June 3, 1941. J. M. D. WOOD 2,244,181

DIRECTION OF GUNFIRE

Filed June 14, 1939 3 Sheets-Sheet 1

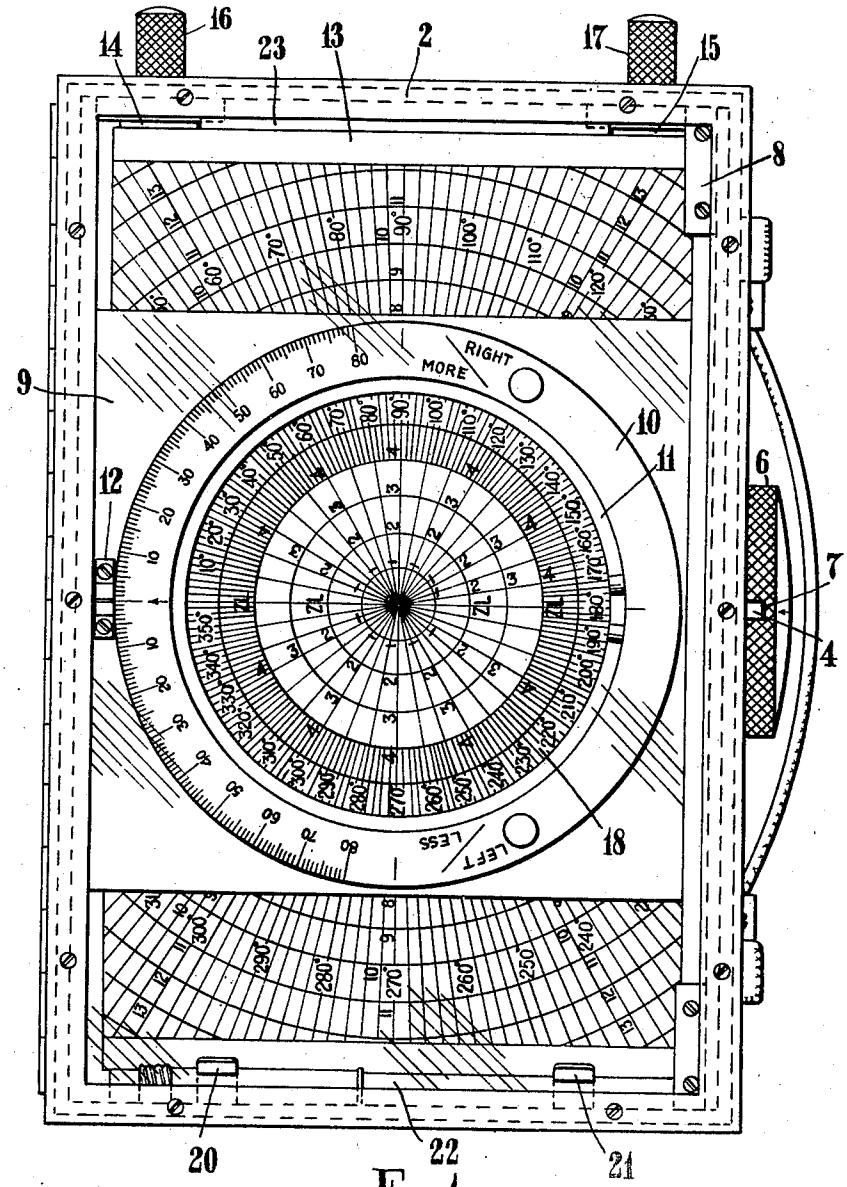

Fig 1

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Filed June 14, 1939 3 Sheets-Sheet 2

Fig. 2

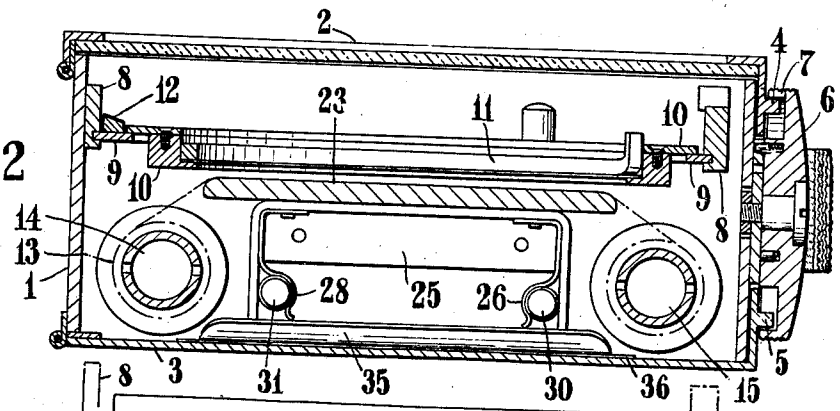
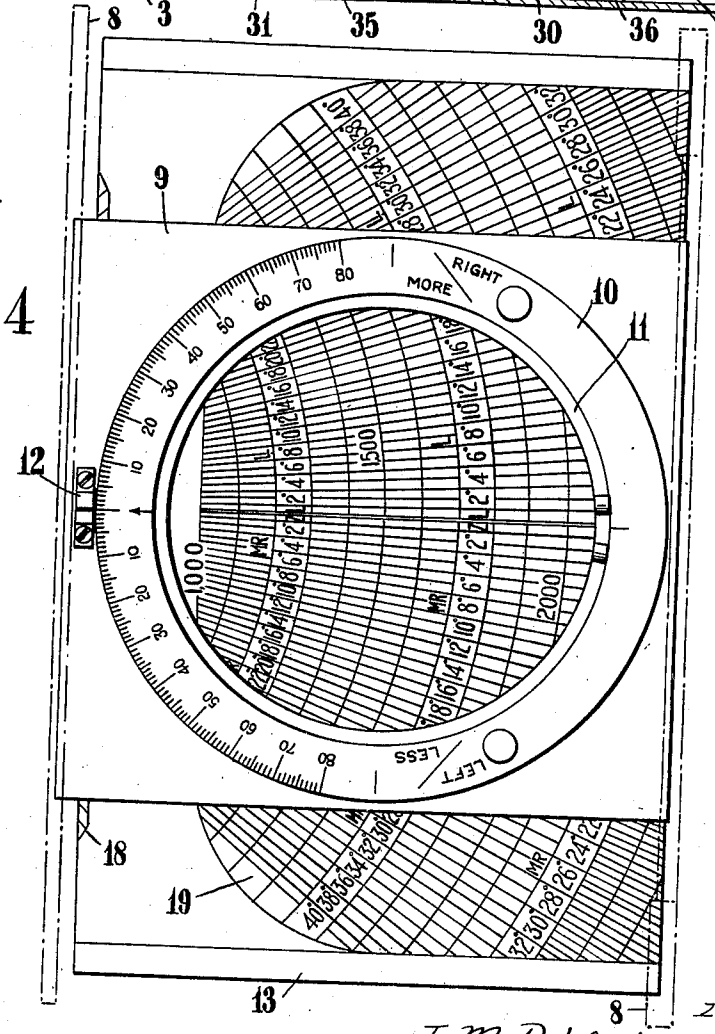


Fig 4



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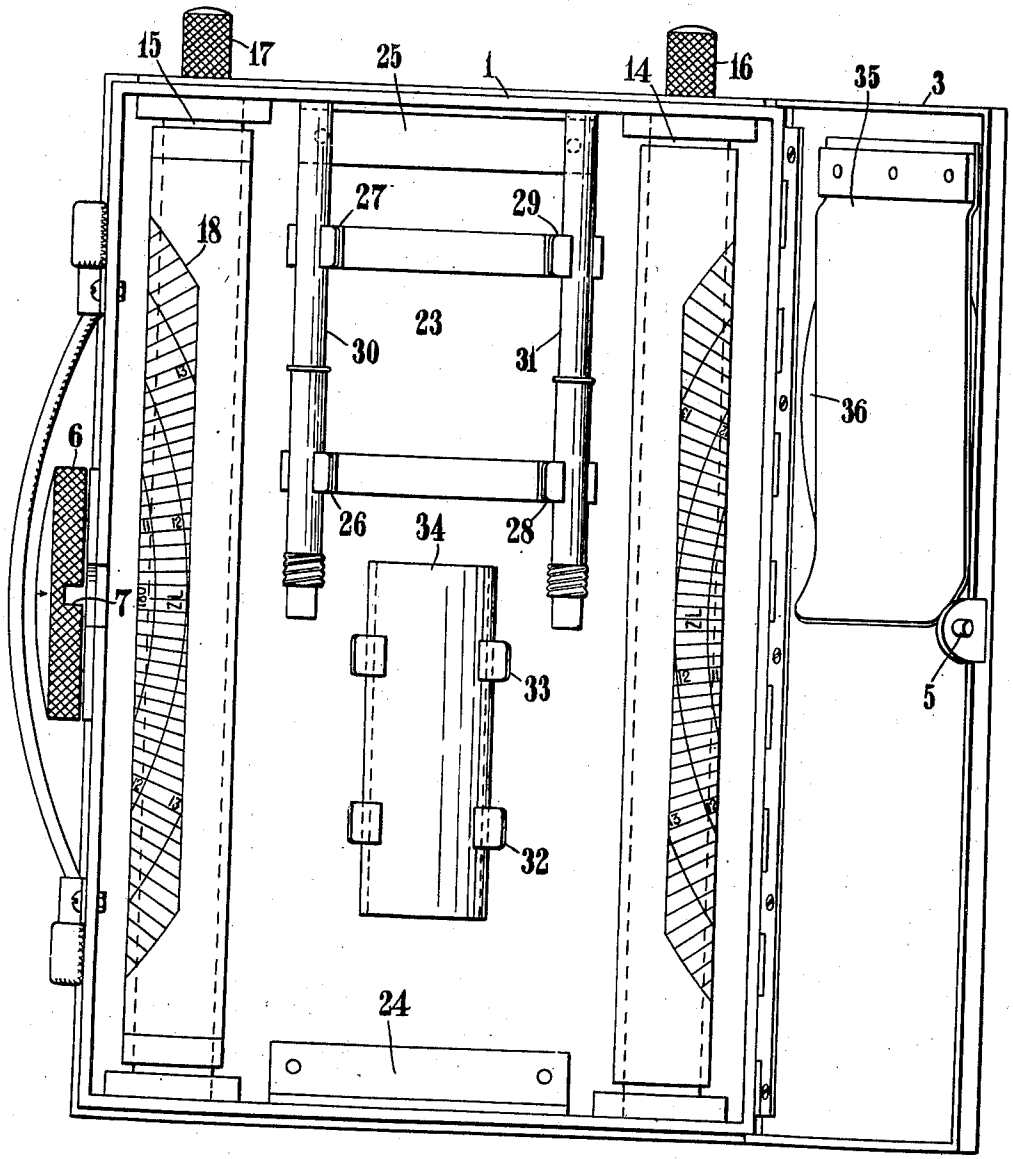

Fig. 3

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Patented June 3, 1941 2,244,181

UNITED STATES PATENT OFFICE

2,244,181

DIRECTION OF GUNFIRE

John Morton Devereux Wood, Woking, England

Application June 14, 1939, Serial No. 279,219
In Great Britain June 15, 1938

2 Claims. (Cl. 33—1)

This invention relates to a method of and apparatus for directing gun fire and has for its main object to provide a quick and simple means of concentrating the fire of a plurality of dispersed guns on to a common target.

In operations of this character it is usual to ascertain the direction and range of the common target from one of the guns which is usually known as the control troop pivot gun and then to plot the positions of the target and the other guns which are generally known as troop pivot guns, on a suitable chart in order that the direction and range of the target in each of the pivot guns may be calculated. This is necessarily a somewhat lengthy and tedious process since it is often found necessary to carry out appreciable survey operations which may involve a serious lapse of time between the moment at which the direction and range of the target from the control troop pivot gun is found, and the moment at which the necessary information regarding the direction and range can be given to the guns of other troops to enable them to fire on the target with any degree of accuracy.

According to the present invention, apparatus for directing the fire of a plurality of dispersed guns on to a common target from a control position is provided, comprising a device on which the relative positions of the pivot guns of the dispersed troops are adapted to be plotted, and which is so arranged as to be set according to the direction of the target for the control position, means being provided which is arranged to cooperate with said device in such a way as to be set according to the range of the target for the control position and which is so constructed as to indicate the directions and ranges of the target for each of the pivot guns of the dispersed troops.

According to the preferred arrangement the device on which the relative positions of the pivot guns are adapted to be plotted comprises a transparent or translucent window which is superimposed upon a setting scale indicating angles and distances from the control position, means being provided for rotating said window to a position determined by the direction of the target from the zero line of the control position, and for replacing said setting scale by a degree fan so marked as to indicate the direction and range of the target from each individual pivot gun from the gun markings plotted upon said window.

The invention will be more completely understood from the following detailed description which is given in conjunction with the accompanying drawings in which:

Figure 1 is a plan view of an apparatus for directing gun fire constructed in accordance with the invention.

Figure 2 is an end view of the apparatus shown in Figure 1.

Figure 3 is a view from the underside, while Figure 4 is another plan view showing the scale for taking readings moved into another position.

Referring now to these drawings the apparatus which will be referred to hereinafter as the plotter is constructed in the form of a hollow rectangular shaped box 1, which is constructed of metal or any other hard material and has a hinged transparent lid 2, and a hinged opaque base 3, both the lid and the base being normally retained in the closed position by means of lugs or projections 4 and 5 which engage behind the periphery of a knurled retaining wheel 6 which is provided with a slot 7 for enabling either the lid or the base to be lifted when the wheel 6 is rotated to such a position as to enable the lug 4 or 5 to pass through the slot 7.

On either side of the interior of the box there is provided a metal retaining strip 8 having a longitudinal groove in which is slidably mounted a flat metal plate 9 having a circular opening in which is rotatably mounted an annular member 10 on which is marked a degree scale and which carries a transparent or translucent sheet of material, the latter being held in position by a spring ring 11.

This annular member together with the transparent sheet of material forms a rotatable window, and the degree scale co-operates with a zero mark 12 on the plate 9 so as to enable the annular member 10 together with the transparent sheet of material to be rotated through any required angle from a zero line up to a predetermined angle, for example, 80° in either direction. Slidably mounted beneath the window is a chart 13 which is stretched between two rollers or spools 14, 15 much in the same way as a film is mounted in a camera so that by means of two control knobs 16, 17 external to the box casing the chart can be wound from one roller on to the other so as to cause the chart to move underneath the transparent window into any desired position. The chart is formed in two sections comprising a setting scale 18 (see Figure 1) consisting of concentric circles spaced apart at intervals representing one hundred yards or any convenient distance with radial lines representing angles between the zero line of the control position and the line joining this control position to the pivot guns of the dispersed troops; and a degree fan 19 (see Figure 4) upon which are plotted radius range marks.

The left hand side of the casing 1 is provided on its upper side with a pair of spring clips 20, 21 for receiving a pencil 22, while a flat sheet of metal 23 across which the chart is wound and which is firmly secured to the sides of the casing

1 by a pair of brackets 24, 25, is provided with two similar pairs of clips 26, 27, 28, 29 for receiving two spare pencils 30, 31 and with a pair of clips 32, 33 for receiving a hollow spool 34, for holding a spare chart. The underside of the base 3 is provided with a flat spring loaded retaining member 35 for holding a supply of discs of transparent or translucent material 36 for use in the annular member 10.

The method of operation is as follows:

When the guns have been allocated to their various positions each is given a zero line which may be determined by any known means, the zero lines of each gun being parallel to one another. The angle between the zero line of the control position, or the director zero line and the pivot gun of each troop is then measured or estimated, together with the distance between the director or control position and each troop pivot gun. The transparent window is then set to zero position and the chart is set with the setting circle 18 disposed beneath the window. Then assuming that the centre of the setting circle is the director or control position the positions of the troop pivot guns are plotted on the window, the positions of these marks being determined by the angles and distances of the guns which are indicated on the setting circle.

While, however, the centre of the setting circle is assumed to be in the middle of the window, this is not essential and the carriage 9 may be in any convenient position provided all the marks representing the gun position are made with the carriage in the same position.

In a case where one of the troop pivot guns is to act as the director and is to determine the position of the other troops, the angle from the zero line of this gun (which is known as the control pivot gun) to the other troop pivot guns together with the distances of such troops from the control pivot gun are measured or estimated, and the chart is set with the control pivot gun at the centre of the setting circle.

In an alternative method, in a case where the coordinates of the troop pivot guns are known, their relative positions may be found by first plotting them on a board on the scale of the chart to be used, and then removing the window from the supporting carriage, and placing it over the board so that the 0–180° line of the window is parallel to the troop pivot gun zero lines. The pivot gun positions can then be marked on the window which is then replaced in the supporting carriage.

The range and direction of the target for the director or control position having been determined by any suitable means, such as by ranging or by calculation or estimation, the annular member 10 together with the window is rotated through a radial angle corresponding to the angle between the director zero line and the line gun target, commonly called the angle from zero line and the carriage 9 is moved sideways if necessary so that the mark on the window representing the director, or the control troop pivot gun is over the centre line of the range and line chart. The chart is then wound by the control knobs 16, 17 until the range of the control troop pivot gun as indicated by the degree fan is disposed under the mark on the window representing the position of the director or the control troop pivot gun. The position of the degree fan immediately under the pivot gun positions of other troops as plotted on the window will then give the ranges of the target for the pivot guns of these other troops, and the angle which must be added to or subtracted from the angle from zero line of the control troop pivot gun in order to give the correct direction for each pivot gun, it being understood that if the zero line angle and correction shown by the chart are both right or both left they must be added, while if one is right and the other left they must be subtracted.

It will be apparent that the plotter constructed in accordance with the invention may have other uses beyond those described above, for example, it may be used to discover the relative positions of troops concealed one from the other. In order that this may be effected, all troop pivot guns are ranged on a common target, and their positions are plotted on the window of the device, the range and line portion of the chart being used. The setting circle is then arranged under the window, and the relative positions of the troops recorded. In this case further concentrations may be carried out, the approximate troop positions thus found being used until more accurate information is available.

I claim:

1. Apparatus for directing the fire of a plurality of dispersed guns on to a common target from a control position comprising a setting scale indicating angles and distances from the control position, a window on which the relative positions of the pivot guns of the dispersed troops are adapted to be plotted superimposed upon said setting scale, means for rotating said window to a position determined by the direction of the target from the zero line of the control position and means for replacing said setting scale by a degree fan so marked as to indicate the direction and range of the target from each individual pivot gun from the gun markings plotted upon said window, and means slidably mounting said window with respect to said setting scale whereby the position plotted for any one of the dispersed pivot guns may be employed as the control position.

2. Apparatus for directing the fire of a plurality of dispersed guns on to a common target from a control position comprising a setting scale indicating angles and distances from the control position, a window on which the relative positions of the pivot guns of the dispersed troops are adapted to be plotted superimposed upon said setting scale, means for rotating said window to a position determined by the direction of the target from the zero line of the control position and a degree fan provided with radius range marks, said setting scale and said degree fan being formed on a piece of flexible sheet material stretched between a pair of rollers or spools whereby said setting scale may be removed from said window and its position occupied by said degree fan which is so marked as to indicate the direction and range of the target from each individual pivot gun from the gun markings plotted upon said window, and means slidably mounting said window with respect to said setting scale whereby the position plotted for any one of the dispersed pivot guns may be employed as the control position.

JOHN MORTON DEVEREUX WOOD.