

C. C. FINN.
SPIRIT LEVEL.

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1,027,532.

Patented May 28, 1912.

Fig. 1.

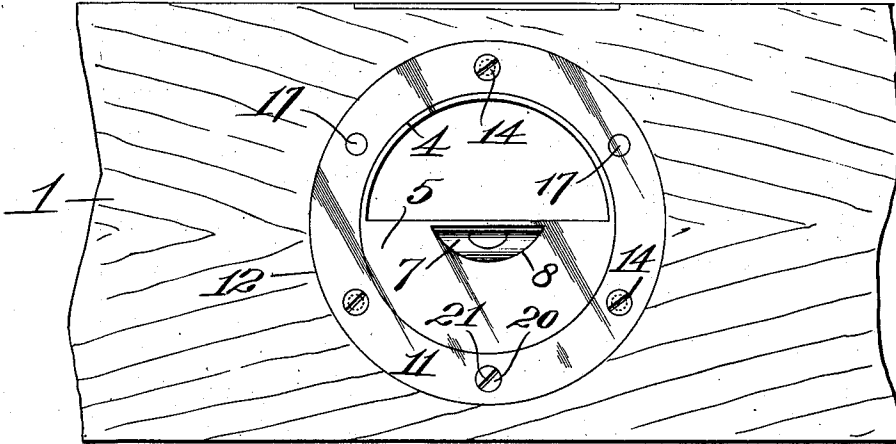
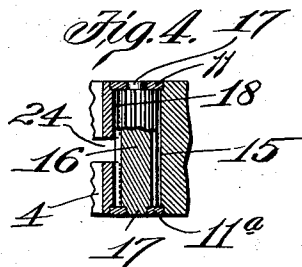
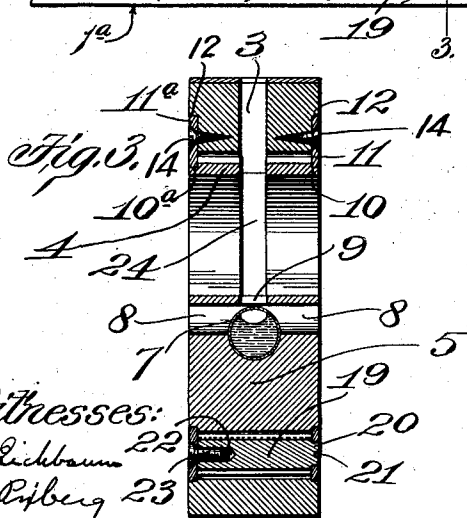
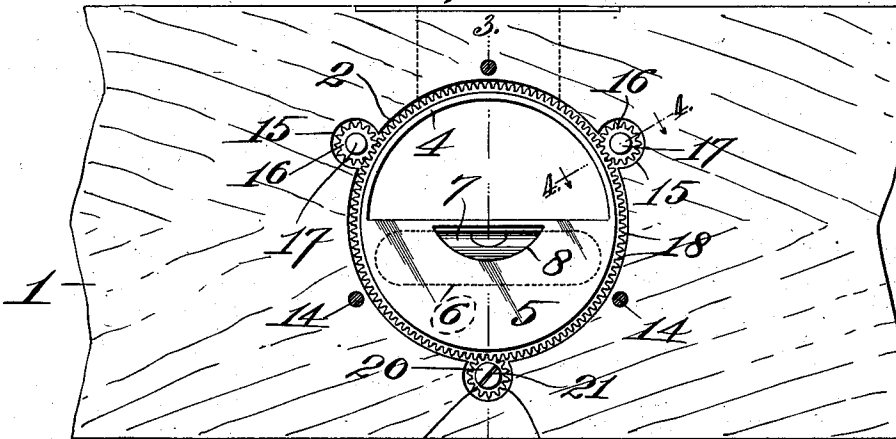


Fig. 2.



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UNITED STATES PATENT OFFICE.

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SPIRIT-LEVEL.

1,027,532.

Specification of Letters Patent.

Patented May 28, 1912.

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To all whom it may concern:

Be it known that I, CLARENCE C. FINN, a citizen of the United States, residing at the city of St. Louis, State of Missouri, have invented a certain new and useful Improvement in Spirit-Levels, of which the following is a specification, reference being had to the accompanying drawings, forming a part hereof, in which—

Figure 1 is a side elevational view of the central portion of a spirit-level embodying my invention; Fig. 2 is a similar view, one of the side or bearing-rings being removed; Fig. 3 is a vertical sectional view on the line 3—3, Fig. 2; and Fig. 4 is a detailed sectional view on the line 4—4, Fig. 2.

This invention relates to a certain new and useful improvement in spirit-levels generally and more particularly in means for adjustably mounting the bubble-tube within or on the body of the level, the objects of my invention being to provide a spirit-level with means carrying the bubble-tube adapted, whenever necessary, to be adjusted to properly position the bubble-tube relatively to the straight leveling-edge of the level, and more particularly to provide a simple, comparatively inexpensive, and adjustable means for carrying the bubble-tube which can be readily operatively arranged in or applied to the beam or member forming the body of the level.

With these objects in view, my invention resides in the novel construction and combination of the several parts of my new adjustable bubble-tube carrying-means and in the novel arrangement and combination of the same with the body of a level, all as will hereinafter be described and afterward pointed out in the claims.

In the drawings, wherein like reference numerals refer to like parts throughout the several views, 1 indicates the body-portion of the level, which may be, and preferably is, of the usual form and construction, having a straight leveling-edge 1^a. This body-portion 1 is provided preferably at or near the center thereof with a laterally-disposed circular opening 2 extending therethrough and in which opening 2 the bubble-tube carrying-member hereinafter described is adapted to be arranged. Said body-portion is also provided in its upper portion with a longitudinally-disposed slot 3 extending from the top surface thereof and communi-

cating with said circular opening 2 and which forms a sight-opening through which the bubble within the bubble-tube carried by said bubble-tube carrying-member may be readily seen or observed, as hereinafter more fully appears from the upper surface of said body-portion.

Arranged or positioned within said circular opening 2 is my new adjustable bubble-tube carrying-member, this member being preferably in the form of a ring 4 with the lower half of its interior or area, as it might be said, preferably solid, as at 5. Located within said solid portion 5 of ring 4 and near the top thereof is a pocket 6, in which pocket is arranged a bubble-tube 7 of usual form—preferably a short glass tube partially filled with a suitable liquid. Formed through the sides of said solid portion 5 and communicating with said pocket 6, so as to expose to view the central portion of said bubble-tube 7, are sight-openings 8; and formed through the top of said solid portion 5 and in direct alinement with said longitudinal slot or sight-opening 3, is a top sight-opening 9.

At its marginal side edges, said ring 4 is suitably cut away or recessed, as at 10 and 10^a, see particularly Fig. 3, to provide grooves adapted to receive the inner edges of retaining or bearing-rings 11—11^a preferably countersunk, so as to be flush with the side faces of body-portion 1, in grooves or recesses 12 formed in said side faces of body-portion 1 immediately adjacent said circular opening 2. These rings 11—11^a, as shown particularly in Fig. 3, are secured on opposite sides of said body-portion by means of screws or other suitable fastening devices 14 and, as will be seen, serve to hold or retain said member or ring 4 in proper position in body-portion 1 and as a bearing therefor—or in other words ring 4 is journaled in said plates 11—11^a. Formed in said body-portion 1 is a series of transversely disposed pockets 15 for the bearing pinions and the adjusting pinion hereinafter referred to. These pockets 15, of which there are preferably three arranged equidistantly apart around the circumference of said circular-opening 2, communicate, as shown particularly in Fig. 2, with said circular opening 2; and located or arranged within the two upper pockets 15 are, what I call, bearing-pinions 16 provided at their ends with

trunnions 17 journaled in said bearing-rings 11—11^a, as shown particularly in Fig. 4, and the teeth of which pinions are adapted to mesh with corresponding teeth 18 formed on the periphery of said ring 4.

Arranged or positioned within the lowermost or intermediate pocket 15 is what I call the adjusting pinion 19, the teeth of which likewise mesh with said teeth 18 on said ring 4. This pinion 19 is provided at one end with a trunnion 20 journaled in one of said bearing-rings, for instance, in ring 11, and having in its face a slot 21 adapted to receive the end or point of a screw-driver or other suitable tool for rotating the same, for purposes hereinafter appearing; at its other or opposite end, this pinion 19 bears directly against the inner face of the opposite ring or ring 11^a, as shown particularly in Fig. 3, and at this end said pinion 19 is provided with a threaded bore adapted to receive the body of a locking screw 23 passing through, and having, when in full locking position, its head countersunk in, said ring 11^a, as shown particularly in Fig. 3. While said bubble-tube and the bubble therein may be readily observed from the sides of said body-portion 1 through said sight-openings 8, yet, as shown clearly in Fig. 3, the upper half of said ring 4 is provided or formed with a circumferentially disposed slot 24 extending centrally there-through and in direct alinement with said sight-openings 3 and 9, whereby, as will be obvious, a view of said bubble-tube and the bubble therein may also be had from the top surface of body-portion through said sight-openings 3, 9, and 24.

On the bubble-tube carrying-member 4 being arranged in said body-portion 1 and adjusted to properly position the bubble-tube 7 and the bubble therein relatively to the straight leveling-edge 1^a thereof, my new level is adapted to be used in the ordinary manner, and when laid with its straight edge 1^a upon a surface for the purpose of ascertaining whether or not said surface is level, the bubble in said tube 7 can be readily observed not only through said side sight-openings 8, but also through said top sight-openings 3, 9, and 24. Should now the position of the bubble in said tube 7 relatively to said straight edge 1^a of said body-portion 1 become untrue, or should it, for any other reason, become necessary or desirable to again adjust bubble-tube 7 relatively to said straight edge 1^a of said body-portion 1, the level is properly placed with its said edge 1^a upon a flat surface known to be level, screw 23 unscrewed or loosened sufficiently to permit pinion 19 to be rotated, and pinion 19 then rotated by means of a screw-driver or other suitable tool. The rotary motion thereby given to said pinion 19 will be transmitted to ring 4 by means of

the teeth of pinion 19 meshing with the teeth 18 on said ring, and thus said ring 4 carrying the bubble-tube 7 may be rotated in either direction to bring or adjust said bubble-tube 7 and the bubble therein into a true, proper position relatively to said straight edge 1^a of said body-portion 1, the bubble in said tube 7 normally, as is usual, occupying a position in the center thereof. During the rotary movement or adjustment of ring 4, the upper portion thereof bears against said pinions 16, and thus said pinions, during such movement of ring 4, perform the functions, as it might be said, of roller bearings. After the said ring 4 has been so rotarily moved to properly adjust the position of said bubble-tube 7 and the bubble therein relatively to said straight edge 1^a of body-portion 1, the screw 23 is again tightened in the end of said pinion 19, thereby locking the same to said ring 11^a and preventing rotary movement thereof and also effectually locking said ring 4 and the bubble-tube 7 carried thereby against rotary movement in either direction, which movement would, of course, render the level unfit for service.

The construction herein shown and described is comparatively simple, comprises but few moving parts, can be constructed at comparatively little cost, presents a neat and finished appearance when operatively applied to the body of a level, and provides a simple means for easily and quickly obtaining accurate adjustment of the bubble-tube and the bubble therein relatively to the leveling-edge of the level.

It will be understood that minor changes in the size, form, construction, arrangement, or combination of the various parts of my new spirit-level may be made in those herein shown and described without departing from the nature and spirit of my invention.

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

1. A spirit-level comprising a body-portion having a straight-leveling-edge and provided with a laterally-disposed opening extending therethrough, bearing-rings on said body-portion around said opening, a bubble-tube carrying-ring provided with gear teeth on its periphery arranged in said opening and journaled in said bearing-rings, said carrying-ring being adapted to be rotarily moved to adjust the position of said bubble-tube and the bubble therein relatively to said leveling-edge of said body-portion, a pinion journaled in said bearing-rings and meshing with said gear teeth and adapted to be rotated to rotarily move said carrying-ring, and a screw adapted to engage with one of said bearing-rings and with said pinion to lock said pinion and

therewith said carrying-ring against rotary movement; substantially as described.

2. A spirit-level comprising a body-portion having a straight-leveling-edge and provided with a laterally-disposed opening extending therethrough, bearing-rings on said body-portion around said opening, a bubble-tube carrying-ring provided with gear teeth on its periphery arranged in said opening and journaled in said bearing-rings, said carrying-ring being adapted to be rotarily moved to adjust the position of said bubble-tube and the bubble therein relatively to said leveling-edge of said body-portion, an adjusting pinion journaled in said bearing-rings and meshing with said gear teeth and adapted to be rotated to rotarily move said carrying-ring, bearing pinions also journaled in said bearing-rings and meshing with said gear teeth, and means adapted to lock said adjusting pinion and therewith said carrying-ring against rotary movement; substantially as described.

3. A spirit-level comprising a body-portion having a straight-leveling-edge and provided with a laterally-disposed opening extending therethrough, bearing-rings on said body-portion around said opening, a bubble-tube carrying-ring provided with gear teeth on its periphery arranged in said opening and journaled in said bearing-rings, said carrying-ring being adapted to be rotarily moved to adjust the position of said bubble-tube and the bubble therein relatively to said leveling-edge of said body-portion, an adjusting pinion journaled in said bearing-rings and meshing with said gear teeth and adapted to be rotated to rotarily move said body-portion, bearing-pinions also journaled in said bearing-rings and meshing with said gear teeth, and a screw adapted to engage with one of said bearing-rings and with said adjusting-pinion to lock said adjusting-pinion and therewith said carrying-ring against rotary movement; substantially as described.

4. A spirit-level comprising a body-portion having a straight-leveling-edge, a laterally-disposed opening extending therethrough, and a longitudinally-disposed slot extending therethrough from the top surface thereof to said opening, and a bubble-tube carrying-ring arranged in said opening and adapted to be rotarily moved to adjust the position of said bubble-tube and the bubble therein relatively to said leveling-edge of said body-portion and having a circumferentially-disposed slot in its upper portion in alinement with said longitudinally-disposed slot, whereby said bubble-tube and the bubble therein carried by said ring may be observed from the top surface of said body-portion; substantially as described.

5. A spirit-level comprising a body-portion having a straight-leveling-edge, a lat-

erally-disposed opening extending therethrough, and a longitudinally-disposed slot extending therethrough from the top surface thereof to said opening, bearing-rings arranged on said body-portion around said opening, a bubble-tube carrying-ring arranged in said opening and journaled in said bearing-rings, said carrying-ring being adapted to be rotarily moved to adjust the position of said bubble-tube and the bubble therein relatively to said leveling-edge of said body-portion and being provided with a circumferentially-disposed slot in its upper portion in alinement with said longitudinally-disposed slot of said body-portion, whereby said bubble-tube and the bubble therein may be observed from the top surface of said body-portion, and means adapted to rotarily move said bubble-tube carrying ring; substantially as described.

6. A spirit-level comprising a body-portion having a straight-leveling-edge, a laterally-disposed opening extending therethrough, and a longitudinally-disposed slot extending therethrough from the top surface thereof to said opening, bearing-rings arranged on said body-portion around said opening, a bubble-tube carrying-ring provided with gear teeth on its periphery arranged in said opening and journaled in said bearing-rings, said carrying-ring being adapted to be rotarily moved to adjust the position of said bubble-tube and the bubble therein relatively to said leveling-edge of said body-portion and being provided with a circumferentially disposed slot in its upper portion in alinement with said longitudinally-disposed slot of said body-portion, whereby said bubble-tube and the bubble therein may be observed from the top surface of said body-portion, and a pinion journaled in said bearing-rings and meshing with said gear teeth and adapted to be rotated to rotarily move said carrying-ring; substantially as described.

7. The adjustable bubble-tube carrying-means herein described, the same comprising a ring provided with gear teeth on its periphery and having in its upper portion a circumferentially-disposed slot, a bubble-tube carried by said ring within the area thereof and in alinement with said circumferentially disposed slot, bearing-rings in which said carrying-ring is journaled, and a pinion also journaled in said bearing-rings and meshing with said gear teeth, said pinion being adapted to be rotated to rotarily move said carrying-ring in said bearing-rings; substantially as described.

8. The adjustable bubble-tube carrying-means for spirit-levels herein described, the same comprising a ring provided with gear teeth on its periphery and having in its upper portion a circumferentially-disposed slot, a bubble-tube carried by said ring with-

in the area thereof and in alinement with
said circumferentially-disposed slot, bear-
ing-rings in which said carrying-ring is
journaled, an adjusting pinion also jour-
naled in said bearing-rings and meshing
5 with said gear teeth, said pinion being
adapted to be rotated to rotarily move said
carrying-ring in said bearing-rings, and
bearing-pinions also journaled in said bear-
ing-rings and meshing with said gear teeth;
10 substantially as described.

9. The adjustable bubble-tube carrying-
means for spirit-levels herein described, the
same comprising a ring provided with gear
15 teeth on its periphery and having in its up-
per portion a circumferentially-disposed
slot, a bubble-tube carried by said ring with-
in the area thereof and in alinement with
said circumferentially-disposed slot, bear-

ing-rings in which said carrying-ring is 20
journaled, an adjusting pinion also jour-
naled in said bearing-rings and meshing with
said gear teeth, said pinion being adapted
to be rotated to rotarily move said carrying- 25
ring in said bearing-rings, bearing-pinions
also journaled in said bearing-rings and
meshing with said gear teeth, and means
adapted to lock said adjusting pinion and
therewith said carrying ring against rotary
movement in said bearing-rings; substan- 30
tially as described.

In testimony whereof, I have signed my
name to this specification, in the presence of
two subscribing witnesses.

CLARENCE C. FINN.

Witnesses:

RUTH PETERSON,
JAMES L. HEATH.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."