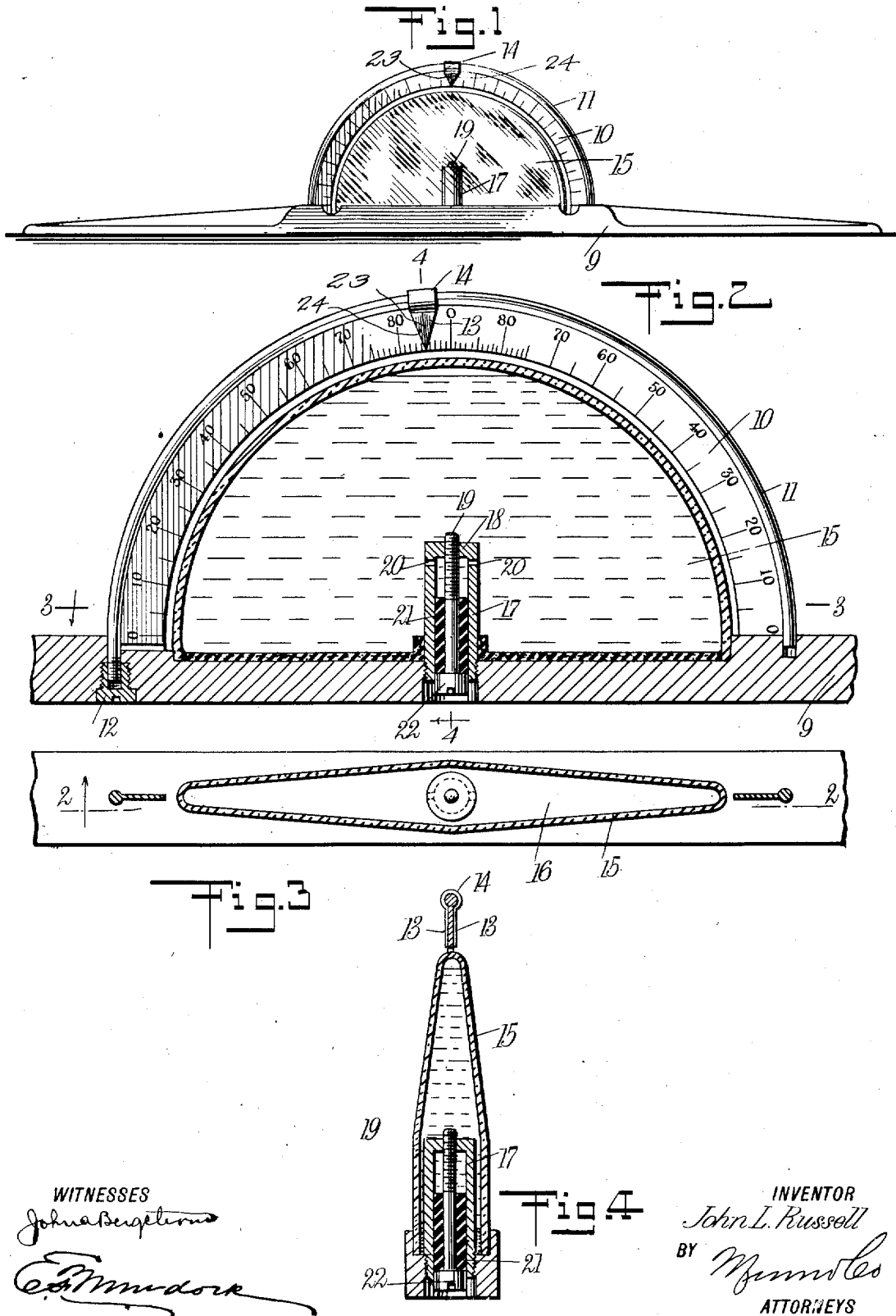


1,059,396.

Patented Apr. 22, 1913.



WITNESSES
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UNITED STATES PATENT OFFICE.

JOHN LYTLE RUSSELL, OF ALBION, CALIFORNIA.

LIQUID-LEVEL.

1,059,396.

Specification of Letters Patent.

Patented Apr. 22, 1913.

Application filed August 9, 1911. Serial No. 643,202.

To all whom it may concern:

Be it known that I, JOHN LYTLE RUSSELL, a citizen of the United States, and a resident of Albion, in the county of Mendocino and State of California, have invented a new and Improved Liquid-Level, of which the following is a full, clear, and exact description.

Among the principal objects which the present invention has in view are: to provide a finder for a level of the character described wherein is employed an air bubble, the finder providing a traveling surface for the said bubble semi-circular in form; to provide a graduated scale disposed adjacent the path of the spot of the finder and a movable index for said scale to indicate the position of the spot previously attained or to be attained; and to provide means operatively connected with the finder for increasing or diminishing the size or definition of the spot.

One embodiment of the present invention is disclosed in the structure illustrated in the accompanying drawings, in which like characters of reference denote corresponding parts in all the views, and in which—

Figure 1 is a side view of a level constructed and arranged in accordance with the present invention; Fig. 2 is a detail view, on an enlarged scale, showing in vertical section the finder, the section being taken on the line 2—2 in Fig. 3; Fig. 3 is a cross section taken on the line 3—3 in Fig. 2; and Fig. 4 is a cross section taken on the line 4—4 in Fig. 2.

As shown in the accompanying drawings, the straight edge 9 is shown in the style usually employed in machine work. Mounted upon the straight edge at about the middle thereof is a semi-circular scale blade 10. The blade 10 is provided at its outer periphery with a guide rod 11, one end whereof is rigidly seated in the body of the straight edge 9, as shown in Fig. 2 of the drawings, and the other end whereof is screw threaded to engage threads formed on the interior of the hollow screw 12. The screw 12 is suitably threaded to engage a tapped perforation formed in the body of the straight edge 9. The blade 10 is engraved substantially as shown in Fig. 2 of the drawings to indicate on one side thereof the degrees of the angles formed about the center around which the said blade is curved. The side of the blade may, in fact, be optionally en-

graved to convey any information indicating the angular disposition of the straight edge to the horizontal plane.

Mounted on the rod 11 to slide thereover, and having as shown in Fig. 4 of the drawings, gripping lip-like extensions 13, is an index 14. The index 14 is provided with a mark 23 to indicate the median line of the said index. Adjacent and in parallel relation to the median line are provided parallel lines 24 spaced apart to form subdivisions of the smallest division of the said markings on the blade 10 to thus operate as a vernier when adjusting the index 14 to position. This adjustment of the index may be made with the naked eye or with an auxiliary magnifying glass. In its employment, to illustrate the operation, it may be said that it is desired to set the index to indicate $4\frac{1}{2}^\circ$ as being the desired angle for the disposition of the straight edge. In this event the index would be moved until the main marking indicated the 4° and then shifted until the half of the one degree carried by the small markings on the index would register with the 4° . This would insure the movement of the main line or finder of the index standing at the $4\frac{1}{2}^\circ$ desired. If, on the other hand, the index be employed as a registering device, the level having been set to position, the index would be moved by hand until the pointer would register with the center of the spot on the finder. The readings could then be taken, the vernier markings carried by the extensions 13 being used to supplement the readings of the degrees indicated on the blade 10.

The finder in the present invention consists of a semi-circular hollow disk 15. The disk 15 may be molded as a complete hollow disk the peripheral edge whereof is contracted substantially as shown in Fig. 3. In the manufacture of the disk the same is parted on the median line forming two semi-circular disks such as 15 shown in the drawings. To mount the disk 15 on the straight edge 9 the latter is provided with a pocket 16, the said pocket being shaped to receive the cut edge of the disk. Opening through the straight edge into the pocket 16 at about the center thereof is the screw threaded plug 17.

The plug 17, as shown in Fig. 2 of the drawings, is screw threaded for engagement with the body of the straight edge 9. The plug 17 is tubular in form, the top 18

thereof having a central perforation to receive the threaded end of the screw 19. Adjacent the upper end of the plug 17 are two orifices 20, 20 through which the liquid contained in the disk 15 finds access to the interior of the tubular plug 17. The tube of the plug 17 is closed by the packing 21 which packing surrounds the screw 19 to form a liquid tight joint between the said screw 10 and the plug 17.

Preliminary to mounting the disk 15 upon the body of the straight edge 9 the pocket 16 is filled with a suitable cement which is impervious to water and sets to a hard body. After the disk 15 is mounted, and preliminary to mounting the screw 19 and the packing 21, the interior of the disk 15 is filled through the plug 17 with the liquid, water or spirits, in which the bubble is to be formed. When the disk is properly filled the screw 19 and packing 21 are introduced in the interior channel of the plug 17. When the exit from the plug 17 is properly closed the disk 15 is inverted, when the bubble contained therein will rise to the upper edge thereof. The screw 19, the head 22 whereof passes into the plug 17, is manipulated to raise the packing 21, and by thus displacing the liquid in the plug 17 forcing the same into the disk 15, an internal pressure is exerted upon the walls of the disk 15 and upon the bubble or spot of air held in the liquid. This pressure reduces the bubble or spot, and at the same time reinforces the disk 15 against pressure externally applied. It will be understood that if the bubble or spot becomes vague or enlarged through leakage or loss of the liquid, this may be compensated for by setting up the screw 19 and packing 21 carried thereby. If the liquid becomes exhausted beyond the capacity to compensate for the same by the screw 19 and packing 21, it will be understood that the said screw

and packing may be removed and the liquid in the disk 15 be renewed.

The blade 10 and the rod 11 carried thereby are disposed in position after the disk 15 is mounted on the straight edge 9. By means of the screw 12 and the manipulation thereof, the rod 11 and blade 10 carried thereby may be drawn into closer juxtaposition to the disk 15.

In its operation a level thus constructed and arranged operates in much the same manner as other so-called spirit levels. One distinctive difference in the operation, however, is that in the present level the spot is caused to travel over a curved or arced surface, or, stated in other words, the curved or arced surface is moved over the spot. In this manner the usual "play" of the spot above the same becomes fixed or eliminated, permitting the adjustment for which the level is employed to be made more rapidly than by levels having the ordinary straight edge finder.

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

A level employing a moving air spot having a circular transparent disk-like liquid container, the curved edge whereof forms a guide for the said spot; a curved index blade surrounding said container and juxtaposed to the edge thereof, said blade having marks to indicate the relative positions of the said spot; and means to vary the juxtaposition of said blade and container by moving the said blade to and from said container. In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN LYTLE RUSSELL.

Witnesses:

F. H. MANSS,

GERARD M. ALEXANDER.