No. 786,269. PATENTED APR. 4, 1905.

L. M. CURRY.

SPIRIT LEVEL.

APPLICATION FILED JULY 8, 1904.

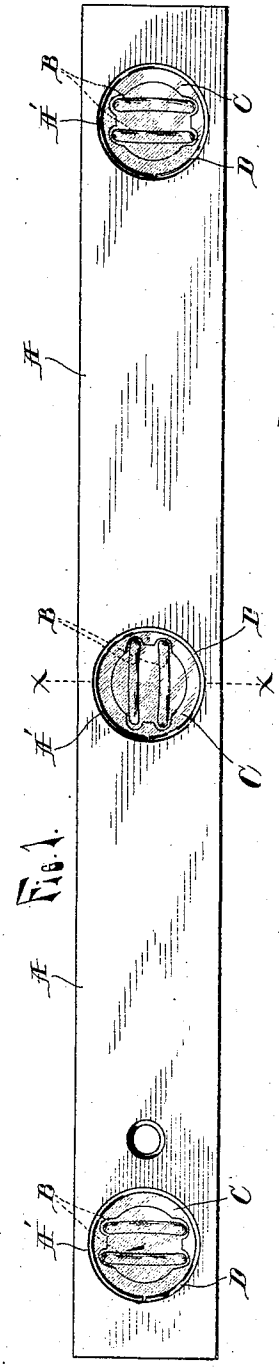

Fig. 1.

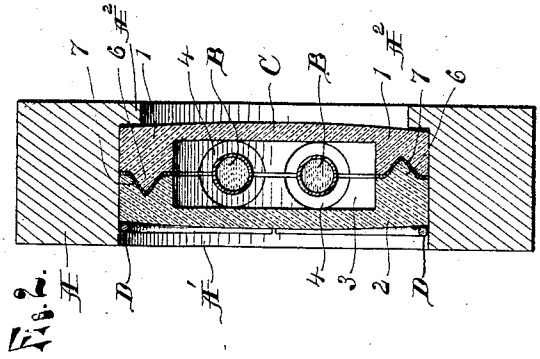

Fig. 2.

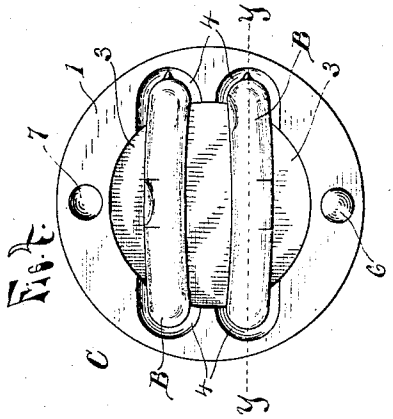

Fig. 4.

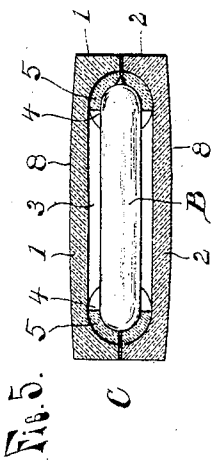

Fig. 5.

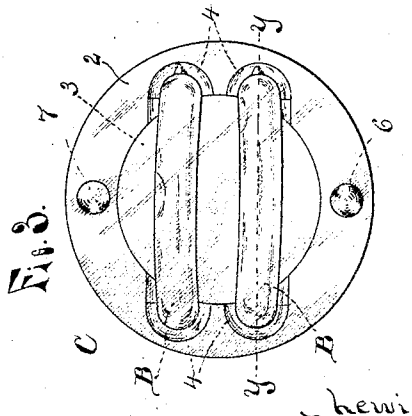

Fig. 3.

WITNESSES.

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UNITED STATES PATENT OFFICE.

LEWIS M. CURRY, OF BRIGHTON, MICHIGAN.

SPIRIT-LEVEL.

SPECIFICATION forming part of Letters Patent No. 786,269, dated April 4, 1905.

Application filed July 8, 1904. Serial No. 215,760.

To all whom it may concern:

Be it known that I, LEWIS M. CURRY, a citizen of the United States of America, residing at Brighton, in the county of Livingston and State of Michigan, have invented certain new and useful Improvements in Spirit-Levels, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to that class of leveling instruments known as "spirit-levels," in which as ordinarily constructed it is necessary to provide means for adjusting the spirit-tube in order that it may be accurately set relative to its straight-edge or other support to which it is secured and also in order to provide for the expansion and contraction of the support or parts.

The object of this invention is to provide a spirit-level which is so constructed that no means for adjusting the spirit-tube is required and in which said tube is effectually protected from becoming broken and from dust, water, &c.

It is also an object of the invention to provide means for holding the spirit-tube, which holder is so constructed that any ordinary mechanic may readily set the same in the stock or straight-edge of the level, thus enabling the manufacturer to sell the holders with their contained spirit-tubes independently of the straight-edge, and also constructed so as to adapt them to be set in or secured to other devices.

A further object of the invention is to so construct the spirit-tube holder that it may be so set as to bring the tube in any desired relation to the straight-edge or support, may be quickly and easily reset at any time to change such relation, and may be made in the form of a magnifying-glass to increase the clearness with which the bubble may be seen; and it is also a further object of the invention to so arrange the spirit-tubes within their holders that the level may be used either side or end up and to provide a very simple, cheap, and efficient construction not liable to get out of order or become broken.

To this end the invention consists in providing holders for the spirit-tube each consisting of a transparent glass disk provided with a socket or sockets to receive and entirely inclose the spirit-tubes, the outer surfaces of said disk being formed convex, and in providing certain other new and useful features, all as more fully hereinafter described, reference being had to the accompanying drawings, in which—

Figure 1 is a front elevation of a level embodying the invention; Fig. 2, an enlarged transverse section of the same on the line $x\,x$ of Fig. 1. Fig. 3 is an elevation of one of the holders detached; Fig. 4, the same with one half or section of the same removed, and Fig. 5 a section on the line $y\,y$ of Figs. 3 and 4.

As shown in the drawings, A is the stock or straight-edge of the level, which may be made of wood or any other suitable material, provided with one or more circular openings A′ to receive the holders C for the spirit-tubes B.

Each holder C consists of a disk of transparent glass, which is preferably made in two like parts or halves 1 and 2, each formed with one-half of an internal axial chamber 3 and sockets 4, extending from opposite edges of said chamber to receive the ends of the spirit-tubes B, which are of the ordinary form, being curved slightly throughout their length to cause the bubble to come to the center of the tube. These tubes are secured at their ends in the sockets 4 in any desired manner, as by filling the socket around the tube with plaster-of-paris or other suitable material 5 to firmly hold the tubes in the proper relation to each other with their lengths oppositely curved, so that when the level is used one side or end up one of the tubes will be in the proper relative position thereto and when the reverse side or end is up the other tube will be in the proper relative position to that side. It is evident that one tube may be provided in a holder, if so desired, in which case the level could not be reversed unless a second holder was used with a tube curved in a reverse direction. After the said tubes are properly set relative to each other in one half of the holder the halves are

cemented or otherwise secured together, lugs 6 on one half being provided to engage sockets 7 in the opposing half to center and to assist in securing the parts together. The outer surface 8 of each part is formed convex and polished to form magnifying-lenses, thus greatly assisting the operator in ascertaining the position of the bubble and adding greatly to the efficiency of the level; but for the sake of cheapness of construction the halves may be cast with plain outer surfaces.

The circular openings A′ in the straight-edge A are each formed on one side with a shoulder A^2, and after the spirit-tubes have been properly set in each holder and the halves thereof cemented together the holder is placed in one of said openings against the shoulder with putty or other suitable material around the same and then turned to set the tubes relative to the straight-edge. After it has been thus properly adjusted the holder is secured within the opening by a split ring D, which is sprung into the outer end of the opening and forced up against the holder, and thus the holders may at any time be quickly and easily removed or may be turned in their openings to change the relative positions of the spirit-tubes and straight-edge.

The spirit-tubes being entirely contained within their holders are effectually protected from being broken and from dust, &c., and the holder may be secured in any desired position to any support.

Having thus fully described the invention, what I claim is—

1. In a spirit-level, the combination with supporting means, of a spirit-tube, and a transparent disk provided with an internal socket to receive and hold the tube.

2. In a spirit-level, the combination with supporting means provided with a circular opening, of a glass disk formed of two parts to fit within said opening and provided with depressions forming an internal socket, a spirit-tube in said socket, and means for securing the disk within the opening.

3. In a spirit-level, the combination with supporting means, of a lens provided with an internal socket, a spirit-tube in said socket, and means for securing the lens to the supporting means.

4. In a spirit-level, the combination with a straight-edge provided with an opening, of a holder formed of glass and provided with a plurality of internal sockets, longitudinally-curved spirit-tubes each secured in one of said sockets in the proper relation to one of the edges of the straight-edge.

5. In a spirit-level, the combination of a straight-edge provided with a circular opening formed with an inwardly-projecting shoulder, a glass-disk holder formed of two parts secured together and provided with depressions in their adjacent faces forming internal sockets, spirit-tubes in said sockets, and a split ring to engage the opening and secure the disk therein between said ring and shoulder.

6. In a spirit-level, the combination of a straight-edge provided with a circular opening formed with an inwardly-projecting shoulder, a glass-disk holder within said opening engaging said shoulder and formed of two like parts, each formed with an axial and lateral depressions forming an axial chamber and lateral sockets extending from said chamber within the disk, and the parts also formed with a lug on one part and a socket in the opposite part to receive said lug, spirit-tubes within said lateral sockets, and means for securing the disk in the opening of the straight-edge.

7. In a spirit-level, the combination with the supporting means, of a glass disk formed with an internal axial chamber and sockets extending from said chamber, and a spirit-tube secured within the disk across said chamber with its ends within said sockets.

8. As an article of manufacture, a spirit-tube holder consisting of a disk of glass formed with an internal socket to receive the spirit-tube.

9. As an article of manufacture, a spirit-tube holder consisting of a disk of glass formed with an internal axial chamber and with sockets extending from said chamber adapted to receive the ends of a spirit-tube extended across the chamber.

10. As an article of manufacture, a spirit-tube holder consisting of a glass disk formed in two parts and having depressions forming an internal socket in the holder to receive the spirit-tube.

11. As an article of manufacture, a spirit-tube holder consisting of a lens formed with an internal socket to receive the spirit-tube.

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

LEWIS M. CURRY.

Witnesses:
OTTO F. BARTHEL,
LEWIS E. FLANDERS.