

(No Model.)

L. D. BLACKWOOD & A. R. BRADLEY.
PLUMB LEVEL.

No. 438,518.

Patented Oct. 14, 1890.

Fig. 1.

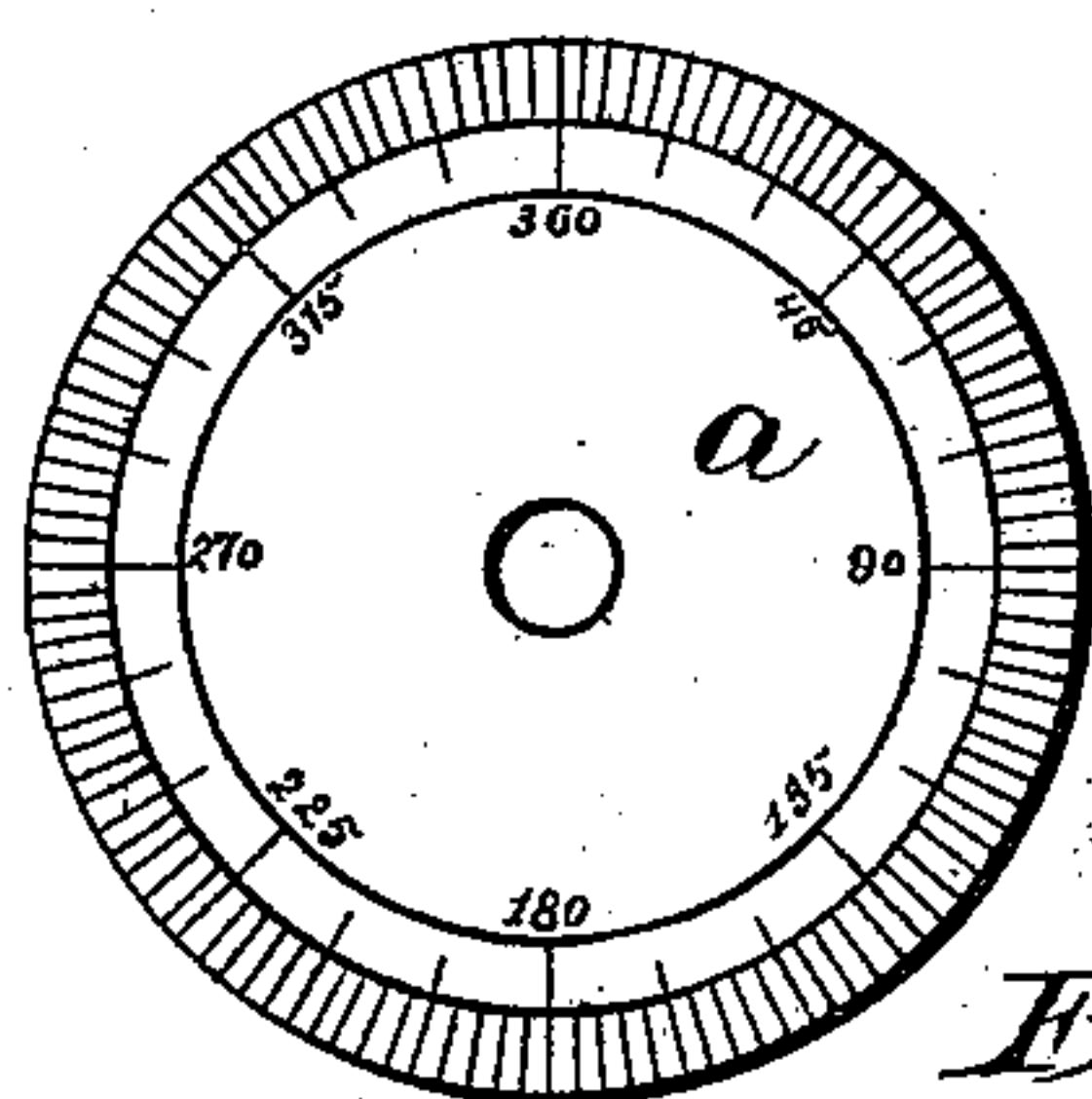


Fig. 7.

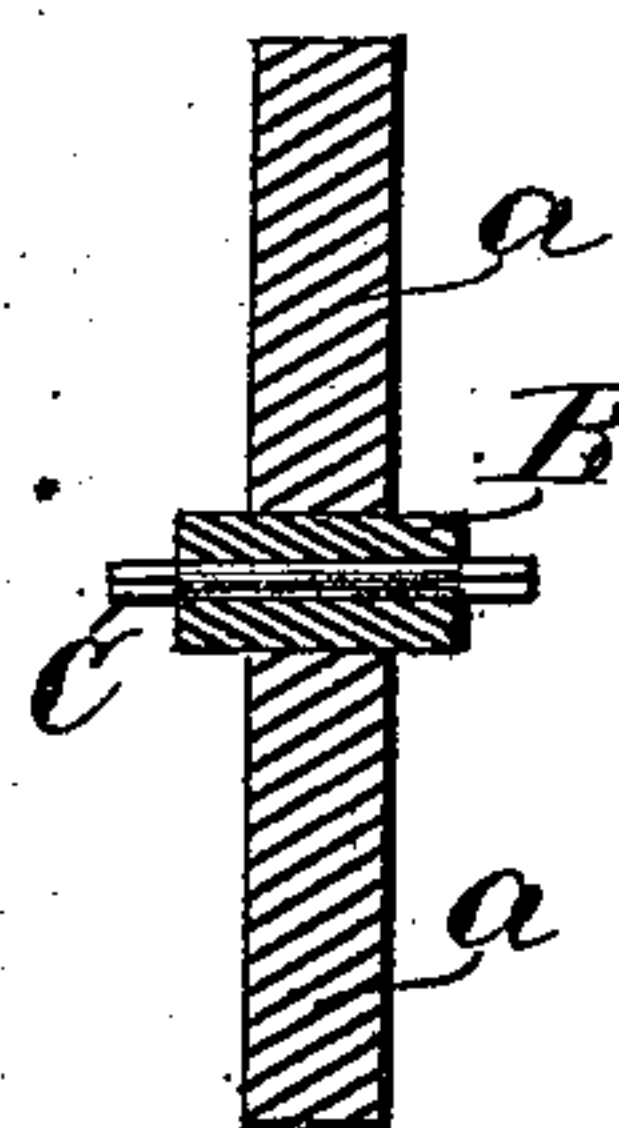


Fig. 3.



Fig. 2.



Fig. 4.



Fig. 5.

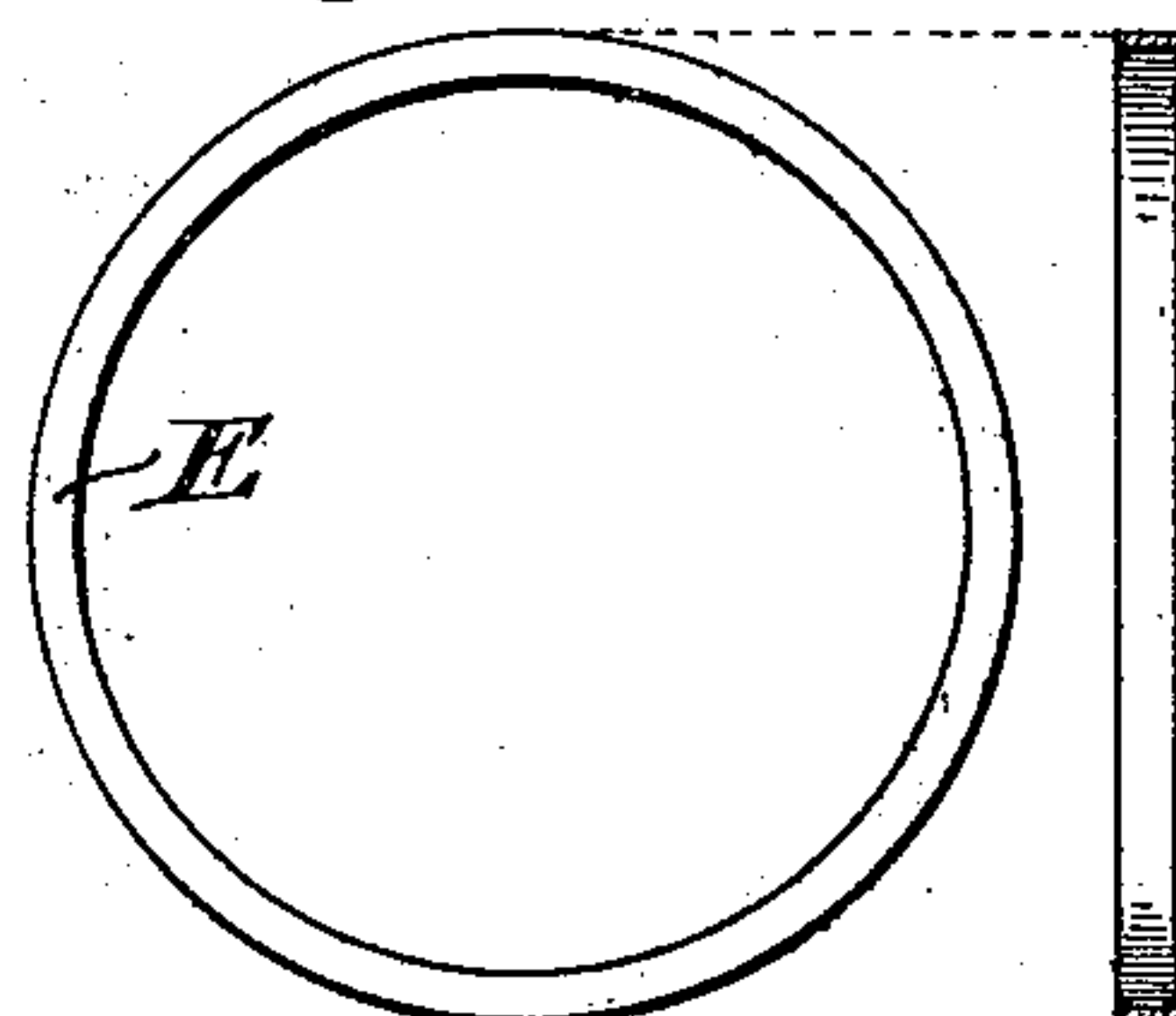
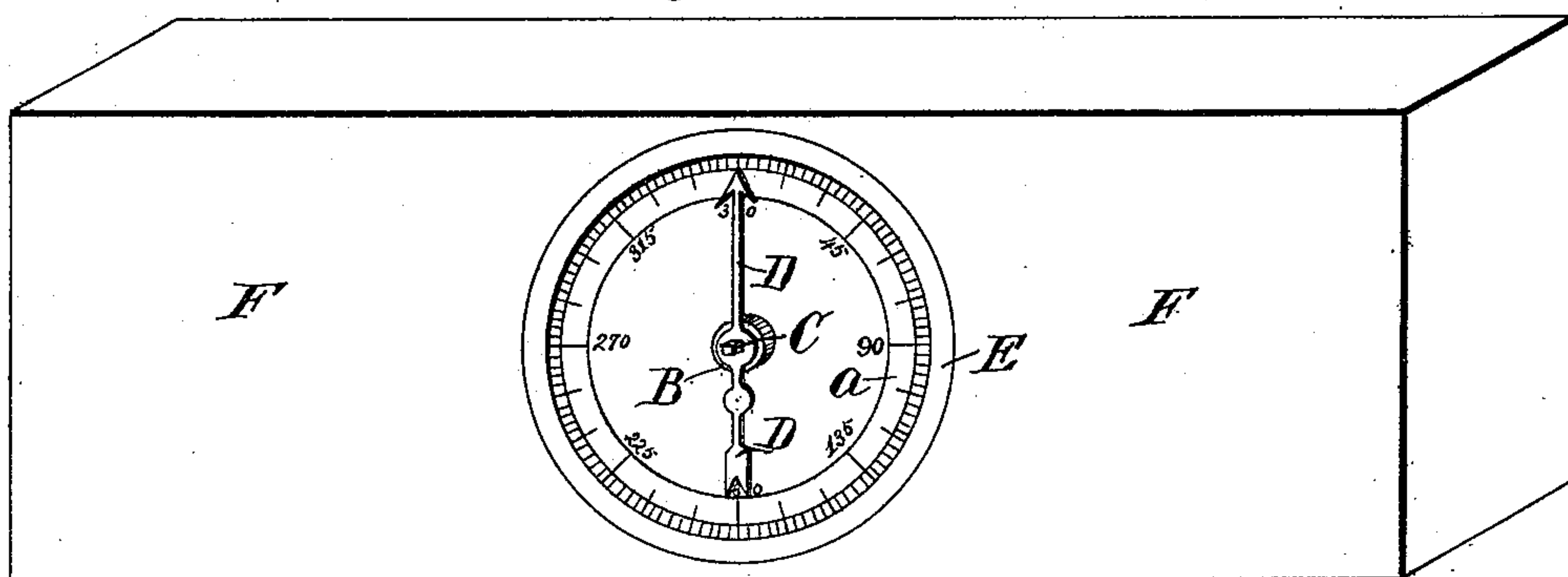


Fig. 6.



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UNITED STATES PATENT OFFICE.

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PLUMB-LEVEL.

SPECIFICATION forming part of Letters Patent No. 438,518, dated October 14, 1890.

Application filed November 11, 1889. Serial No. 329,958. (No model.)

To all whom it may concern:

Be it known that we, LORENZO D. BLACKWOOD and ARTHUR R. BRADLEY, citizens of the United States, residing, respectively, at Lathrop and Cameron, in the county of Clinton and State of Missouri, have invented certain new and useful Improvements in Mechanics' Levels, of which the following is a description.

This invention relates to instruments of precision, more especially to that class known as "levels."

The object of the present invention is to provide a device by which a horizontal and vertical or any desired oblique line may be found at a moment's notice and without reversing the device. This object we accomplish by our improved level, which consists in a block having a central transverse aperture covered with glass at each end, and in which aperture is seated a disk provided with dials on each face, in which disk turns a central shaft carrying indexes at each end, and in certain specific details of construction incident thereto which tend to enhance the mechanical completeness of the device, all as hereinafter more fully described, and illustrated in the accompanying drawings, in which--

Figure 1 is a side view of the dial. Fig. 2 is a side view of the bushing. Fig. 3 is a side elevation of the pin. Fig. 4 is a side elevation of one of the indicators or indexes. Fig. 5 is an elevation and section of the annulus or rim of the glass. Fig. 6 is a perspective view of the level complete; and Fig. 7 is a central vertical section of the dial, bushing, and pin.

Heretofore it has been common to provide the stock or wooden body of the level with a recess in one face, in which recess is mounted a stationary dial or scale, and to pivot centrally in said dial an indicator-hand weighted at one end, so that when the body of the level is tilted the indicator will turn upon a pivot and its point will lie over or opposite certain marks on the scale, which show the degree of inclination. It is also common to provide the stock with a transverse opening, to set glass disks in the same, and to mount between these disks a weighted index whose central shaft is

seated in depressions in the inner faces of the disks, and whose ends are bifurcated, so as to straddle an annular dial marked with a scale on each face, and located in the transverse opening about midway between the two glass disks. These devices possess certain disadvantages, especially in their central pivots, upon which the indicator is mounted, as well as in the difficulty with which the scales upon the dials are read by the user, all of which it is the object of the present invention to overcome.

Referring now to the accompanying drawings, the letter F designates a stock, preferably of wood, forming the body of our improved level, and this stock is provided at or near its center with a transverse opening. In this opening near each end—that is to say, near each face of the stock F—is located an annular ring or annulus E, which is L-shaped in cross-section, and each annulus holds in place a circular disk of glass, whereby the operator may look through the same and see either face of the metallic dial A. The latter is preferably of brass, located in the transverse opening in the stock midway between the two glass disks. On each face of this dial is marked a scale near its periphery, the scale on one face reading to the right and that on the other face to the left, in order that they will both read around the dial in the same direction, as will be readily understood.

At the center of the dial, which is preferably about one-fourth of an inch thick, is inserted a steel bushing B, preferably about half an inch in length, and this bushing is held positively against rotation within the dial by any suitable means. (Not shown.) We have illustrated the bushing as cylindrical upon its exterior and omitted the illustration of any securing device; but it will be understood that by making the bushing angular its shape will hold it against rotation within the dial. However, the shape of the bushing is of little importance so long as it is of finely-tempered steel.

The letter C designates a pin, also of finely-tempered steel, which pin is about three-fourths of an inch in length, its ends for one-eighth of an inch from each extremity being

squared, and its body between these squared portions being round, as shown in Fig. 3. This round body of the pin is seated in a cylindrical hole through the center of the bushing B, in which it turns very freely, and within which it is hardly possible for it to bind by any usual swelling or contraction of these parts due to varying conditions of the atmosphere. Upon the two squared ends of the pin C are located indexes D, which are preferably made in the form of arrows, as shown in Fig. 4, their large ends being weighted, so as to make them heavy, and their pointed ends standing normally over the scales marked around the edges of the dials upon either side of the metallic disk A. These indicators have square holes at their centers, into which are fastened the square ends of the pin C, to prevent their movement relative thereto, and the indicators are arranged exactly parallel with each other, so that they will turn in exact unison, and will simultaneously point to the same graduation upon the scales on both sides of the dial A. It will thus be seen that the brass dial A occupies a position at the center of the transverse opening in the stock F, that the bushing B of steel, a little longer than the thickness of the dial, passes through the center of the latter, that the steel pin C, a little longer than the bushing, turns in the center thereof with as little friction as possible, that the two indicators are mounted upon the ends of the pin C, where they protrude from the ends of the bushing B, and the indicators are thereby held by said bushing a slight distance above each face of the dial A, that the glass disks are mounted near each end of the transverse opening and almost touch the opposite ends of the pin C, and, finally, that the annuli E encircle the outer corners of the glass disks and hold them in place within the stock F.

The dial A holds the bushing B irremovably in proper position, the indicators D hold

the pin C properly within the bushing B, and the bushing in turn holds the indicators a slight distance above the faces of the dial, and thereby serves the function of two washers, one at either side of the dial. The glass disks hold the pin and indicators from a too great longitudinal movement, which would bind the latter against the ends of the bushing, and the annuli E finally hold the disks in place. It will thus be seen that no one feature in this device is indispensable, and that each contributes something to the entire device which adds to its efficiency.

Having thus described our invention, what we claim as new is—

1. In a level, the combination, with a stock F, having a transverse opening, a two-sided stationary dial seated in said opening at about its center, and a bushing of greater length than the thickness of the said dial rigidly secured through the center of the latter, of a pin of greater length than the length of the bushing journaled through the center thereof and indicators keyed to the opposite ends of the pin where they protrude from the ends of the bushing, substantially as described.

2. In a level, the combination, with a stock having a transverse opening, a two-sided brass stationary dial seated therein at about its center, and a steel bushing B, rigidly seated through the center of said dial, of a steel pin C, journaled through the center of said bushing, indicators D, keyed to the opposite ends of said pin, and glass disks seated near the ends of said transverse opening and standing in close proximity to the ends of the pin, substantially as and for the purpose set forth.

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