No. 677,285.

Patented June 25, 1901.

R. W. SMITH.

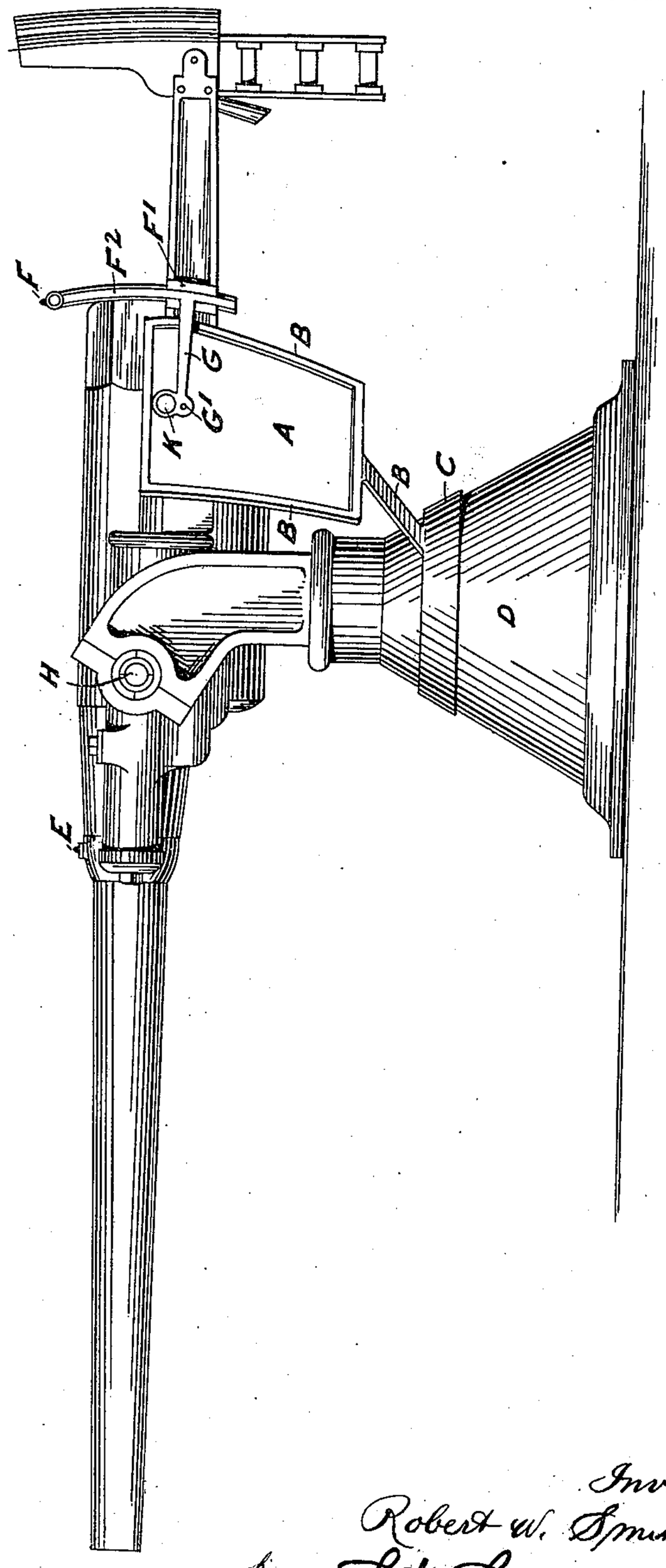
SIGHTING ORDNANCE.

(Application filed Dec. 26, 1900.)

(No Model.)

3 Sheets—Sheet 1.

FIG. 1.



Witnesses
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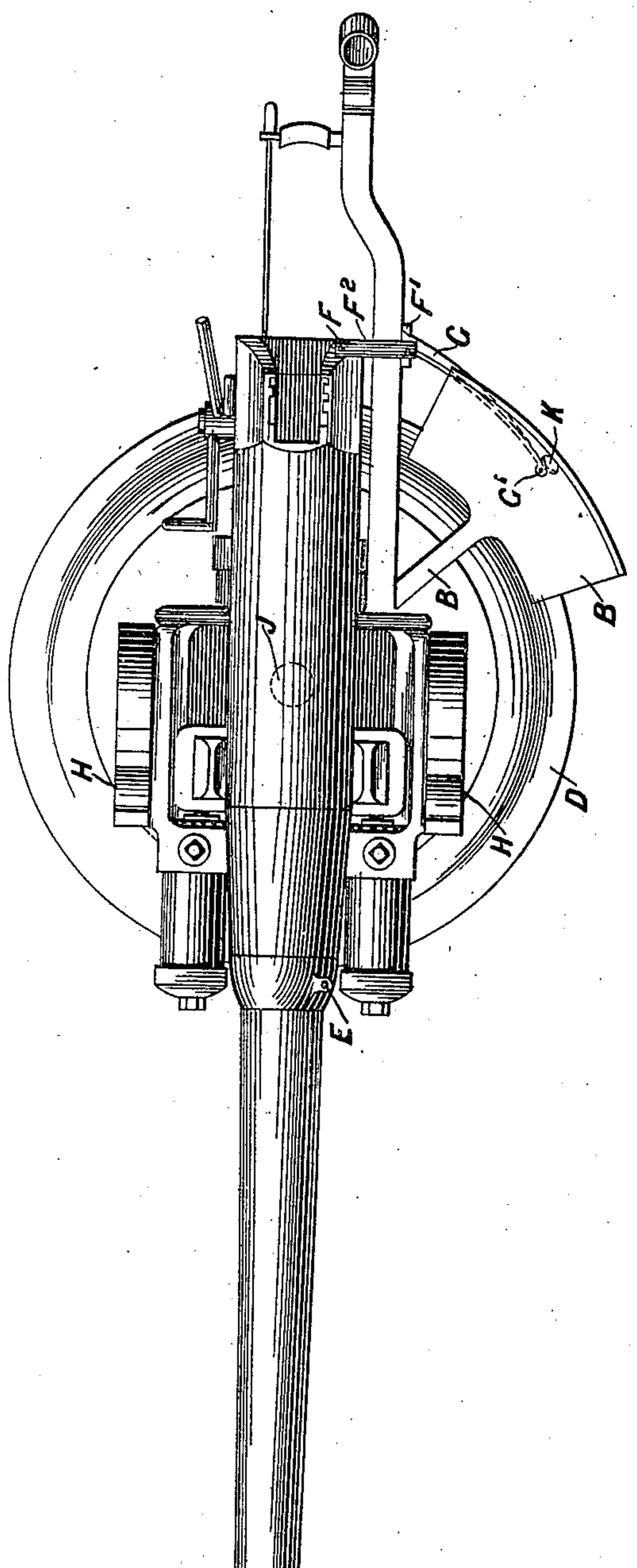
FIG. 2.



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3 Sheets—Sheet 3.

FIG. 4.

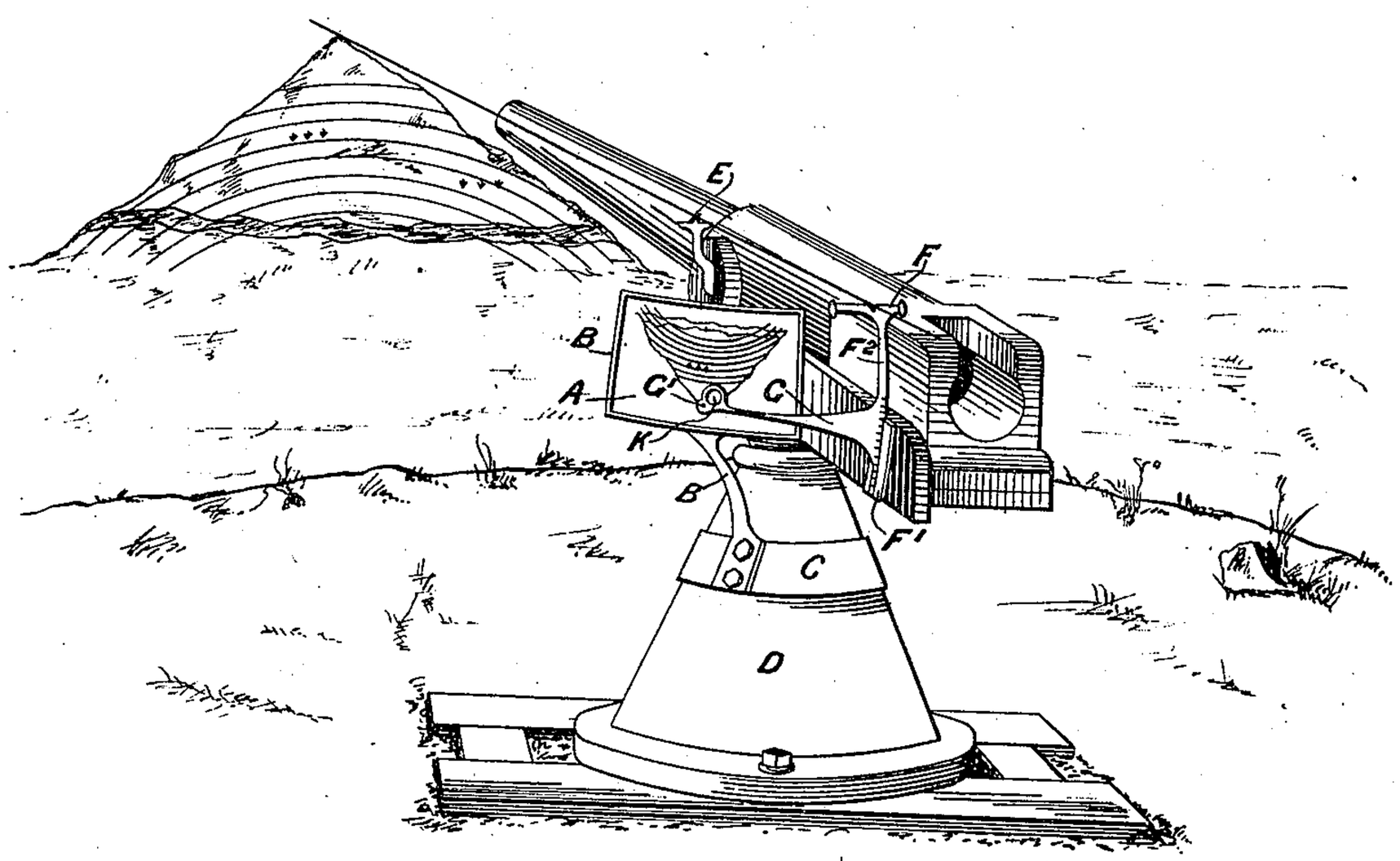
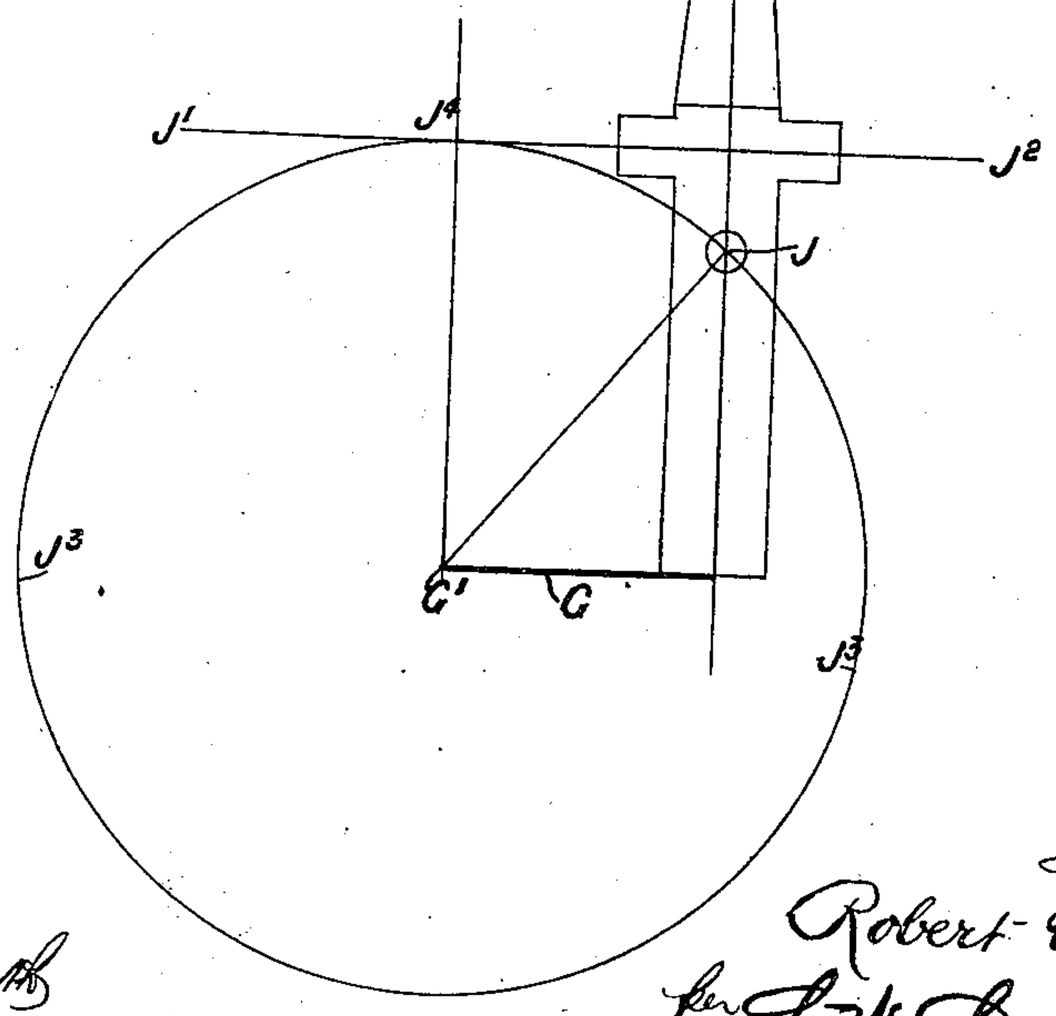


FIG. 3.



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UNITED STATES PATENT OFFICE.

ROBERT WILLIAM SMITH, OF FILEY, ENGLAND.

SIGHTING ORDNANCE.

SPECIFICATION forming part of Letters Patent No. 677,285, dated June 25, 1901.

Application filed December 26, 1900. Serial No. 41,019. (No model.)

To all whom it may concern:

Be it known that I, ROBERT WILLIAM SMITH, a subject of the Queen of Great Britain, residing at Upcliffe, Filey, in the county of York, England, have invented certain new and useful Improvements in Sighting Ordnance, (for which I have made application for patent in Great Britain under date the 28th of May, 1900, No. 9,765,) of which the following is a specification.

This invention refers to the arrangement and combination of devices for sighting ordnance, all as hereinafter described and claimed, for use with garrison, field, and all gun-mounts which are or may be made absolutely stationary and whereby after a gun has been placed in position a complete and detailed chart or record of the zone of fire of the gun can be mechanically and rapidly obtained while the light permits, such chart or record being so arranged that in conjunction with indicating means the gun may be trained upon any desired point within the zone of fire during darkness or when the objects to be aimed at are otherwise obscured—as, for instance, by fog, dust, or the like.

My invention will be understood by describing an example of its application with reference to the accompanying drawings.

Figure 1 is a side elevation showing a gun and mount with my invention applied thereto, Fig. 2 being a plan of same; Fig. 3, a diagram for determining the form of the plate upon which the record is produced and the curvature of the sight-bar, and Fig. 4 an explanatory perspective view to illustrate the operation of the invention.

The drawings are, as above stated, intended to be used for the purpose of obtaining a proper understanding of my invention; but my said invention is in no way limited to any particular class of ordnance, but is capable of general application, as will be gathered from the following description.

According to my invention I provide a record-plate A, upon which the aforesaid chart is to be produced, such plate having a convex-curved surface determined by the centers of motion of the gun, as hereinafter described. This record-plate A, which may be either transparent, translucent, or opaque, is carried by a suitable framework from the carriage or stationary mounting of the gun. In the drawings the plate A is mounted in a frame B and carried from a band C upon the stationary mounting or base D of the gun and may be adjusted thereon, if required.

The front sight of the gun is indicated at E and may be of any approved construction.

The rear sight of the gun is indicated at F and is adjustable in guides F′, being further provided with a projecting arm or extension G. The arm G carries at its outer end a pointer, indicating-needle, or tracer G′, which, with the arm G, follows the movements of the breech of the gun when the latter is being trained and elevated, and the curvature of the record-plate A is such that the tracer or pointer G′ will in all its movements be equally distant from or in contact with the surface of the said plate A. A true record may thus be obtained upon the plate A of the movements of the tracer which is likewise indicative of the movements of the gun.

The trunnions H of the gun are arranged, as shown at Fig. 1, forward of the training pivot or center J, Fig. 2, and the distance of such trunnions from the pivot J and the curve of the plate A are obtained as I will now describe with reference to the diagram Fig. 3. From the center G′ (which represents the pointer G′ of Figs. 1 and 2) I describe a circle with the radius J, (J being the point where the axes of the gun and training-pivot intersect.) The trunnion-axis should then be so much in front of the training-pivot J that it lies in a line $J' J^2$ tangential to the circle J^3. Thus the axis of trunnions $J' J^2$ touches the circle J^3 at J^4 at the same distance from the axis of the gun as the pointer G′. This done the pointer G′ will describe when the gun is elevated a part of a circle of exactly the same radius as it does when the gun is trained. These circles, as J^3, thus determine the convexity of the surface of the record-plate A, and the rear sighting-bar F^2 is also curved to conform to a segment of the same circle J^3, it being capable, as aforesaid, of being moved up or down in the guides F′, which are also curved.

A magnifying and inverting lens (indicated at K, Fig. 1) is fitted to the arm G, carrying the pointer or tracer G′, in order to accurately ascertain the position of the latter relatively to any point upon the convex surface.

The invention is brought into operation as I will now describe with reference to Fig. 4, which shows in perspective so much of a gun with my improvements fitted thereto as will be necessary to describe the operation thereof. The gun having been placed in position, a continuous sighting of the outline of the zone of fire is carefully made, the tracer G′ during this operation producing upon the convex surface A an inverted diagram of the same, as shown, or sightings may be made at several salient points in the zone of fire and recorded by means of needle-pricks on the convex surface A. An illustration may now be made of the zone of fire corresponding to the diagram or other record produced and then secured upon the convex surface A, the diagram or other record and the illustration being arranged so that corresponding parts coincide. A complete record of all the features in the zone of fire is thus obtained, and by placing the indicator-needle or tracer G′ upon any point in the illustration when the gun-sight F has been adjusted to the proper range it is thereby accurately aimed at the object corresponding to that indicated by the tracer G′ in the illustration.

The illustrated record is preferably plotted out by lines, which will show the various range-zones in which the different objects recorded thereon are situated.

If desired, suitable means may be provided for illuminating the convex surface of the record-plate A, or the latter, as before mentioned, may be transparent or translucent and be illuminated from the side opposite to the pointer.

When the record-plate A is made, say, translucent, lights, such as gun-flashes on the enemy's position, may be located on the said plate A by the latter having upon it a picture of the enemy's position similar to that on a photographic negative, but positive. The convex surface of plate A would then be fitted at a suitable distance in front thereof with a pin-hole lens or a telephoto-lens, which would allow the rays of light to fall upon the convex surface A. By these means when the lights or flashes appear upon the convex surface A their relation to the physical features could be determined and they could be fired upon.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In sighting ordnance, the combination with a rear sighting-bar adjustable in a vertical plane, guides upon the gun to carry the sighting-bar, an arm extending laterally from the rear sighting-bar and fixed thereto, and a tracing-pointer upon the extremity of the said arm; of a convex-curved stationary record-plate, means for supporting the said plate from the carriage of the gun, the curvature and location of the plate being such that when the gun is trained or elevated the tracing-pointer is always in contact with the surface of the record-plate, whereby an inverted diagram of the zone of fire is produced upon the plate, to enable the gun to be afterward aimed at required points in the zone of fire when the actual points are invisible, substantially as set forth.

2. In sighting ordnance, the combination with a rear sighting-bar adjustable in a vertical plane, guides upon the gun to carry the sighting-bar, an arm extending laterally from the rear sighting-bar and fixed thereto, and a tracing-pointer upon the extremity of the said arm; of a convex-curved stationary record-plate, means for supporting the said plate from the carriage of the gun, the curvature and location of the plate being such that when the gun is trained or elevated the tracing-pointer is always in contact with the surface of the record-plate, whereby the salient points in the zone of fire are located on the said plate, to enable the gun to be afterward aimed at required points in the zone of fire when the actual points are invisible, substantially as set forth.

3. In sighting ordnance the combination with a curved rear sighting-bar, curved guides upon the gun to carry the said sighting-bar and to allow of adjustment of the latter in a vertical plane, a curved arm extending laterally from the sighting-bar, and a tracing-pointer upon the extremity of the said arm; of a stationary convex-curved record-plate, means for supporting the said plate from the carriage of the gun, a vertical pivot about which the gun is trained, and trunnions located forward of the vertical pivot, about which trunnions the gun is elevated, the curvature of the plate and of the sighting-bar coinciding with a circle struck from the pointer as center, passing through the intersection of the axis of the gun and the training-axis, and being tangential to the extension of the trunnion-axis, whereby the pointer will always be in contact with the surface of the convex record-plate, when either trained or elevated, and an inverted diagram of the zone of fire be thereby produced on the plate for use in afterward aiming the gun, when the points aimed at are invisible, substantially as set forth.

4. In sighting ordnance, the combination with a convex record-plate, and means for carrying same from the gun-carriage; of a rear curved sighting-bar, guides upon the gun to carry the said bar, an arm extending from the bar laterally, a tracing-pointer carried at the extremity of the said arm, the curvature of the record-plate and of the sighting-bar being such that the distance of the pointer

from the curved plate does not vary when the gun is trained or elevated, the movements of the pointer delineating upon the plate an inverted figure of the objects sighted, and a magnifying and inverting lens carried upon the arm adjacent to the pointer to enable the inverted figure produced upon the record-plate to be accurately observed, substantially as set forth.

ROBERT WILLIAM SMITH.

Witnesses:
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