Nov. 10, 1942. F. A. BABCOCK 2,301,769

LEVEL

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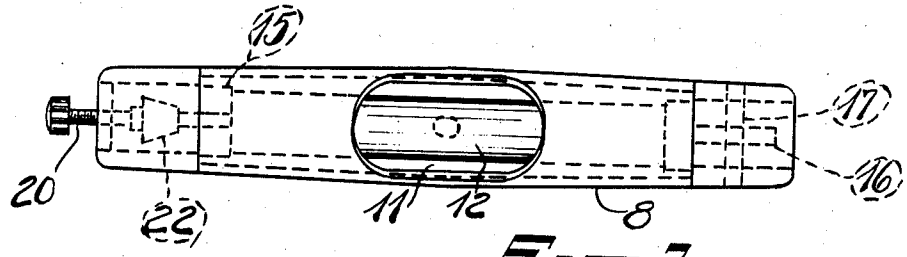


Fig. 2

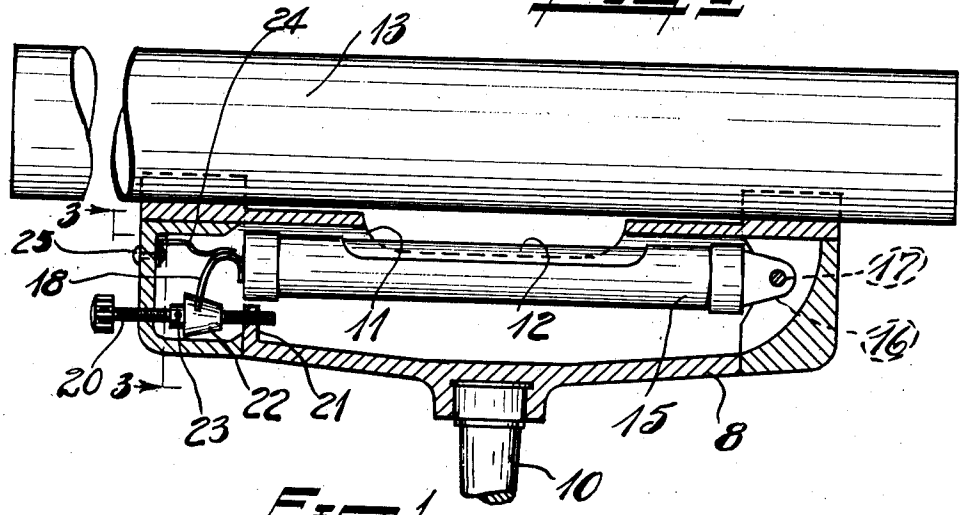


Fig. 1

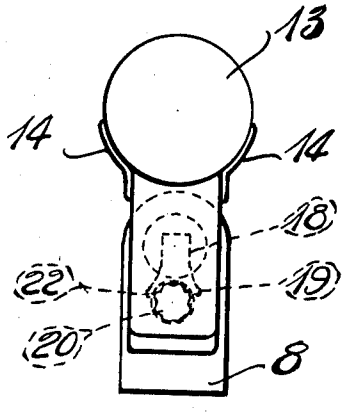


Fig. 4

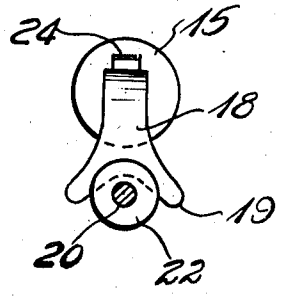


Fig. 3

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LEVEL

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5 Claims. (Cl. 33—214)

This invention relates to levels, transits, and similar instruments in general, and more particularly to means for adjusting the level vial thereof.

One of the prime objects of the invention is to design a very simple, practical, and economical, self-locking, adjusting means which cannot be shocked out of adjustment.

Another object is to design a level vial adjusting means which is of simple and substantial construction and exact in operation so as to avoid the objectionable qualities incident to the adjusting mechanisms at present in general use on instruments of this general classification.

A further object is to provide an adjusting means which is easily operable, which remains in its set position, and which is not affected or shocked out of adjustment by rough handling.

With the above and other objects in view, the present invention consists in the combination and arrangement of parts, hereinafter more fully described, illustrated in the accompanying drawing, and more particularly pointed out in the appended claims, it being understood that changes may be made in the form, size, proportions, and minor details of construction, without departing from the spirit, or sacrificing any of the advantages of the invention.

In the drawing:

Fig. 1 is a fragmentary, sectional, side elevational view of a level showing my adjusting mechanism in position thereon;

Fig. 2 is a top plan view thereof with the telescope omitted;

Fig. 3 is a fragmentary, end elevational view taken on the line 3—3 of Fig. 1; and

Fig. 4 is an end elevational view of the vial case, adjusting cone, etc., shown in Fig. 1 of the drawing.

Inasmuch as the present invention relates to adjusting means only, I do not deem it necessary to describe the complete level and its operation in detail. The accompanying description is, therefore, limited to this adjusting means and its relation to the asociated parts.

Referring now more particularly to the drawing in which I have shown one embodiment of my invention, the numeral 8 indicates the horizontally disposed level bar or housing preferably formed of hard cast bronze, said bar being hollow in cross section, and is substantially cylindrical in shape to provide a neat, compact structure.

The housing 8 is mounted on a vertical axis or spindle 10 and is supported on a tripod (not shown) in the conventional manner. An opening 11 is provided in the upper wall of the housing to facilitate reading the level vial 12, and a telescope 13 is rigidly mounted on said housing by means of cheek plates 14, the lens system (not shown) being of terrestrial or erecting order. This, however, is immaterial, as the telescope, etc., forms no part of the present invention.

The level vial 12 is mounted in a horizontally disposed vial case 15 which is in turn adjustably mounted in the housing 8, said case being formed with an outwardly projecting leg 16 which is pivotally secured in the housing 8 by means of the pin 17, the opposite end being supported by the adjusting mechanism, and in a manner to be presently described.

A supporting leg 18 is rigidly secured to the free end of the vial case, said leg being downwardly curved and terminating in a forked, fishtail-shaped end 19, as clearly shown in Fig. 3 of the drawing.

The adjusting means comprises a horizontally disposed screw 20 mounted in the end wall of the lever housing, and having threaded engagement with a vertically disposed lug 21 cast integral with or secured in said housing.

A cone member 22 is rigidly mounted on the adjusting screw 20 and is secured in position by means of the pin 23, the bifurcated fishtail end 19 of the member 18 riding on said cone; and it will be obvious that as the adjusting screw 20 is manipulated to move the cone 22 horizontally, that the vial case and vial will be swung about the pivotal axis or pin 17 to secure the correct setting, and as this adjusting means is self-locking, the setting is in no manner disturbed as occurs in the conventional instruments where lock nuts, or screws, etc., must be manipulated, causing the bubble to move from its correct setting.

A spring 24 is mounted on the end wall of the housing 8 at the point 25, the free end of said spring engaging the leg 18 and exerting a downward pressure thereon, thus holding the end 19 in engagement with the cone at all times.

I also wish to direct particular attention to the fact that ample space is provided in the housing to permit free circulation of air currents around the vial case to prevent temperature changes in the housing walls being communicated to the level vial.

The mechanism is automatically self-locking, it is capable of the most minute and accurate adjustment to insure absolute accuracy; the vial

has ample ventilation; the design is smooth and clean; and there are no unnecessary parts or projections.

From the foregoing description it will be obvious that I have perfected a very simple, practical, and economical level adjusting means which is composed of a minimum number of parts, which is self-locking, and which can be readily manufactured and assembled.

What I claim is:

1. A surveying instrument including a main housing, a vial case having a vial mounted therein, one end being pivotally connected to said housing, and a horizontally adjustable cone mounted in said housing and engaging the free end of said case for adjusting said level vial when the cone is actuated.

2. A level of the class described comprising a housing, a horizontally disposed vial case assembly mounted therein with its one end pivotally connected thereto, a horizontally disposed adjusting screw mounted in said housing, a cone mounted on said screw, a bracket secured to the free end of said case assembly and terminating in a fishtail-shaped end for engagement with said cone, said vial case being adjusted upon manipulation of said screw.

3. A level of the class described comprising a housing, a horizontally disposed case and associated vial mounted therein with one end pivotally connected thereto, a horizontally disposed cone adjustably mounted in said housing, and a downwardly curved bracket attached to the free end of the case and terminating in a forked end section engageable with said cone, whereby said case and vial will be adjusted when the cone is manipulated.

4. An instrument of the class described comprising a housing, a horizontally disposed vial case and vial mounted therein with one end pivotally connected to the housing to swing about a vertical axis therein, a horizontally disposed adjusting screw mounted in said housing, a cone mounted thereon, and a forked bracket on the free end of the vial case with its lower end engageable with said cone for adjusting said vial case as the screw is actuated.

5. An instrument of the class described comprising a housing, a horizontally disposed vial case and an associated vial adjustably mounted therein, one end being pivotally connected to said housing, a horizontally disposed cone adjustably mounted in the housing, a downwardly curved bracket attached to the free end of the case and terminating in a forked section engageable with said cone for supporting the opposite end of said vial case, and resilient means mounted on said housing and engaging one end of said vial case for exerting a downward pressure thereon.

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