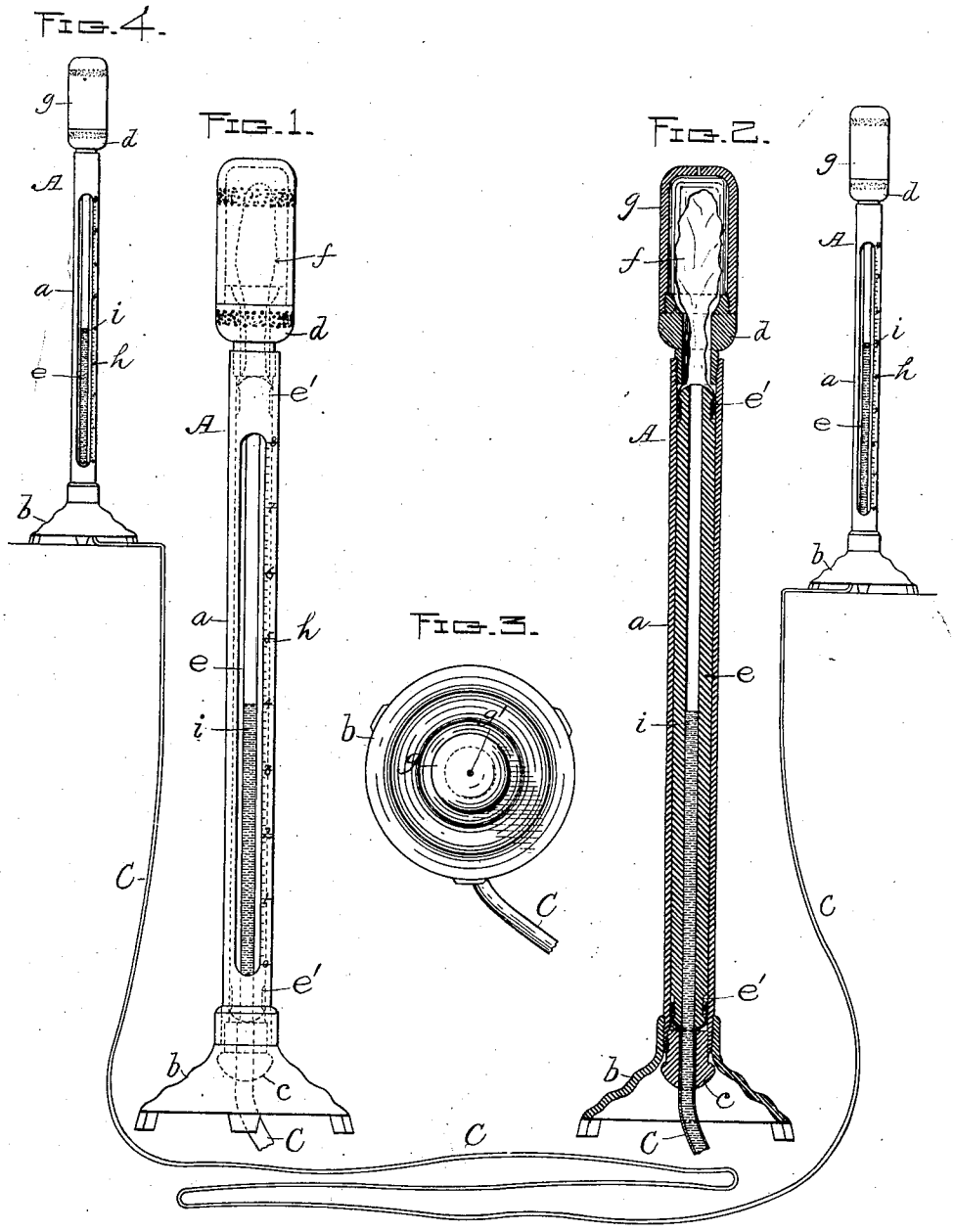
No. 762,072. PATENTED JUNE 7, 1904.

P. LORD.

LEVELING INSTRUMENT.

APPLICATION FILED JUNE 12, 1903.

NO MODEL.



Witnesses;

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No. 762,072. Patented June 7, 1904.

UNITED STATES PATENT OFFICE.

PETER LORD, OF WORCESTER, MASSACHUSETTS.

LEVELING INSTRUMENT.

SPECIFICATION forming part of Letters Patent No. 762,072, dated June 7, 1904.

Application filed June 12, 1903. Serial No. 161,149. (No model.)

To all whom it may concern:

Be it known that I, PETER LORD, of the city and county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Leveling Instruments; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, forming a part of this specification, and in which—

Figure 1 represents a side view of one of the levels of my said improved leveling instrument. Fig. 2 is a central vertical section thereof. Fig. 3 is a top or plan view of said level; and Fig. 4 represents the two levels of the leveling instrument, which are connected by a flexible tube, as and for the purpose hereinafter described.

The object of my invention is to provide a leveling instrument whereby levels may be obtained at considerable distances apart without the use of an engineer's transit or leveling instrument; and it consists of two separate levels of special construction connected by a flexible tube for obtaining an uninterrupted fluid connection between said two levels, as and for the purpose hereinafter more fully set forth.

To enable others to better understand the nature and purpose of my said invention, I will now proceed to describe it more in detail.

Referring to the drawings, A A represent the two separate levels, and C the flexible connecting-tube before alluded to. As the two levels are alike, a description of the construction of one will serve for both. Said construction is as follows: *a* is a metal tube slotted on opposite sides nearly its entire length, so as to admit of looking through the same. Said metal tube is both externally and internally threaded at its bottom end and internally threaded at its upper end. A hollow base *b*, having a hub with internal threads, is screwed to the outside of said bottom end of tube *a*, and a plug *c*, having external threads, is screwed into said bottom end. A head *d*, having an externally-threaded hub, is screwed into the upper threaded end of said tube *a*, and inside of tube *a* between said head *d* and plug *c* is arranged a glass tube *e*, which serves to hold the leveling fluid, as in other leveling instruments. The end of the connecting-tube C, which is preferably made of rubber, is passed longitudinally through the plug *c* and over the bottom end of the glass tube *e*, to which it is fastened by means of glue or otherwise to hold it from slipping off. The opposite end of said glass tube has attached thereto in the same way the bottom end of a thin rubber case or bag *f*, which extends above the head *d*, as is shown in Fig. 2, the purpose thereof being to prevent the fluid from flowing out at the upper end and also to form a vent for the air from the glass tube to permit the fluid to freely flow through the connecting-tube C and the glass tubes *e e* in either direction, according to which level is at the highest elevation. To protect said rubber case *f*, a metal cap *g* is screwed to the upper end of head *d*, which is provided with a small vent-hole *g'* (see Fig. 3) to admit of the expansion and contraction of the rubber case *f*, inclosed within the same. To facilitate holding the ends of the rubber connecting-tube C on the bottom ends of the glass tubes *e e* and the necks of the rubber cases *f f* on the upper ends of said glass tubes, the latter may be formed with an annular groove *e'* at each end, as is shown in Fig. 2. The outer metal tubes are also provided with gage-marks *h*, as is shown in Fig. 1, to indicate the level of the water *i* in the glass tubes. An uninterrupted connection of the fluid-passage is maintained between one glass tube and the other through the flexible tube C, and it is therefore obvious that no matter how long said tube may be if the same is filled with water or other thin fluid that will flow and find its level readily the level of said water will be indicated in the glass tube, the same raising or lowering therein according to the elevation of the levels in leveling.

By the use of such an instrument comprising two leveling parts with a long tube connection between them, as described, it is also obvious that many levels may be obtained that it is difficult, and in some cases impossible, to obtain with an ordinary leveling instrument.

I prefer in practice to construct the instrument with a single connecting-tube between two separate levels, as described and shown

by Fig. 4; but, if desired, the same principle may be carried out by arranging two vertical glass tubes *k k* transversely in the ends of a long pole D and connecting said tubes by means of two longitudinal tubes *l l*, arranged in suitable grooves in said pole D and inclined from the outer edge of the center of the pole inward toward each end, so that when either tube *l* comes uppermost the water will flow out of it toward each end into the transverse glass tubes and the bottom longitudinal tube. By thus having two levels and arranging them at the ends of a long pole it does not matter whether the pole is straight or not, as the leveling is established by the height of the end rather than by the straightness of the pole or bar in which the glass tube is placed when only one tube is used. In view of the above I reserve the right to use either one or two fluid-connecting tubes between the glass tubes and to make such other modifications in the construction as circumstances may require in practice.

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

1. A leveling instrument comprising in combination two separate levels, each consisting of a slotted metal outer tube having a base and head secured to opposite ends thereof, a plug screwed into the bottom end of said metal tube, a glass tube arranged in said slotted metal tube between said head and plug, and an elastic case, whose neck is attached to the upper end of the glass tube, a metal cap over the same, attached to the aforesaid head on the metal tube, and a connecting-tube attached at the ends to the bottom ends of the glass tubes substantially as and for the purpose set forth.

2. In a leveling instrument, the combination of two glass tubes *e e*, and means for holding them in position, comprising the slotted, metal tubes *a*, their bases *b*, heads *d* and plugs *c*, with elastic cases *f*, attached to the upper ends of said glass tubes, caps *g*, arranged over said elastic cases and flexible tube C, connecting one glass tube with the other, substantially as and for the purpose set forth.

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