C. A. ELTAG AND J. M. THOENNES.

LEVELING DEVICE.

APPLICATION FILED JUNE 22, 1920.

1,403,676. Patented Jan. 17, 1922.

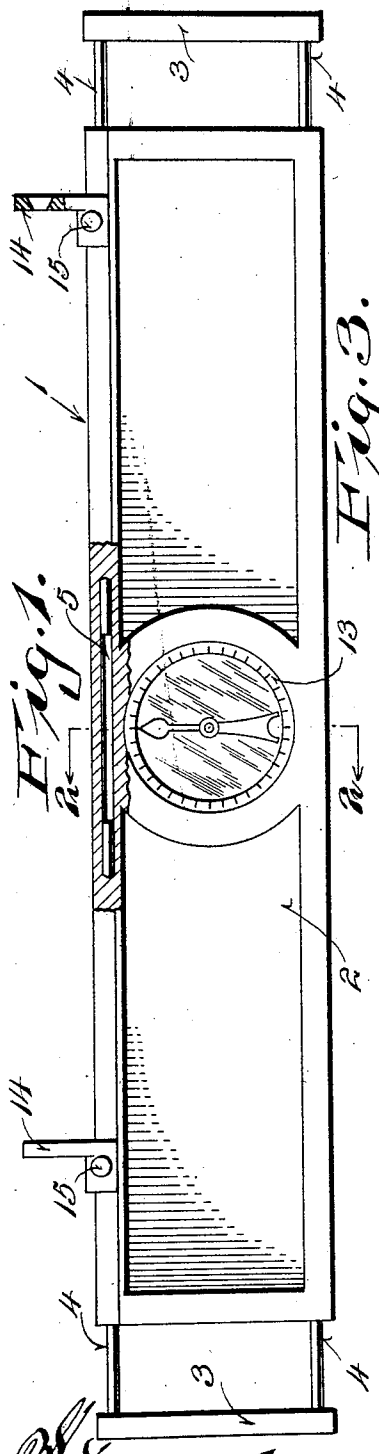


Fig. 1.

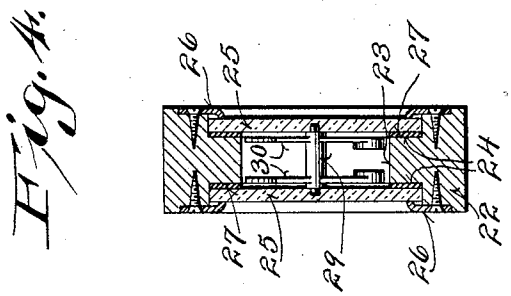


Fig. 4.

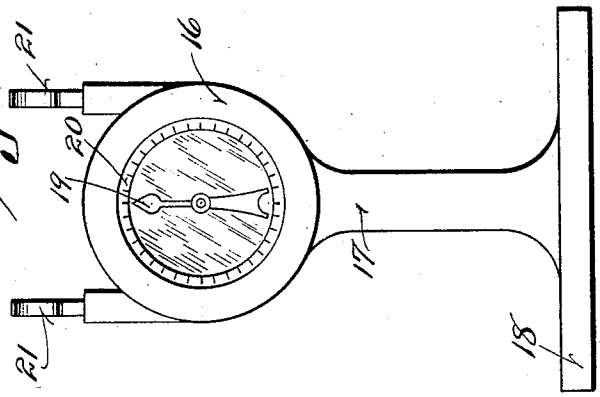


Fig. 3.

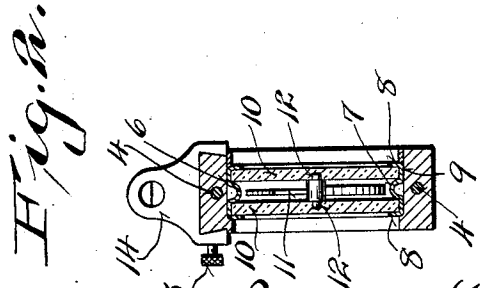


Fig. 2.

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LEVELING DEVICE.

1,402,676. Specification of Letters Patent. Patented Jan. 17, 1922.

Application filed June 22, 1920. Serial No. 390,869.

To all whom it may concern:

Be it known that CHARLES A. ELTAG and JOHN M. THOENNES, both citizens of the United States, and residents of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Leveling Devices; and we do hereby declare that the following is a full, clear, and exact description thereof.

Our invention relates to new and useful improvements in devices for obtaining the degrees of inclination of various objects or for use in leveling such objects.

It is the primary object of this invention to provide a suitably constructed device by which a degree of inclination of an object can be very quickly ascertained. And a further object of the invention is to provide a device of this nature which can be employed in connection with different forms of leveling apparatus and inclination determining means.

With these general objects in view, the invention resides in the novel features of construction, combination and arrangement of parts which will be hereinafter more particularly described and claimed.

In the accompanying drawing,

Figure 1 represents an elevational view, partly in section, of a leveling device having our invention applied thereto.

Figure 2 is a transverse sectional view on the plane of the line 2—2 of Figure 1.

Figure 3 is an elevational view of a second embodiment of the primary features of the invention, and,

Figure 4 is a transverse sectional view through a leveling device somewhat similar to the structure shown in Figure 1.

The principles of our invention may be used in a great variety of forms and for many purposes. Therefore although if we have illustrated only a few embodiments of these principles, it is to be understood that we do not desire to be in any way limited by the figures of the accompanying drawing or the description relative thereto. Even in the embodiments illustrated various changes can be made in the different parts without departing from the principles of the invention or sacrificing any of its advantages.

Referring more particularly to Figures 1 and 2 of the drawing, it will be seen that we have shown the invention in use in connection with a level 1 including an elongated block or frame 2 which is approximately rectangular in cross section as is usually the case in carpenter's and other similar levels. To permit such a level to be used for leveling extended surfaces as well as those of limited area, the opposite ends of the frame or block 2 are provided with extension members, each of which consists of an end plate 3 and a pair of extension rods 4. The end plates 3 normally engage the ends of the block 2 as is customary in such levels, and the rods 4 are secured to the end plates and slide in passages 5 formed in said block. Thus by extending the end plates 3, a level of many different lengths may be formed.

The leveling portion of the device is disposed midway the ends of the block 2 and consists of a circular retaining band 6 having a central annular rib 7 and the outer annular flanges 8. These flanges 8 extend inwardly of the band thus forming annular seats 9 between the same and the annular rib 7. In each of these seats 9 is disposed a relatively heavy transparent glass disc 10, or disc of other transparent material, thereby forming a casing in which a suitable indicator may be located.

In the present instance we dispose within such casing a counter balanced hand 11, the same having oppositely extending bearing pintles 12 projected therefrom and engaged in bearings formed in the glass discs 10 centrally thereof. By reason of the counter balanced nature of the indicating hand 11, the same will always settle to an absolutely vertical position when it comes to rest. Each of the annular flanges 8 is graduated as at 13 in degrees so that the operator will readily determine the angle of inclination of the article on which the level 1 is resting.

The level as shown in Figures 1 and 2 is also provided with sights 14 which are slidable thereon and held in adjusted positions by set screws 15. By means of such sights together with the leveling means enclosed within the retaining band 6, the level 1 lends itself to a great variety of uses.

In Figure 3 a level and inclination determining article somewhat different from the level 2 is illustrated. In this instance the indicating hand and its dials are disposed in a mount which consists of a casing 16 disposed on a standard 17 and supported on a base 18. An indicating means similar to that described for use in the level 1 is located in said casing 16 and includes an in-

dicating hand 19 and a dial 20, the latter being graduated in degrees as hereinbefore mentioned. This article is also provided with sights 21 which are carried by the casing 16 and are used for a purpose similar to the sights 14.

Inasmuch as the form of the invention shown in Figure 3 has a relatively small base, the same can be used in positions where it is impossible to employ the level 1. For instance such an article as this, or a modification thereof, can be used for determining the inclination of automobiles in travelling up or down a grade, of aeroplanes, ships and the like, and can be used by surveyors and others in an obvious manner.

A modified arrangement for holding the indicating means within a support is shown in Figure 4, such figure representing a cross sectional view of a level such as is depicted in Figure 1. In other words the block 22 forming the same is provided with a circular transversely extending hole 23 which is shouldered as at 24 to provide a cavity. The opposite ends of this cavity are closed by heavy transparent glass discs 25 held in position by retaining rings 26. The peripheries of the discs 25 and their adjacent portions engage the shoulder 24 and hold dial rings 27 thereagainst. These dial rings are graduated in degrees and are used for the same purpose as the graduations on the flanges 8 of the structure shown in Figures 1 and 2. Each of said discs 25 has a central bearing recess in which bearing pintles 28 are journalled. The shaft 29 from the opposite ends of which said pintles 28 project has a pair of spaced registering over-balanced ends 30 secured thereto, one of these hands being located adjacent each of the discs 25 so that it will readily register with the graduations on the dial rings 27. Either of these forms of mountings for the indicating means may be inexpensively constructed and assembled and will be dust and water-proof.

We claim:

A device for measuring the angle of inclination of a surface, comprising a supporting means adapted to rest on the surface, an indicator casing carried by the supporting means and including a circular retaining band having an integrally formed central inwardly projecting annular rib, and integrally formed lateral inwardly projecting flanges, transparent front and back plates secured between the rib and the respective flanges and having alined bearings, a counter balanced indicator mounted between said plates and journalled in said bearings, said indicator being vertical when in a position of rest, there being graduations on each of said flanges for cooperation with the indicator.

In testimony that we claim the foregoing we have hereunto set our hands at Milwaukee, in the County of Milwaukee and State of Wisconsin.

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