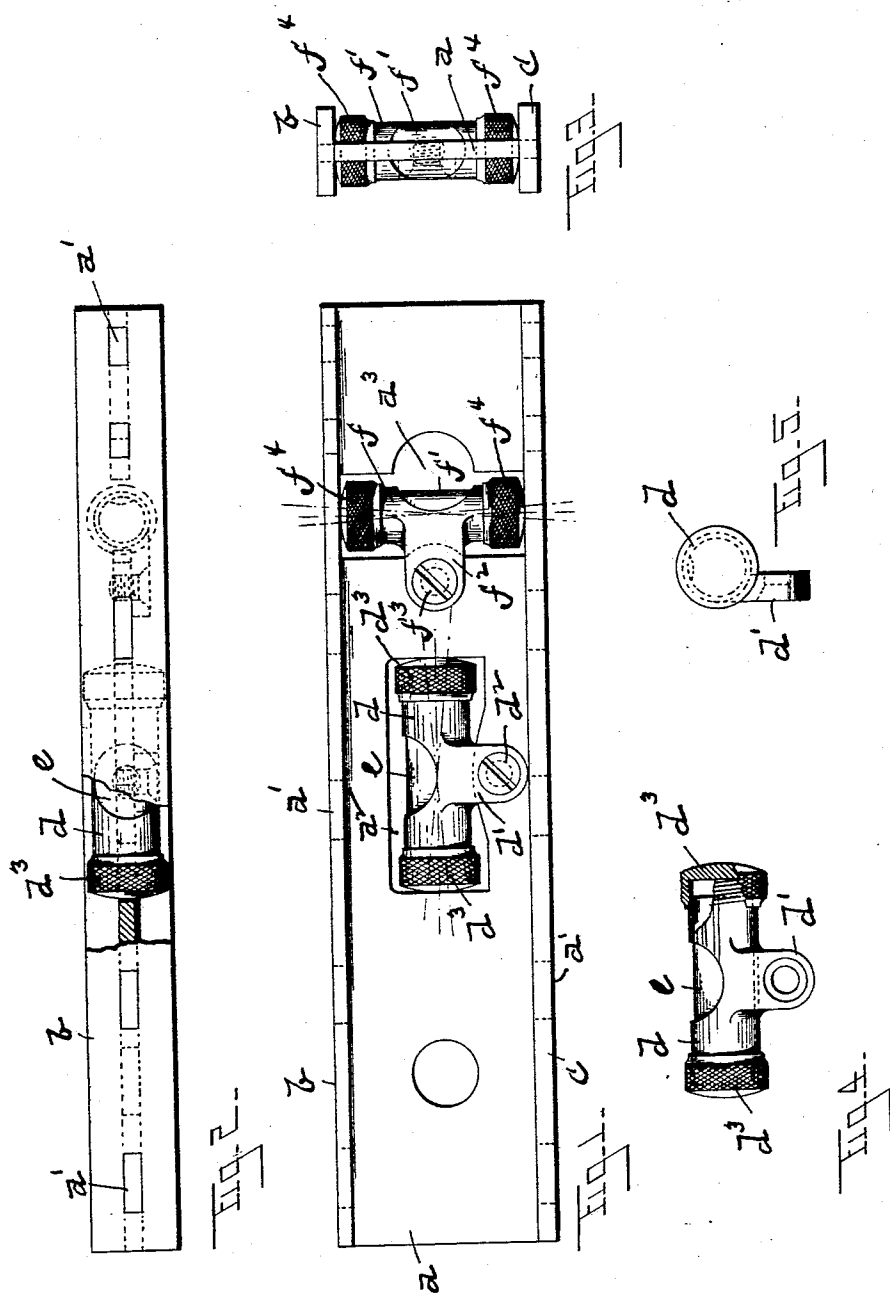


(No Model.)

W. M. MORTON.
SPIRIT LEVEL AND PLUMB.

No. 573,682.

Patented Dec. 22, 1896.



WITNESSES:

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WILLIAM M. MORTON, OF NEW HAVEN, CONNECTICUT.

SPIRIT-LEVEL AND PLUMB.

SPECIFICATION forming part of Letters Patent No. 573,682, dated December 22, 1896.

Application filed February 8, 1896. Serial No. 578,477. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM M. MORTON, a citizen of the United States, residing at New Haven, county of New Haven, and State of Connecticut, have invented a new and useful Improvement in Spirit-Levels and Plumbs, of which the following is a specification, reference being had to the accompanying drawings, forming part thereof.

The object of my invention is to provide a simple and comparatively inexpensive form of spirit-level and plumb, the bubble-glass cases of which can be readily removed for repair and quickly and conveniently adjusted to secure perfect accuracy in their indication.

To this end my invention consists in the spirit-level constructed as hereinafter fully described, and particularly pointed out in the claims.

Referring to the drawings, in which like letters designate like parts in the several figures, Figure 1 is a side view of a level and plumb embodying my invention. Fig. 2 is a plan view thereof with a portion of the frame broken out. Fig. 3 is an end view thereof. Fig. 4 is a detail view of one of the bubble-glass cases with a portion of the same broken out. Fig. 5 is an end view of said case.

The frame of the level and plumb devised by me is composed of three plates of sheet metal, preferably sheet-steel, to wit: a top plate *b*, a bottom plate *c*, and an intermediate plate *a*, which intermediate plate is provided at its side edges with a series of tenons *a'*, which enter a series of corresponding slots or mortises centrally located in said plates *b* and *c* and are riveted down against the outer surface of the latter, thereby securely uniting said plates together. A very strong and rigid frame is thus secured, which is considerably lighter than those heretofore used, and which presents a neat and pleasing appearance, the ends of the tenons *a'* being practically invisible at the outer sides of the plates *b* and *c* after said outer faces have been reduced to a true plane.

At a point substantially midway between its ends the plate *a* is provided with an opening *a²*, in which is located the level bubble-glass case *d*, it being retained within said opening by means of a centrally-located

downwardly-projecting ear or lug *d'*, which is bored and counterbored, as shown, to receive the screw *d²*, said screw entering a tapped hole in said plate *a* adjacent to said opening. Said case *d* is preferably made of tubular form, as shown, and is provided with the usual opening in its upper side to expose to view its bubble-glass *e*, which is of common form. At each of its ends said case is provided with a screw-cap *d³*, the outer surfaces of which are knurled, as shown, to facilitate turning them. Said screw-caps serve the double function of enabling a broken bubble-glass to be readily removed from the case by removing the latter from the frame and a new one inserted, and also of adjusting the case upon the frame to secure perfect accuracy of its indication at all times. Such adjustment is secured by loosening one of said caps and tightening the other, as the case may demand, the case *d* turning upon the screw *d²* as a center, as indicated by the series of dotted lines in Fig. 1.

When the instrument is also to perform the function of a plumb, the plate *a* is provided with a second opening *a³*, located near one end thereof and extending transversely thereof, in which opening is located the plumb bubble-glass case *f* and its glass *f'*, said case having an ear or lug *f²* to receive a holding-screw *f³*, and having screw-caps *f⁴*, all of which perform the same functions as the corresponding parts of the level-glass just described.

In both cases the end bearing of the screw-caps against the walls of the openings in which the cases are located in connection with the holding action of the screws *d²* *f³* not only enables a very delicate and accurate adjustment of the cases to be secured, but securely holds the cases against movement after being so adjusted. As before stated, the use of said screw-caps also enables the user of the instrument to quickly and conveniently remove a broken glass from the case and insert a new one without being obliged to return the instrument to the maker thereof for such operation, as has been customary heretofore.

I do not herein claim, broadly, the frame for levels and plumbs herein shown and described, such form of frame being made the

subject of claim in an application filed by me of even date herewith, Serial No. 578,480.

While I have herein shown and described the holding and adjusting devices at the ends of the bubble-glass cases *d* and *f* as being in the form of screw-caps, it will be obvious that other forms of screw-thread devices applied to the ends of said cases can be used within the spirit of my invention.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a spirit-level, the combination with a frame provided with an opening in the upright portion thereof, of a bubble-glass case located within said opening and pivotally secured to said frame, said case being provided at each end thereof with an adjustable contact device which contact devices are adapted to engage the opposite ends of the opening in said frame simultaneously to hold the case in varying positions of adjustment, substantially as set forth.

2. In a spirit-level, the combination with a suitable frame, of a bubble-glass case located within an opening in said frame and provided with a laterally - projecting lug through which passes a pivot-screw entering the frame, said case being provided at its opposite ends with removable screw-caps the outer surfaces of which engage the end walls of the opening in said frame, substantially as set forth.

3. In a spirit-level, the combination with a frame composed of three plates of sheet metal, viz: a top plate, a bottom plate, and an intermediate plate standing at a right angle to said top and bottom plates and joining the latter at their center line, of a bubble-glass case located within an opening in said intermediate plate and having a centrally-located, projecting lug which receives a screw passing into said plate at one side of said opening, said case being provided at each end thereof with a removable head each of which heads bears at its outer side against the adjacent end wall of said opening, substantially as set forth.

4. In a spirit-level, the combination with the frame composed of the sheet-metal plates *a b c* joined together substantially in the manner described, said plate *a* being provided with the openings *a² a³*, of the bubble-glass cases *d* and *f* located in said openings respectively and having the projecting lugs *d' f²* respectively to receive the holding-screws *d² f³*, said cases being provided with the screw-caps *d² f⁴* respectively, located at their opposite ends and bearing against the adjacent end walls of said openings, substantially as and for the purpose described.

WILLIAM M. MORTON.

Witnesses:

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