

place of an ordinary circular plate or button, another threaded tube or plate is inserted in the same bar near its foot, viz.: between the two battens on each side of the target groove, before they are glued together, and a third supplementary threaded tube on a circular plate is inserted into bar B_2 near its upper end. All these tubes are disposed so as to traverse the face bars in the space reserved, on one side of the rod, for the figures and at places where they do not disguise the latter any more than they interfere with the target stripes or line divisions. Three extra screw holes corresponding to the tubes are also bored in the rod, viz., one (h_1, h_2) at each end of the bar B_3 , and one (h_3), near the top of bar B_2 . Moreover, in order that the upper clasp Y_1 may be of service for keeping the steel tubes T_1, T_2 in position on the back of the rod, as well, when it is put up for transportation, as when it is mounted for operating in the field,—instead of being fixed directly to bar B_2 , this clasp is screwed on the top of a thin brass band about $\frac{3}{4}$ -inch wide, passing over the top or rear face and sides of this bar. In the centre of the band a tube is brazed to its underside, which is imbedded in bar B_2 right down to the brass plate in bar B_1 affording a passage to the screw which connects intermediate bar B_2 with front bar B_1 , and the ends of the band rest on bar B_1 and are turned in sufficiently, to butt against the bottom of the groove in the side of the rod along which the aluminum target slides up and down, so that when bar B_2 is removed the band with clasp is still properly supported and effectually prevented from turning round.

I will now place before the Department a few typical pages of a proposed field book with columns disposed so that the book may be of service, not only for registering geodetic levelling operations; but also all other kinds of engineers' and surveyors' field work carried on exclusively with the tachometer and accompanying rod.

In these five double pages (See illustrations Nos. 46, 47, 48, 49 and 50 in accompanying pocket) I made all the entries that could be required in carrying on a series of supposed field operations, in black; the office work generally in red, and the mental computations in green, with a view of showing in a practical manner the work to be done by using the self-reducing Sanguet tachometer, generally, for surveying and levelling operations, as a substitute as well for the chain, as for the transit or theodolite and the spirit level. The field operations and computations indicated are typical of those required in running simultaneously two lines of geodesic levels in cases where accuracy in the horizontal distances, is deemed to be as great a desideratum as precision in the elevations.

It will be seen that in column 1. we enter:—

1. The nature of the sight, whether it is a fore, back or intermediate sight taken for levelling purposes alone or for levelling and surveying purposes combined, or simply a sight taken for establishing the position of a survey point. The word sight is printed and we have only to prefix the proper qualifying adjective as required.