Jan. 12, 1943. O. B. MISZ 2,308,018

SLOPE INDICATOR

Filed July 25, 1941

Fig. 1.

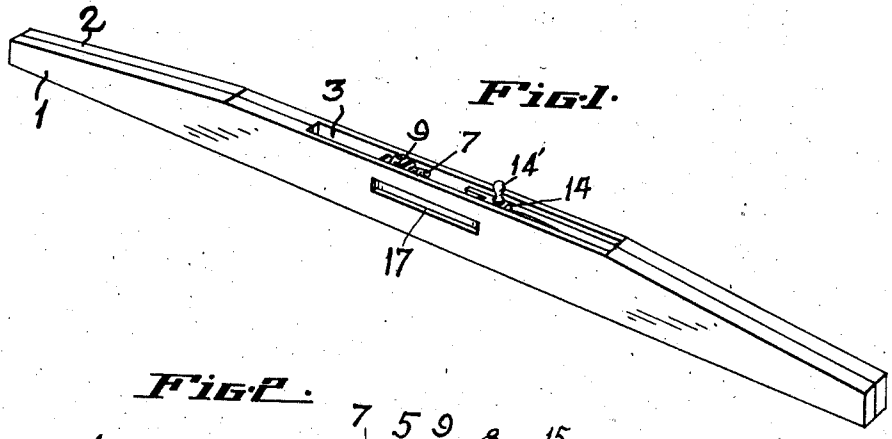


Fig. 2.

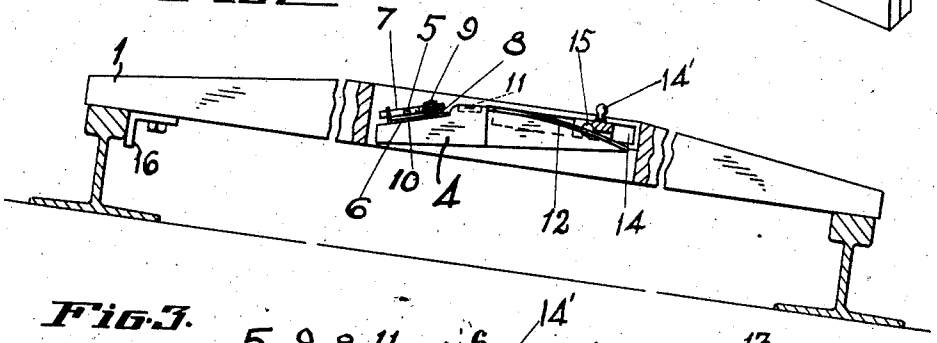


Fig. 3.

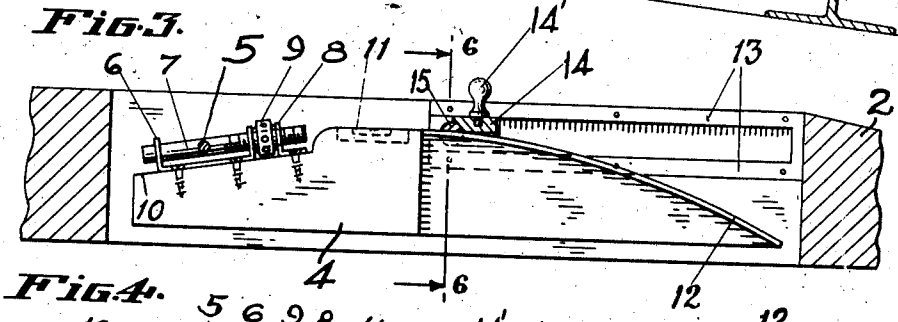


Fig. 4.

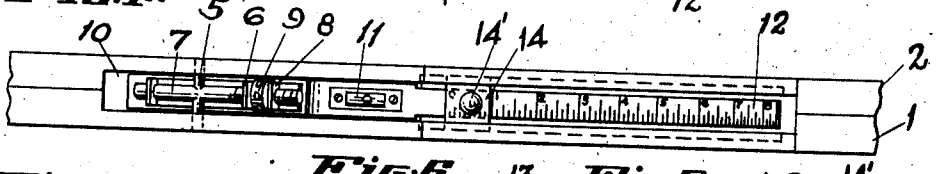


Fig. 5.

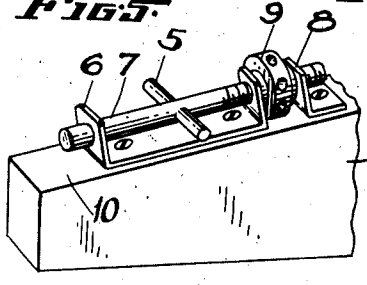


Fig. 6.

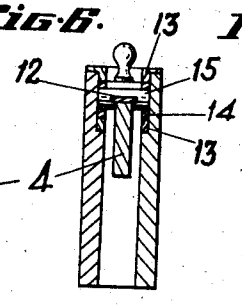
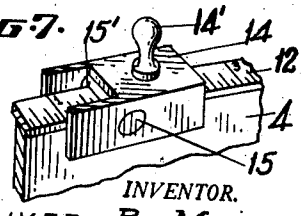


Fig. 7.



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SLOPE INDICATOR

Oliver B. Misz, Redding, Calif.

Application July 25, 1941, Serial No. 403,937

6 Claims. (Cl. 33—214)

This invention relates to improvements in slope indicators and more particularly to a device for readily indicating whether a structure is positioned at a certain predetermined inclination with respect to the horizontal.

Another object of my invention is to provide a device of the kind characterized having novel improved adjusting means for bringing certain parts of the device into proper positions with respect to one another in the event they become relatively disarranged, as when one or both of the side boards becomes warped or bent.

A further object of my invention is to provide an improved slope indicator of the kind characterized, having side boards, a pivoted level arm, and novel means for readily adjusting the angular position of the level arm with respect to the side boards, and for releasably holding the arm in a certain adjusted position while the device is being used.

The present invention embodies the aforesaid improvements applied to the device shown and described in my co-pending application for Letters Patent entitled "Slope indicator," filed May 17, 1941, Serial No. 393,948.

Other and further objects of my invention will become apparent as the following description develops.

In the accompanying drawing:

Fig. 1 is a perspective view of a slope indicator embodying the preferred principles of my invention;

Fig. 2 is a side elevation, showing a part of one of the side boards broken away;

Fig. 3 is an enlarged vertical section taken longitudinally through the central part of the device, showing the pivoted level arm and its associated elements in elevation;

Fig. 4 is an enlarged top plan of the central part of the device;

Fig. 5 is a perspective view of the means used to pivotally and adjustably mount the level arm on the side boards;

Fig. 6 is a sectional view taken on the line 6—6 of Fig. 3; and

Fig. 7 is a perspective view showing a fragmentary part of the level arm and the adjustable slide indicator mounted thereon.

Referring to the drawing, the numerals 1 and 2 designate two elongated side boards or members attached together by screws, glue or other suitable means. The side boards are centrally cut away to provide a vertical elongated slot 3 within which a level arm 4 is pivotally mounted. The level arm is pivotally supported at one of its ends by the following: A pin 5 extends across the vertical slot 3 and is imbedded at its ends in the side boards 1 and 2. An elongated U-shaped bracket 6 slidably supports a rod 7 having a transversely disposed hole therein through which the pin 5 rotatably extends. One end of the rod 7 is threaded and slidably extends through an adjacent but spaced L-shaped bracket 8. A capstan nut 9, threaded on the rod 7, is positioned between the adjacent parts of the brackets 6 and 8 and preferably in contact therewith. The brackets 6 and 8 are secured as by screws to the level arm 4 near one end thereof and at points along an inclined upper surface 10. The turning of the capstan nut 9 in a certain direction causes the level arm 4 to be bodily moved in a certain direction with respect to the pivot pin 5, and the turning of the said nut in the opposite direction causes the reverse movement of the arm.

Mounted in a suitable seat provided in the upper side of the level arm 4 is a glass spirit level bulb 11 which is so positioned that when the level arm is positioned with its upper and lower straight edges horizontally disposed and parallel to the straight edges of the side boards 1 and 2 as shown in Fig. 3, the bubble in the bulb is in its center position.

The free end of the pivoted level arm 4 is preferably pointed and provided with a curved or inclined upper edge to which a graduated strip 12 is suitably secured. The strip 12 is somewhat wider than that part of the lever arm to which it is attached, thereby providing projecting flanges extending outwardly beyond the opposite parallel faces of the level arm. The graduation marks extending along the curved strip 12 are of a certain number, and they are separated from one another by a space of predetermined width. The particular graduation mark commencing at the upper end of the curved strip 12 is preferably marked with a zero, and each successive group of marks is suitably numbered.

Slidably positioned between two pair of horizontal guides 13 provided on the opposed inner faces of the side boards is a block 14, having a finger piece 14' projecting from its upper side. Rotatably carried by the block is a grooved indicator pin 15 having an upper transverse straight edge 15' and oppositely disposed side slots within which the protruding side flanges of the graduated strip 12 are slidably positioned. The sliding of the block 14 toward or away from the center of the device will cause the pivotal downward or upward movement of the level arm. By mov-

ing the block to a position where the zero graduation mark of the strip 12 is in registry with the transverse straight edge of the indicator pin 15, the level arm 4 will have been brought to a position in which its straight edges are parallel to the straight edges of the side boards, and in such position the bubble of the spirit level bulb 11 will be in its center position.

The pivot pin 5, the zero graduation mark and the lower graduation mark are all points on the circumference of a circle, and the curved graduated strip also, is preferably an arc on the said circle. The position of the indicator pin 12 with respect to the curved graduated strip 12 determines the inclined position of the level arm 4. The arrangement of the graduation marks on the curved strip 12 is accurately predetermined, thereby enabling one using the device to know that by bringing the indicator pin 15 to a position where its transverse straight edge registers with a certain graduation mark, the level arm 4 will be inclined at a certain angle with respect to the straight edge of the side boards.

An angular lug 16 preferably secured to the lower side of the side boards 1 and 2 at an end thereof serves to readily position the device in an operative position upon the rails of a railroad track.

When the device is used to determine whether a structure has a certain inclination with respect to the horizontal, the slidable block 14 is first moved to a position where the straight edge of the indicator pin 15 registers with a certain graduation mark on the curved strip 12, thereby causing the level arm 4 to be positioned at a certain angle with respect to the straight edge of the side boards 1 and 2. When the device is placed upon the structure, the slope of which is to be determined, the bubble in the spirit level bulb will readily indicate if the said structure has the desired degree of inclination with respect to the horizontal.

It is, of course, understood that the curved graduated strip 12 may be formed integrally with the pivoted level arm 4, or it may comprise a flexible or rigid pre-curved strip secured by any suitable means to the curved upper surface of said arm. It is also to be understood that the curved strip 12 of the level arm 4 is provided with suitably spaced graduation marks which have been so pre-arranged that by the adjustment of the block 14 and indicator pin 15 with respect thereto, one can readily set the said arm at any predetermined angle with respect to the horizontal. The graduation marks on the curved strip 12 are in reality linear measurements indicating degrees of inclination.

When, for some reason, the side boards become warped, bent or otherwise disfigured, and as a result thereof the various parts of the device are disarranged and the bubble of the spirit level bulb 11 no longer assumes a centered position when the indicator pin 15 is positioned on the zero mark of the graduated strip 12 and when the said boards are positioned with their straight edges horizontally, the device may be re-set or the parts brought into correct relationship by suitably manipulating the capstan nut 9. Ordinarily the turning of the capstan nut in the proper direction will bodily move the level arm 4 so the bubble of the spirit level bulb 11 assumes a centered position when the side boards 1 and 2 are positioned with their straight edges disposed in a horizontal plane.

Grooves 17 in opposite sides of the side boards 1 and 2 provide finger gripping means for conveniently holding the device.

Suitable means may be employed to maintain the block 14 in a certain fixed position after it has been moved to bring the pin 15 into registry with a certain graduation mark on the arcuate strip 12. The frictional engagement of the block 14 and pin 15 with the guides 13 and the strip 12, respectively, may be such that the block is normally maintained in a certain position while the device is being used to determine the slope of a structure, or if preferred, suitable spring means capable of being released by a pressure applied to the finger piece 14 may be carried by the block and positioned to engage the guides 13 or the side boards, to releasably hold the block in a suitable fixed position.

It may be desirable to provide a suitable plate or plates on the bottom surface of the side boards for protection purposes, and in such an event care should be taken to have both ends of the boards provided with plates of equal thickness, otherwise when the device is applied to the rails of a railroad track one end will be raised higher than the other end, thereby throwing the device out of alignment.

Having described my invention, what I claim is:

1. In a slope indicator, an elongated member having an elongated straight edge thereon, an adjustable arm pivoted to one end of the elongated member and movable in a plane at right angles to the straight edge, the opposite end of the said arm having a curved surface provided with a series of pre-arranged markings thereon, a slidable indicator carried by the elongated member and engageable with the curved surface of the arm, a spirit level bulb mounted on the arm and normally positioned so its bubble is centered when the arm is in a certain relative position with respect to the straight edge of the elongated member, and means for bodily shifting the pivoted arm without changing the position of the pivot, whereby certain parts of the device may be brought into proper relative positions when they have been disarranged.

2. In a slope indicator, an elongated member having an elongated straight edge thereon, an adjustable level arm pivotally mounted at one end on a stationary pivot carried by the elongated member, the said arm being mounted to pivotally move in a plane substantially at right angles to the plane of the straight edge, a level indicating means carried by the arm, means at the free end of the arm for indicating by linear measurement the degree of inclination of the arm with respect to the straight edge of the elongated member and means for bodily adjusting the level arm with respect to the pivot.

3. In a slope indicator, an elongated member having an elongated straight edge thereon, an adjustable level arm pivotally secured at one end to the elongated member and having a longitudinally disposed straight edge thereon, the said arm being mounted to pivotally move in a plane substantially at right angles to the plane of the elongated member's straight edge, a level indicating means carried by the arm and arranged to normally indicate when the straight edges of the level arm and the elongated member are in parallel relationship with respect to one another, and a graduated arcuate scale at the free end of the level arm and an adjustable member engaging with the graduated scale for indicating in combination with the graduated scale and

by linear measurement the difference in elevation of one end of the elongated member with respect to its opposite end.

4. In a slope indicator, an elongated member having an elongated straight edge thereon, an adjustable level arm pivotally secured at one end to the elongated member and provided with a longitudinally disposed straight edge, the said arm being mounted to pivotally move in a plane substantially at right angles to the plane of the elongated member's straight edge, a level indicating means carried by the arm and arranged to normally indicate when the straight edges of the level arm and the elongated member are in parallel relationship with respect to one another, means at the free end of the level arm for indicating by linear measurement the degree of inclination of the straight edge of the arm with respect to the straight edge of the elongated member, and means for bodily adjusting the arm without changing the position of the pivot, whereby the parts of the device may be brought into proper relative positions when they have been disarranged.

5. In a slope indicator, an elongated member having a longitudinally disposed straight edge and a centrally disposed elongated slot, a level arm pivotally mounted in the slot and arranged to pivotally move in a plane substantially at right angles to the plane of the straight edge of the elongated member, the said arm having a longitudinally disposed straight edge, level indicating means on the level arm for indicating when the level arm is in a position with its straight edge in parallel relationship to the straight edge of the elongated member, the said arm having an arcuate graduated strip provided at its free end, a slidable block mounted in elongated guides provided near the free end of the arm at opposite sides of the slot and disposed in substantially parallel relation to the straight edge of the elongated member, and an indicator pin movably carried by the block, the said pin being in engagement with the strip and adapted to move the arm about its pivot when the block is slidably moved toward or away from the pivoted end of the arm, the said pin and the graduated strip constituting means for indicating the degree of inclination of the straight edge of the arm with respect to the straight edge of the elongated member.

6. In a slope indicator, an elongated member having a longitudinally disposed straight edge and a centrally disposed slot, a level arm pivotally mounted in the slot and arranged to pivotally move in a plane substantially at right angles to the plane of the straight edge of the elongated member, the said arm having a longitudinally disposed straight edge, level indicating means on the level arm for indicating when the level arm is in a position with its straight edge in parallel relationship to the straight edge of the elongated member, the said arm having a graduated arcuate strip on its free end, a block slidably positioned in the slot near the strip and mounted for movement toward and away from the pivoted end of the arm, and an indicator pin carried by the block, the said pin being in slidable engagement with the strip and adapted to move the arm about its pivot when the block is slidably moved, the said pin and the graduated strip constituting means for indicating the degree of inclination of the arm with respect to the straight edge of the elongated member.

OLIVER B. MISZ.