

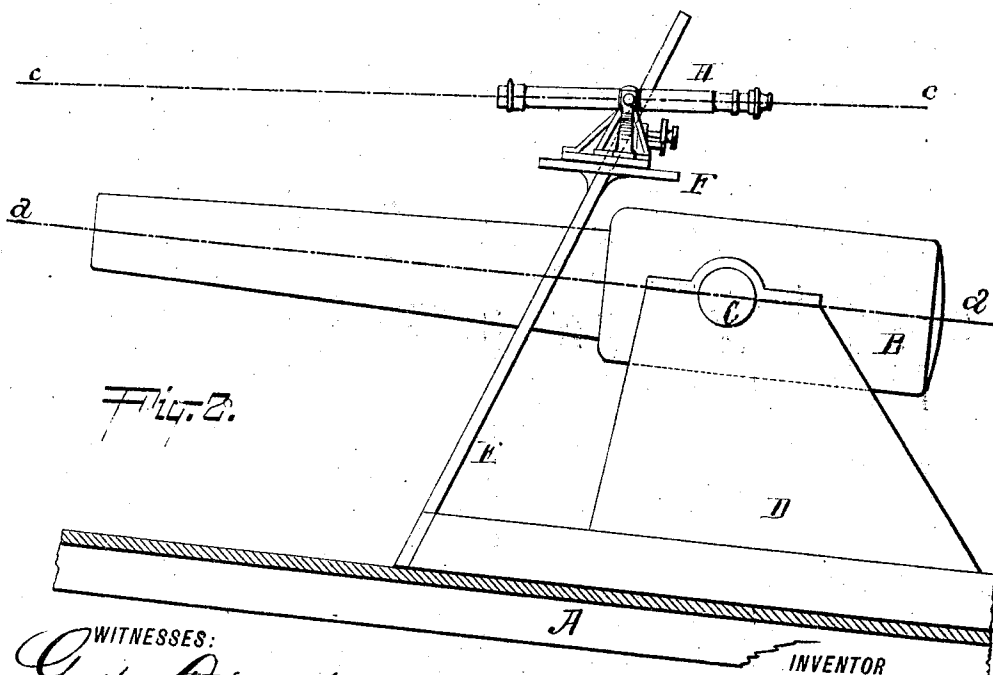
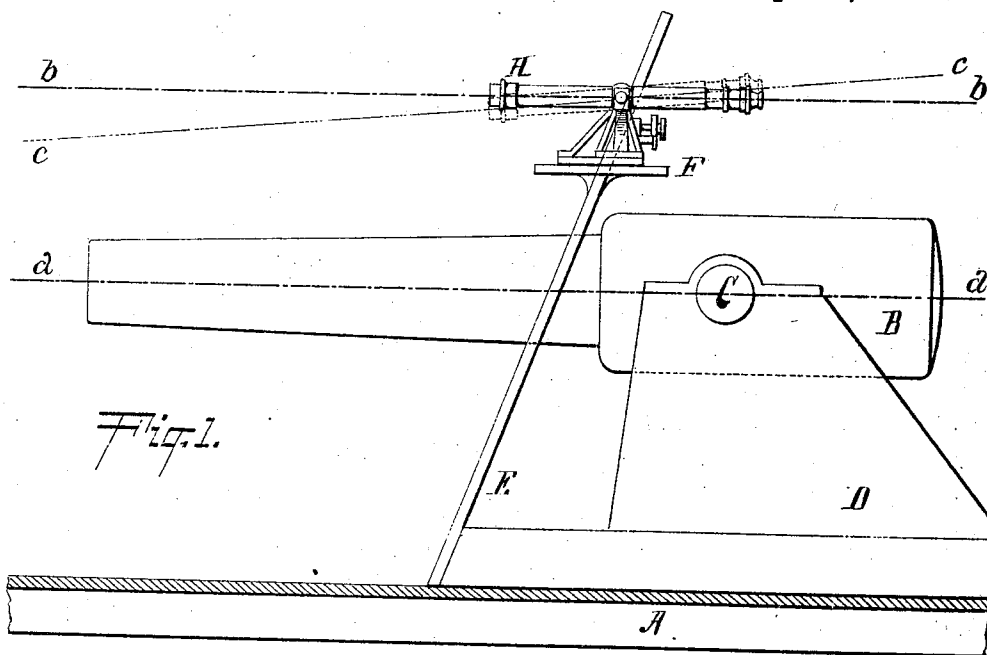
(No Model.)

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B. A. FISKE.
TELESCOPIC SIGHT FOR SHIPS' GUNS.

No. 504,337.

Patented Sept. 5, 1893.



WITNESSES:
Gustave Nitenich
Wm. Birch

INVENTOR
Bradley A. Fiske
BY *Park Benjamin*
his ATTORNEY.

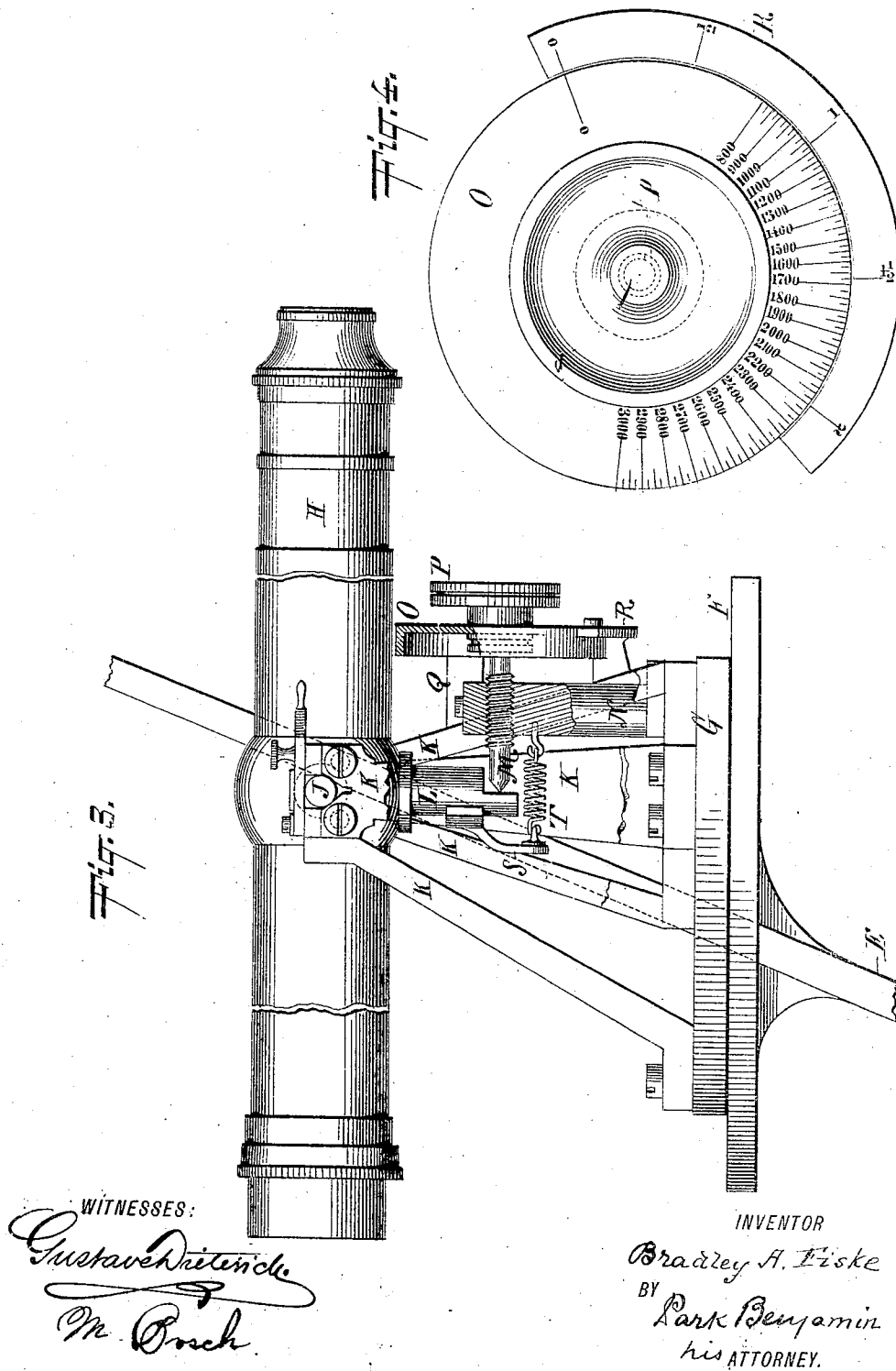
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WITNESSES:

Gustave Dietrich
Wm. Brock

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UNITED STATES PATENT OFFICE.

BRADLEY A. FISKE, OF THE UNITED STATES NAVY.

TELESCOPIC SIGHT FOR SHIPS' GUNS.

SPECIFICATION forming part of Letters Patent No. 504,337, dated September 5, 1893.

Application filed March 9, 1891. Serial No. 384,218. (No model.)

To all whom it may concern:

Be it known that I, BRADLEY ALLAN FISKE, of the United States Navy, have invented a new and useful Improvement in Telescopic Sights for Ships' Guns, of which the following is a specification.

In Letters Patent No. 435,925, granted to me on the 9th day of September, 1890, I have fully set forth my method of pointing a gun located on a rolling, heeling, or vibrating platform, which method consists in adjusting a telescope also located on said platform and movable on a transverse axis approximately parallel to that of the gun at an angle to the axis of the bore of said gun equal to a certain predetermined angle of elevation necessary to cause the projectile fired from said gun to travel to a given target, and then noting the moment when the line of sight of said adjusted telescope is caused by the movement of said supporting platform to intersect said target.

My present invention relates to an apparatus for carrying said method into practical effect, and consists more particularly in the construction of a telescopic sight for ships' guns as hereinafter set forth and in the combination of the same with the gun.

In the accompanying drawings, Figure 1 illustrates diagrammatically a gun disposed with the axis of its bore parallel to the plane of the ship's deck and provided with a shield, upon which is mounted my aforesaid telescopic sight, which is shown in two positions; namely, with the axis of the telescope parallel to the gun axis, with the axis of the telescope placed at an angle to said gun axis. Fig. 2 represents the same parts as in Fig. 1, and shows how the telescope is brought into horizontal position after it has been adjusted at an angle, as aforesaid, by the rolling or pitching of the vessel, whereby the deck assumes an inclined position. Fig. 3 is an elevation of my telescopic sight showing certain parts broken away and in partial section. Fig. 4 is a face view of the graduated disk and stationary surrounding limb which is graduated in degrees and fractions.

Similar letters of reference indicate like parts.

Referring first to Figs. 1 and 2, A represents a portion of a ship's deck.

B is the gun, the trunnions C of which are

mounted upon any suitable carriage D supported on a slide which carries the usual protecting shield E, through an opening in which the gun extends. Upon a side of the shield is secured a bracket F, upon which is secured the supporting base G of the instrument.

H is the telescope having trunnions J which are received in suitable bearings carried by standards K which rise from the base G.

Extending downward from the middle part of the telescope H is a projection L, the lower extremity of which is cut away to form a vertical flat surface, against which surface bears the point of the adjusting screw M. The screw M passes through a threaded standard N upon the base G; and upon its shaft carries a flanged disk O, and also outside of said disk a milled head P, by means of which head P said screw is turned.

Supported by bars Q projecting from the standards K, is an arc-shaped limb R, which has its inner periphery in close proximity to the circumferential edge of the disk O.

Connected to the projection L and extending downward below the same, is an arm S to which is secured one end of a coiled spring T; the other end of said spring being fastened to a hook, or otherwise secured upon the post N.

The telescope H is of the usual kind for field work and is provided with suitable cross-hairs. Upon the disk O is marked first a zero point, and then follow regular graduations, suitably marked, as shown in Fig. 4, which indicate yards of range. The markings upon the limb R represent degrees of elevation or depression of the telescope.

The general operation of my aforesaid apparatus will be understood from Figs. 1 and 2, and also from the statements contained in my above-named patent. Referring first to Fig. 1, here the axis of the bore of the gun represented by the dotted line *a a*, is shown to be parallel to the plane of the deck A. The line of sight of the telescope H (full lines) is shown by the dotted line *b b*, which is parallel to the line *a a*. Let it now be assumed that the gun is to be given a certain elevation necessary to carry the projectile over a given range or interval between the said gun and the target. Ordinarily this is done by adjusting a vertically moving sight bar sup-

ported upon the breech of the gun so that a notch thereupon will be properly elevated, and then lowering the breech of the gun until the line of sight of the person directing said gun includes the bottom of said notch, the top of a fixed sighting point located upon the gun body and the object. When this occurs, the muzzle of the gun will have been raised over a certain angle; or in other words, the gun will have been elevated over an angle sufficient to cause the projectile to travel over the given range or interval. In practice, it is customary to mark the ordinary sight bar both in degrees and fractions, so that the gun may be set at any desired elevation, and also for yards of range corresponding to the elevation in degrees; so that by means of said sight-bar, the gun may be adjusted in elevation to any desired angle, or for any desired range. The objections to this form of sight upon ships' guns are numerous. Inasmuch as the sight-bar is upon the gun itself, it partakes of all motions of the gun; such as the recoil. The bar after adjustment is, therefore, liable to displacement, and in fact is usually readjusted for each shot. The person sighting the gun is obliged to stand at a distance from the breech and hence from the sight bar; thus greatly increasing the difficulty of bringing the rear sight and front sight of the gun and the object into line. These difficulties are much enhanced when the ship (as is invariably the case at sea) is rolling or pitching. The person sighting the gun must then maintain his own equilibrium, and in addition must seize the exact moment when the sights come in line with object, to fire. The consequence is that accurate firing in a sea-way has become largely a matter of individual skill, which may require high development not merely by reason of the difficulties before noted, but for the elimination of personal equation of error, as well as for its employment under the exciting conditions of actual conflict. By my present invention, the aforesaid difficulties are greatly reduced, and to a large extent overcome. In accordance with the method described in my prior patent, I employ primarily the rolling or pitching of the ship itself to give to the gun the necessary elevation; the piece being normally laid with the axis of its bore parallel to the deck; or, if the extent of angular movement of the deck is not sufficient to carry the gun over the whole desired angle of elevation, then I give to the gun by the ordinary elevating gear, a certain initial angle of elevation which is made sufficiently great to allow of the ship's movement completing the whole desired angle. I also, in accordance with my aforesaid method, effect the sighting of the gun by means of a telescope not supported on the gun, nor partaking of the gun's recoil. To this end, in my present invention I support the telescope H, as shown in Figs. 1 and 2, preferably upon the

shield E, and I sight the gun in the following manner: The line of sight bb of the telescope, the axis of the bore aa , and the deck being parallel, the gun is trained laterally upon the target; and the telescope being attached to the shield, is so trained at the same time. The observer at said telescope notes the fact that the target, as the ship rolls, is seen at the intersection of the cross-wires. The object end of the telescope is then depressed by the means hereinafter detailed over an angle which is to equal that of elevation of the gun necessary to cause the projectile to travel over the distance or range between gun and target. The position of the telescope when so depressed is indicated by the dotted lines in Fig. 1, and the direction of its line of sight by the line cc . The observer still keeping his eye at the telescope, then watches for the target once more to appear at the intersection of the cross-hairs. This obviously will occur when the deck A, and hence the axial line aa of the gun, assume an angle equal to that at which the telescope has been placed; or in other words, when the telescope H becomes horizontal, as indicated in Fig. 2, then the axis of the bore aa will stand at the proper angle to give the projectile the required range. The observer therefore, as soon as he notes the coming of the target upon the intersection of the cross-wires, presses the firing key and discharges the gun.

Referring now to Figs. 3 and 4, I have here illustrated the mechanism which practically supersedes the ordinary sights on the gun. It will be plain that when the milled head P is turned in one direction, the point of screw M pushing upon the extremity of the projection L, causes the object end of the telescope to rise; but when said milled head is turned the other way, the spring T acting upon the arm S and projection L, causes the object end of the telescope to descend. Therefore the telescope may be elevated or depressed by turning said head P, which is conveniently placed to the hand of the operator. The zero mark on the disk O is so placed that when it coincides with the zero mark on the limb R, the line of sight of the telescope is parallel to the deck. The limb R is marked to represent degrees of angular motion of the telescope; and upon the disk O are marked the ranges which correspond to those angles and which will be given by the gun which the apparatus is to control. Thus in Fig. 4, it is shown that at an angle of elevation of two degrees the range will be two thousand two hundred yards. At an angle of one and a half degrees, the range will be about sixteen hundred and seventy-five yards. At one degree, ten hundred and seventy-five yards, and so on. If, therefore, we wish to adjust the telescope for a range say of two thousand two hundred yards, the milled head P is turned until the mark two thousand two hundred comes opposite the zero mark on the

limb R. The spring T acting on the projection L, will then have depressed the telescope over an arc of two degrees. A similar operation is performed for any other range mark on the disk O: it being necessary simply to bring the proper range mark into coincidence with the zero mark on the limb R to know that the telescope has been set at such an angle as that when the object appears at the intersection of its cross-hairs, the gun itself located in proximity to that telescope will be at the same angle; or in other words, be so adjusted as to throw its projectile over the range indicated by the disk. In case the ship is not rolling or pitching sufficiently to give to the gun the desired elevation, then, as already described, an initial elevation is given to the gun itself; say, for example, one degree, when the total required angle is two degrees. It will be obvious then that the necessary angular movement of the telescope will be only one degree for a range, say of two thousand two hundred yards. In such case, therefore, the two thousand two hundred mark on the disk O is not moved around to the zero point on the limb R, but to the one degree point on said limb; or in other words, to the point representing the initial elevation given to the gun whatever it may be. By the word "deck" is herein meant that part of the deck on which the gun moves and which in modern war ships is always a plane surface. The line from the gun to that point of a target situated at the same height above the water as the gun, is here assumed as the line of sight, and the line of sight is thus assumed to be horizontal. But it is evident that no appreciable error is introduced if the line of sight be not exactly horizontal, but intersect a target on the water at any point, for the projectile will simply strike the target higher or lower according as the line of sight is higher or lower. It is evident that for night firing, the cross hairs may be made incandescent by an electric current, as is done with astronomical telescopes, thus avoiding the necessity for the complicated electrical night sights used in all the navies of the world.

I claim—

1. The combination of a gun a support laterally movable with said gun, and a sight tube mounted on said support, the said tube and the said gun being independently movable on their transverse axes in parallel vertical planes.

2. The combination of a gun mounted on a vibrating platform, a supporting carriage therefor, a protecting shield for said gun and carriage and a sight tube supported on said shield; the said tube and the said gun being independently movable on their transverse axes in parallel vertical planes.

3. The combination of a gun mounted on a vibrating platform, a support laterally movable with said gun, a sight tube mounted on said support (the said tube and the said gun

being independently movable on their transverse axes in parallel vertical planes) and means for adjusting said tube to desired angles of elevation or depression.

4. The combination of a gun mounted on a vibrating platform, a support laterally movable with said gun, a sight tube mounted on said support (the said tube and the said gun being movable on their transverse axes in parallel vertical planes) means for adjusting said tubes to desired angles of elevation or depression and an index showing the extent of said angular movement.

5. The combination of a gun mounted on a vibrating platform, a support laterally movable with said gun, a sight tube mounted on said support (the said tube and the said gun being movable on their transverse axes in parallel vertical planes), means for adjusting said tube to desired angles of elevation or depression, and an index showing the range of the said gun when laid at corresponding angles.

6. The combination of a gun mounted on a vibrating platform, a support laterally movable with said gun, a sight tube mounted on said support (the said tube and the said gun being movable on their transverse axes in parallel vertical planes), means for adjusting said tube to desired angles of elevation or depression, an index showing the extent of said angular movement, and an index showing the range of said gun when laid at corresponding angles.

7. The combination of a sight tube movable on a transverse axis, a screw operating to cause said motion, a graduated disk carried by said screw, and an index or scale plate in proximity to said screw index, the disk and the plate being graduated one in angles and the other in the ranges corresponding thereto.

8. The combination of a sight tube movable on a transverse axis, a screw operating to cause said motion in one direction, and an opposing spring operating to cause said motion in the other direction, an index carried by said screw, an index or scale plate in proximity to said screw index, and showing the extent of rotation of said screw and hence of the angular movement of said sight tube.

9. The combination of the telescope H supported on its transverse axis and having the projection L, the adjusting screw M bearing upon said projection and operating to move said telescope on its axis in one direction, means, such as a retracting spring for moving said telescope in the opposite direction, a disk O on the screw shaft and provided with an index and a fixed scale R in proximity to said disk and showing the extent of rotation of said screw, and hence of the angular movement of said telescope.

10. The combination of the telescope H supported on its transverse axis and having the projection L, the adjusting screw M, bearing upon said projection and operating to

move said telescope on its axis in one direction, means, such as a retracting spring for moving said telescope in the opposite direction, a disk O on said screw shaft provided
5 with marks indicating the ranges of a given gun corresponding to angles of depression or elevation similar to that of said telescope, and a fixed scale or index R in proximity to

said disk and showing the extent of rotation of said screw and hence the angular movement of said telescope.

BRADLEY A. FISKE.

Witnesses:

ROBT. M. HOOPER,
ARTHUR ELLALOIS.