

for use when comparatively long sights are taken and wider rectangular marks *M* on either side for very long sights. The target *T* is exactly 0.50 foot or 0.17 yard long and 0.40 foot or 0.14 yard wide, cut to out, and can be fixed in position so as to bring its centre exactly at any desired height above 0 by means of two metal strips *t* soldered on its reverse side with their outer faces precisely 0.20 foot or 0.07 yard on each side of the said centres. It has also a centre line painted on the back all round by means of which it can be placed closely in position at any one of the standard heights of 0.3, 2.58, 7.14 and 12.84 feet above 0 indicated on the sides and the rear of the rod, by white lines or grooves. These heavy white lines or grooves are, however, intended to serve only as guides for fixing the targets provisionally in position at the said standard elevations above the 0 of the rod; the final close adjustments of targets should in all cases be made with the aid of the metal strips *t* just described, which are better suited for the purpose.

The foot of the rod is shod with a brass shoe *H* firmly secured to the wood with three brass screws *w* extending from front to rear of shoe; the face of the shoe is cut out between the fillets so as to reduce its height to 0.140 foot or 0.046 yard, viz., to a level 0.0100 foot or 0.0020 yard below the zero point, in order that the whole of the scale above this point may be entirely painted on wood, so that the zero target line (a very important one for tachometric measurements) may not become defaced by the accidental rubbing of branches, weeds, &c., against the brass, on the field, or when the shoe is removed from the rod for packing it in a box, which would be quite likely to happen soon, if the zero line was painted on brass at the extremity of the rod, as is often done.

The shoe carries on one side a circular level *l* mounted on parallel plates with three capstan adjusting screws *a* working against spiral springs; this level is used by the rodman in all positions in which a similar level *l* inserted in the rod about 3.5 feet or 1.17 yard above the foot and which will be presently described—cannot be seen by him—on account of being too high up or because he cannot stand in rear of his rod, or for some other reason.

One half of the number of rods used should have the circular level on the right hand side and the other half on the left hand side of the shoe, for it happens sometimes that the projecting level as fixed on one side, prevents the rod from being held up vertically, while it would not thus interfere with the proper holding of the rod if it were attached on the opposite side.

To the lower plate under the lower level *l* can be fixed, when found requisite, a gauging attachment provided with a straight or hook pointer *j*, for the accurate determination of water levels.

The pointer *j* proper is screwed into the end of a brass tube *k* with lateral openings or slits, which slides along a steel centre pin *P* and can be fixed at any desired height on the pin by means of either of two clamp screws *e*. The steel centre pin is divided lengthwise into hundredths of a foot or yard by marks cut all around it, and thousandths of a foot or of a yard can be read (and ten-thousandths of a yard estimated) by means of an index division *d* of fivehundredths of a foot or ten thousandths of a yard engraved on the sliding tube, on each side of the slits or open-