

# MAJOR WATKIN'S POSITION FINDER

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The following article should be read in conjunction with the previous articles on firing the guns and position finding in The Redan no.33 - February 1995 pages 4 to 14 and no 34 June 1995 pages 5 to 16.

## WO33/45

**Report on Trial of Major Watkins Depression Position Finder at Bovisand Fort 21st. and 22nd October 1885.**

### Appendix II

#### Description of Major Watkins system of Depression Position Finding

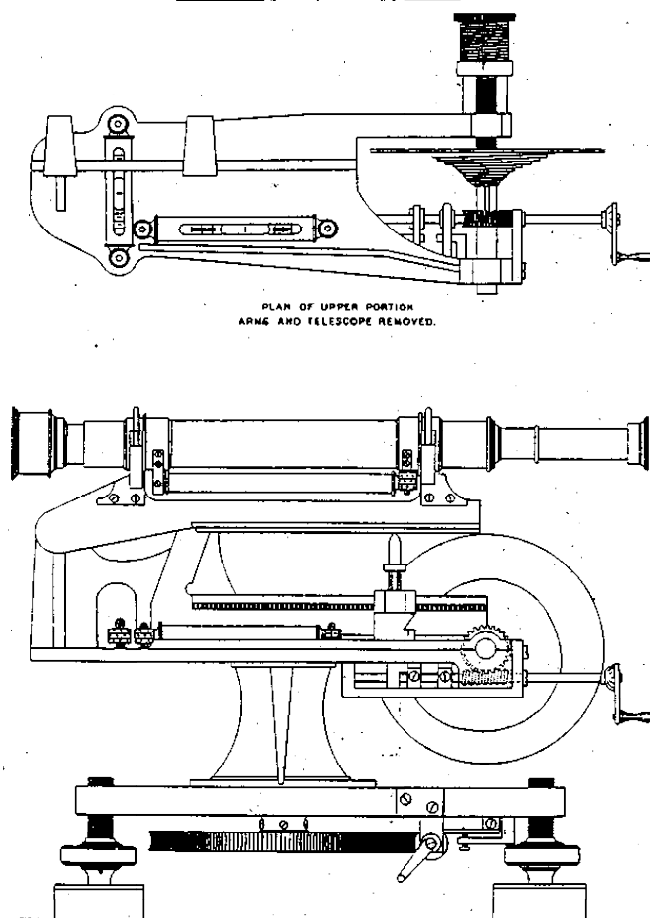
The system consists of a telescope position finder similar in principle to that of the depression range finder but differing in details and two dials one of which is placed in the observing station and one in the centre of the group of guns in the battery. The three instruments are in electrical communication and lateral and vertical movements of the telescope are automatically translated into range and training (bearing), which are shown on the dials. On these dials are pivoted two arms, A-A<sup>1</sup> and B-B<sup>1</sup> (see diagram), one being moved by the telescope and corresponding with it as regards direction, and the other centred at the point B, so placed that the distance A-B represents the distance a-b on plan. The last named, B-B<sup>1</sup>, which may be called for convenience the "gun arm", is terminated by a pointer which traverses a sector of a circle E E<sup>1</sup>, divided into degrees numbered to correspond with the graduated arcs of the group. It is also graduated with a scale of yards, and is fitted with a belt or indicator, C, travelling freely up and down it and carrying a projection or stud. The "telescope" arm, A-A<sup>1</sup>, engages with the stud on the indicator of the gun arm by means of a similar belt, encircling and free to slide on it.

There are thus on the dial an arm, A-A<sup>1</sup>, representing the horizontal axis of the telescope, a second and graduated

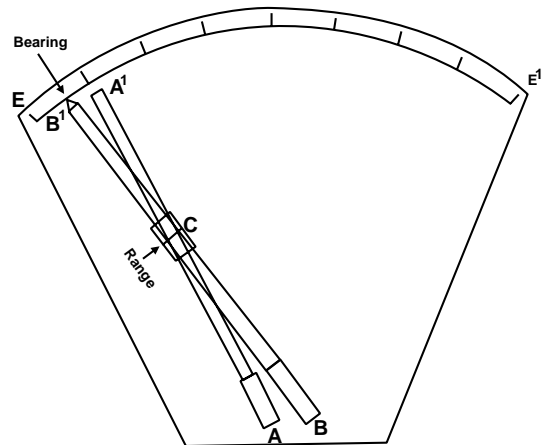
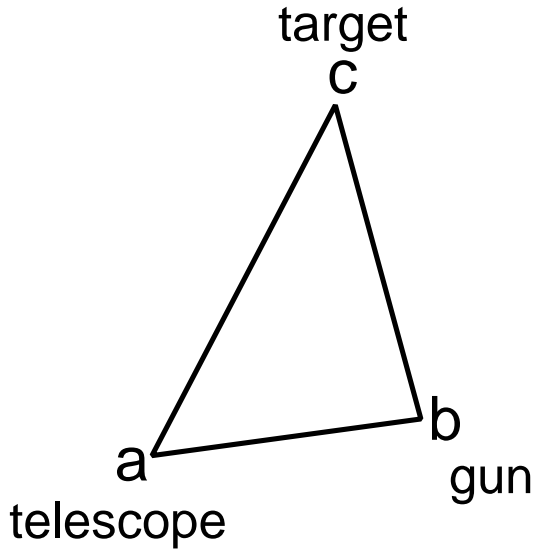
arm, B-B<sup>1</sup>, carrying the indicator, and a third side, A-B, representing on the scale adopted the distance in plan between the vertical axis of the telescope and the pivot of the gun. In the figure, the triangle A C B will therefore be similar to a c b.

Now, if the arm A-A<sup>1</sup> be actuated by the horizontal movement of the telescope, it is evident that motion will be imparted by the stud on the indicator C to the "gun arm" B-B<sup>1</sup>, which will thus be made to travel along the graduated circle; also, that if the vertical movement of the telescope causes the indicator to slide up and down that arm, the radial movement of the pointer will be governed by the position of the stud. In other words, the similarity of the two triangles A C B, a c b, will always be ensured. If, therefore, the te-

WATKIN POSITION-FINDER.



**Right**  
Diagram to show the correlation of the gun arm on Watkins Gun dial to the gun, target and observer.



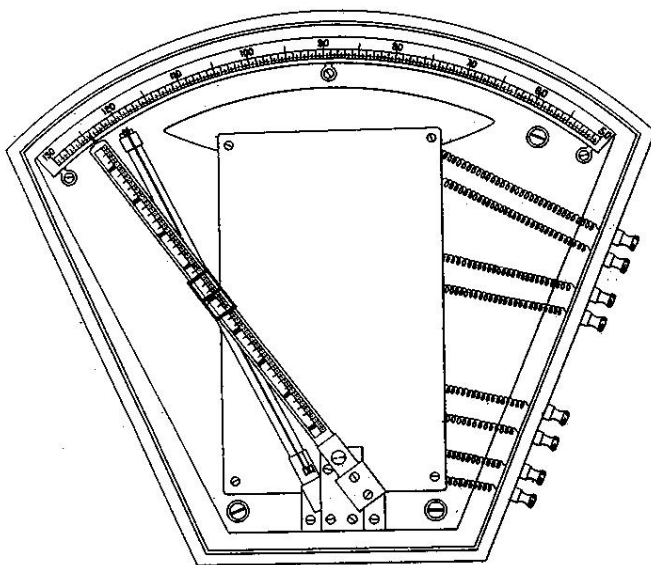
lescope be directed on any object within the arc of fire of the group, the requisite training may be read off on the graduated circle E-E1, and the elevation on the range scale of the "gun arm", B-B1; any alteration of position being at once indicated by a corresponding change in the aspect of the dial.

This arrangement is a great improvement on the systems hitherto proposed, as it obviates the necessity for a chart divided into squares. It also affords a ready means of signalling to isolated groups or guns the position of the par-

ticular vessel to be fired at; a difficulty never so satisfactorily met before.

To enable the position of a ship to be predicted in order that an electric salvo may be successfully discharged at her, Major Watkin has provided a graduated scale, which may be affixed by a pneumatic holder to any part of the glass covering the dial, the mode of using it being as follows:- A circular opening in the end of the scale is adjusted so as to be vertically over the stud on the indicator, and as this travels with the movement of the telescope following the vessel, the scale is shifted so as to lie in the direction of the ship's course, about two observations at intervals of about 150 yards being necessary to establish this. The observer at the upper dial now gives the word "train" to the man at the telescope and then "range", directing the movements of arm and indicator so that the stud assumes a position along the line of the scale corresponding to such a distance ahead of the vessel as will give time for the careful laying of the guns and their preparation for electric firing. The guns are then fired when the vessel approaches the cross wires in the field of the telescope, due allowance being made for her speed and for the time of flight of the projectile. As the resistance of the circuit was too great to allow of the battery in the observing station firing the guns, Capt. Holden fitted up an ingenious arrangement of

**Below**  
Watkins Gun dial



relay and firing signal, by which a small battery on the gun-floor was brought into circuit with the electric tubes, and the gun fired at the will of the observer stationed at the Position Finder. By a suitable arrangement of switches; it was contrived that the gun could not be fired until

- (a). No. 1 had connected up his tube and inserted his plug in the firing switch ;
- (b). The officer in command of the group had switched in the relay, and thereby exposed a signal in the observation station;
- (c). The officer there had completed the circuit by depressing his key when the vessel arrived at the predicted position.

It is, perhaps, superfluous to remark that should the vessel's course change and the prediction prove to be erroneous, the guns are at once warned to re-lay by the movement of the arms on the dial as the telescope is turned in the new direction.

A telephone is used to enable the officers in the observing station and on the gunfloor to communicate with each other. This is a necessity, and no difficulty was experienced during these experiments in conversing, the instrument on the gun-floor being placed behind one of the piers.

There is no necessity, however, for the lower telephone being in such close proximity to the guns, where it would probably be injured by concussion. As it is not in constant use (like the dials), there is no reason why it should not be fixed in some convenient place, such as the artillery store, near, but not too close, to the gun-floor. The Ader telephone, with two receivers, was the instrument used. The observing station is 230 feet above the gun-floor, and 275 feet above mean tide level. It is necessary that it should be well concealed from the fire of the enemy, and removed from any possible obscuration by smoke, while commanding a wide and uninterrupted view of the field of action.



**Plate 1**  
 Loopholed  
 defensive wall  
 Voortrekker  
 entrenchment  
 Ohrigstad.  
 (Mike Darling)