C. OLSON.

LEVEL.

APPLICATION FILED FEB. 11, 1911.

995,030.

Patented June 13, 1911.

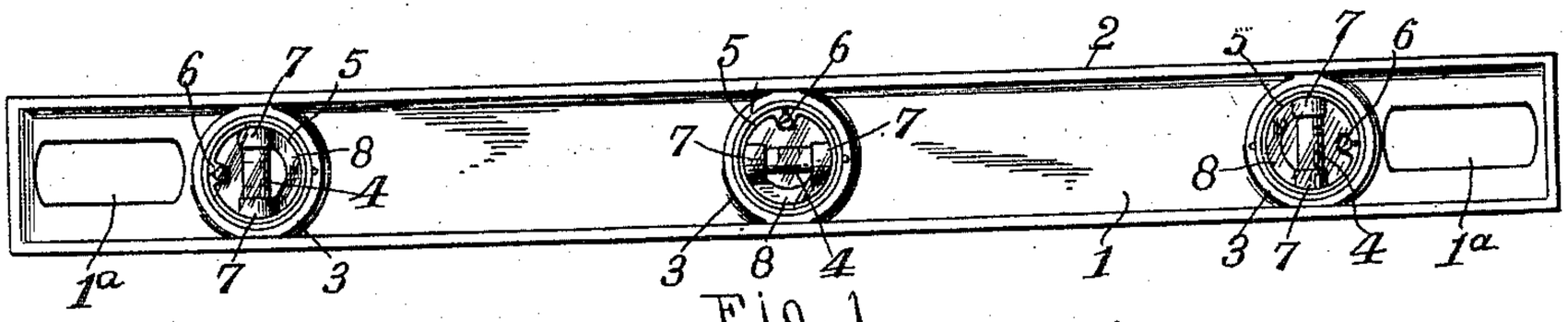

Fig. 1

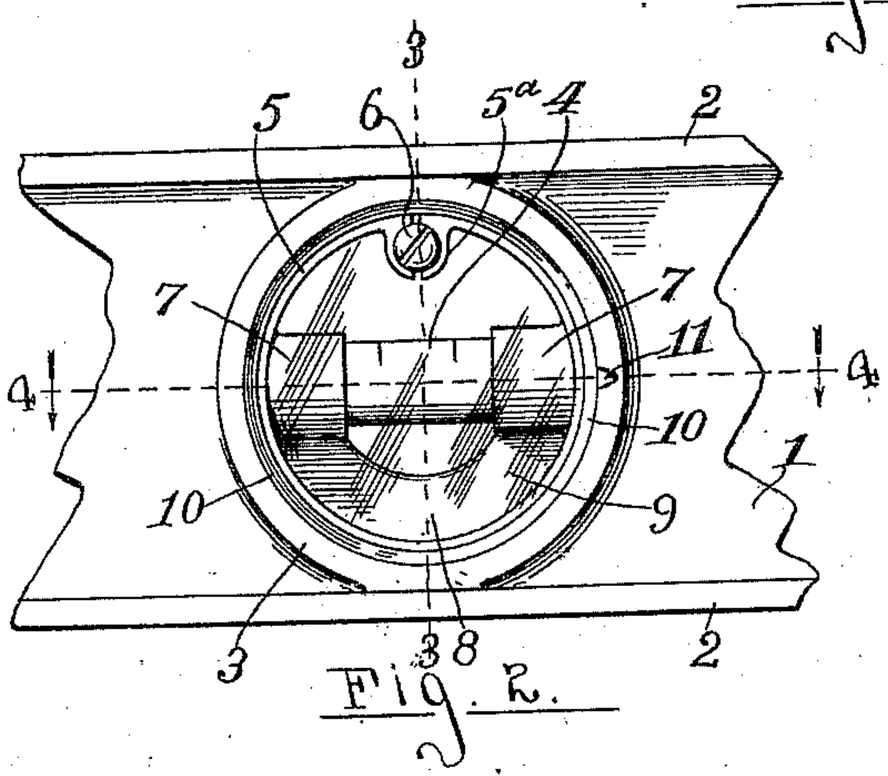

Fig. 2.

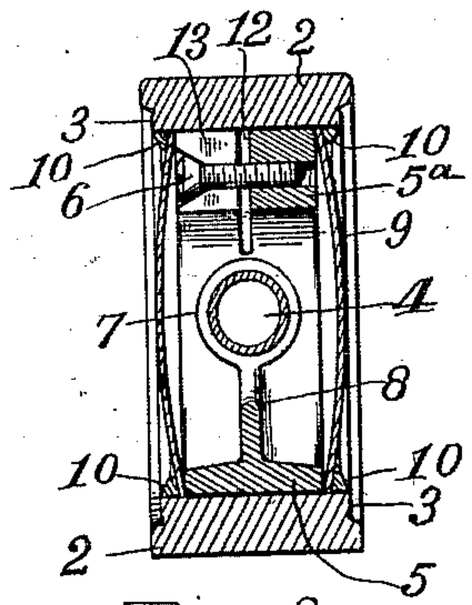

Fig. 3.

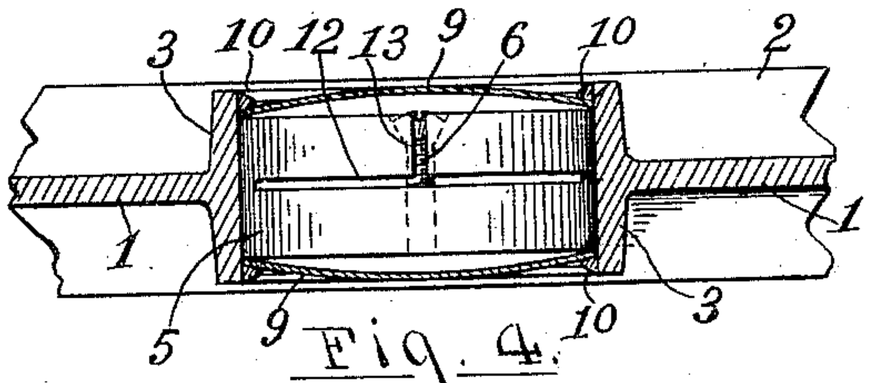

Fig. 4.

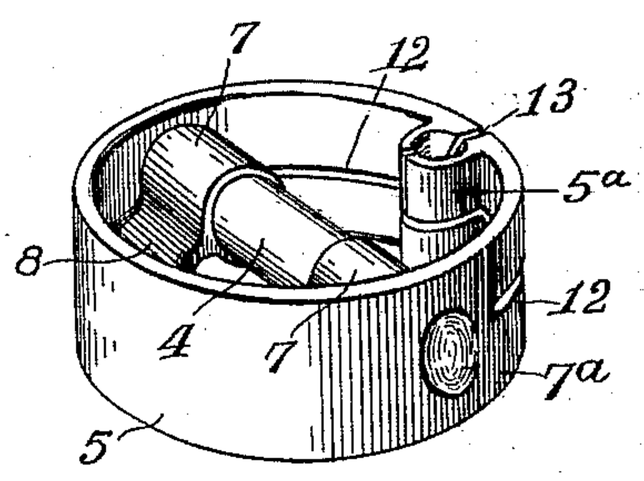

Fig. 5.

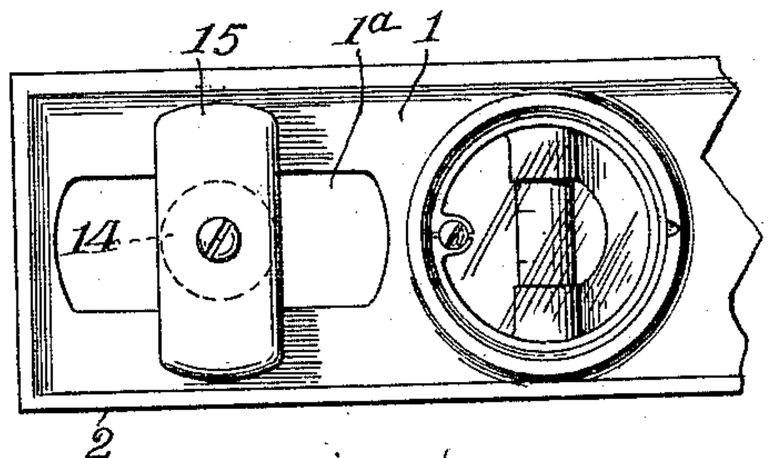

Fig. 6.

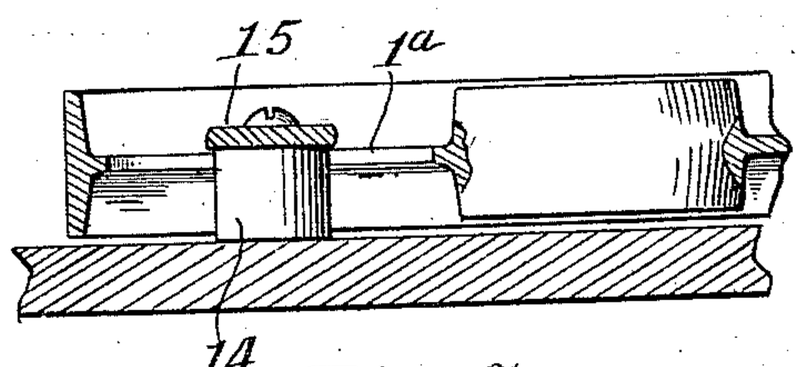

Fig. 7.

Witnesses

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UNITED STATES PATENT OFFICE.

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LEVEL.

995,030. Specification of Letters Patent. **Patented June 13, 1911.**

Application filed February 11, 1911. Serial No. 608,031.

To all whom it may concern:

Be it known that I, CHARLES OLSON, a citizen of the United States of America, residing at Grand Rapids, in the county of Kent and State of Michigan, have invented certain new and useful Improvements in Levels; and I do hereby 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 an improved level and its object is to provide the same with adjustable tubes, to provide detachable tube-holding means which can be readily removed and replaced, to provide dust-proof inclosures for the tube-holders and to provide the device with various new and useful features hereinafter more fully described and particularly pointed out in the claims reference being had to the accompanying drawings, in which:—

Figure 1 is a side elevation of a device embodying my invention; Fig. 2 an enlarged detail in elevation; Fig. 3 a vertical section on the line 3—3 of Fig. 2; Fig. 4 a plan view partially in horizontal section on the line 4—4 of Fig. 2; Fig. 5 a perspective detail of the tube-holder detached; Fig. 6 an elevation of one end of the device showing means for supporting the same within a case or chest; and Fig. 7 a plan of the same with portions broken away.

Like numbers refer to like parts in all of the figures.

The body of the device is preferably made of aluminum having an inner web portion 1 provided near each end with horizontally extended openings 1^a to receive any suitable means for securing the device in place in a case, chest or other receptacle as illustrated in Figs. 6 and 7.

2 is a marginal flange extending continuously around the outside of the web and of any convenient width or face on its external surface. At intervals in the web and extending across from flange to flange at the opposite sides of the same are circular bosses 3 surrounding transverse openings through the web. Within each of these openings is fitted a ring 5 adapted to be secured therein, said ring carrying a glass tube 4 in which is the ordinary liquid and air bubble to indicate the position of the level. The ends of this tube are inserted in inwardly projecting bosses 7 on the interior of the ring 5 and at opposite sides of its axis. Openings are bored wholly through the bosses and ring and closed by stucco as at 7^a after the tube 4 is inserted therein. Connecting these bosses is a rib 8 in one side of the ring and holding them rigidly in alinement, and in the other side of the ring is an inwardly projecting enlargement 5^a. This ring is divided through this enlargement and down to near the sockets in a plane at right angles to its axis as at 12, and one portion again divided radially through the axis of the enlargement as at 13 and in this enlargement is inserted an expanding screw 6, threaded into the undivided portion and having a conical head within the radially divided portion to expand the same and thus securely hold the ring in its adjusted position within the transverse opening of the boss 3. This ring is of less dimension in the direction of its axis than the opening of the boss and is located centrally therein, leaving space to insert watch glasses 9 which glasses are secured in place by rings 10 pressed into the ends of the opening in the boss. This ring 10 can be removed by inserting a sharp instrument in a nick 11 in the outer end of the boss (see Fig. 2). I am thus able at pleasure to remove and replace any one of these rings holding a tube and am also able to accurately adjust the same within the opening of the boss and secure the same when adjusted, and by means of the watch glasses the device is fully protected from dust or dirt and also from any breakage or injury.

The whole structure also presents a neat workmanlike appearance and is light, durable, and not likely to get out of order.

To support this device in a case or other receptacle a pair of supports 14 may be provided adapted to project through the openings 1^a and having on their ends buttons 15 adapted to pass through said openings and turn transversely of the same and hold the device upon the supports 14 as illustrated in Figs. 6 and 7.

What I claim is:—

1. A level, comprising a body having a circular transverse opening, a ring to fit the opening, said ring having an enlargement at one side and being partially divided through said enlargement and in a plane at right angles to its axis, one part of the enlargement being also radially divided, an expanding screw in said enlargement, and

a glass tube extending across said ring and containing a liquid and a bubble.

2. A level, comprising a body having a circular transverse opening, a ring in said opening having inwardly projecting bosses at opposite sides, a glass tube mounted in said bosses, a web in one side of the ring rigidly connecting the bosses, an inward enlargement in the opposite side of the ring, said ring being partially divided in a plane at right angles to its axis and radially divided through one part of the enlargement, and a screw having a conical head in the radial division and threaded into the other part of the enlargement.

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

CHARLES OLSON.

Witnesses:
PALMER A. JONES,
LUTHER V. MOULTON.