

(No Model.)

3 Sheets—Sheet 1.

J. C. HUTTON.
SPIRIT LEVEL.

No. 385,516.

Patented July 3, 1888.

Fig. 1.

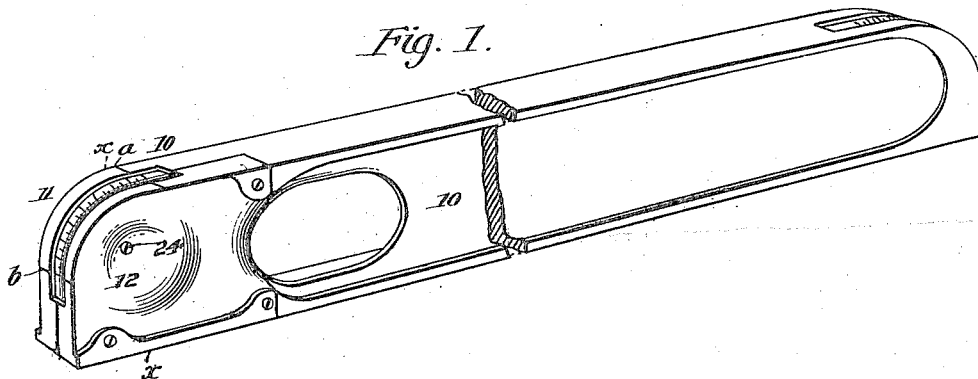


Fig. 2.

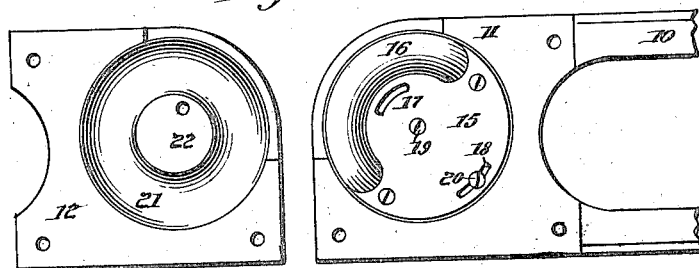


Fig. 3.

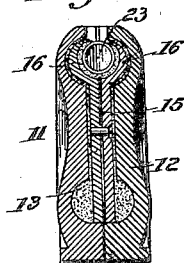


Fig. 4.

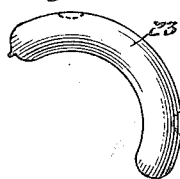
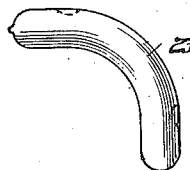


Fig. 5.



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Fig. 6.

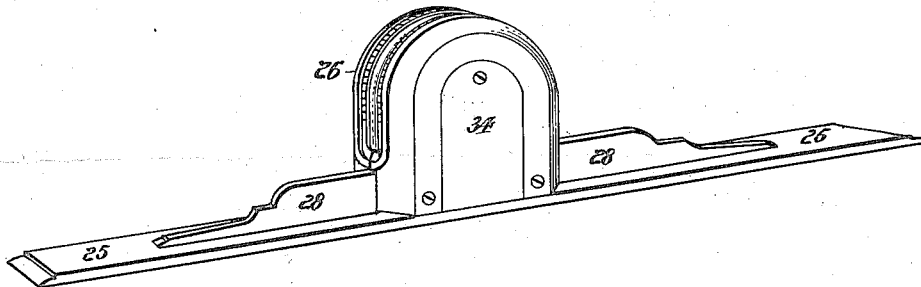


Fig. 7.

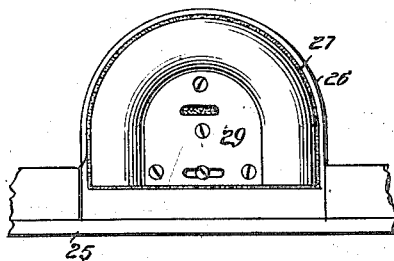


Fig. 8.

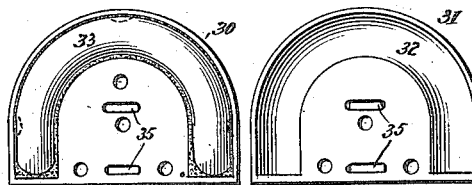


Fig. 9.

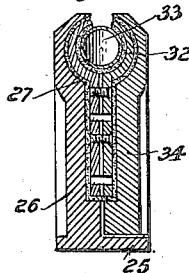
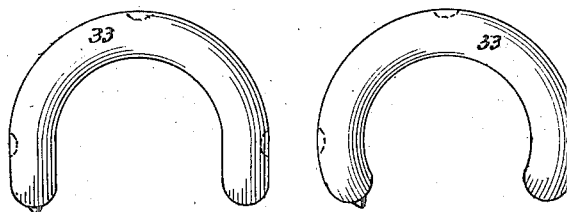


Fig. 10.



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Fig. 11.

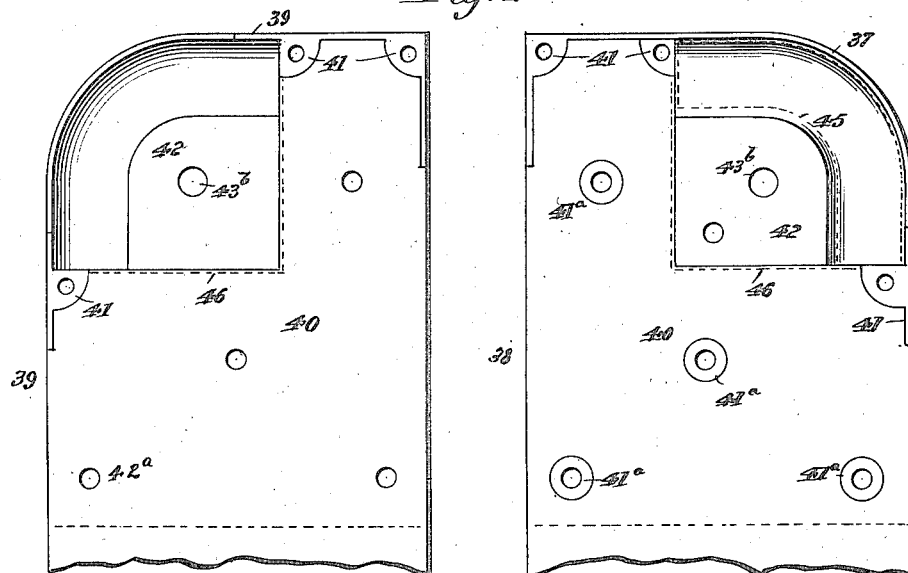
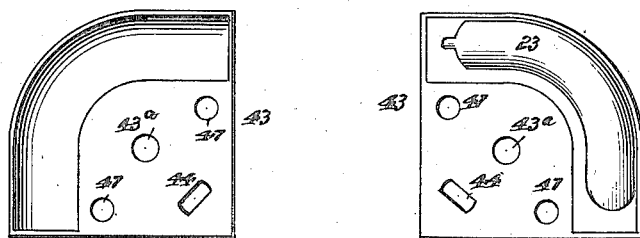


Fig. 12.



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UNITED STATES PATENT OFFICE.

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PATRICK J. McELROY, OF EAST CAMBRIDGE, MASSACHUSETTS.

SPIRIT-LEVEL.

SPECIFICATION forming part of Letters Patent No. 385,516, dated July 3, 1888.

Application filed February 28, 1888. Serial No. 263,554. (No model.)

To all whom it may concern:

Be it known that I, JAMES C. HUTTON, of Corvallis, in the county of Benton and State of Oregon, have invented a new and useful Improvement in Spirit Levels and Plumbs, of which the following is a full, clear, and exact description.

My invention relates to an improvement in spirit levels and plumbs, and has for its object to so construct the same as that it will be in condition at all times to indicate a level or plumb, or any required angle, without the manipulation of set-screws and similar devices; and the further object of the invention is to provide a setting for the vial, wherein the same will be absolutely protected against hard usage.

The invention consists in the construction and combination of the several parts, as will be hereinafter fully set forth, and pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar figures of reference indicate corresponding parts in all the views.

Figure 1 is a perspective view of a level having the vials set in the ends; Fig. 2, an elevation of the parts detached. Fig. 3 is a vertical section on line *xx* of Fig. 1, and Figs. 4 and 5 are elevations of the vials employed. Fig. 6 is a perspective view of a modified form of level, the vial being centrally placed. Figs. 7 and 8 are elevations of detached parts. Fig. 9 is a central vertical section of Fig. 6, and Fig. 10 an elevation of the vials. Figs. 11 and 12 are detail views of further modifications.

In carrying out the invention the ends of the main frame 10 are divided into two sections, 11 and 12, the section 12 being detachable. In the fixed section 11 a circular recess, 13, is produced, a segment of which is counter-sunk. In the compound recess thus produced a bed of plaster-of-paris is prepared to receive a vial-case, 15. The vial-case is circular in contour and divided into two equal sections, each section being provided with a segmental depression, 16, a central aperture for a pivotal screw, and slots 17 and 18, one above the other, below the pivotal aperture, as illustrated to

the right in Fig. 2. Prior to the vial-case being set in the aforesaid recess 13 a bed of cement is prepared in the segmental concavity in the inner face of the case-sections formed by the depression 16, and, the vial 23 being placed in the bed of one section, the two concavities are made to register. The sections are then screwed together.

The vial-case when placed in the frame-recess 13 is held therein by a pivotal screw, 19, and the case is thereupon revolved until the vial is properly positioned between the plumb and level marks *a* and *b*. When so placed, the degrees are marked upon the surface intervening the said points in any approved manner, as shown in Fig. 1. In order to insure the fixture of the vial-case in its recess a screw, 20, is entered through the slot 18.

The detachable section 12 of the frame is provided upon its inner face with an annular recess, 21, of a circumference equal to the circumference of the recess 13 in the fixed section, and centrally within said recess 21, as shown to the left in Fig. 2, a projection, 22, is produced adapted to bear against the vial-case, a similar projection having been produced in the recess 13.

In the recess 21 and in the recess 13 a plaster-of-paris bed is provided, and to complete the construction of the level the detachable section 12 is placed in position upon the fixed section, the plaster-of-paris surrounding the vial-case. Thus it will be observed that the vial is doubly embedded in the plaster-of-paris, whereby a strong, durable, and immovable setting is obtained.

As illustrated in Figs. 4 and 5, the vials may be somewhat varied in shape—as, for instance, the vials illustrated are of the same size and length, which is a little more than a quarter of a circle—the difference consisting in that the vial shown in Fig. 4 is a true circle its entire length, and the vial illustrated in Fig. 5 a true circle for only a quarter of its length.

The detachable section is secured to the main frame in any suitable manner, and as an additional safeguard a screw, 24, is passed through the section 12 and slot 17 in the vial-case into the frame proper. It will be under-

stood that that portion of the vial-case and frame above the vial is cut away to permit the latter to be readily seen. The frames may be of wood or metal or any desirable material.

5 By reason of the construction above set forth any degree of inclination can be obtained as readily as a plumb or level.

To obviate the inconvenience of having to turn a level end for end when used in connection with different work, as would be necessitated in the above construction, I provide a means for locating the vial centrally the instrument, which vial may be read upon either side. To that end I illustrate in Fig. 6 one of the proposed forms, which is preferably made of metal. Centrally and integral with the base 25 an upwardly-extending vertical frame-section, 26, is cast or otherwise formed, segmental in contour, and provided upon the inner face with a recess, 27, extending parallel with the sides and top, and centrally and longitudinally the base, upon the upper side, a rib, 28, of any preferred style of construction, is provided, extending from each side of the frame-section outward, as illustrated in Fig. 6. The vial-case 29 is also segmental in contour and divided into two equal sections, 30 and 31, as shown in Fig. 8, each of which sections is provided upon its inner face with a marginal semicircular depression, 32, in which the semicircular vial 33 is adapted to rest, each of the said depressions being provided with a bed of plaster-of-paris, in which the vial is laid.

35 When the two sections of the case are united by screws suitably placed, the vial will be held embedded in the plaster, and the inner contiguous edges of the sections, upon which degrees are produced, are so spaced as to admit of the vial being readily seen. In the surface of the sections slots 35 are cut, through which screws may be entered in order that the parts may be shifted slightly to bring the bead in the proper position and be so held until firmly united. The vial-case having been placed properly together, it is laid upon a bed of cement in the frame-section 26, the depression in the case fitting into the recess in the frame-section. To complete the frame, a detachable frame-section, 34, similarly recessed upon its inner face to the fixed frame-section, after receiving a bed of plaster-of-paris, is brought in contact with the exposed surface of the vial-case, and the two frame-sections, likewise the frame and vial-case, are held together in any well-known or approved manner, the upper side contiguous edges of the frame-sections being so spaced as to render the vial and degrees readily discernible. The vials used in this construction may differ somewhat in contour. For instance, as shown in Fig. 10, they may prescribe a true half-circle or be made more or less of horseshoe form. In this form of level, no matter what the inclination or how the instrument is placed, the degrees may be readily observed and the bead seen.

In Fig. 11 I illustrate the sections of a holder which is designed to act in the dual capacity of a receiver of the vial and case and also as a protector for the corners of the wood. The rims or flanges 37 upon the sections 38 and 39 are adapted to project a sufficient distance, so that when the two sections are placed in position upon the wood the rims will meet centrally the edge. The rim is cast integral with the plates 40, which are made as thin as practicable and provided with apertured lugs 41, adapted to receive the binding-screws uniting the sections. The plates 40 are let into the wooden body of the level flush with the sides, which body, as heretofore stated, is protected at the ends by the rims or flanges 37. One plate 40 is strengthened by lugs 41^a, into which lugs other binding-screws are entered, having been passed through the corresponding apertures, 42^a, of the opposing plate. In one corner of each plate a recess, 42, is sunk, adapted to receive the vial-case 43, the detached sections of which are illustrated in Fig. 12. In the said recess the plates are provided with an aperture, 43^b, to receive a screw binding the plates and vial-cases together. The slot 44 in the vial-case is purposed to receive a fixing-screw, when the several vial-case sections have been adjusted, to hold them properly in the recess of the plate.

The dotted lines 45 to the right in Fig. 11 illustrate the position of the vial, and the dotted lines 46 in the same figure illustrate the recessed portions of the wooden body, the other edges whereof extend full to the rim or flange.

The vial 23 is illustrated as secured in a plaster bed in the right-hand section of Fig. 12. When adjusting the vial-case sections in proper position, a screw is temporarily passed through the apertures 43^a and 43^b, and when the proper adjustment is found the sections of the vial-case are permanently united by passing screws through apertures 47 therein. The final adjusting-screw being entered through the slots 44, the temporary screw is now removed, the plaster placed in the recess of the plates, and all bound together by a main screw, as aforesaid, passing through the apertures 43^a and 43^b.

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

1. In a spirit-level, the combination, with a sectional frame having recesses in the contiguous faces and a cement bed laid in said recesses, of a vial-case provided with a vial cemented therein, held between the said frame-sections in contact with the cement bed, substantially as shown and described.

2. In a spirit-level, the combination, with a sectional frame having recesses in the contiguous faces and a cement bed laid in said recesses, of a sectional vial-case having aligning depressed surfaces provided with a cement bed, a segmental vial held in said bed, and

means for retaining the vial-case in contact with the cement bed of the frame-sections, substantially as shown and described.

5 3. In a spirit-level, the combination, with a sectional frame, of a vial-case, a segmental vial cemented in said case, and means, substantially as described, for cementing the vial-case

between the frame-sections, as and for the purpose set forth.

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S. T. JEFFREYS.