the case to said spacer elements.

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