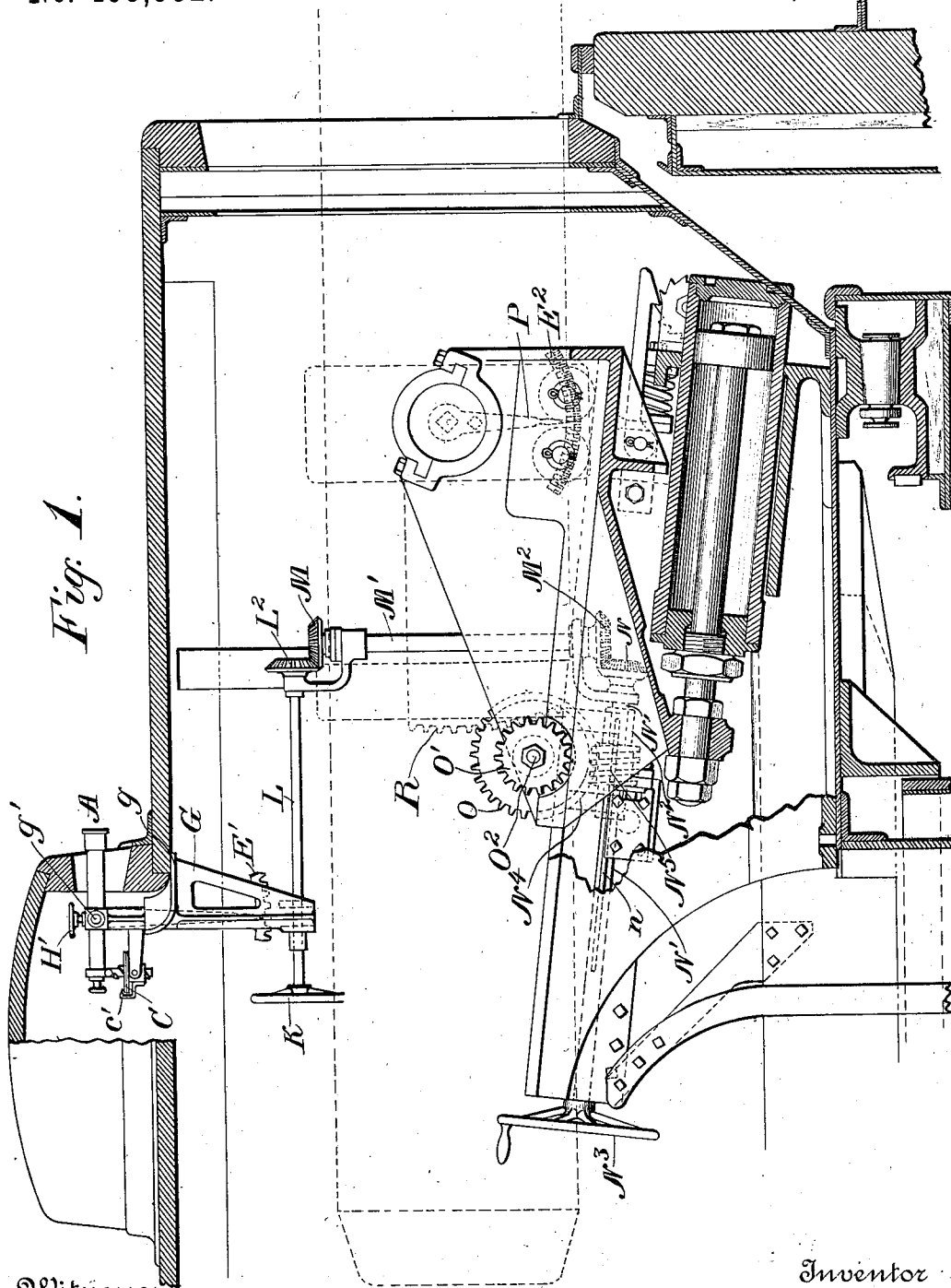


F. F. FLETCHER.
APPARATUS FOR SIGHTING GUNS.

No. 499,532.

Patented June 13, 1893.



Witnesses

Witnesses
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(No Model.)

3 Sheets—Sheet 2.

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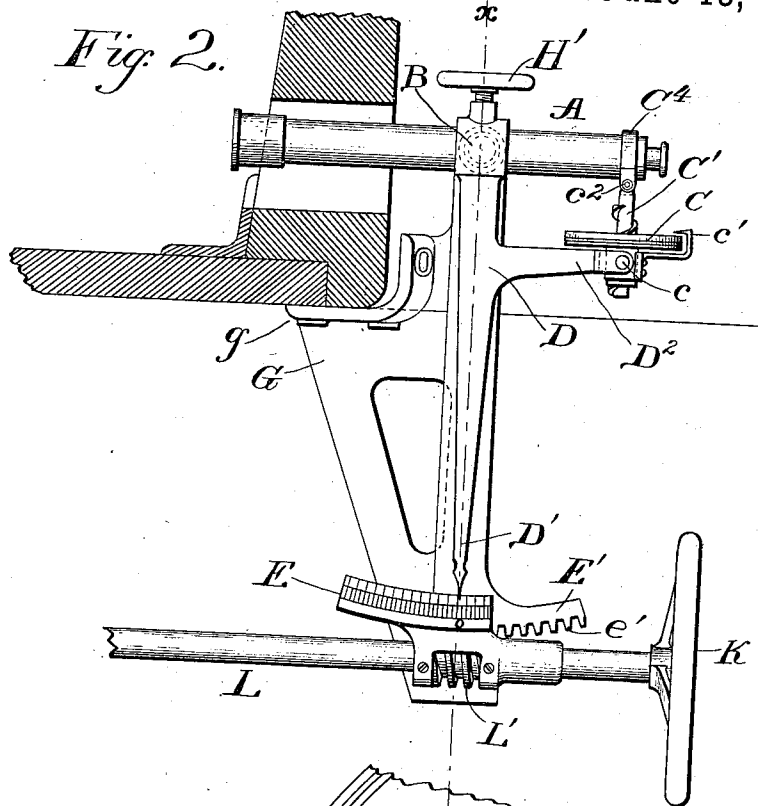
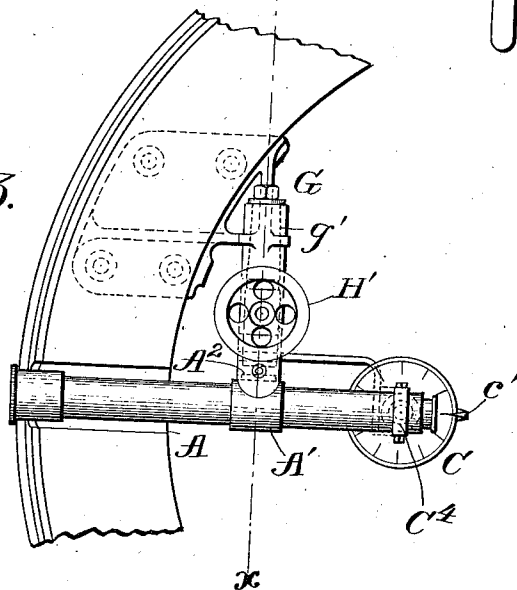


Fig. 3.



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Fig. 5.

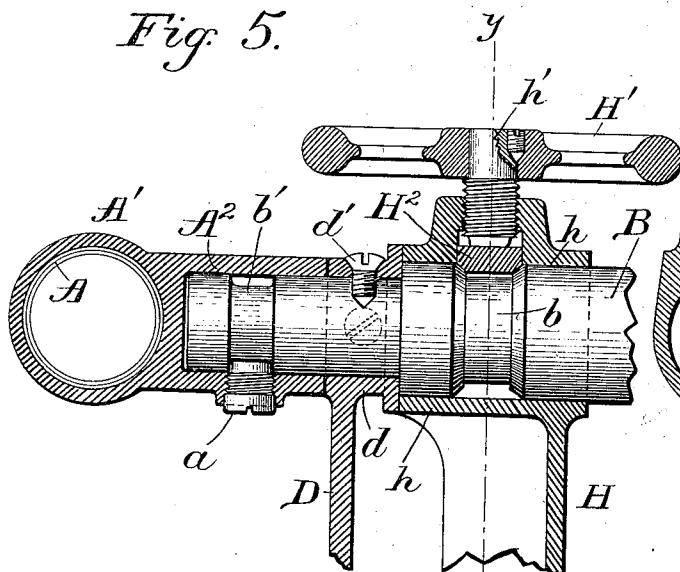


Fig. 6.

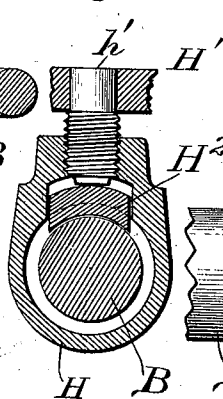


Fig. 7.

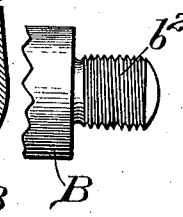


Fig. 4.

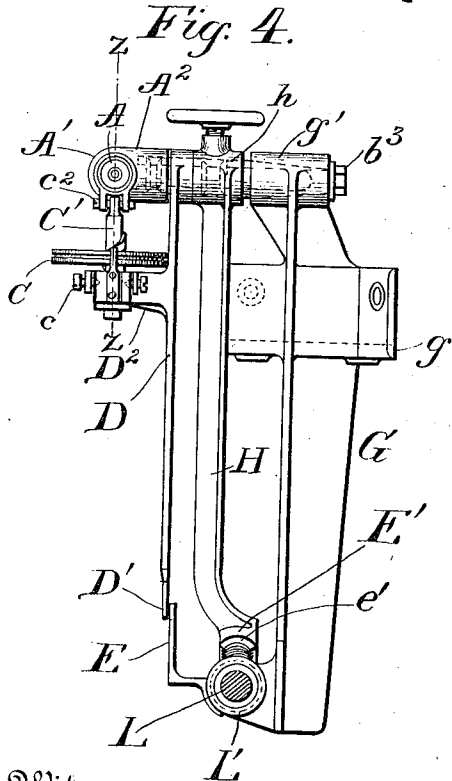
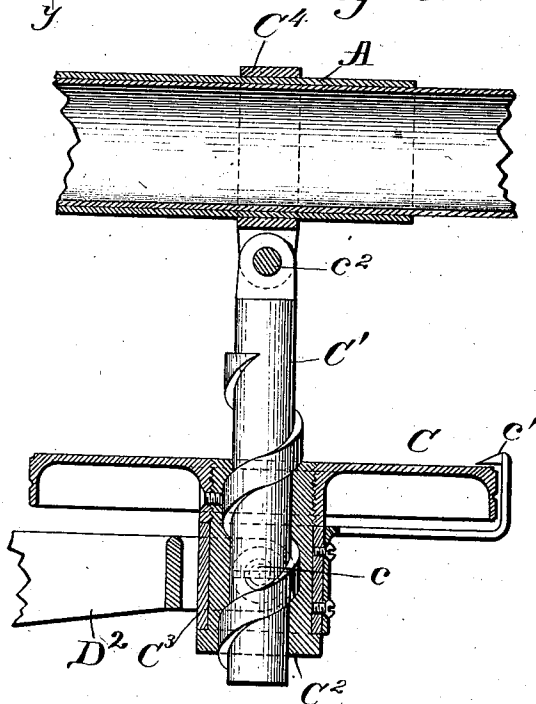


Fig. 8.



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UNITED STATES PATENT OFFICE.

FRANK F. FLETCHER, OF THE UNITED STATES NAVY.

APPARATUS FOR SIGHTING GUNS.

SPECIFICATION forming part of Letters Patent No. 499,532, dated June 13, 1893.

Application filed November 17, 1892. Serial No. 452,273. (No model.)

To all whom it may concern:

Be it known that I, FRANK F. FLETCHER, a lieutenant in the United States Navy, and a citizen of the United States, stationed at Washington, in the District of Columbia, have invented certain new and useful Improvements in Systems of and Apparatus for Sighting Guns; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My present invention relates to a system of and apparatus for pointing guns where the sights are not attached to the guns, and are independent of the recoil.

The invention is adapted for use with guns mounted on revolving platforms, as in turrets, and is especially applicable where the gun is situated behind heavy shields or other protection, where it is desired to keep the gun port opening at a minimum.

The apparatus consists of mechanism by which the act of bringing a sight bar, or telescope sight, to bear on the target also lays the gun at the correct elevation for firing.

Reference is had to the accompanying drawings, wherein the same parts are indicated by the same letters throughout the several views.

Figure 1 represents a sectional elevation of a turret mount fitted with the improved apparatus for sighting the gun, the gun itself being shown in dotted lines, and parts of the carriage being broken away. Fig. 2 represents a side elevation of the telescope used for sighting, and of its immediate connections. Fig. 3 represents a plan view of the device shown in Fig. 2, the hand-wheel being omitted. Fig. 4 represents a rear view of the telescope and its immediate connections; the worm for altering the elevation of the same being shown in section. Fig. 5 represents a transverse section of the telescope and illustrates the shaft on which it is mounted, and the two frames borne by said shaft, being a section along the line $x-x$ of Figs. 2 and 3. Fig. 6 represents a section along the line $y-y$ of Fig. 5. Fig. 7 represents a side elevation of the end of the shaft B; and Fig. 8 represents a section along the line $z-z$ of Fig. 4, the elevating screw being shown in elevation.

A represents the telescope, which is preferably provided with the usual cross hairs, not shown, for sighting. This telescope is fitted in a sleeve A' which is provided at right angles thereto with a sleeve A^2 inclosing the end of the shaft B journaled in the sleeve g' of the frame G which is secured at g to the top of the turret. This shaft B is provided near its outer end with a groove b' adapted to receive the end of the screw a , by which the sleeve A^2 is revolvably held on the said shaft B. Mounted on the said shaft B at the end of the sleeve A^2 , is the sleeve d of the frame D. This sleeve is clamped on the shaft B by means of the screw d' , or in any other convenient way. The frame D hangs beneath the said shaft and is provided at its lower end with a pointer D' and near its center with a projecting arm D^2 on which the graduated circle C, and elevating screw C' are mounted. The graduated wheel C is keyed on the nut C^2 which is revolvably mounted in the sleeve C^3 , which sleeve is mounted on gimbals c supported by the arm D^2 of the frame D. The upper end of the elevating screw C' is pivoted at c^2 to the band C^4 on the telescope A. It will be seen that if the wheel C be turned, the nut C^2 held in the sleeve C^3 will cause the screw C' to move up or down, and will raise or lower the rear end of the telescope A which will revolve on the shaft B. The upper face of the wheel C should be marked to correspond with either the degrees and fractions thereof of elevation of the telescope, or the range of the gun in yards corresponding to that elevation of the telescope, or with both degrees and range. A pointer c' is attached to the sleeve C^3 and passes over the edge of the graduated wheel C for the purpose of indicating the number of graduations through which the wheel C is turned and the consequent elevation or range of the gun. The pointer D' moves along the graduated arc E, and so indicates the angle through which the shaft B is turned for the purposes to be hereinafter described. A frame H is attached to the shaft B by means of the sleeve h and the said sleeve and frame are clamped at any desired position relative to the shaft by means of the hand wheel H' , screw h' and block H^2 which engages in the groove b as shown in Figs. 5 and 6. The said frame H is provided

with a dependent arm terminating in the rack E' having worm teeth c' shown more clearly in Figs. 2 and 4; these teeth mesh in the worm L' mounted on the same shaft L with the hand wheel K and miter gear L².

M and M² are miter gears mounted on the shaft M'.

N is a miter gear mounted on the shaft N' parallel to the recoil of the gun and carrying the sleeve N² and hand wheel N³. This sleeve is provided with a feather, not shown, projecting into the longitudinal groove n in the shaft N', and thus is free to slide longitudinally on said shaft, but not to turn independently thereof. This sleeve N² is journaled in the frame N⁴ beneath the worm wheel O and pinion O' journaled on the shaft O² in the gun carriage; and the said sleeve N² carries the worm N⁵ which meshes in the worm wheel O. The pinion O' meshes in a rack R attached to the gun. These various attachments to the gun and carriage are old, and I do not claim them as a part of my invention.

P represents a pointer attached to the trunnion of the gun, or of the rocking slide, where the gun is so mounted, and moving along a graduated arc E² attached to the gun carriage. When the axis of the gun and the axis of the telescope sight A are parallel to the gun platform, the pointer D' indicates zero degrees of elevation, the pointer c' indicates zero yards of range, and the pointer P indicates zero degrees of elevation.

The operation of the device is as follows:—

The wheel C is revolved until the pointer c' indicates the predetermined range or distance of the object to be fired at. This causes the telescope sight A to revolve on its axis B by an angle equal to whatever the gun would have to be revolved in order to carry its projectile the known distance. Having moved the wheel C until c' indicates the distance of the target, the hand wheel K is turned until, by means of the worm L', rack E', and frame H, the telescope sight is brought to bear on the target. The act of turning the hand wheel K to bring the telescope A on the target also operates the gear wheels L², M, M² and N, the worm N⁵, worm wheel O, and pinion O', engaging in the rack R and so revolves the gun about its trunnions through a certain angle of elevation. The gearing connecting the hand wheel K and the shaft B is so arranged relatively to the gearing connecting the hand wheel K and the rack R, that the axis of the gun will be raised or lowered through the same angle as the axis of the telescope A, and therefore when the telescope bears on the target, the gun will be laid at the proper elevation. Lateral train is given by revolving the turret or in any other convenient way. While the lateral train is being adjusted, if the distance of the target be increased or diminished, the wheel C should be revolved until the pointer c' indicates the new range, and then the telescope and gun should be simultaneously revolved through the necessary

vertical angle as before. Whenever the telescope sight bears on the target the gun will be laid at the proper elevation.

In order to be able at all times to properly adjust the axis of the telescope relative to the axis of the gun, and to compensate for lost motion, slipping of the gun or its elevating gear and for other similar errors the pointers P and D' are provided. These pointers P and D' should always indicate the same angle on the graduated arcs E² and E' respectively. Since the pointer P is attached to the trunnion of the gun and the arc E² to the carriage the likelihood of error there is practically nil, and any difference between the readings of the two pointers P and D' should be corrected by adjusting the position of the axis of the telescope. This is done by easing up on the hand wheel H' and clamp screw h' , and then moving the pointer D' until its position relative to the arc E corresponds with the position of the pointer P relative to the arc E². When the two pointers indicate the same angle, the frame H is clamped to the shaft B, and the device is in adjustment; the telescope A may then be sighted and the gun simultaneously elevated or depressed as before.

In addition to the herein-described method of elevating and sighting the gun, the gun may be provided with the ordinary sights and may be elevated or depressed by the hand wheel N³ and the elevating gear shown in dotted lines in Fig. 1.

It will be evident that many modifications would readily suggest themselves to any one skilled in the art which could be used without departing from the spirit of my invention.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. In a system of sighting guns mounted upon platforms capable of being revolved horizontally, the combination with the gun and platform of a telescope sight mounted on said platform and detached from the gun, an elevating screw for setting said telescope at any desired vertical angle from the target, a graduated wheel adapted to raise and lower said elevating screw, a fixed pointer adapted to indicate the horizontal angle through which said wheel or the vertical angle through which said telescope has been turned, and mechanism connected to said telescope and to said gun, and adapted to turn both said telescope and said gun through a desired vertical angle, substantially as and for the purposes described.

2. In a system of sighting guns mounted upon platforms capable of being revolved horizontally the combination with the gun and platform of the frame G rigidly attached to said platform, the shaft B journaled in said frame G, the telescope A and means for pivoting the same on said shaft, the frame D having the arm D² rigidly attached to said shaft, the graduated wheel C, screw C' and pointer c' mounted on said arm D²; the frame

H suspended from the shaft B with means of clamping said frame on said shaft, the curved rack E' connected to the end of said frame, the worm L' meshing in said rack E'; the shaft L, hand wheel K and gear wheel L² mounted on the same shaft with said worm and mechanism connected to said gear wheel L² for elevating said gun, substantially as and for the purposes described.

3. In a system of sighting guns mounted upon platforms capable of being revolved horizontally the combination with the gun and platform of the frame G rigidly attached to said platform, the shaft B journaled in said frame G, the telescope A and means for clamping the same on said shaft, the frame D having the pointer D' and the arm D² rigidly attached to said shaft, the graduated wheel C, screw C' and pointer c' mounted on said arm D²; the graduated arc E attached to said frame G; the frame H suspended from the shaft B with means of clamping said frame, the worm L' meshing in said rack E'; the shaft L, hand wheel K and gear wheel L² mounted on the same shaft with said worm and mechanism connected to said gear wheel L² for elevating said gun, substantially as and for the purposes described.

4. In a system of sighting guns mounted upon platforms capable of being revolved horizontally the combination with the gun and platform of the frame G rigidly attached to said platform, the shaft B journaled in said frame G, the telescope A and means for clamping the same on said shaft, the frame D having the arm D² rigidly attached to said shaft, the graduated wheel C, screw C' and pointer c' mounted on said arm D²; the frame H suspended from the shaft B with means of clamping said frame on said shaft, the curved rack E' connected to the end of said frame, the worm L' meshing in said rack E'; the shaft L, hand wheel K and gear wheel L² mounted on the same shaft with said worm and mechanism connected to said gear wheel L² for elevating said gun, and the pointer P attached to the trunnions of the gun and the graduated arc E², substantially as and for the purposes described.

5. In a system of sighting guns mounted upon platforms capable of being revolved horizontally the combination with the gun and platform of the frame G rigidly attached to said platform, the shaft B journaled in said frame G, the telescope A and means for clamping the same on said shaft, the frame D having the pointer D' and the arm D² rigidly attached to said shaft, the graduated wheel C, screw C' and pointer c' mounted on said arm D²; the graduated arc E attached to said frame G; the frame H suspended from the shaft B with means of clamping said frame, the worm L' meshing in said rack E'; the shaft L, hand wheel K and gear wheel L² mounted on the same shaft with said worm and

mechanism connected to said gear wheel L² for elevating said gun, and the pointer P attached to the trunnions of the gun and the graduated arc E², substantially as and for the purposes described.

6. In a system of sighting guns mounted upon platforms capable of being revolved horizontally, the combination with the gun and platform of the frame G rigidly attached to said platform, the shaft B journaled in said frame G, the telescope A and means for clamping the same on said shaft, the frame D having the arm D² rigidly attached to said shaft, the graduated wheel C, screw C' and pointer c' mounted on said arm D²; the frame H suspended from the shaft B with means of clamping said frame on said shaft, the curved rack E' connected to the end of said frame, the worm L' meshing in said rack E'; the shaft L, hand wheel K and gear wheel L² mounted on the same shaft with said worm, the gear wheel M meshing with the gear L², the gear M² on the same shaft with the gear wheel M, and meshing with the gear wheel N, the worm N⁵ mounted on the same shaft with said gear wheel N, the worm wheel O, meshing in said worm, the gear wheel O' on the same shaft with the gear wheel O, and the rack R attached to the gun and operated by said gear wheel O', substantially as and for the purposes described.

7. In a system of sighting guns mounted upon platforms capable of being revolved horizontally, the combination with the gun and platform of the frame G rigidly attached to said platform, the shaft B journaled in said frame G, the telescope A and means for clamping the same on said shaft, the frame D having the arm D² rigidly attached to said shaft, the graduated wheel C, screw C' and pointer c' mounted on said arm D², the frame H suspended from the shaft B with means of clamping said frame on said shaft, the curved rack E' connected to the end of said frame, the worm L' meshing in said rack E'; the shaft L, hand wheel K and gear wheel L² mounted on the same shaft with said worm, the gear wheel M meshing with the gear L², the gear M² on the same shaft with the gear wheel M, and meshing with the gear wheel N, the worm N⁵ mounted on the same shaft with said gear wheel N, the worm wheel O, meshing in said worm, the gear wheel O' on the same shaft with the worm wheel O, and the rack R attached to the gun and operated by said gear wheel O', the pointer P attached to the trunnions of the gun, and the graduated arc E² attached to the gun carriage, substantially as and for the purposes described.

In testimony whereof I affix my signature in presence of two witnesses.

FRANK F. FLETCHER.

Witnesses:

JOHN C. WILSON,
PERCY C. BOWEN.