May 27, 1958 N. J. ZIMMERMAN 2,835,975

RANGE ROD

Filed April 21, 1955

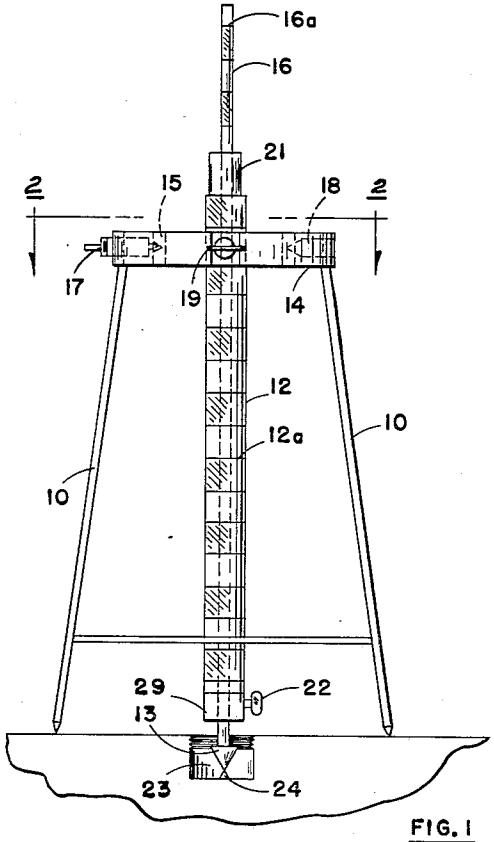


FIG. 1

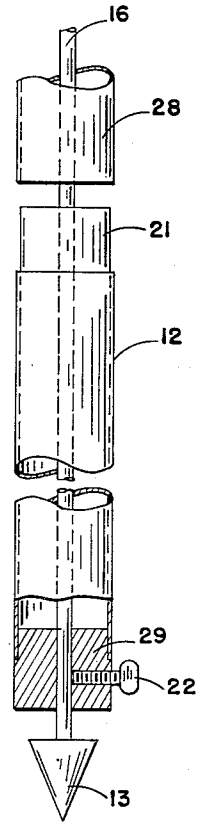


FIG. 4

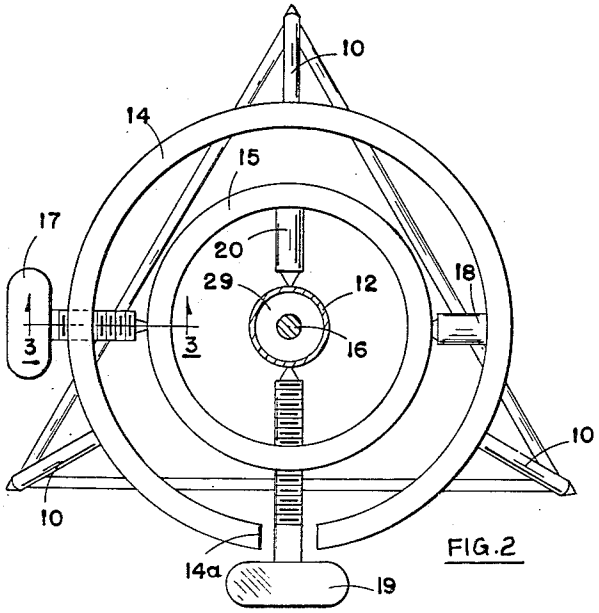


FIG. 2

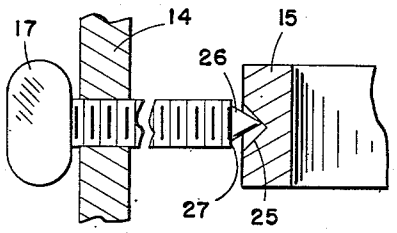


FIG. 3

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RANGE ROD

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3 Claims. (Cl. 33—74)

The present invention is directed to a gimbal mounted surveyor's range rod. More particularly the invention concerns a range rod having means for both short and long range surveying without the employment of a rodman to hold the rod.

Heretofore it has been the usual practice in the surveying field to have an assistant hold a range rod at the point being sighted by the surveyor through his transit. The surveyor must ordinarily give visual directions to the rodman to insure that the rod is being held in a vertical position. It has been suggested that range rods be supported in an adjustable tripod support by a gimbal mounting. The devices which have incorporated this suggestion have been extremely complex and expensive due to machined parts and attempts to make the devices extremely accurate. The main disadvantages of such gimbal mounted devices are that the gimbal mounted rods are affected by windage preventing the rods from staying at a vertical position and that the rods are not adaptable for both long and short range surveying work. The range rod combination of the present invention provides a device which incorporates means to effectively lock the range rod in a vertical position without lateral movement of the rod away from the marked station point, thus negating wind effects. Furthermore, the range rod of the instant invention provides means, cooperating with a weighted tip member and the gimbal mount, to sight in at both short and long distances.

An object of this invention is to provide a simple construction for a gimbal mounted range rod.

A further object of this invention is to provide a gimbal mounted range rod having means to lock said rod in a vertical position.

A still further object of this invention is to provide a range rod combination adapted for sighting at both long and short distances.

An additional object of this invention is to provide a gimbal mounted range rod having an adjustable weighted tip portion and an extension thereon forming an auxiliary range rod adjusted for short distance surveying.

Other objects will be apparent from the hereinafter described device and the accompanying drawings in which

Fig. 1 represents a side view of the gimbal mounted range rod;

Fig. 2 is a sectional plan view of the combination shown in Fig. 1;

Fig. 3 is a detailed view of the combination pivot and locking means of the invention taken in section on line 3—3 of Fig. 2;

And Fig. 4 is a partial cut-away drawing of the rod per se.

In the overall device shown, the range rod is mounted in a gimbal mount comprising a first ring means 15 within which a first tube 12 is pivotally mounted by pivot means 19 and 20, and a second ring member 14,

split as at 14*a* (Fig. 2) to receive pivot means 19, within which ring 15 is pivotally mounted by pivot means 17 and 18 at right angles to the pivoting action of tube 12 and ring 15. Tripod legs 10 are normally welded or otherwise attached to the ring member 14 to support the entire structure. Extending from the lower end of the tube 12 is an adjustable tip portion 13 of sufficient weight to insure pendulum action of said tube to adjust the tube automatically to a vertical position. Attached to the tip 13 is an extension member 16 extending concentrically through the tube 12 and of greater length than the tube 12. The member 16 is guided or journalled in the tube 12 by an internal collar member 29 (Fig. 4) having a tapped hole for a thumb screw tip locking means 22, and by an upper collar 21 which also serves as a base to telescopically receive a second tube 28 when it is desired that the range rod obtain a greater height. Succeeding telescoping tubes may be placed on tube 28. The exteriors of the tube members and the extension 16 are provided with indicia 12*a* and 16*a* to facilitate sighting thereon. In operation, the extension member 16 extending above tube 12 provides a short range sighting rod perfectly aligned vertically with the tube 12 by reason of the weighted tip 13 and the gimbal mount. The tube 12 or extension 28 mounted thereon, each of greater diameter than the rod 16, provide a range rod adapted for long range work.

Fig. 1 further discloses a particular usage of the range rod combination in which the tip portion 13 is adapted to be lowered, by slacking screw 22, on to a station point 24 in a recessed opening 23. When the tip and its extension member 16 is lowered onto point 21 the extension member 16 still extends from the top end of tube 12 enabling close tolerance sighting thereon.

As seen in Fig. 2 the tube 12 and ring 15 are gimbaled by pivot means 17, 18, 19 and 20. Pivot means 18 and 20 are stud members rigidly affixed to the ring 14 and ring 15, respectively. The pivot means 17 and 19 are adjustable so as to lock the gimbal arrangement without lateral movement of the tube or the inner ring.

Fig. 3 illustrates in detail the combined locking and pivot means. The pivot means 17 and 19 each are journalled through the ring members 14 and 15, respectively. As seen in Fig. 3, the pivot means 17 has a conical pivot point 26 and a shoulder portion 27, the pivot point normally seating on the side of a conical notch 25 in the ring 15. The gap between the shoulder portion 27 and the exterior surface of the ring 15 is overemphasized for illustration purposes. When it is desired to lock the tube 12 or ring 15 in position, the means 17 and 19 need be rotated only a slight amount to frictionally engage the shoulder portions with peripheral surfaces of the tube means 12 and ring 15. Due to the extremely small movement of the point 26 on the incline of the notch 25, canting of the tube from a vertical position is virtually eliminated. Lateral movement of the tube 12 or the ring 15 is completely prevented, insuring that tip portion 13 remains accurately over the station point.

Although the invention has been described and illustrated in detail, it is to be clearly understood that the same is by way of illustration and example only and is not to be taken by way of limitation, the spirit and scope of this invention being limited only by the terms of the appended claims.

I claim:

1. A range rod combination comprising a first tube, a support, means to gimbal mount said tube on said support, an extension member extending concentrically within and from the ends of said first tube, a tip portion attached to one end of said member, and a second

tube adapted to extend from said first tube and to telescope over the other end of said member.

2. The invention as set out in claim 1 in which indicia are placed on said tubes and on said extension member.

3. The invention as set out in claim 1 in which a bored collar means is provided on one end of said first tube through which the extension member is guided and over which the second pipe is telescoped.

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