No. 700,717. Patented May 20, 1902.

E. A. BOSTROM.

DITCHING AND TERRACING LEVEL.

(Application filed Feb. 18, 1901.)

(No Model.) 2 Sheets—Sheet 1.

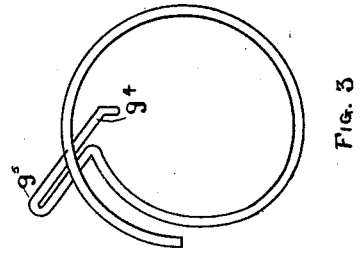


FIG. 3.

FIG. 1.

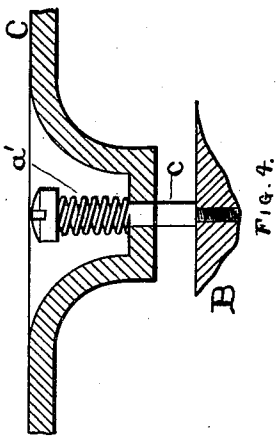


FIG. 4.

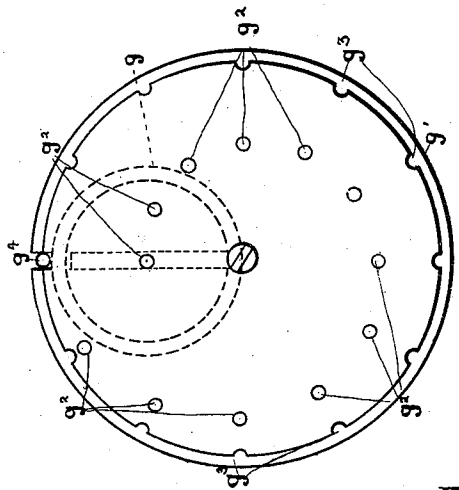


FIG. 2.

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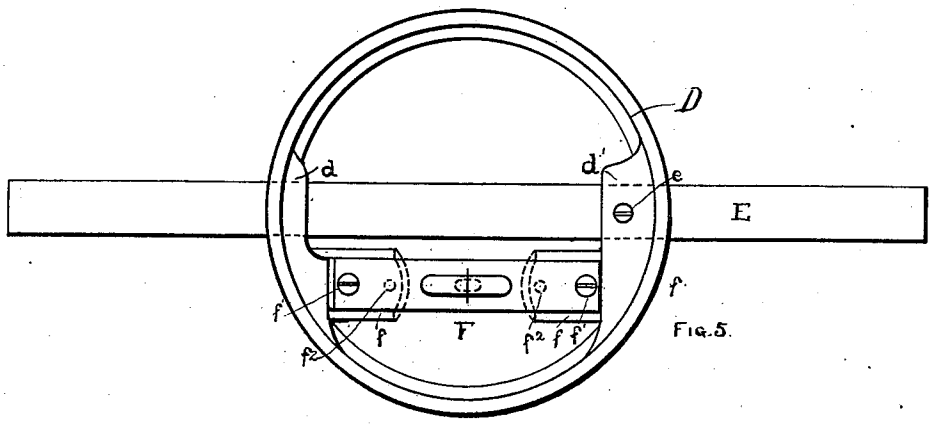


FIG. 5.

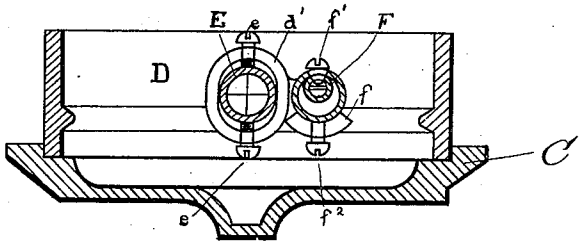


FIG. 6.

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UNITED STATES PATENT OFFICE.

ERNST A. BOSTROM, OF ATLANTA, GEORGIA.

DITCHING AND TERRACING LEVEL.

SPECIFICATION forming part of Letters Patent No. 700,717, dated May 20, 1902.

Application filed February 18, 1901. Serial No. 47,892. (No model.)

To all whom it may concern:

Be it known that I, ERNST A. BOSTROM, a citizen of the United States of America, and a resident of Atlanta, in the county of Fulton and State of Georgia, have made a certain new and useful Ditching and Terracing Level; 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, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

This invention relates to levels, having particular reference to the more inexpensive class of such devices which are useful and sufficiently accurate for ditching and terracing as practiced on farms, for builders' use in laying foundations, &c.

The invention consists of the device hereinafter fully described, and shown in the accompanying drawings, in which—

Figure 1 is a side elevation of the device. Fig. 2 is a face view of the device for obtaining predetermined deflections from the horizontal or vertical. Fig. 3 is a detail of the spring used thereon. Fig. 4 is a sectional detail of the universal joint. Fig. 5 is a plan of the revoluble turret. Fig. 6 is a section thereof at a right angle to the sighting-tube.

In the figures like reference characters are uniformly employed in the designation of corresponding elements of construction in all the views.

A is the tripod-iron, to the lugs *a* of which the three legs forming the tripod are secured pivotally, and to the upper end of which is secured, preferably by screwing on, as shown, a spider B, through the arms of which, there being preferably three of such arms, pass the leveling-screws *b*.

C is the circle-plate, which is preferably saucer shape, being depressed in its center and perforated in the bottom of said depression, a screw *c* passing through said perforation and screwing into the spider B in such a manner that the circle-plate may have movement on said screw as on a universal joint, a spring *a'* being interposed between the bottom of said depression and the head of said screw, so that the circle-plate will be always pressed downwardly to a bearing on the ends of the screws *b*, so that the angle of said circle-plate will be reliably influenced by said screws and the horizontal plane be obtained on its upper side and especially in the finished seat therein for the turret D, which I will now proceed to describe. This turret D consists of an annular body finished on its periphery perfectly cylindrical and having its edges faced off parallel to each other.

d and *d'* are diametrically opposite bosses, one of which, *d*, is perforated radially of the turret D to fit the sighting-tube E, which passes through these bosses, the hole in the other boss, *d'*, being slotted, (elongated,) so that the said tube E may be adjusted by the screws *e*, so that it will lie in practically absolute parallelism to the aforesaid finished edges of the annular turret. Given a horizontal plane on the upper side of the circle-plate C, it is obvious that premising parallel edges of the turret and parallelism of the tube E a reliable horizontal plane may be projected by revolving the turret in its seat. Also should the parallelism of the tube be disturbed the turret may be turned over and sighted at a point in both positions, noting the variation, and the parallelism of the tube to both edges be reinstated. With this provision and an adjustable spirit-level on the turret, such as I will now proceed to describe, any disturbance of the adjustment of said tube or spirit-level may be corrected without especial skill. As best shown in Fig. 5, other bosses *f* project from the inner side of the turret, and a trough-shaped continuation of said bosses projects from the ends thereon at their lower side, in which is seated the spirit-level F, consisting of a slotted metallic tube with the level-glass seated therein, as ordinarily. This spirit-level is held in place by screws *f'*, passing downwardly through its ends into the respective trough-shaped projection, while other screws f^2 pass upwardly through said projections near their inner ends and bear their ends against the lower side of the said level, whereby either of said ends may be elevated to throw the spirit-level into practically absolute parallelism with the

edge of the turret and the sighting-tube. The ends of the metallic tube of the spirit-level F contact with the faces of the bosses *f*, which bosses for sake of neat appearance should be about the same diameter as said tube. One end of the tube E is provided with the usual "crossed hairs" and the other end with a novel form of adjustable sighting-hole, which I will now proceed to describe.

As seen in Figs. 1 and 2, a suitable slip-socket *g* is provided, having an eccentric plate *g'*. The slip-socket fits the outside of the tube E and holds the plate *g'* at substantially a right angle to the axis thereof. A disk G is rotatably mounted on the face of said plate and is provided with a spiral series of holes g^2, the holes of said series being at an increasing distance from the center of said disk G in a regular ratio, the terminal holes of said series being capable, respectively, of locating concentrically of the sighting-tube and at an extra elevation, so that with the disk G in normal position a central sight-hole is provided which in connection with the crossed hairs will project the horizontal plane, and as the said disk is rotated in place the said sight-hole will be gradually elevated with relation to said crossed hairs and a correlative amount of depression be given the projected plane until an extreme of depression is obtained at the terminal sight-hole. The plate *g'* may be slotted, as shown, so as to not obstruct the vision. Notches g^3 in the edge of the disk G and a spring-pawl g^4 insure proper and reliable location of the disk G. This spring-pawl g^4 is preferably constructed as shown in Fig. 3—that is, of a single piece of wire bent in the form of a coil with a right-angle return-bend, the back end g^5 of which rests upon the outside of the slip-socket *g*, while the front end (the pawl proper) rests in the notch in the plate *g'* and the contiguous notch in the edge of the disk, the coil lying across the top of the said return-bend and additively increasing the downward pressure of the pawl proper into the said notches. This adjustable sighting device may be turned into any position on the sighting-tube and so give a predetermined degree of deflection of the plane projected in any direction.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a leveling instrument, a sighting-tube and means for leveling same, and a sight-adjusting device consisting of a plate secured to one end of said tube, and a disk rotatably mounted on said plate having a series of holes therein at different radial distances adapted to register with said tube.

2. In a leveling instrument, a sighting-tube and means for leveling same, and a sight-adjusting device consisting of a plate secured to one end of said tube, and a disk rotatably mounted thereon having a series of holes therein at different radial distances and a latch adapted to engage said disk for locking the same.

3. In a leveling instrument, a sighting-tube and means for leveling same, and a sight-adjusting device consisting of a plate secured to one end of said tube and a disk rotatably mounted on said plate and having a series of holes therein, at different radial distances, and means for locking same consisting of a spiral-spring coil having its end bent laterally into contact with and within said coil and a return-bend projecting on the other side and adapted to engage the disk.

4. In a leveling instrument, a circle-plate having a circular seat in its upper side, means for leveling said circle-plate, an annular turret provided with parallel edges and fitting said seat and having, at diametrically opposite points, apertures, one of which is elongated vertically, and a sighting-tube located in the apertures in said turret and adjusting-screws located in one of said apertures for the purpose of adjusting said tube.

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

ERNST A. BOSTROM.

Witnesses:
EDWD. P. WOOD,
A. P. WOOD.