March 15, 1938. G. R. ERICKSON 2,111,094

LEVEL

Filed Sept. 19, 1935

Fig. 1.

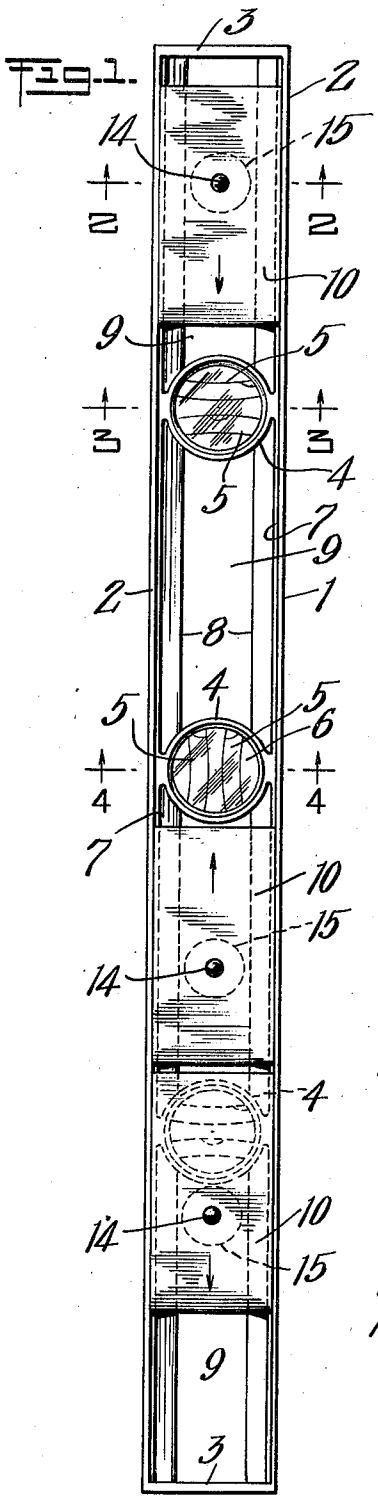


Fig. 2.

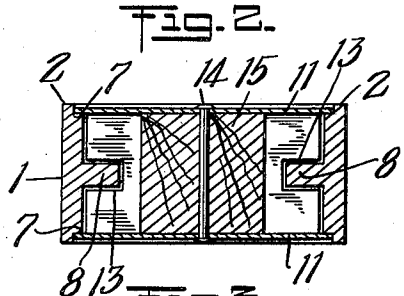


Fig. 3.

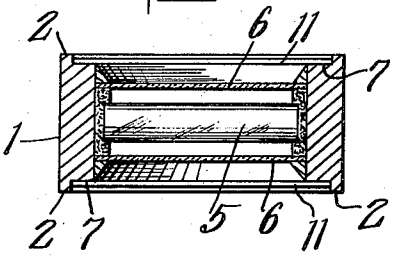


Fig. 4.

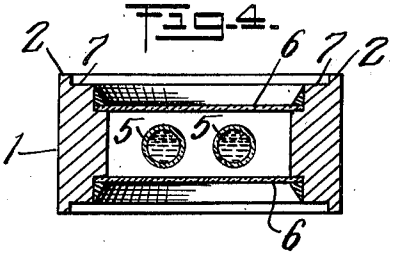
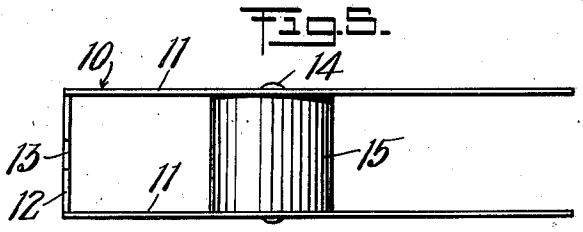


Fig. 5.



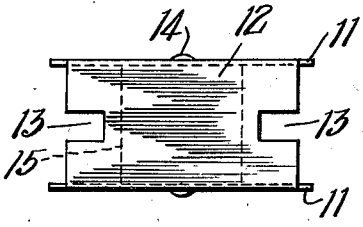


Fig. 6.

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UNITED STATES PATENT OFFICE

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LEVEL

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Application September 19, 1935, Serial No. 41,195

5 Claims. (Cl. 33—211)

This invention relates to levels, and more particularly to means for protecting bubble tubes and glasses of levels of present-day construction.

The objects of the invention are to provide an improved protector; to provide a protector which will not in any way obscure sight of the bubble when the level is in use; to provide a protector applicable to levels already in use or upon the market; to provide a protector which will not protrude beyond the outermost plane of the level; to provide a protector which will remain in position where placed; to limit movement of the protector; to provide a simple and readily made as well as installed construction; and to obtain other advantages and results as may be brought out in the following description.

Referring to the accompanying drawing in which like numerals of reference indicate similar parts throughout the several views,

Figure 1 is a side elevation of a level embodying my invention;

Figures 2, 3 and 4, are cross sections thereof on lines 2—2, 3—3 and 4—4 respectively;

Figure 5 is an edge view of one of the protectors; and

Figure 6 is an end view of the protector.

In the specific embodiment of the invention, the reference numeral 1 designates the level body generally, the same being here shown as providing integral edge rails 2, 2 and end pieces 3, 3. At intervals between the side rails are provided integral cross connections 4 which are appropriately socketed to receive bubble tubes 5, and, if desired, protective glasses 6, 6 on opposite sides of the bubble tubes. The foregoing is descriptive of levels now upon the market, so that I wish it distinctly understood that my invention is not only applicable with respect to such levels, but others which may differ in detail from the particular one selected for illustration herein. Levels of this type are generally open between the side rails and between the end pieces and cross connections as well as between cross connections. So far as the present invention is concerned, these openings may be considered as slots 9 through the level longitudinal thereof and transverse to the plane of the broad side. Furthermore, the plane of the broad side may be considered as the plane defined by the rim edge surface of the two side rails at the broad side. In other words, it is the plane of rest if the level were placed upon a flat surface broad side down.

In carrying out my invention, I prefer to shoulder off the side rails along their inner sides, as at 7, thereby providing said shoulders at each broad side of the level in a plane inset from and parallel to the plane of the broad side. The cross connections are likewise inset as far as the shoulders. Longitudinal of the level, on the inside of the side rails, are re-enforcing ribs 8 midway between the planes of the broad sides and parallel thereto.

Further, according to my invention, I provide a slidable protector 10 for each of the socketed cross connections. Description of one, therefore, will suffice for all. Said protector is shown as comprising a pair of parallel, or substantially parallel cover plates 11, 11. In the present showing, said cover plates are integral with an end connection 12 common to both and integral therewith, whereby the protector will appear U-shape in edge view. The said end connection is notched, as at 13, 13, at opposite sides to clear the two re-enforcing ribs 8. The longitudinal edges of the cover plates are enough wider than the end connection 12, as clearly shown in Figures 2 and 6, so that the side margins of said plates will ride upon the shoulders 7.

Midway between the side edges of the cover plates and spaced from the free ends thereof, is a transverse securing means, such as rivet 14, by which the plates are held toward each other in contact with the shoulders of the level. Between the plates and carried by the rivet or the like, is a sleeve or similar member 15 which will act in one of its functions to limit the action of the rivet in drawing the plates toward each other. In another function, the member 15 acts as a stop to limit sliding of the protector in covering direction by engagement with the cross-connection carrying the bubble tubes being protected. In Figure 1, the lower one of the protectors is shown in protecting position, and the member 15 thereof is shown engaged with the socketed cross-connection. To make use of that bubble tube, the protector would have to be slid longitudinally in the direction of the arrow to expose the tube. The other two protectors shown in Figure 1 have already been slid to expose the leveling instrumentalities, and to return them to protecting position, they would have to be slid in the directions of the arrows thereon. It is here to be noted that none of the parts of the protectors are at any time projecting from the surface plane of the level. Furthermore, the protector, in providing connected cover plates, will simultaneously expose or uncover the leveling instrumentality at both sides of the level.

In the construction and assembly of my improved protector with a level, it is preferred that

a frictional contact be assured between the side margins of the plates and the shoulder of the level rail. This may be accomplished through resiliency of the metal of the protector and proper proportioning of the length of sleeve 15. For instance, the sleeve may have a length equal to the distance through the level from shoulder to shoulder, in which event the side plates normally bulge slightly at their middle part and are drawn flat by the rivet. However, by having the plates initially flat and the sleeve slightly less than the distance from shoulder to shoulder, the rivet will concave the plates and thereby obtain the desired frictional engagement with the shoulders. The protector will thus be held in any position to which it is slid. Finally I might state that I prefer to employ metal for the protector plates, and wood for the spacing sleeve, but do not confine myself thereto. It is desirable, in using metal protector plates, to round the corners somewhat or otherwise prevent them from cutting into the metal of the level upon sliding the plates.

Obviously detail changes and modifications may be made in the construction and use of my invention, especially to accommodate the same to different makes and types of levels now upon the market. Furthermore, while I have selected a metal level for the specific illustration herein, let it be said that the invention is equally applicable to wood levels, which, if not already provided with longitudinal slots, may have slots cut therein for reception of the transverse connections between the protector plates. With wood levels, the end connection between the protector plates would have less width since the slot in the level would be less wide than in a metal level, and, in fact, in either case, the end connection need not be integral, but may be an applied connection such as a rivet if so desired. The invention is accordingly not to be limited to details shown and described, except as set forth in the following claims.

Having thus described the invention, I claim:—

1. A level protector for a level having a level instrumentality and a slot longitudinal of the level approaching said instrumentality, said protector comprising a pair of substantially parallel cover plates having sides and ends, and a plurality of connecting means extending from one plate to the other between the plates for riding in the slot of the level, each of said connecting means being spaced at a distance from one end of the protector thereby providing space between said plates having unobstructed opening at the said end of the protector from which said connecting means are spaced with one connecting means engageable with the end of the slot next said level instrumentality and with the protector projecting over said instrumentality.

2. A level protector comprising a pair of substantially parallel cover plates having sides and ends with the dimensions of the sides of greater length than the ends and providing side margins next the said side edges, and a plurality of connecting means between the plates, said plates having a width greater than each of said connecting means, and said connecting means being inset from both side edges of the plates for providing said margins continuous from end to end of said plates.

3. A level protector comprising a pair of substantially parallel cover plates having sides and ends with the dimensions of the sides of greater length than the ends and providing side margins next the said side edges, and an end connection between said plates, said end connection having less width than said plates and being inset from both side edges of both plates for providing side margins continuous from end to end of said plates.

4. A level protector for a level having a level instrumentality and a slot longitudinal of the level approaching said instrumentality, said protector comprising a pair of substantially parallel cover plates, an end connection between said plates at one end of the protector, and means spaced from the other end of the protector for establishing connection between the plates intermediate the ends thereof, thereby enabling said plates to project over and protect the leveling instrumentality against which said connecting means is brought into contact in use.

5. In combination with a level having a level instrumentality to be protected, and having a slot directed longitudinally toward said instrumentality, of a protector slidable longitudinally of said slot to cover and uncover said instrumentality, said protector having connecting means extending transversely through said slot.

GEORGE R. ERICKSON.