United States Patent

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[54] **REMOVABLE AND REPLACEABLE INSTURMENT LAMPS**
7 Claims, 6 Drawing Figs.

[52] **U.S. Cl.** **240/2.1,** 58/50, 116/129
[51] **Int. Cl.** **G01d 11/28**
[50] **Field of Search** ..... 240/2.1; 116/129, 124.4, 129 L; 58/50; 33/consulted 324/consulted

[56] **References Cited**

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ABSTRACT: An indicating instrument having electric lamps disposed behind the dial and pointer, for illuminating the same. The lamps are demountably carried in an annular reflector the periphery of which extends along the inside wall of the cylindrical instrument casing. Lamp removal from the reflector is in outward directions through openings in the reflector periphery. The instrument casing is provided with corresponding or aligned access openings whereby lamp servicing can be performed without removing the annular reflector. A shallow, wide groove is provided in the casing exterior, communicating with the access openings and normally accommodating a removable cover band which closed over the openings so that the casing has a closed exterior appearance.

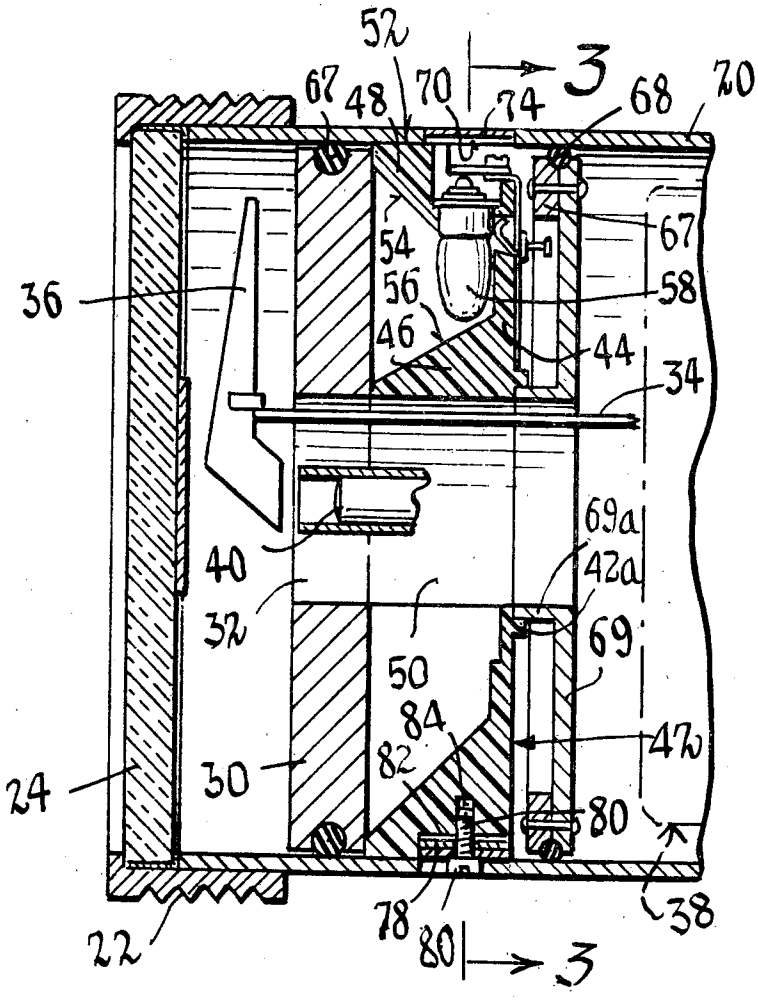


Fig: 1

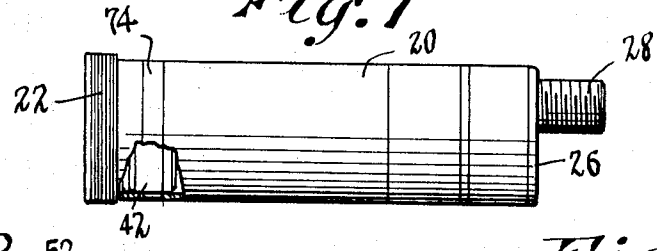


Fig: 2

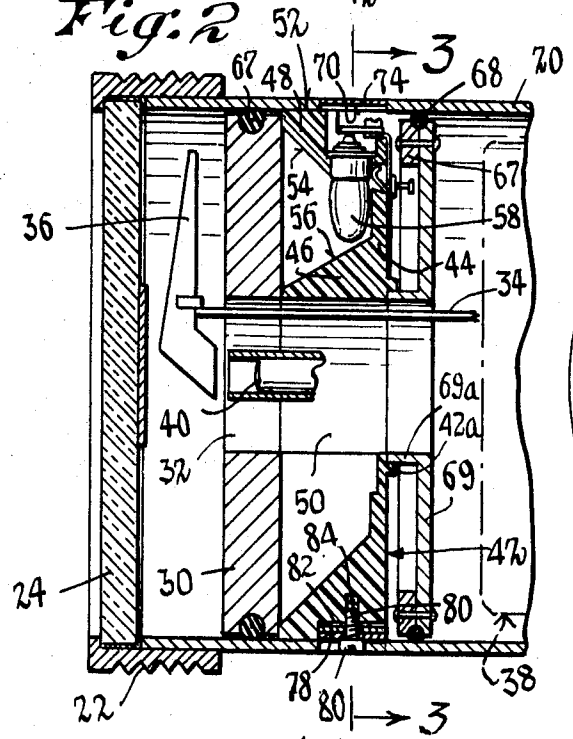


Fig: 5

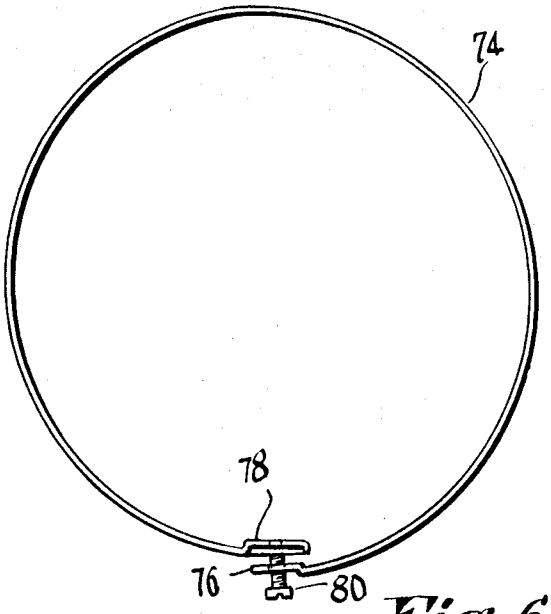


Fig: 3

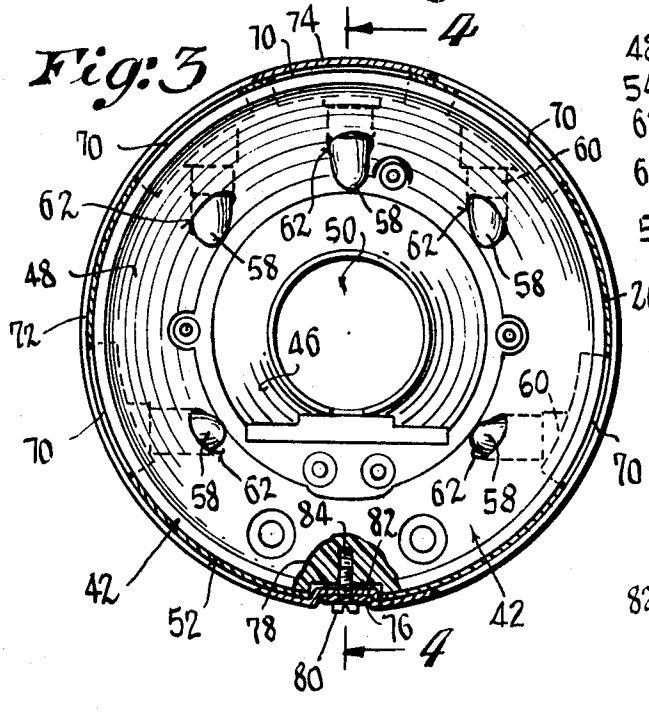


Fig: 4

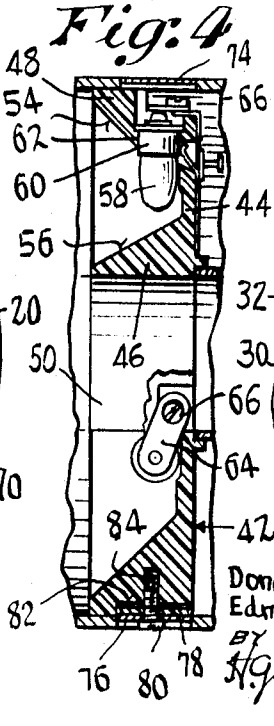
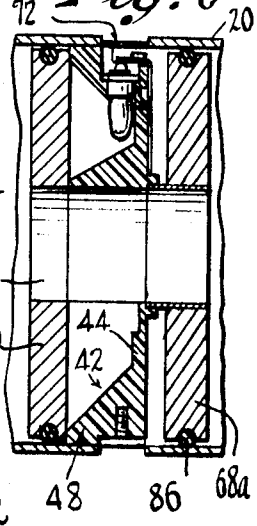


Fig: 6



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REMOVABLE AND REPLACEABLE INSTURMENT LAMPS

CROSS-REFERENCES TO RELATED APPLICATIONS

1. Copending application of Dana J. Blackwell, Ser. No. 802,485, filed Feb. 26, 1969, entitled "Illuminated Indicator Means and Instrument" and having common ownership with the present application.

2. Copending application of Dana J. Blackwell, Ser. No. 716,189, filed Mar. 26, 1968, entitled "Illuminated Indicating Instrument with Replaceable Lamps" and having common ownership with the present application.

3. Copending application of Dana J. Blackwell, Ser. No. 718,097, filed Apr. 2, 1968, now abandoned, entitled "Illuminated Indicating Instrument with Front Replaceable Lamps" and having common ownership with the present application.

BACKGROUND

This invention relates to indicating instruments having illuminated indicia, and more particularly to instruments of this type, wherein small incandescent lamps are disposed within a closed casing to illuminate dial and pointer elements therein. Prior instruments of this type included a reflector or lamp holder assemblage disposed behind the dial, on which the lamps were mounted. If at any time it became necessary to replace one or more lamps, the instrument had to be dismantled to the extent of removing the reflector or holder assemblage from the casing in order to gain access to the lamp sockets or holders. This was time consuming and required skilled help. In addition it upset the calibration or adjustment of the instrument, which then had to be readjusted.

SUMMARY

The above drawbacks and disadvantages of prior illuminated instruments are obviated by the present invention, one object being the provision of an improved illuminated instrument of the kind having small incandescent lamps, wherein removal and replacement of the lamps may be easily and quickly effected by relatively unskilled help and without the necessity of dismantling the instrument or upsetting the adjustment thereof. This is accomplished by disposing the lamps in the annular reflector in such a manner that they may be removed through exterior openings located in the outer periphery, and by arranging corresponding or registering access openings in the casing which surrounds the annular reflector. The necessity for removal of the reflector is thus eliminated. An annular cover strip or band is provided, to encircle the casing and enclose the access openings thereof; and to prevent interference with removal of the casing from its mounting, the band is recessed in the casing in a manner to be flush with the exterior. By such organization, the casing can be dismounted and the cover band removed to service the lamps, without requiring disassembly of the instrument from the casing.

Other objects of the invention reside in the provision of an improved, illuminated instrument as above set forth, which is especially simple and economical to produce, involving relatively few parts and operations; and to provide an instrument which at the same time is effective and reliable in its functioning.

Still other features and advantages will hereinafter appear.

In the drawings:

FIG. 1 is a side elevational view, partly broken away, of an indicating instrument embodying the invention.

FIG. 2 is a fragmentary axial sectional view, greatly enlarged, of the front portion of the indicating instrument, revealing the lamp and reflector assemblage. The instrument mounting is not shown.

FIG. 3 is a transverse section taken on line 3–3 of FIG. 2.

FIG. 4 is a section of the reflector and lampholder assemblage taken on the line 4–4 of FIG. 3.

FIG. 5 is a plan view of the cover band for the casing.

FIG. 6 is a fragmentary axial sectional view illustrating a modified form of sealed backplate.

Considering first FIGS. 1—5, there is shown an instrument casing 20 having at its front end a bezel 22 in which there is carried a transparent window 24. The casing 20 has a transverse rear wall 26 provided with an electrical fitting 28 by which connections are effected to the instrument contained within.

Behind the window 24 there is a circular dial 30 having a central opening 32 through which there extends a supporting arm 34 carrying at its front extremity a pointer 36 adapted to traverse the dial. The supporting arm 34 is part of an electrical instrument movement designated generally by the numeral 38.

In the central opening 32 there is disposed a light-piping member 40 of known construction, for illuminating the pointer 36. Further details of the instrument movement 38, supporting arm 34, and pointer 36 together with the light-piping member 40 are not given herein since such details per se form no part of the invention and since they may be found in the above-listed copending related applications.

In accordance with the present invention, the dial 30 is cooperable with and sealed to an annular lampholder and reflector member 42 which is in the form of a centrally apertured disc 44 having a centrally disposed forwardly extending truncated conical portion 46 and a flangelike peripheral portion 48 of tapered cross section. The conical portion 46 of the lampholder has a cylindrical bore 50, and the peripheral portion 48 has an outer peripheral surface 52 of cylindrical configuration. A sloping or partially conical inner wall 54 constitutes the inner surface of the peripheral portion 48 and preferably is of reflecting characteristic, together with the conical surface 56 of the central portion 46 whereby the member 42 is adapted to reflect forwardly the light produced by a plurality of miniature incandescent lamps 58 arranged in the annular space bounded by the surfaces 54, 56.

The incandescent lamps 58 include bases 60 which are set in recesses or openings 62 provided in the peripheral flange portion 48 of the lamp holder or reflector. Retainer arms 64 held by screws 66 may be swung aside to permit removal of the lamps 58 from the openings 62. Such removal is in directions outwardly of the annular peripheral portion 48 of the lampholder 42, as will now be understood. The central and peripheral portions 46, 48 respectively of the lampholder 42 are arranged to sealingly engage the back surface of the dial 30, and may be cemented thereto or otherwise secured to make a rather tight seal therewith.

In accordance with the invention, a front sealing ring 67 is engaged between the periphery of the dial 30 and the interior of the casing 20, to provide an annular seal. The ring 67 may be of the well-known O-ring type. Also, a rear sealing assemblage comprising an annulus 67 and an O-ring 68 is provided behind the peripheral portion 48 of the lampholder 42, the ring 68 of said assemblage being engaged with the inside wall of the casing 20 to provide an annular seal at this location. The annulus 67 and rear sealing ring 68 are carried by a backplate 69, all as shown in FIG. 2. The plate 69 has an annular flange 69*a* engaging and sealed to an annular shoulder 42*a* of the lampholder 42, thereby sealing the compartments or recesses 62 and lamp assemblages.

Further, in accordance with the invention, the casing 20 is provided with a plurality of access openings 70 which are arranged to register with the openings 62 of the lampholder 42 whereby access may be had to the lamp mountings for the purpose of removal and replacement of the lamps. The casing 20 is also provided with a relatively wide, shallow, annular groove 72 which extends around its outer periphery and communicates with the access openings 70. Normally the annular groove 72 is occupied by a cover band 74 in such a manner that the outer surface of the band and the outer surfaces of the casing 20 are substantially flush. The band 74 has inwardly offset extremities 76 and 78, the latter being in the form of a shallow rectangular cup. The extremities 76, 78 also have apertures to accommodate a fastening screw 80. For the pur-

pose of receiving the screw 80 and inwardly offset extremities 76, 78 of the ring 74, the lampholder 42 is provided with a recess 82 and with a threaded hole 84. The screw 80 may be threaded into the hold 84 with the extremities 76, 78 of the band 74 occupying the recess 82 whereby there are no protruding parts of the cover band but instead the band is either flush (at its circular portion) or else (at its extremities) recessed below the outer surface of the casing 20. Accordingly, the usual mounting for the instrument casing 20 need not be altered, and the instrument may be removed from its mounting in the usual manner, with the cover band 74 in place.

In FIG. 6 a modified form of backplate 68*a* is illustrated, said plate carrying in a peripheral groove another sealing ring or O-ring 86 for engagement with the interior casing wall to effect a seal therewith. A positioning and sealing tube 87 engages the lampholder 42 and the backplate 68*a* effecting a seal and support between these parts.

It will now be understood from the foregoing that the instrument movement and casing 20 may be taken from its panel mounting (not shown) in the usual manner, by loosening the mounting and pulling the instrument and casing forwardly, partially through the mounting panel. This will reveal the cover band 74 which may then be removed by loosening the fastening screw 80. The incandescent lamps 58 may now be removed and replaced, by loosening the retainer screws 66 and swinging the retainer arms 64 so as to provide clearance for permitting the outward removal of the lamps from the openings 62 in the reflector and lampholder member 42.

By virtue of the provision of the front and rear seals provided respectively at the dial 30 and rear peripheral portion of the lampholder 42, the annular space occupied by the lamps 58 will be sealed from the remainder of the interior of the casing 20. Accordingly, dirt or foreign matter which may inadvertently enter or find its way to the area in front of the lampholder through the lamp openings, will be retained in the annular space at the rear of the dial 30 and prevented from circulating to the front of the dial, or in the compartment containing the instrument movement 38.

The lamp access and servicing structure as above set forth is seen to be especially simple, small and compact, and to greatly facilitate the servicing of incandescent lamps without requiring the use of skilled personnel. Moreover, the construction will prevent the ingress of dirt and foreign matter to the critical interior areas of the instrument casing, and will not require alteration of the usual mounting means by which the instrument is attached to the supporting panel.

Variations and modifications are possible without departing from the spirit of the invention.

We claim:

1. In an illuminated instrument, in combination:
a. a casing,
b. an annular lampholder in the casing, having a peripheral portion extending along the interior of the casing wall,
c. said peripheral portion having openings which are accessible from the exterior thereof,
d. lamps and mounts therefor carried at said openings, said mountings enabling the lamps to be removed from the exterior of said peripheral holder portion,
e. said casing having a relatively wide and shallow annular groove in its exterior, and having access openings which open into said groove and which register with the openings of the lampholder,
f. a removable cover band disposed in said shallow annular groove of the casing and fitting substantially flush with the casing exterior,
g. removal of said cover band providing access to the lamps and lamp mountings of said lampholder whereby the lamps can be readily removed and replaced without removal of the lamp holder from the casing.

2. An instrument as in claim 1 and further including:
a. inwardly offset end portions on said cover band,
b. said lampholder and casing having registered openings in which the offset end portions of the cover band are disposed.

3. An instrument as in claim 2, wherein:
a. the end portions of the cover band are apertured,
b. a fastener screw passing through the apertures of said end portions, and
c. means providing a threaded hole into which the fastener screw extends, for securing the cover band.

4. An instrument as in claim 1, and further including:
a. a dial disposed in the casing in front of the lampholder,
b. a backplate in the casing at the rear of the lampholder,
c. front and rear sealing rings engaged with the casing and the dial and backplate, to seal peripheral portions of the dial and plate to the casing,
d. central annular portions of the dial and lampholder having sealing engagement,
e. an annular space between the lampholder and dial being sealed from the interior of the casing,
f. said lamps being carried in said annular space.

5. An instrument as in claim 1, and further including:
a. a dial disposed in the casing in front of the lampholder,
b. front and rear sealing means engaged with the casing and respectively with the dial periphery and rear portions of the lampholder,
c. central annular portions of the dial and lampholder having sealing engagement,
d. an annular space between the lampholder and dial being sealed from the interior of the casing,
e. said lamps being carried in said annular space.

6. An instrument as in claim 5, wherein:
a. the front sealing means comprises an O-ring carried in the periphery of the dial.

7. An instrument as in claim 4 wherein:
a. the rear sealing ring comprises an O-ring carried in the periphery of the backplate.