No. 657,443. Patented Sept. 4, 1900.

C. L. NEWTON.

SPIRIT LEVEL.

(Application filed June 28, 1900.

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

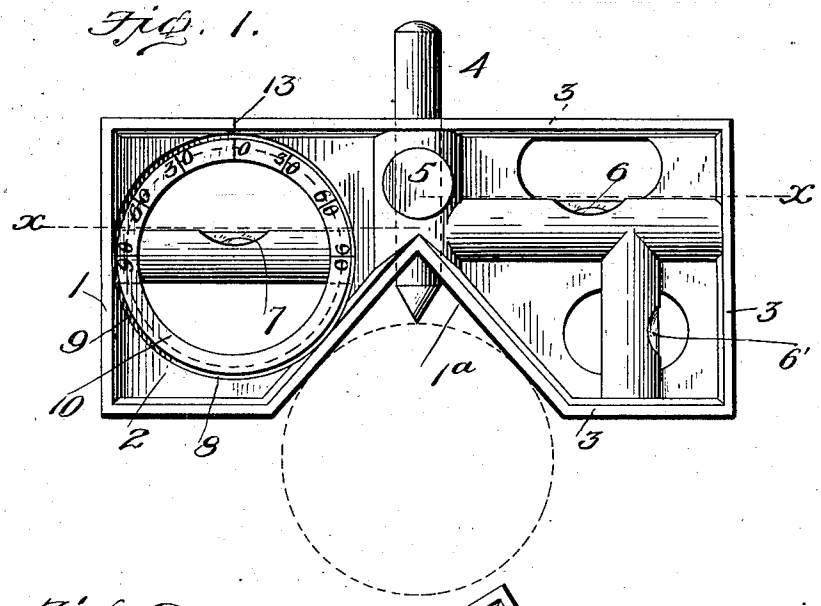


Fig. 2.

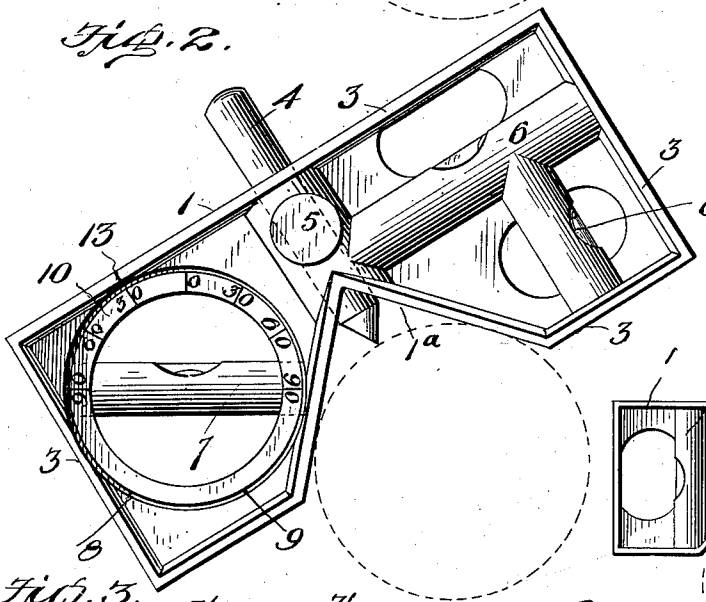


Fig. 7.

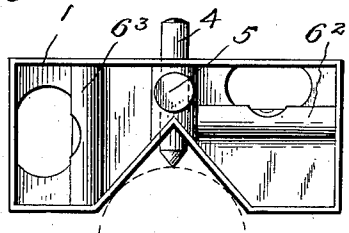
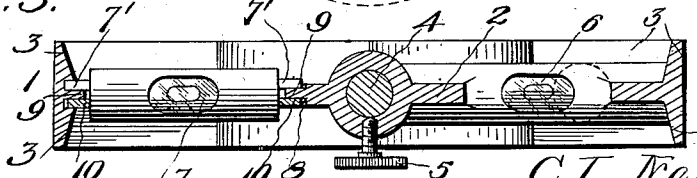


Fig. 3.



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(No Model.) 2 Sheets—Sheet 2.

Fig. 4.

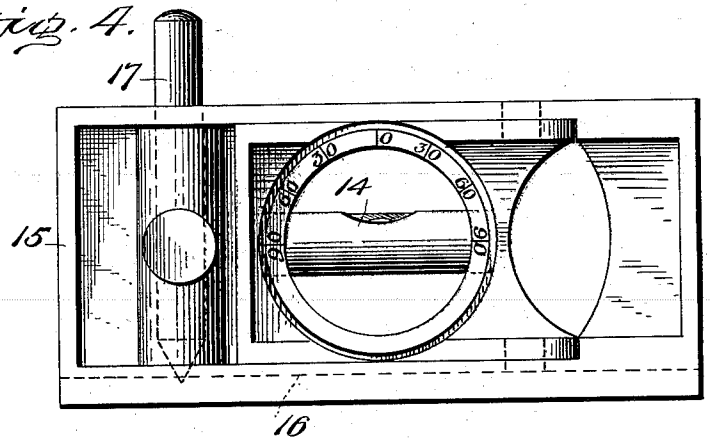


Fig. 5.

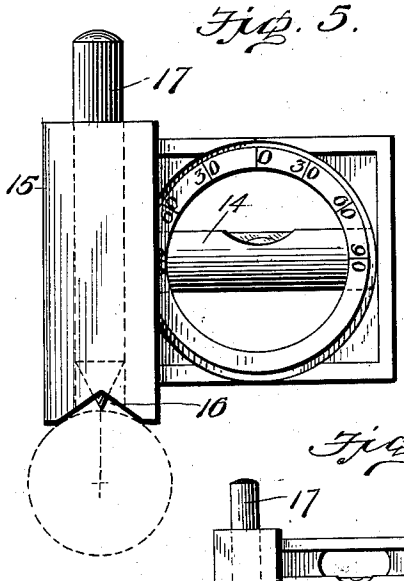


Fig. 6.

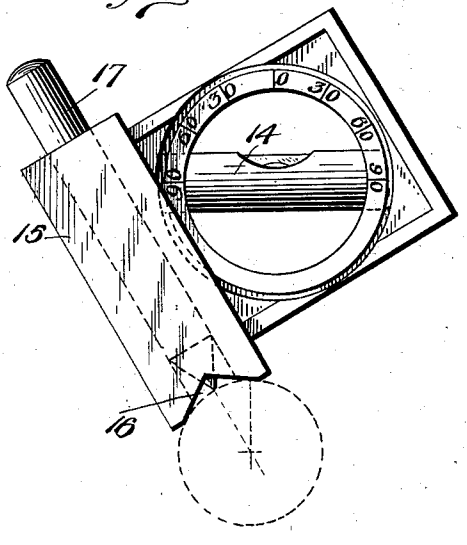
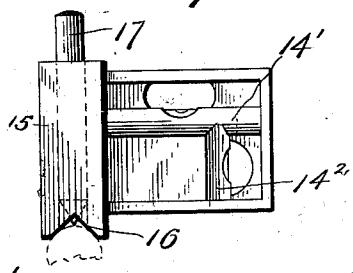


Fig. 8.



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UNITED STATES PATENT OFFICE.

CHARLES L. NEWTON, OF PUEBLO, COLORADO.

SPIRIT-LEVEL.

SPECIFICATION forming part of Letters Patent No. 657,443, dated September 4, 1900.

Application filed June 28, 1900. Serial No. 21,978. (No model.)

To all whom it may concern:

Be it known that I, CHARLES L. NEWTON, a citizen of the United States, residing at Pueblo, in the county of Pueblo and State of Colorado, have invented certain new and useful Improvements in Spirit-Levels; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to spirit-levels; and one object is to produce a combined arrangement of levels which may be used for all purposes in which a common level and an inclinometer are used.

A further object is to produce a level which will be compact in form, simple in construction and operation, which can be manufactured and sold at a small cost, and which is well adapted to the purpose for which it is designed.

With these and other objects in view my invention consists in the construction and arrangement of parts, as will hereinafter be more fully described and claimed, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation of my device, showing it applied to a shaft, as for the purpose of obtaining a number of points along a straight line on said shaft or to find a point above and in a perpendicular line with the center of said shaft. Fig. 2 is a similar view showing the position of the level on a shaft to obtain points at any angle to other points on said shaft. Fig. 3 is a horizontal sectional view on the line *x x* of Fig. 1. Fig. 4 is a side elevation of a modified form of my device, showing the hinged portion folded against the main frame. Fig. 5 is an end elevation of the same, showing the hinged portion unfolded and the device applied to a shaft in a similar manner and for the same purpose as in Fig. 1. Fig. 6 is a similar view showing the device applied in a similar manner and for the same purpose as in Fig. 2. Fig. 7 is a side elevation illustrating another and simpler form of my device. Fig. 8 is a similar view of still another form.

In the drawings, 1 denotes the main frame of the level, consisting of a rectangular plate 2, provided on its top, bottom, and end edges with a flange 3, projecting on both sides of the plate. The frame 1 is formed on its bottom edge midway between the ends with an inverted-V or wedge shaped notch 1^a for a purpose hereinafter to appear.

4 denotes a movable prick-punch mounted to slide in a vertical guideway or slot formed in an enlarged central portion of the plate 2 and is held in its adjusted positions by means of a set-screw 5, the point of said punch being thus allowed to engage shafts of different diameters.

6 denotes an ordinary horizontal spirit-level glass rigidly mounted in the plate 2 to one side of the punch 4, and in using this glass the frame is placed in the usual manner on a plane surface for leveling the same horizontally. 6′ denotes a similar spirit-level glass rigidly mounted in a vertical position or at right angles to the level-glass 6 for obtaining perpendicular lines or planes in a manner common to ordinary levels.

7 denotes a movable glass mounted in the opposite side of the punch of the frame, the plate 2 being provided here with a circular opening 8, the periphery of which is provided with an annular tongue or flange 9. The protecting-casing of the glass 7 is formed on its ends with lugs or extensions 7′, which bear on one side of the annular flange 9, and 10 denotes an annular band or ring rigidly connected to the casing 7 in such manner that the outer edge of the band or ring 10 will bear on the opposite side of the annular flange 9. By this construction it will be seen that the glass 7 is mounted in the frame 1, so that it may be turned to any angle. The face of the annular ring or band is provided with a scale of degrees beginning with "0" at a point diametrically opposite the center of the bubble in the glass 7 and extending along the ring on both sides of this point to ninety degress, or the degree at a right angle.

A mark or scratch 13 is formed on the frame 1 at a point which when the level and the glass 7 are in an exact horizontal position will be diametrically opposite or perpendicular to the center of the bubble in the glass 7, or in line with the "0" mark on the ring 12.

To use the instrument for the purpose of getting a series of points along a straight line

on a shaft, adjust the inclined sides of the notch 1^a upon the periphery of a shaft or cylinder so that the bubble in the rigid glass is in the center of the view-opening of its protective casing. A light tap with a hammer on the prick-punch will mark a point at that position. Repeat this along the shaft or cylinder wherever a point is required in line with the first one. In order to get a point or points at any angle to the above-described points and on either side thereof, the movable level-glass and its attached ring or band are slid around on the annular tongue or flange 9 until the desired angle of degree on the said ring is in line with the scratch on the frame. The instrument is now adjusted on the shaft until the bubble in the movable glass 7 is in the center of the view-opening of its shell or casing and the point on the shaft where the punch touches will be the angle indicated by the scale on the ring or band 10. In order to get a point at ninety degrees, or at right angles to the position shown in Fig. 1, I would use the vertical glass 6′ in preference to using the movable glass, and when using the vertical glass 6′ for the purpose just stated the instrument is simply adjusted around the shaft until the bubble in the glass 6′ is in the center of the view-opening, at which time the point touched by the prick-punch is just ninety degrees from the point formerly indicated by said punch.

In Figs. 4, 5, and 6 of the drawings is illustrated a modified form of level. In this form I use but one glass 14, which is similar in construction and operation to the glass 7, but which in this instance is mounted in a hinged frame pivoted to the top and bottom sides of a main frame 15 to fold between the same. The lower edge of the frame 15 is provided with an inverted-V-shaped slot or groove 16, extending lengthwise of the frame 15, and near one end of the said frame is arranged the vertically-adjustable punch 17. To use this form of the instrument as a common level for horizontal work, the parts are folded in the position shown in Fig. 4. To use the same for the purposes described in Figs. 1 and 2 in connection with the first-described form, the parts are unfolded, and thereby turned at right angles to its position lengthwise the body of the level and arranged as shown in Figs. 5 and 6.

In Fig. 7 of the drawings I have shown a modification of my device as illustrated in Figs. 1, 2, and 3. In this instance I do away with the movable glass and simply employ fixed horizontal and vertical glasses 6^2 and 6^3, mounted at right angles to each other in the frame 1, and use the same in a manner similar to that described in connection with the form shown in the first three figures.

In Fig. 8 I have shown a modification of my device as illustrated in Figs. 4, 5, and 6 of the drawings. In this instance I also do away with the movable glass and employ fixed horizontal and vertical glasses 14′ and 14^2 and use the same in a manner similar to that described in connection with Figs. 4, 5, and 6.

It is obvious that the inverted-V-shaped slot in all the forms of my level might be of other shape—such, for instance, as semicircular.

From the foregoing description, taken in connection with the accompanying drawings, the construction and operation of my device will be readily understood, and a further description of the same is not deemed necessary, and it is obvious that the invention may be put to many uses not mentioned herein.

Various changes in the form and construction of my device may be made without departing from the principle or sacrificing any of the advantages of this invention.

Having thus described my invention and pointed out its merits, what I claim, and desire to secure by Letters Patent, is—

1. In a spirit-level of the class described, the combination of a main frame having mounted therein one or more fixed spirit-level glasses, a movable frame carrying a spirit-level glass, the said movable frame rotatably mounted in said main frame, an inverted-V-shaped notch or recess provided in the lower edge of said frame, an adjustable punch or prick mounted to move vertically in said frame and means for holding said punch in its adjusted position, substantially as and for the purposes described.

2. In a spirit-level of the class described, the combination of a main frame having mounted near one end thereof a vertically-disposed adjustable punch, a hinged frame pivoted to and adapted to be folded by said main frame, a rotatably-mounted spirit-level glass and a scale of degrees carried by said hinged frame, an inverted-V-shaped longitudinally-disposed groove or recess formed in the lower edge of said main frame, substantially as and for the purposes set forth.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

CHARLES L. NEWTON.

Witnesses:
LILLIAN LITZ,
JOHN STANTON.