E. T. STEPHENS.

METHOD OF AND APPARATUS FOR TARGETING GUNS.

APPLICATION FILED NOV. 6, 1916.

1,309,429. Patented July 8, 1919.

Fig. 1.

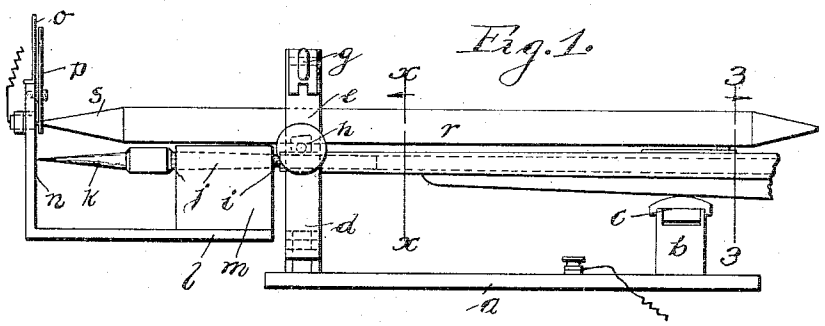


Fig. 2.

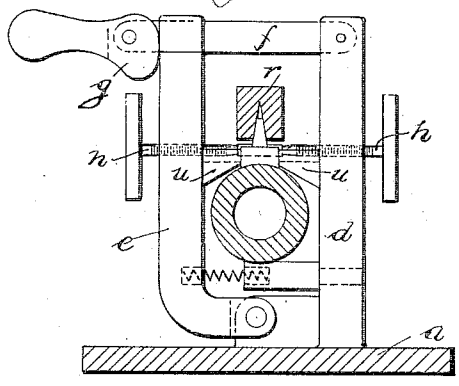


Fig. 4.

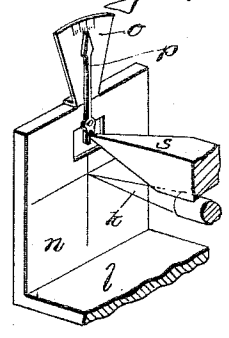


Fig. 5.

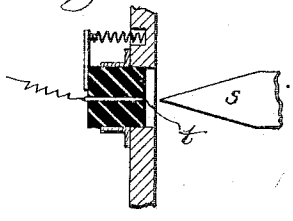
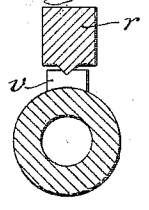


Fig. 3.



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METHOD OF AND APPARATUS FOR TARGETING GUNS.

1,309,429. Specification of Letters Patent. Patented July 8, 1919.

Application filed November 6, 1916. Serial No. 129,816.

To all whom it may concern:

Be it known that I, ELWYN T. STEPHENS, a citizen of the United States, residing in Springfield, Hampden county, Massachusetts, have invented new and useful Improvements in Methods of and Apparatus for Targeting Guns, of which the following is a specification, reference being had to the accompanying drawings and letters of reference marked thereon.

Heretofore it has been usual to target, *i. e.* properly locate the sights on a gun barrel by shooting and by socalled bore-sighting and by ascertaining the axis of the bore at the muzzle end and locating the rear sight with its zero or other arbitrary mark in the same plane. Some, however, prefer that the rear sight be located with its zero mark in the vertical plane of the axis of the bore at the rear end of the barrel and that then the front sight be moved to the right or left as required, until the projectile traveled in the line of sight between the rear and front sights. It will be understood that the shifting of the front sight becomes necessary because the direction of travel of the projectile is governed by the direction at the bore at the muzzle end of the barrel; and as the axis of the bore at the muzzle end, is rarely in line with the axis at the breech end, it will be seen that if the front sight be set in the vertical axis of the bore at the front end, and the rear sight set in the vertical plane of the bore at the rear end of the barrel, the projectile will not travel in the line of sight as defined by the sights unless the axis of the bore at the front is the same, or in perfect alinement with the axis of the bore at the breech end of the barrel; and as this rarely occurs, it becomes necessary to move either one sight or the other, until the line of sight over or through the sights is such, as to be in the same plane as the axis of the bore at the muzzle end.

The object of my invention is to provide a new method of and appratus for targeting fire arms by the employment of which accuracy is attained and time and expense saved. I accomplish these objects by the employment of the method herein set forth, and by the construction of an apparatus herein shown and described as one exemplification of an apparatus designed to assist in carrying out the improved method.

In the accompanying drawings in which like letters of reference indicate like parts—

Figure 1 is a side view of an apparatus showing the portion of a gun barrel from the muzzle end back to a short distance back of the rear sight mounted therein and showing the muzzle plug and pointer together with the target and straight edge.

Fig. 2 is a sectional end view of the same taken on line *x x* looking toward the target.

Fig. 3 is a sectional view of a gun barrel and the straight edge the section being shown on a line 3—3 adjacent the rear sight.

Fig. 4 is a detached view in perspective showing the target and indicating pointer thereon and showing also the indicating pointers of the muzzle plug and the straight edge.

Fig. 5 is a vertical section showing a construction wherein an electric circuit is employed to light a lamp or sound a bell when the straight edge pointer contacts with a conductor or is moved to a point where a circuit is made.

In detail *a* indicates the base of the apparatus, *b* a support for the rear portion of the arm, *c* a table mounted on the part *b*, *d* a fixed upright member of the device for holding the forward end of the barrel in place, *e* a pivotally mounted member, *f* a lever or arm pivoted in the member *d*, *g* a locking cam, *h* screw threaded members, *i* bore plug, *j* bore plug extension, *k* bore plug pointer, *l* target base, *m* target block mounted on the muzzle plug extension, *n* target plate, *o* micrometer indicator plate, *p* micrometer pointer, *r* straight edge, *s* straight edge pointer, *t* contact member or conductor.

The construction and operation will be readily understood on reference to the drawings in connection herewith.

The illustrations are of one type only of a practical apparatus for carrying out the improved method and I do not limit myself to it, as other devices may be provided to accomplish a like result.

A suitable supporting frame is provided in which the barrel (and by preference the barrel after being mounted in the stock) is firmly supported. For such frame I illustrate a base *a* having a supporting piece *b* secured thereto, upon which the rear portion of the gun barrel, or barrel and stock are supported. I prefer that this support be provided with a table *c* movable laterally on the support *b* on ball or roller bearings or other sensitive mechanism, so that the barrel may be easily located in position. At the

opposite end portion of the fixture, I provide two uprights *d* and *e* between which the barrel is held. By preference when operating on a gun barrel of the usual construction I provide the members *d* and *e* with engaging lugs *u* which bear against the rib or lug upon which the sight is mounted. These members bring the barrel to the proper position and prevent danger of rotation of the barrel when the sight is moved by application of the adjusting screws *h*.

I provide a bore plug *i* which for a distance of from 2 to 4 inches, as may be found most practicable, enters and fits closely within the bore at the muzzle end of the barrel. This plug is provided with an extension *j* which projects beyond the end of the barrel and supports a block *m*, this support being attained by passing the plug through a suitable opening in the part *m* in which opening this portion of the plug fits snugly and by preference the plug at this part is made tapering. The target base *l* is fixed to the block *m* and is provided with a vertical plate *n* the latter being provided with a vertical line in registry with the pointed end of the plug *k*. It will now be seen that the line on the target *n* is in perfect alinement with the axis of the bore at the muzzle end of the barrel, because of the fact that the plug fills the bore of the barrel at the muzzle end and therefore projects therefrom in the same direction and the pointed extending part *k* will indicate at its pointed end the direction of the axis of the bore at the muzzle end of the barrel and if this point be indicated upon the target *n* it will indicate the point where a line drawn from the axis of the bore at the muzzle end of the barrel would intersect the target if projected thereto, and a vertical line drawn on the target from the point so indicated will indicate the vertical plane of the axis of the bore at the muzzle end. If now the block *m* be mounted on the plug *j* and the target be fixed to the block *m*, then the extended tapering point of the plug will always point to the same vertical plane on the target and it simply becomes necessary to move one of the sights laterally so that the sighting line from the rear sight through or over the front sight will intersect the same vertical plane as indicated on the target thus putting the sights in proper alinement so that when the arm is sighted the sighting line will be in the same vertical plane as the line of the axis of the bore at the muzzle end of the barrel. The straight edge *r* is placed in engagement with the rear sight and as the rear sighting line is usually a notch, I have illustrated in Fig. 3 the straight edge having a V-shaped projection on its lower edge resting within the notch of the rear sight. The portion of the straight edge adjacent the front sight rests over the front sight as illustrated in Fig. 2. If now the straight edge pointer is in registry with the same vertical line with the pointer of the barrel-plug, then the fact is established, that a line drawn through the notch of the rear sight over the front sight is in the same vertical plane as the axis of the bore of the barrel at the muzzle end; and the direction of the projectile will therefore be in the same vertical plane as the sighting line. If, however, it is found that the two pointers do not register in the same vertical line on the target, then the barrel being firmly held in place, the front sight is moved to the right or left as may be necessary, by turning the thumb screws *h* to the right or left, thus forcing the sight to the right or left of the barrel until the pointer of the straight edge registers in the same vertical line as the pointer of the muzzle-plug.

It will now be seen that as the direction of the flight of the projectile is controlled by the direction of the bore at the muzzle end, the proper location of the front sight may be readily determined mechanically by this method and apparatus and that the correct line of sight may be attained by moving or ascertaining the correct position of the rear sight as well as by operating at the muzzle end.

In order to save undue strain on the eyes and in order to enable a workman having defective eyesight to operate the apparatus accurately, I provide for the closing of an electric circuit, when the line of vision over the sights is in proper relation to the line of the axis of the bore at the muzzle end of the barrel, which circuit may either light a lamp, show a spark or ring a bell; thus indicating to the operative instantly and without close watching, that the points are in proper registry.

When the proper location of the sights is ascertained the barrel is removed from the rest and the sights permanently fastened in place.

In order to facilitate the ready reading of the registry of the parts I in some instances provide the target *n* with a micrometer dial and mount a multiplying pointer or hand thereon, so that as the straight edge pointer is brought in contact with the dial hand the operative may easily note when the dial hand reaches the marking indicating that the straight edge pointer is in the same vertical plane as indicated by the muzzle plug pointer. In the event of the employment of the micrometer scale and hand or pointer it is desirable that the contacting points be knife edges so that the utmost accuracy may be secured.

Having therefore described my invention what I claim and desire to secure by Letters Patent is:

1. The method of targeting a firearm having rear and front sights, which consists in

securing the firearm in a fixed position, so fixing a line with reference to the muzzle end of the bore of the firearm that it is in the vertical plane containing the axis of the bore at such end, and making such lateral sight adjustment as may be required to cause the line of sight along the rear and front sights to intersect said vertical line.

2. The method of targeting a firearm having rear and front sights one of which sights is laterally adjustable, which consists in securing the firearm in a fixed position, so fixing a line with reference to the muzzle end of the bore of the firearm that it is in the vertical plane containing the axis of the bore at such end, and adjusting the movable sight to cause the line of sight along the rear and front sights to intersect said vertical line.

3. The method of targeting a firearm having a rear sight and a laterally adjustable front sight, which consists in securing the firearm in a fixed position, so fixing a target with reference to the muzzle end of the bore of the firearm that a line thereon is in the vertical plane containing the axis of the bore at such end, and adjusting the front sight to bring the line of sight along the front and rear sights to intersect said vertical line.

4. In an apparatus for targeting a firearm having front and rear sights, means adapted to be accurately supported in the bore at the muzzle end of the barrel of such firearm, means supported by said first-named means and provided with a fixed point, and means to engage the sights and to be accurately located thereby for determining the registration of the line of sight with said point, which latter is fixed with reference to the axis of the bore at the muzzle end of the firearm.

5. An apparatus for targeting a firearm having front and rear sights, a supporting frame for such firearm, means adapted to be accurately supported in the bore at the muzzle end of the barrel of such firearm, means supported by said first-named means and provided with a fixed point, means to engage the sights and to be accurately located thereby for determining the registration of the line of sight with said point, which latter is fixed with reference to the axis of the bore at the muzzle end of the firearm, and indicator means for said engaging means for said sights.

6. In an apparatus for targeting a firearm having front and rear sights, a supporting frame for such firearm, a plug adapted to be accurately supported in the bore at the muzzle end of the barrel of such firearm, a target supported by said plug, a straight edge adapted to engage the sights and to be accurately located thereby for determining the registration of the line of sight with a point fixed on said target with reference to the axis of the bore at the muzzle end of the firearm, and indicator means in operative relation to said straight edge for denoting the accurate location of said straight edge.

7. In an apparatus for targeting a firearm having front and rear sights, a supporting frame for the firearm, said frame comprising a rest for the rear portion of the firearm, and a clamp for the front portion of said firearm, means to move one of said sights laterally on the barrel of the firearm, while the latter is held in fixed position by said frame, means adapted to be accurately supported in the bore of said barrel at the front end, and means for determining when the sight-moving means and the barrel-supported means are in vertical alinement.

8. In an apparatus for targeting a firearm having front and rear sights, a frame for supporting the firearm, means adapted to be accurately supported in the bore of the barrel of the firearm, at the muzzle end of said barrel, for ascertaining the direction of such bore, means for indicating such direction at a distance from the front end of the barrel, and means extending from the rear sights to a point in the same vertical line with the point indicated by said indicating means, for the purpose of locating the front sight in accurate relation to the rear sight, and the line of sight in accurate relation to the axis of said bore.

9. In an apparatus for targeting a firearm having front and rear sights, a plug adapted to be accurately supported in the bore at the muzzle end of the barrel of such firearm, a target supported by said plug, means to engage the sights and to be accurately located thereby for determining the registration of the line of sight with a point fixed on the target with reference to the axis of the bore at the muzzle end of the firearm, a micrometer scale, and a pointer therefor, said pointer being operated by said last-mentioned means.

10. In an apparatus for targeting a firearm having front and rear sights, means adapted to be accurately supported in the bore at the muzzle end of the barrel of such firearm, means supported by said first-named means and having a fixed point, means to engage the sights and to be accurately located thereby for determining the registration of the line of sight with said point, which latter is fixed with reference to the axis of the bore at the muzzle end of the firearm, and means to indicate when the sight-engaging means is accurately positioned.

11. In an apparatus for targeting a firearm having front and rear sights, means adapted to be accurately supported in the bore at the muzzle end of the barrel of such firearm, means supported by said first-named means and having a fixed point,

means to engage the sights and to be accurately located thereby for determining the registration of the line of sight with said point, which latter is fixed with reference to the axis of the bore at the muzzle end of the firearm, and electrical indicating means arranged to be set in operation when said sight-engaging means is accurately positioned.

12. In an apparatus for targeting a firearm having front and rear sights, a plug adapted to be accurately supported in the bore at the muzzle end of the barrel of such firearm, a target supported by said plug, and means to engage the sights and to be accurately located thereby for determining the registration of the line of sight with a point fixed on the target with reference to the axis of the bore at the muzzle end of the firearm.

13. In an apparatus for targeting firearms, a suitable frame to support a firearm the barrel of which has a front sight base and front sight, means to support the rear portion of the firearm, and a clamp at the front portion adapted to engage the front sight base and thereby hold the muzzle end firmly in position.

14. In an apparatus for targeting firearms, a suitable frame adapted to support a firearm the barrel of which has a front sight base and a front sight adjustable thereon, means to support the rear portion of the firearm, a clamp at the front portion adapted to engage the base upon which the front sight is mounted and thereby hold the muzzle end firmly in position, and means for moving the front sight laterally.

15. In an apparatus for targeting firearms, a suitable frame adapted to support a firearm the barrel of which has a front sight and front sight base, means to support the rear portion of the firearm, and a clamp at the front portion adapted to engage the base upon which the front sight is mounted and thereby hold the muzle end firmly in position, said means comprising threaded stems arranged to move the sight.

16. In an apparatus for sighting firearms, a suitable frame adapted to support a firearm the barrel of which has a front sight base and front sight, means to support the rear portion of the firearm, and a clamp for holding the muzzle end, said clamp comprising a fixed member, a member pivoted thereto, and a locking member pivoted to the fixed member, and provided with a cam adapted to engage said pivoted member.

ELWYN T. STEPHENS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents. Washington, D. C."