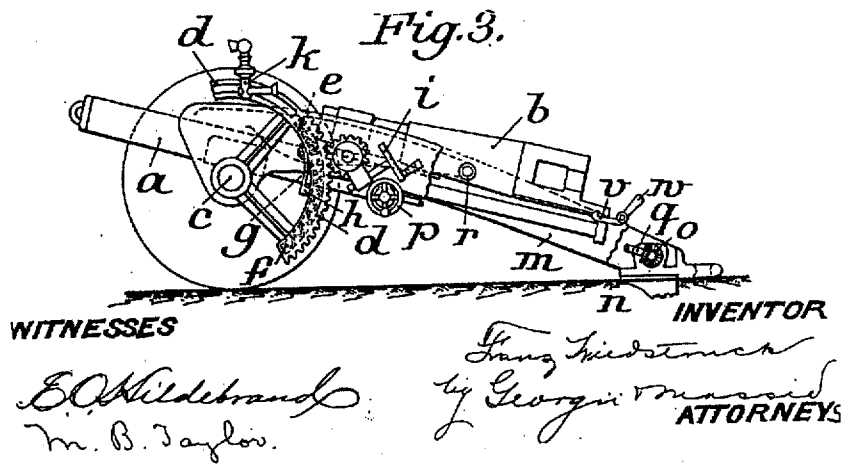
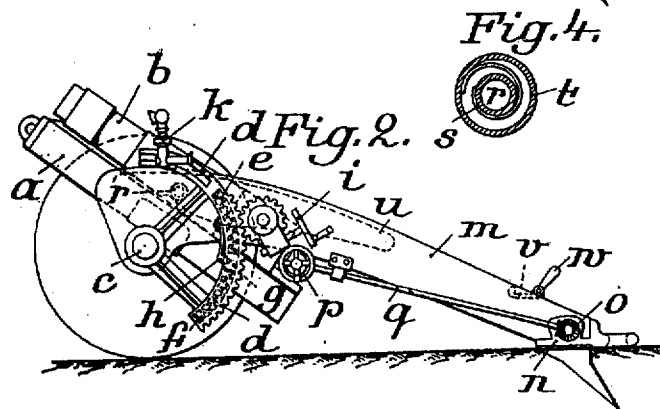


1,039,869.



UNITED STATES PATENT OFFICE.

FRANZ WIEDSTRUCK, OF KÖNIGGRÄTZ, AUSTRIA-HUNGARY, ASSIGNOR TO RHEINISCHE METALLWAAREN- UND MASCHINENFABRIK, OF DUSSELDORF-DERENDORF, GERMANY.

GUN HAVING A RECOILING BARREL.

1,039,869.

Specification of Letters Patent.

Patented Oct. 1, 1912.

Application filed December 11, 1908. Serial No. 466,983.

To all whom it may concern:

Be it known that I, FRANZ WIEDSTRUCK, major, a subject of the Austro-Hungarian Emperor, residing at 138 Enge Gasse, Königgrätz, Austria-Hungary, have invented certain new and useful Improvements in Guns Having a Recoiling Barrel; 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.

The present invention relates to improvements in guns having a recoiling barrel, especially those in which the recoil is a long one.

By use of the invention even those guns which are fired at a very high elevation can have a long recoil, the length of recoil being the same or nearly the same for all elevations without the necessity for employing the usual auxiliary means such as the displacement of the trunnions, or the raising of the position of the barrel. Moreover, the invention obviates the necessity for making the recoil variable, that is to say, for decreasing its length as the elevation increases. In fine, the present invention fulfills the general purposes of a long recoil gun; more particularly, it permits the gun to remain stationary and allows the firing height to be as low as may be desirable without an appreciable diminution of the length of recoil. As regards the first point, there is afforded the possibility that by use of the present invention, even when the firing is at a high elevation, the barrel and parts sliding therewith never come below a certain minimum height, which can be determined beforehand. As regards the second point, in proportioning the recoil in the present invention even with guns firing on steep inclines, one is not more limited than with guns firing on the level or on flat inclines, for instance, field guns in general. These advantages are obtained by causing the barrel which begins to recoil in the line of fire, to deviate from this direction, and compelling the whole recoiling system to move in a predetermined path. This is effected by guiding a part of the recoiling system and involves a rotation of the barrel and cradle around the trunnions. The guiding part moves in a suitably curved guide, the construction being such that the barrel

recoiling through the same distance, is always brought to the same final position. In this end position the barrel may be retained by an automatically acting locking device and loaded. Thus for all elevations the gun can always be loaded in the same position, which may be arranged at a suitable height and in which the barrel arrives of its own accord.

The invention is illustrated in the accompanying drawings.

Figure 1 is an elevation of a gun to which the invention is applied, the barrel being in a horizontal position and as far forward as possible. Fig. 2 is a like view of the gun at about 45° elevation, the barrel again being as far forward as possible. Fig. 3 is a like view of the gun after it has been fired, the barrel being in the position assumed at the end of the recoil. This is the position of the barrel at the end of the recoil whether the gun is fired in the position shown in Fig. 1 or that shown in Fig. 2 or even at a higher elevation. Fig. 4 is a section view of a modified detail.

The cradle *a* which constitutes or carries the surface on which the barrel *b* recoils is adapted, in the example shown, to turn about the wheel axle *c*. The toothed sector *d* is also free to turn about the axle *c* and is formed as a casing open at the end directed toward the cradle and containing two springs *e* and *f*. Both springs bear against a projection *g* on the cradle extending into the casing, and tend to keep the cradle in the same position. In its middle position relatively to the toothed portion of the sector the projection *g* is also held by a spring pawl *h*, fixed to the sector, the pawl *h* having a V-shaped end entering a notch in the projection *g*. By this arrangement, while the spring pawl *h* is sufficient to hold the gun-barrel and cradle to the sector, when adjusting the sector to the desired angle of elevation, yet the spring pawl will yield and ride out of the notch in the projection *g* thus freeing the latter during recoil. When the elevating mechanism is operated by the hand wheel *j*, the cradle moves together with the sector *d* owing to the engagement of the latter with the projection *g*. By means of the adjustable sighting device *k* attached to the toothed sector the gun can be trained on to the target.

On one side of the barrel or on each side

there is a pin *r* which may be in one piece or may consist of an outer ring *t* and an inner ring *r* (Fig. 4), the latter constituting the pin proper and being held to the outer ring by a spiral spring *s* or by radially arranged helical springs or in any other suitable yielding manner. In the following description whatever the arrangement may be it will be regarded as a pin. When the barrel recoils from its forward position, after it has moved through a certain distance in the plane in which it was situated when the gun was fired, the pin *r* moves in contact with a curved guide *u* on the gun carriage *m*, and according to the elevation of the gun when it is fired the pin engages either with the upper surface of the guide as in Fig. 1 or with the lower surface thereof as in Fig. 2. Accordingly as may be desired, the barrel in a horizontal position or when elevated up to a certain angle may be allowed to recoil in a straight line without the use of the present invention and only be caused to deviate from the line of fire when the elevation exceeds a certain angle, or the barrel may be caused to deviate from the line of fire whether this be horizontal or at any elevation, so that the barrel is brought to the same final position no matter what the elevation may be. This latter case is that shown in the drawings. When the pin *r* engages the lower surface of the curved guide *u* during the recoil, which is the case when firing at high elevation, the pin is pressed on the surface not only by the weight of the barrel but also by the upper spring *e*. This case is shown in Fig. 3, where the recoil of the barrel has occurred from the position shown in Fig. 2. On the other hand, when the barrel recoils from the position shown in Fig. 1, the pin *r* engages the upper surface of the guide *u* being pressed against this surface by the spring *f*. By the deviation of the direction of recoil, the cradle is turned from its original position and the pawl *h* is automatically released, so that the aforesaid action of the spring *e* or *f* can come into play. The toothed sector *d* and with it the sighting device, retains its position in spite of the oscillation of the barrel during recoil, since it is coupled by the elevating mechanism with the stationary part of the gun carriage. During the return of the barrel the pin is again compelled to move along that surface of the guide which caused the deviation from the line of fire; during the recoil, being maintained against that surface by the spring which happens to be compressed. For this reason the barrel always returns to the original elevation. Just as in this example there are provided two guiding surfaces, of which in some cases one, in other cases the other comes into operation by spring pressure or weight thus causing the deviation, so the deviation can

be effected positively by a pair of elements which, for the whole length of the recoil or for a part thereof allows of the contact and guiding of the organs in question, in this case the pin *r* and the guide *u*. When the barrel has returned to its original position the pawl *h* again springs into the notch in the stop *g* on the cradle *a*.

By means of the device described above the recoiling barrel may always be so diverted that at the end of the recoil it, has the same position no matter what the elevation of the gun; thus the end position of the barrel can be utilized as the loading position. For this purpose care must be taken that the barrel is automatically fixed at the end of the recoil, for example by means of a pawl lever *v* which snaps into a suitable notch in the barrel. After the loading operation the catch is again released, such as by means of a handle *w*. The gun can then be fired automatically or manually after the barrel has been returned to its forward position.

The gun carriage in the present case differs somewhat from the usual form in that it is upwardly curved, that is to say its under surface is concave relatively to the earth's surface. As the guide causing the deviation of the barrel must be made somehow in material, the selected upwardly curved profile of the wall of the gun carriage presents the advantage that the guide *u* can be formed in the substance of the gun carriage, and moreover by preserving the usual profile for the lower part of the gun carriage, a considerable height of wall and therefore a satisfactorily stiff cross section can be obtained, although indeed one may depart from the usual lower form of gun carriage walls and make these concave as well.

In the example shown the gun carriage *m* which carries the guide *u*, is adapted to slide transversely on its spade *n* and is so slid by the training mechanism. The latter consists of a screw spindle *o* driven through bevel gear by shaft *q* from the hand wheel *p*.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:

1. In a field gun, the combination, with a carriage, a cradle mounted thereon, a gun barrel slidably mounted directly on said cradle, and securing connections between said gun barrel and cradle arranged to permit relative movement thereof in a direction substantially parallel to the barrel axis and to prevent movement in other directions, of a recoil brake arranged to act on the barrel, elevating means for simultaneously adjusting the cradle and gun barrel in elevation, and means acting only during recoil and return for swinging the gun bar-

rel and cradle in elevation during such recoil and return.

2. In a field gun, the combination, with a carriage, a cradle mounted thereon, and a gun barrel slidable on said cradle, of an upper and a lower guiding device and means carried by the barrel and arranged to engage one guiding device during recoil in one position of the gun barrel and another guiding device in another position of the gun barrel whereby the gun barrel is swung in elevation during recoil.

3. In a field gun, the combination, with a carriage, a cradle mounted on the carriage and arranged to swing in elevation, a barrel sliding directly on the cradle in a line always substantially parallel to the axis of the barrel, a curved guide for the barrel arranged to oscillate the barrel and cradle during recoil to bring the barrel from the firing elevation to a basic elevation, and means to automatically return the barrel to battery at the former firing elevation.

4. In a field gun, the combination, with a carriage, a cradle mounted on the carriage and arranged to swing in elevation, a barrel sliding directly on the cradle in a line always substantially parallel to the axis of the barrel, a curved guide for the barrel arranged to oscillate the barrel and cradle during recoil to bring the barrel from the firing elevation to a basic elevation, means to temporarily detain the barrel at the basic elevation for loading, and means to automatically return the barrel to battery at the former firing elevation.

5. In a gun having a recoiling barrel, a cradle pivoted on a horizontal axis, a barrel sliding on the cradle in a right line, a pin carried by the barrel, a fixed curved guide for the pin, said guide being widened in its initial portion and narrowed in its final portion to divert the barrel during recoil from any firing elevation to a basic elevation at the end of recoil, and automatic means to return the barrel to battery and simultaneously to the firing position.

6. In a gun having a recoiling barrel, a cradle pivoted on a horizontal axis, a barrel sliding on the cradle in a right line, a pin

carried by the barrel, a fixed curved guide for the pin, said guide being widened in its initial portion and narrowed in its final portion to divert the barrel during recoil from any firing elevation to a basic elevation at the end of recoil, automatic means to return the barrel to battery and simultaneously to the firing position, a catch to automatically detain the barrel at the basic elevation for loading and manually operable means to release said catch.

7. In a gun having a recoiling barrel, a cradle pivoted on a horizontal axis, a barrel sliding on the cradle in a right line, an elevating segment, a stop carried by the cradle, springs bearing from opposite sides on the stop and against the extremes of the segment, a pin carried by the barrel, a curved guide formed in the gun carriage for the pin, said guide being widened in its initial portion and narrowed in its final portion to divert the barrel during recoil from any firing elevation to a basic elevation at the end of recoil, a catch to automatically detain the barrel at the basic elevation, and means to manually release the catch.

8. In a gun having a recoiling barrel, a cradle pivoted on a horizontal axis, a barrel sliding on the cradle in a right line, an elevating segment, a stop carried by the cradle, springs bearing from opposite sides on the stop and against the extremes of the segment, releasable means to fix the stop relative to the segment, a pin carried by the barrel, a curved guide formed in the gun carriage for the pin, said guide being widened in its initial portion and narrowed in its final portion to divert the barrel during recoil from any firing elevation to a basic elevation at the end of recoil, a catch to automatically detain the barrel at the basic elevation, and means to manually release the catch.

In testimony whereof I have hereunto affixed my signature in the presence of two witnesses.

FRANZ WIEDSTRUCK.

Witnesses:

ROBERT W. HEINGARTNER,
AUGUST FUGGER.