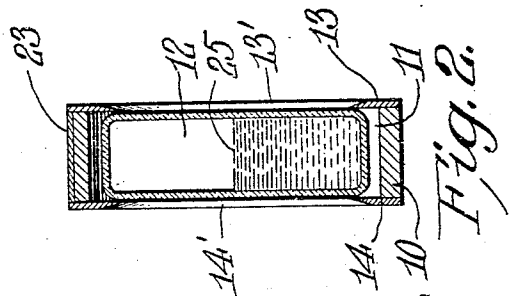
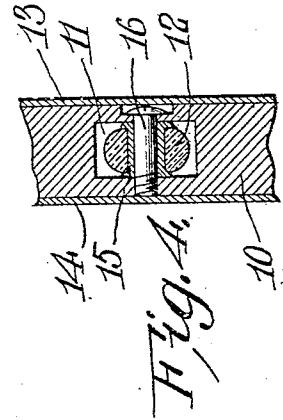
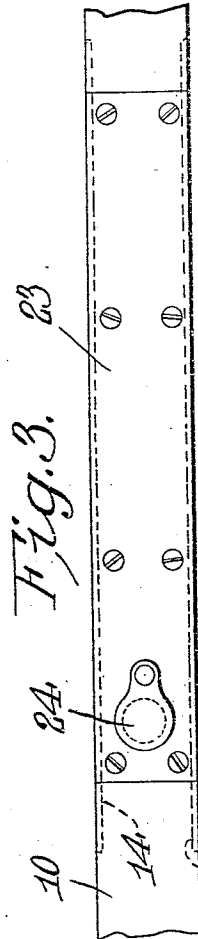
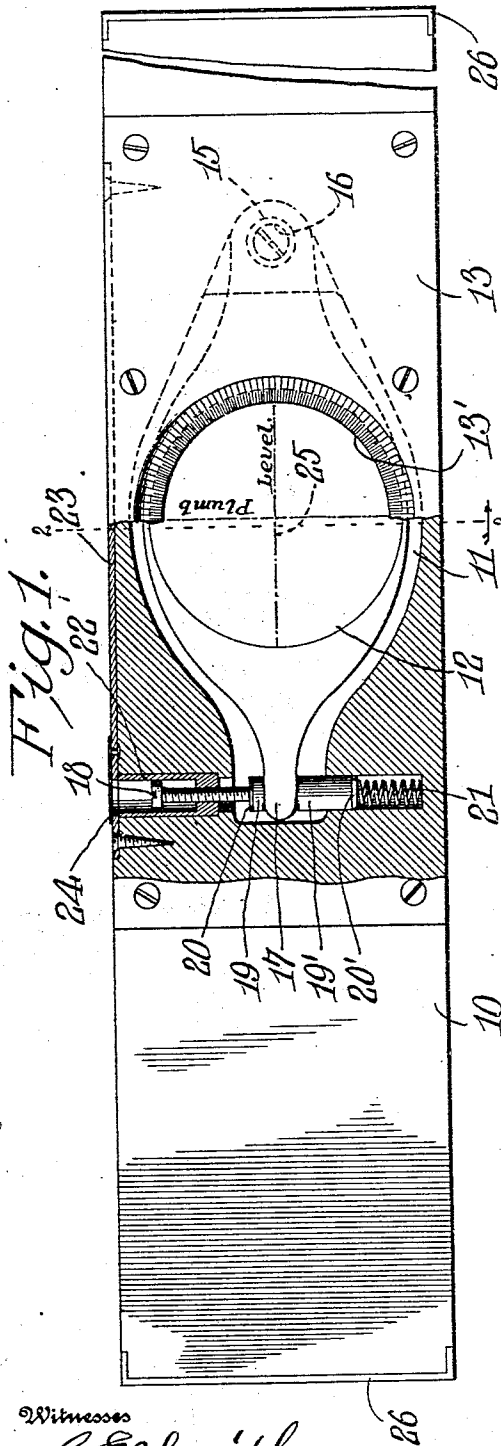


931,769.

Patented Aug. 24, 1909.



Witnesses
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UNITED STATES PATENT OFFICE.

ARTHUR KNOLL, OF DAYSLAND, ALBERTA, CANADA.

SPIRIT-LEVEL.

931,769.

Specification of Letters Patent.

Patented Aug. 24, 1909.

Application filed June 5, 1908. Serial No. 436,860.

To all whom it may concern:

Be it known that I, ARTHUR KNOLL, a subject of the King of England, residing at Daysland, Alberta, Canada, have invented certain new and useful Improvements in Spirit-Levels, of which the following is a specification.

This invention relates to instruments used by carpenters and other artisans for the purpose of indicating whether or not a piece of work is level or plumb or whether it is inclined.

It has reference also to that class of such devices which indicate the amount of inclination if any of the work.

The subject-matter of this invention more especially has reference to certain details of construction whereby the device is improved with reference to its nicety of adjustment, and the instrument as a whole is improved in certain details which will be hereinafter fully set forth.

For a full understanding of the invention and its characteristic advantages, reference is to be had to the following detail description and the accompanying drawings, in which—

Figure 1 is a side elevation, parts being broken away to show interior structure; Fig. 2 is a transverse sectional view through the spirit glass on the line 2—2 of Fig. 1; Fig. 3 is a partial plan view, and Fig. 4 is a detail showing the structure at the point where the spirit glass is pivoted to the body of the device.

Throughout the following description and on the several figures of the drawings similar parts are referred to by like reference characters.

Referring now particularly to the drawings, the numeral 10 indicates the body or casing of the instrument, made of wood preferably although the material chosen may be any suitable for the purpose. Situated through the intermediate portion of the body is a cavity 11 within which the spirit glass or bulb 12 is located. Said glass is inclosed and protected except for an eye on each side by metallic plates 13 and 14, which serve not only to protect the glass from breakage but also to strengthen the instrument at the region of the cavity 11. The plates 13 and 14 are provided with circular eyes or peep holes 13' and 14' respectively. The bulb 12 is provided at one end with a bushing 15 where the bulb is

pivoted on a pivot 16 to the casing. At the opposite end from said pivot the spirit glass is provided with an extension 17 whereby it may be adjustably held in place with respect to the body 10. As a convenient and efficient means for effecting such adjustment there is provided a screw 18 movable at right angles to the longer axis of the instrument and which bears against one side of the projection 17 whereby the latter is moved in one direction. Interposed between the screw and the projection are a cushion 19 and a washer 20, the cushion being preferably of rubber and the washer of metal. On the opposite side of said extension and supporting the same against the aforesaid cushion is a spring 21 and a cushion 19' and washer 20' corresponding to those aforesaid. The screw 18 operates in a metallic casing 22 which is held in place by the edge closure plate 23. In order to gain access to the screw 18 there is provided a pivoted cap 24 on said closure plate 23. The supporting means for the end of the spirit glass will therefore serve not only as a means for adjusting the position of the glass with respect to the body but also will prevent such jar of the delicate portion of the instrument as would likely be disastrous during rough usage.

The means aforesaid are designed to be used to indicate in a single construction both the level and the plumb. The spirit glass is half filled with liquid 25, and when the instrument is used to indicate the level the upper surface of the liquid is parallel to the longer edge of the instrument as will be obvious. When, however, the instrument is used to indicate the plumb the surface of the liquid will be shifted through an angle of ninety degrees. In either case the said liquid will be visible from either side of the instrument. Either or both of the metallic plates 13 and 14 will be provided preferably with a graduated scale ranging from 0 at both the level and the plumb for the purpose of indicating the amount of variation from the level or the plumb. Such scale may indicate the amount of inclination of the instrument in inches, or if desired it may indicate the angulation in degrees.

When the instrument is made of wood, there may be provided at each end a metallic cap as at 26 for the purpose of preserving the proper shape of the instrument and to prevent injury thereto in actual use.

As indicated in the drawings the spirit glass or bulb 12 has an extension at each end, one to constitute the means for supporting the same upon its pivot and the other constituting the means whereby the glass may be adjusted. The cavity of the glass may be of any symmetrical form, but preferably it is circular, and the liquid should exactly half fill such cavity. In instruments of this character it is not infrequent, especially when constructed of wood, for one end of the device to shrink or warp more than the other, and it is necessary therefore that the bulb of glass be delicately adjustable to compensate for any such irregularity as may be occasioned in the instrument. All of the delicate parts of the device, so far as it is possible, are thoroughly housed within the casing of the device. So also the adjusting means are fully protected within the confines of the casing, a matter of considerable importance, considering the fact that the device is subjected to rough usage in the hands of workmen.

Having thus described the invention, what is claimed as new, is:

1. In a spirit level, the combination of a body having a central cavity, a spirit glass located within said cavity, said glass having a circular liquid cavity and being provided with end extensions, a pivot support for one

of said extensions and the other extension constituting a lip, spring cushioning means operating upon one side of said lip, an adjustable screw operating upon the other side of said lip against the tension of said cushioning means, and means inclosing all of the aforesaid parts within the body of the device.

2. The hereindescribed spirit level comprising, in combination, a body having a central cavity, a liquid containing spirit glass pivoted at one end within said cavity, the opposite end of said glass being extended to form a lip, a metallic plate secured to each side of said body adjacent to said spirit glass and each of said plates having a peep hole, a strengthening plate located adjacent to the aforesaid plate, a metallic casing extending inwardly from the last mentioned plate toward the aforesaid lip, an adjusting screw cooperating with said casing and bearing upon one side of said lip, and cushioning means cooperating with said lip upon the opposite side thereof, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

ARTHUR KNOLL.

Witnesses:

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W. D. WELLES.