(No Model.)

E. A. & C. M. STRATTON.

SPIRIT LEVEL.

No. 383,196. Patented May 22, 1888.

Fig. 1.

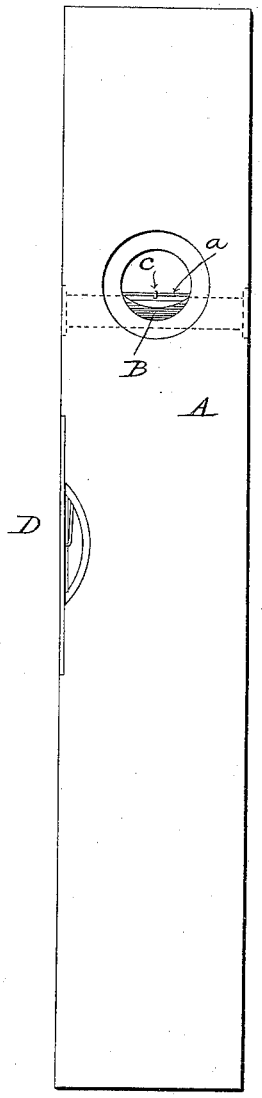


Fig. 2.

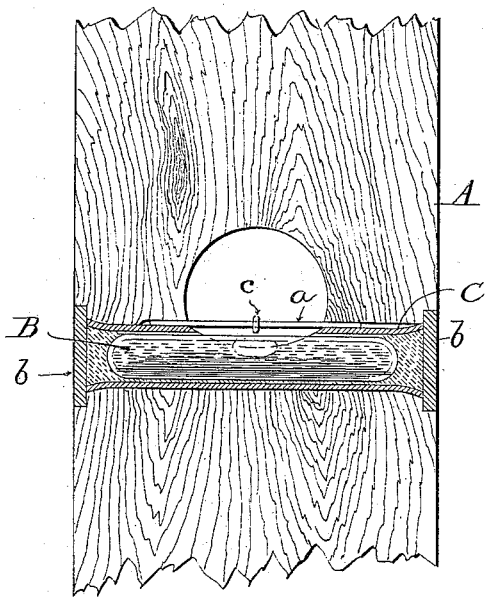


Fig. 3.

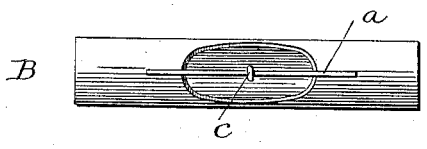
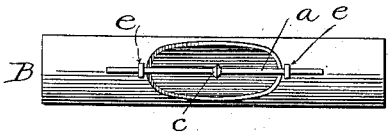


Fig. 4.



Witnesses:

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UNITED STATES PATENT OFFICE.

EDWIN A. STRATTON AND CHARLES M. STRATTON, OF GREENFIELD, MASSACHUSETTS.

SPIRIT-LEVEL.

SPECIFICATION forming part of Letters Patent No. 383,196, dated May 22, 1888.

Application filed March 5, 1888. Serial No. 266,143. (No model.)

To all whom it may concern:

Be it known that we, EDWIN A. STRATTON and CHARLES M. STRATTON, of Greenfield, in the county of Franklin and State of Massachusetts, have invented certain new and useful Improvements in Spirit-Levels, of which the following is a specification.

Our invention relates to spirit-levels; and the invention consists in an adjustable bead or point applied to the tube, which contains the glass tube arranged transversely of the stock or body of the level, by which the level may be trued up or adjusted when necessary without removing or detaching any of the parts, as hereinafter more fully set forth.

Figure 1 is a side elevation of a level complete, with our improvement applied thereto. Fig. 2 is a sectional view of a portion of the same, of full size, showing the parts more in detail; and Figs. 3 and 4 are views of the metal tube which incloses the glass bulb or tube, (shown detached,) with the adjustable device attached.

In these spirit-levels as usually constructed two bulbs are used, one, as at D, Fig. 1, which is set in one edge of the stock A for testing or truing horizontal surfaces or objects, this bulb being arranged lengthwise of the stock, and the other bulb, B, is arranged crosswise of the stock to be used in lieu of a plumb-bob for testing or truing vertical or perpendicular surfaces or objects. For various reasons unnecessary to enumerate, it is found that it is almost impossible to make these levels so that they will remain accurate and it frequently becomes necessary to return them to the factory and have the bulb reset. To remedy this difficulty, so far as the horizontal or longitudinal bulb D is concerned, we devised an improvement for which Letters Patent No. 129,183 were issued to us July 16, 1872; but that plan is not applicable to the cross-bulb B, for the reason that the bulb being secured permanently in a hole bored transversely through the stock, as shown in Fig. 2, and has no removable plate over it, as the bulb D has, there is no way of getting at the device to adjust it in case one should be applied, as shown in our prior patent. To remedy this difficulty and enable the level to be adjusted or trued in relation to the bulb B, we have devised another plan, which we will now proceed to describe.

In making these levels a hole is bored transversely through the stock, into which is fitted a metal tube, C, and which is secured therein by spreading or flaring its ends, more or less, as shown in Fig. 2, this tube being short enough to permit a plate, *b*, to be inserted at each end and come flush with the surface of the stock A, thus closing the hole and forming a finish. Within this metal tube B the glass bulb or tube C is fixed by means of plaster-of-paris, it being fitted therein as accurately as possible. Formerly a small cross-bar was left at the center of the opening cut at the central portion of the metal tube B, said cross-bar being designed to be exactly opposite the center of the bubble in the glass bulb when the level was in a perfectly true or accurate position. But it is very difficult to so adjust and set the bulb B as to bring the cross-bar in the exact position desired; and even if that be done, the level after a while is apt to become untrue from the warping or springing of the wooden stock owing to changes of temperature, moisture, &c., and then the bubble is thrown more or less to one or the other side of the fixed cross-bar, and as both the cross-bar and the bulb are stationary, there is no means by which the difficulty can be remedied, except to send the level back to the factory and have the bulb reset, and even then it is liable to again get out of order. To remedy all these difficulties we make the metal tube B without the central cross-bar, and instead thereof we use a movable bead, *c*, as shown in Figs. 2 and 3. This bead is mounted on a small wire, *a*, arranged longitudinally over the opening in the tube B, the wire *a* being soldered to the tube at each end and the bead *c* being movable thereon, as represented in Fig. 3, or the bead being soldered or otherwise fastened to the wire, and the latter being secured to the tube B by means of eyes or small loops *e*, in which it can be moved with the bead to and fro, either plan being adopted, as may be preferred, though we consider the plan shown in Fig. 3 as being the simplest, cheapest, and best. When the parts have been thus arranged, and

the tube B with the bulb C is secured in place in the stock, as shown in Fig. 2, it will be seen that this movable bead will be directly over the center of the bubble when the level is accurately adjusted, and that when from any cause the level becomes untrue it is only necessary to move the bead *c* slightly to one or the other side, as the case may be, to restore the level to its original degree of accuracy, and that this can be done at any time by the person using it, thereby obviating all the difficulty and trouble above mentioned.

While this improvement is especially designed for application to the transverse bulb, which is used for testing vertical objects or surfaces, it is obvious that it may, if desired, be applied to the longitudinal bulb D with equal facility.

Having thus described our invention, what we claim is—

For use in a spirit-level, the tube B, having the bead *c*, mounted on a wire, *a*, secured to said tube, said bead being made adjustable longitudinally of the tube, substantially as shown and described.

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