A. J. STONE & W. SHUKER.

NON-RECOIL ORDNANCE.

APPLICATION FILED JULY 27, 1917.

1,280,579.

Patented Oct. 1, 1918.

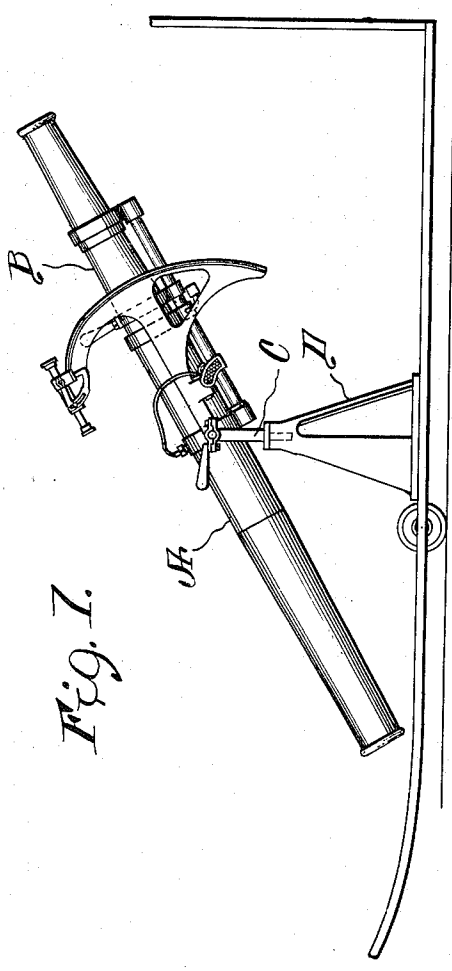


Fig. 1.

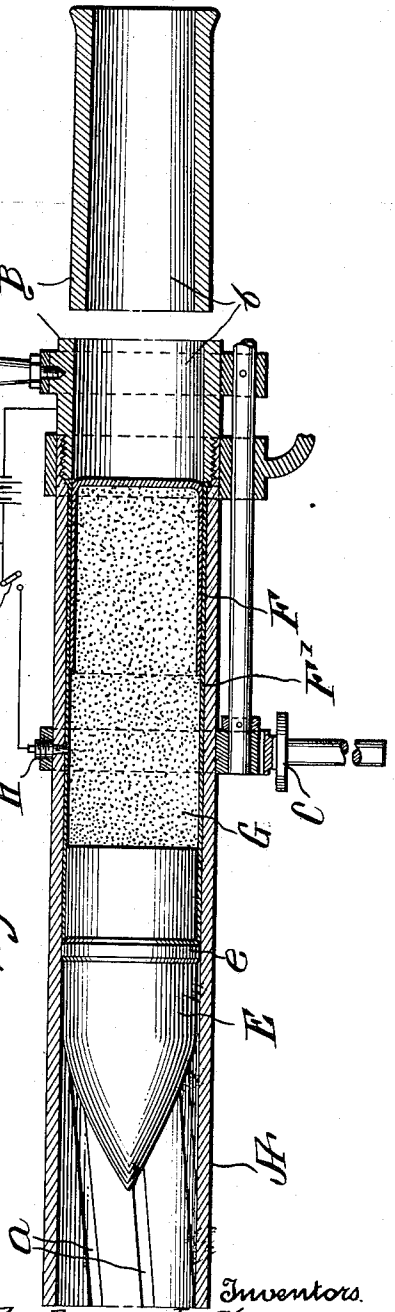


Fig. 2.

Witness
Edwin J. Beller.

Inventors.
Andrew J. Stone and
William Shuker.
by Wilkinson & Gioeta,
Attorneys.

UNITED STATES PATENT OFFICE.

ANDREW J. STONE, OF NEW LONDON, AND WILLIAM SHUKER, OF DERBY, CONNECTICUT; SAID SHUKER ASSIGNOR TO SAID STONE.

NON-RECOIL ORDNANCE.

1,280,579. Specification of Letters Patent. Patented Oct. 1, 1918.

Application filed July 27, 1917. Serial No. 183,175.

To all whom it may concern:

Be it known that we, ANDREW J. STONE and WILLIAM SHUKER, citizens of the United States, residing at New London and Derby, respectively, in the counties of New London and New Haven, respectively, and State of Connecticut, have invented certain new and useful Improvements in Non-Recoil Ordnance; and we 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.

This invention relates to improvements in non-recoil ordnance, and has reference to guns of that character wherein recoil is minimized or wholly eliminated by the discharge from the gun of an inertia mass in a direction opposite to that in which the main projectile is projected.

Our invention relates especially to ordnance of the non-recoil type shown, for instance, in the U. S. Patent Number 1,108,716, granted August 25, 1914, and entitled Apparatus for firing projectiles from air craft.

Hitherto it has been considered necessary to provide an inertia mass nearly approximate in weight to the effective projectile; and the object of the present invention is to provide means whereby this inertia mass can be very much reduced; and the invention consists in providing means whereby friction is utilized to take the place of weight or inertia. That is to say, the inertia effects due to the weight of the effective projectile are balanced by a small and light inertia mass plus the friction of this mass in the gun barrel. By this means the effects of recoil can be avoided, although the gun barrel will be necessarily subjected to more or less longitudinal stress, depending upon the pressure of the powder gases in the bore.

In accordance with the invention we propose to provide a cartridge having the usual effective projectile at its forward end, while at the rear end we provide a copper or like disk or cup adapted to fit a tapered passage opening through the breech of the gun.

The taper of the passage may be varied to give a greater or less squeezing action on the cup, thus increasing or decreasing the force required to propel this cup rearward through the breech of the gun.

In operation the firing of the explosive charge will occur between the effective projectile and the copper disk or cup with the result that the projectile will be shot out of the gun in one direction while the copper disk or cup will be forced through the tapering passage and out of the gun barrel in the other direction. It will readily be seen that by arranging the copper disk or cup of the proper diameter, weight and thickness, and arranging the tapering passage or passages in accordance, a frictional resistance can be provided for which will have precisely the same effect as a greater weight with less frictional resistance. It will be appreciated that the actual method of carrying the invention into practice may vary so long as the general principle involved is adhered to. This principle can be stated quite simply as follows: The inertia effects due to the heavy weight of the effective projectile plus the light frictional resistance of the projectile in the gun barrel should equal the inertia effects of the lighter weight of the disk or cup plus the heavier frictional resistance of the disk in the barrel so that if the disk is made lighter the frictional resistance must be increased accordingly to effect the desired balance.

Reference is had to the accompanying drawings, in which:

Figure 1 shows the gun mounted upon part of the framework of an aeroplane.

Fig. 2 shows a section through the loading chamber of the gun and through the cartridge case and counterpoise cup, the projectile being shown in elevation, the muzzle of the gun being cut away, and the rear end of the gun being broken away; the parts in Fig. 2 being on a larger scale than in Fig. 1.

The gun body consists of the forward portion or barrel A, which is trunnioned in the yoke C carried by the mount D, which mount may be of any suitable or desired construction, and B represents the rear portion of the gun which is detachably connected to the muzzle portion, as fully de-

scribed in the patent to Cleland Davis aforesaid.

The muzzle portion of the gun is rifled, as at *a*, to engage the rifling band *e* of the main or effective projectile E, and the rear portion of the gun is tapered, as at *b*, to compress the cup of copper, or other soft material, F, which forms the closure of the rear end of the cartridge case F′.

The breech portion of the gun B may be also rifled, but in the reverse direction to the rifling *a*, so as to compensate in a measure for the twist imparted to the gun barrel as the main projectile leaves the gun, but since the cup F will ordinarily be of comparatively small weight relative to that of the main projectile E, this rifling of the breech portion of the gun may ordinarily be omitted, except in guns of heavy caliber.

G represents the propelling charge which is carried in the cartridge case F′ between the cup F and the projectile E. This propelling charge may be fired in any convenient way, as by means of the electric primer H controlled by the switch I in the electric circuit K. We have indicated an electric battery L for supplying the source of electricity, but the electricity may be had from any suitable source.

The breech of the gun may be opened and the gun may be loaded in the same way as is fully described in the Patent No. 1,108,716, aforesaid, and we make no special claim in this present application to the breech mechanism or to the firing mechanism, or to the gun mount, the present invention relating entirely to the construction and functioning of the inertia mass.

It will be obvious that when the gun is fired, the projectile E will fly forward through the muzzle in the usual way, while the cup-shaped inertia mass F will be forced backward and subjected to compressive strains as it passes rearward through the breech, with the result that there is very great friction; and it will require great force to force this cup backward, even though it be of light weight compared to that of the projectile.

It will be noted that this cup-shaped inertia mass also serves as a gas check, to prevent the premature escape rearward of the powder gases; and the effect of the powder gases will be to expand the thin walls of this cup, causing them to bind against the interior of the bore of the rear barrel of the gun, thus still further increasing the frictional resistance against the expulsion rearward of said inertia mass.

After the inertia mass leaves the gun its shape will be such that it will not fall with any great speed through the air, and therefore will not be seriously dangerous to persons below or in rear who exercise a reasonable amount of caution.

The cylindrical cartridge case F′ may be extracted in the usual way.

It will be obvious that with guns of larger caliber, where the propelling charge is supplied in sections, that the cartridge case may be omitted, and the counterpoise mass cup may be filled with explosive and with its contents constitute one of the sections of the propelling charge.

Having thus described our invention, what we claim and desire to secure by Letters Patent of the United States is:

1. A gun of the type described comprising a front barrel in which the projectile proper is mounted, and a rear barrel having a continuously tapered bore adapted to compress an inertia mass and to thereby increase the frictional resistance of said mass in passing rearward from the gun, the said gun being provided with a powder chamber located between the projectile seat and the said inertia mass when the gun is loaded, substantially as described.

2. A gun of the type described, provided with open front and rear barrels in which the projectile is propelled through the muzzle of the gun, and an inertia mass in the opposite direction through the open breech thereof, having its rear barrel continuously tapered so that the inertia mass is forced to pass through an orifice less in diameter than its own normal diameter, substantially as described.

3. In a non-recoil gun of the character described, the combination with a forward barrel provided with a chamber for the projectile and the propelling charge, of a rear barrel removably connected to the forward barrel and provided with a tapered bore continuously narrowing to the rear, substantially as described.

In testimony whereof, we affix our signatures.

ANDREW J. STONE.
WILLIAM SHUKER.