

Sept. 8, 1925.

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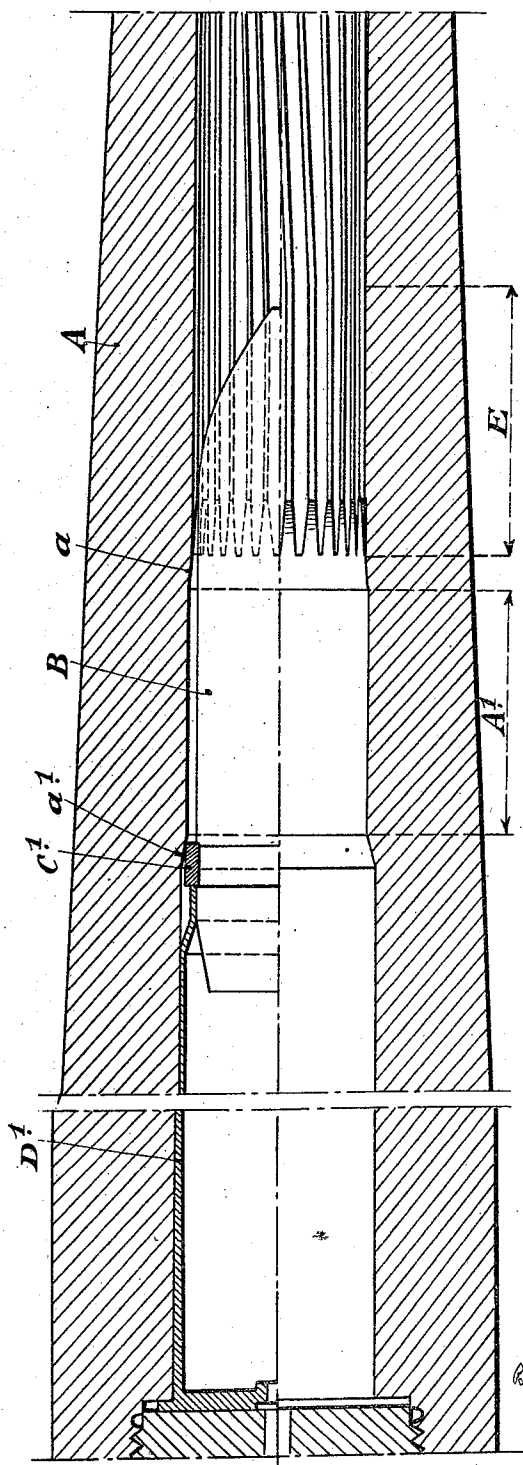
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GUN FOR FIRING AT RANGES WHICH MAY BE VARIED BETWEEN VERY WIDE LIMITS

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Fig. 1.



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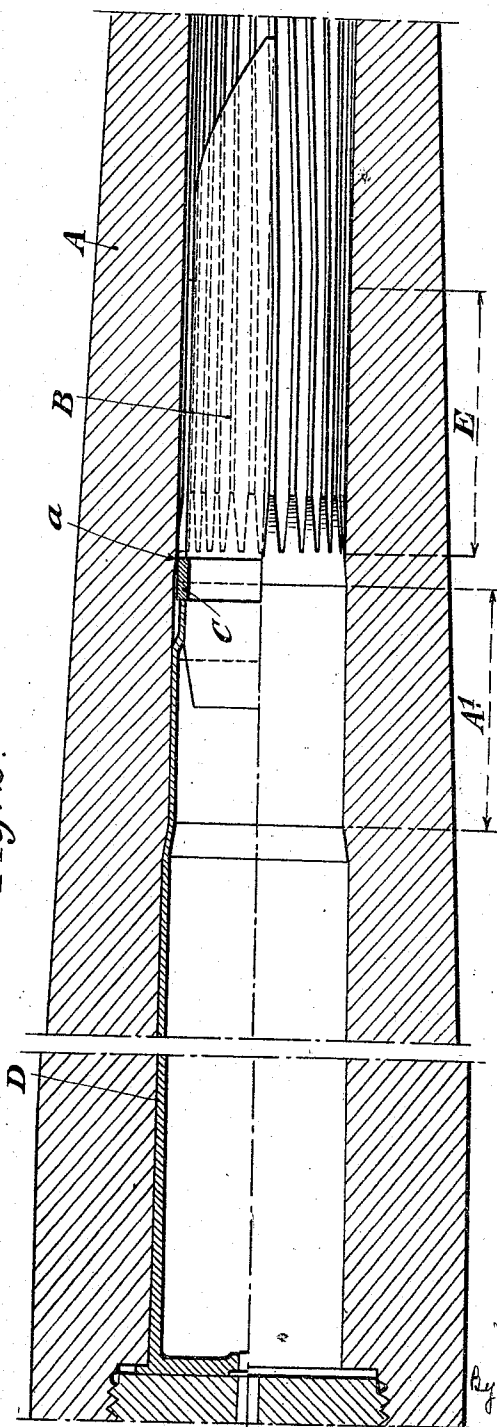
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Fig. 2.



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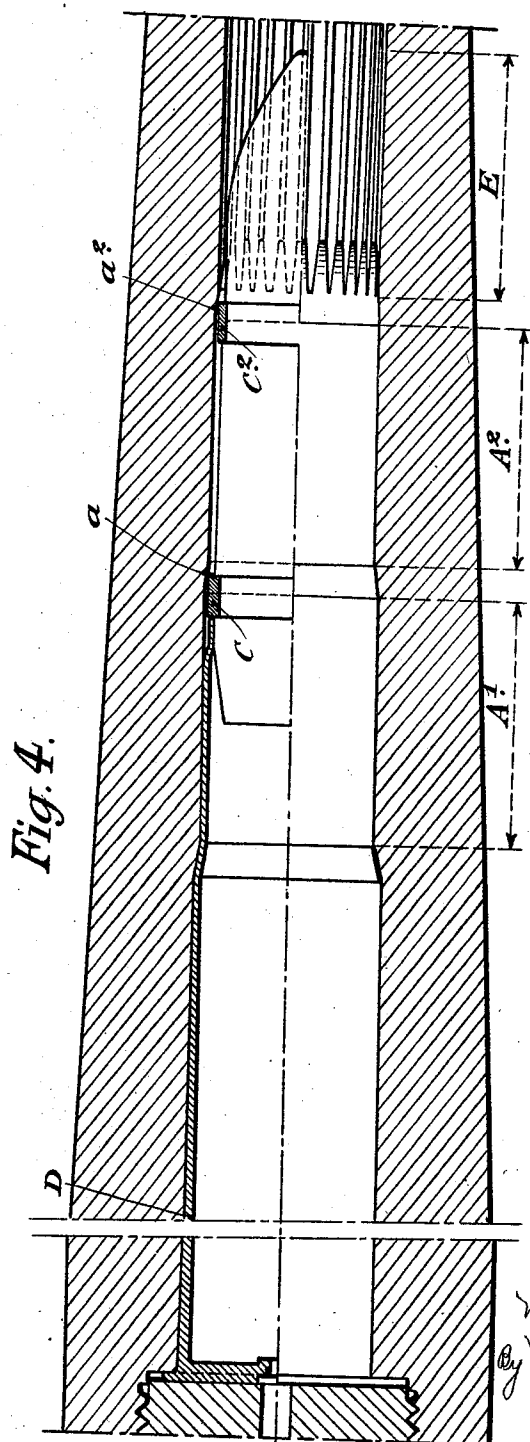
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UNITED STATES PATENT OFFICE.

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GUN FOR FIRING AT RANGES WHICH MAY BE VARIED BETWEEN VERY WIDE LIMITS.

Application filed April 4, 1925. Serial No. 20,818.

To all whom it may concern:

Be it known that I, NICOLAS EMILIE MATHLIN, a citizen of the Republic of France, resident of Paris, France, have invented new and useful Improvements in Guns for Firing at Ranges Which May Be Varied Between Very Wide Limits, which is fully set forth in the following specification.

This invention relates to a gun which may be used at will for firing at very long ranges or for firing at short distances.

In order to vary the effective range of one particular gun, it has already been proposed to vary the charge by displacing the obturator relatively to the base of a projectile which still occupies the same position in the gun tube, the variations of capacity being obtained either by a displacement of the tube itself relatively to a fixed breech block, or by displacing the breech block, in the gun chamber. These known devices are very complicated.

The disadvantage of varying the effective range (i. e., the initial or muzzle velocity) by simply altering the mass of the charge in an unvarying chamber is that the ranges obtained are very uncertain, the range varying according to whether the charge burns more or less rapidly or completely.

In conformity to the invention the bore of the gun is provided with a number of forcing cones, separated by smooth parts of the bore which are cylindrical or slightly coned, and one or the other of these cones acts as a stop for the driving band of the projectile, according to the size of the charge contained in the space comprised between the back face of the projectile and the breech block. Use may be made, for example, of the same type of projectile, the projectiles being provided, at the same distance from their back face, either with a band the diameter of which corresponds to the forcing cone which is furthest from the breech block, or with a band of larger diameter corresponding to the forcing cone nearest the breech block.

These projectiles provided with bands of different diameters may be used either with cartridge cases of different lengths corresponding to the distance between the breech block and the forcing cones chosen, or with

a variable number of cartridges, and plastic obturators.

Combined with these multiple forcing cones and projectiles with bands of different diameters, use is made, in conformity to the invention of rifling grooves which start at the forcing cone which is furthest from the breech, the said grooves being straight or with a very slight twist at their commencement, so that if a forcing cone distant from the commencement of the rifling grooves is used, the band which will have travelled, upon discharge, along a cylindrical or slightly conical smooth path, will not be suddenly pulled up at the entrance or in the back part of the rifling grooves, such a sudden stop being liable to cause an untimely operation of the fuse of the projectile.

Various examples of the application of the invention are illustrated in the accompanying drawings in which:—

Figure 1 is a longitudinal sectional elevation of a gun barrel constructed according to the invention. It shows the barrel arranged for firing at short distances, with a projectile provided with a driving band the diameter of which corresponds to the rear forcing cone.

Figure 2 is a sectional elevation of the same gun barrel, and shows the latter arranged for firing at long ranges, that is to say with a projectile which may be of the same shape and of the same dimensions as those which are used for firing over short distances, but provided with a driving band of smaller diameter corresponding to the front forcing cone.

Figures 3 and 4 are sectional elevations showing the applications of the invention with a view of use being made of projectiles with two bands, arranged respectively for firing over short and long distances.

As shown in Figures 1 and 2, the gun tube A is provided with two forcing cones a , a' one immediately behind the origin of the rifling grooves, and the other at a certain distance behind the first one, the part A' of the bore of the gun which extends from the cone a to the cone a' being smooth and cylindrical or preferably, slightly coned.

In conformity to the invention use is made, in combination with such a tube, of

projectiles B which may be of the same shape and dimensions, which comprise a driving band C¹ or a driving band C, the diameters of which are different and correspond to the forcing cones α^1 and α respectively, according to whether it is desired to fire at short or long ranges.

These projectiles with driving bands of different diameters are used either in combination with cartridge cases D¹ or D of different lengths, corresponding respectively to the distance between the cone α^1 and the breech and to the distance between the cone α and the breech, or with a varying number of cartridges, the breech being provided in this case, in the known manner, with a plastic obturator.

In order to prevent the driving band from being suddenly stopped when firing over a short distance, when this band, before entering the rifling grooves has passed through the smooth part A¹ of the bore, its entry into the rifling grooves is assisted by the very slightly increasing twist which is given to the latter over a certain length E, the rifling grooves being made straight over this length if desired.

In the example shown in Figures 3 and 4, the gun barrel is arranged for firing projectiles with two bands. The gun chamber comprises in this case, as in the preceding case, two forcing cones α , α^1 which act as stops before firing, for the rear band C¹ or C. It is provided with a third forcing cone α^2 immediately behind this origin of the rifling grooves, which, when firing at long ranges, serves as a stop for the front band C², this band abutting against the forcing cone α when firing over short distances. The spaces A¹, A² comprised respectively between the cones α^1 and α on the one hand, and α and α^2 on the other hand, are not rifled and are cylindrical or slightly coned.

The device described and illustrated does not prevent the range being slightly varied in each of the methods of employing the gun tube, by varying the charge contained in the case or the free charge formed by the cartridges.

In the same way, instead of making use of projectiles which only differ in the diameter of the band, the position of the band may also be varied, in the different projectiles, by making use for example of different projectiles having bands of the same diameter but arranged at a variable distance from the base of the projectile. Any other modification of the shape and dimensions of the projectiles may evidently be also made.

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. A rifled gun for firing at short and

long ranges and adapted to be used with projectiles provided with driving bands of various diameters, comprising a barrel having formed in the bore thereof two or more forcing cones decreasing in diameter from the breech toward the muzzle and longitudinally spaced by a smooth portion, or portions, of the bore, said cones constituting stops for the projectile driving bands, the forcing cone located at a distance farthest from the breech, being at the beginning of the rifling of the gun, which rifling is approximately rectilinear near the origin of the same, whereby a driving band, engaged with one of the cones that is at a distance from the cone at the origin of the rifling, is not suddenly stopped at said origin.

2. A rifled gun adapted to receive projectiles fitted with driving bands of various diameters and powder charges of various sizes, the bore of said gun being provided with two or more forcing cones decreasing in diameter from the breech toward the muzzle and longitudinally spaced by a smooth portion, or portions, of the bore, one of said cones constituting a stop for the driving band and the forward one of said cones being provided at the commencement of the rifling whereby sudden deformation of the driving band is avoided.

3. A gun for firing at variable ranges comprising a plurality of forcing cones decreasing in diameter from the breech toward the muzzle of the gun, a plurality of smooth coned portions formed in the bore of the gun intermediate said forcing cones, said forcing cones being adapted to engage driving bands formed on projectiles to be fired and to deform the same, and rifling grooves formed in the bore of the gun, said grooves having their origin at the front forcing cone, and being formed substantially straight for the first part of their length and then gradually increasing in twist as they approach the muzzle of the gun.

4. A gun for firing at various ranges comprising a barrel having a bore formed therein, said bore having a smooth portion and a rifled portion, a plurality of forcing cones of different diameters formed in the smooth portion of said bore, the smallest of said forcing cones being arranged at the juncture of the smooth and rifled portions of the bore, the portions of the bore intermediate the forcing cones being smooth and slightly tapering toward the muzzle of the gun.

5. The method of firing a gun at short and long ranges which consists in varying the powder charge and the diameter of the driving bands of the projectiles to be fired whereby said projectiles may be seated at varying distances from the breech of the gun.

6. The method of selectively firing pro-

jectiles from a single gun at short and long ranges which consists in reducing the powder charges and increasing the diameter of the projectile driving band or bands, whereby the projectiles may be seated in the gun at a relatively short distance from the breech thereof for short range firing, and increasing the powder charges and decreasing the diameter of the projectile driving band or bands whereby the projectiles may be seated in the gun at a relatively great distance from the breech thereof for long range firing.

In testimony whereof I have signed this specification.

NICOLAS EMILIEN METHLIN.