

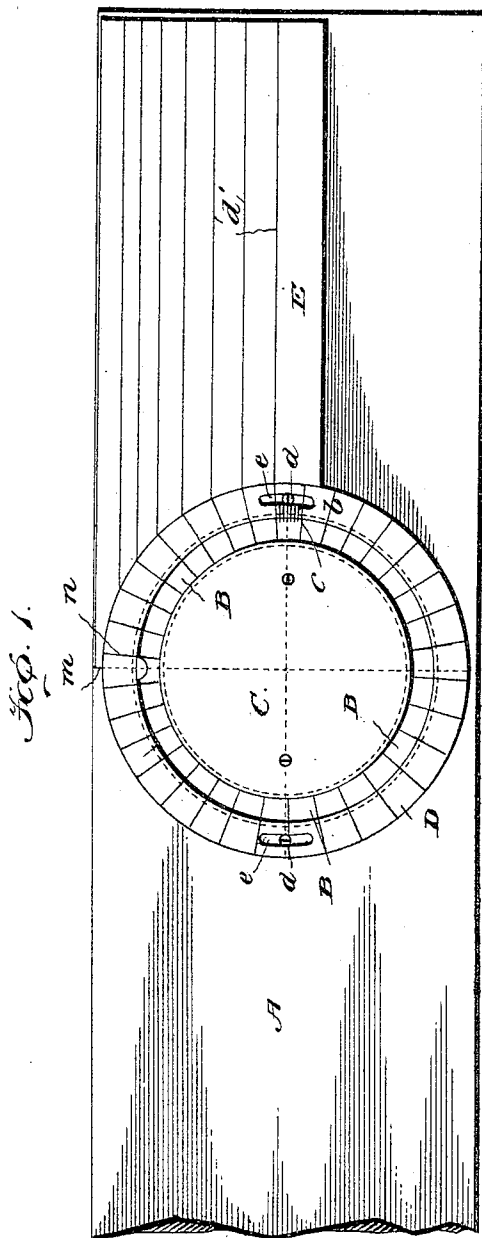
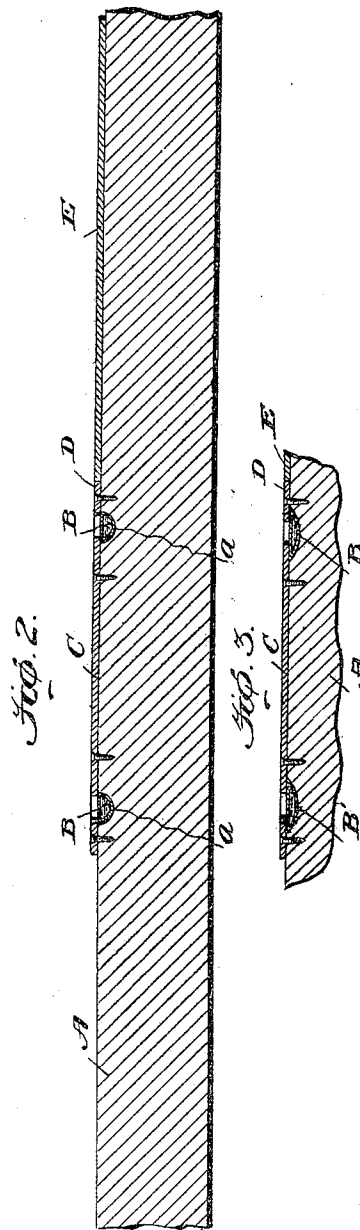
No. 808,372.

PATENTED DEC, 26, 1905.

R. W. HUNTER & L. CALLAHAN.

LEVEL.

APPLICATION FILED JAN. 31, 1905.



Inventors

Witnesses

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ROBERT W. HUNTER AND LEE CALLAHAN, OF COLORADO SPRINGS,
COLORADO.

LEVEL.

No. 808,372.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that we, ROBERT W. HUNTER and LEE CALLAHAN, citizens of the United States, residing at Colorado Springs, in the county of El Paso and State of Colorado, have invented new and useful Improvements in Levels, of which the following is a specification.

Our invention pertains to spirit-levels of the clinometer type; and it has for one of its objects to provide a spirit-level of the kind mentioned embodying a circular spirit-tube of a form in cross-section calculated to conduce to accurate reading of the level.

Other advantageous features of the invention will be fully understood from the following description and claims, when taken in connection with the accompanying drawings, forming part of this specification, in which—

Figure 1 is a broken side elevation of a spirit-level constituting one embodiment of our invention. Fig. 2 is a longitudinal section of the same, taken in a plane at right angles to Fig. 1; and Fig. 3 is a detail section similar to Fig. 2, illustrative of a modification hereinafter referred to.

Referring by letter to the said drawings, and more particularly to Figs. 1 and 2 thereof, A is the stock of the level constituting the preferred embodiment of our invention. The said stock is preferably, though not essentially, of wood and is provided in one side with a circular groove *a* of semicircular form in cross-section.

B is a circular and transparent, preferably glass, tube, arranged in the groove *a* of the stock and having an inner portion concave in cross-section and also having a flat outer portion. The tube is arranged with its outer portion flush with the side of the stock, Fig. 2, and is designed to contain alcohol or other suitable spirit, as shown.

C is a circular plate, preferably of brass or other suitable metal, connected to the side of the stock A and overlapping the inner portion of the circular tube B, so as to assist in retaining said tube in the stock and protecting the tube against breakage or other injury, and D is an open plate, also preferably of brass or other metal, connected to the side of the stock at the opposite side of the groove *a* with reference to the plate C and designed to assist in retaining the tube B against displacement and injury. The said open

plate has a circular inner edge and is provided with graduations *b* extending to the said edge, as illustrated in Fig. 1. These graduations for the sake of accuracy in the reading of the level are made to register with graduations *c*, preferably provided upon the outer flat side of the tube B.

We prefer to connect the plate D to the stock A through the medium of screws *d*, extending through circular slots *e* in the plate, this in order to permit of the plate being turned. We also prefer to fix the glass tube so that the plate D may be adjusted with respect to the said tube.

E is a plate connected to the stock. This plate E is provided with lines *d'*, and it may be used to bear instructions regarding the use of the level.

The tube B' (shown in Fig. 3) is similar to the tube B of Figs. 1 and 2, except that it is of segmental form in cross-section.

In the practical use of the level when the same is placed in a cooler temperature than that which it previously occupied the bubble will expand owing to the contraction of the spirit. In this event the annular plate D is turned slightly to the right, so as to place the line *n* thereon in such position relative to the end of the bubble that the other degree-marks on the said annular plate will give a correct reading. Incidentally the level may be placed in a horizontal position and the plate D turned so that line *n* will coincide with line *m*, after which any desired angle may be obtained by placing a bevel-square on the stock and adjusting the blade of the square so as to make said blade coincide with any degree-mark on said plate D.

It will be gathered from the foregoing that our level is read from the end of the bubble, which by reason of the form in cross-section of the tube is a fine point calculated to conduce to accurate reading.

Having described our invention, what we claim is—

1. A spirit-level comprising a stock, a transparent, spirit-containing tube in the form of a circle and arranged at one side of the stock; said tube having an inner portion concave in cross-section and also having a flat outer portion, and a graduated plate in the form of a circle, adjustable circularly on the stock and overlapping the tube.

2. A spirit-level comprising a stock having

a line perpendicular to one of its longitudinal edges, a transparent, spirit-containing tube in the form of a circle and arranged at one side of the stock with its center in line with
5 said line of the stock; said tube having an inner portion concave in cross-section and also having a flat outer portion, and a graduated plate in the form of a circle, adjustable circularly on the stock and overlapping the
10 tube.

3. A spirit-level comprising a stock having a line perpendicular to one of its longitudinal edges, a circular, transparent, spirit-containing tube arranged at one side of the stock and

having its center in line with said line of the 15 stock; said tube having an inner portion concave in cross-section and also having a flat outer portion, and a circular plate adjustable circularly on the stock and overlapping the
20 tube.

In testimony whereof we have hereunto set our hands in presence of two subscribing witnesses.

ROBERT W. HUNTER.
LEE CALLAHAN.

Witnesses:

W. N. ARMSTRONG,
B. WINFRED STIVERS.