

Jan. 29, 1924.

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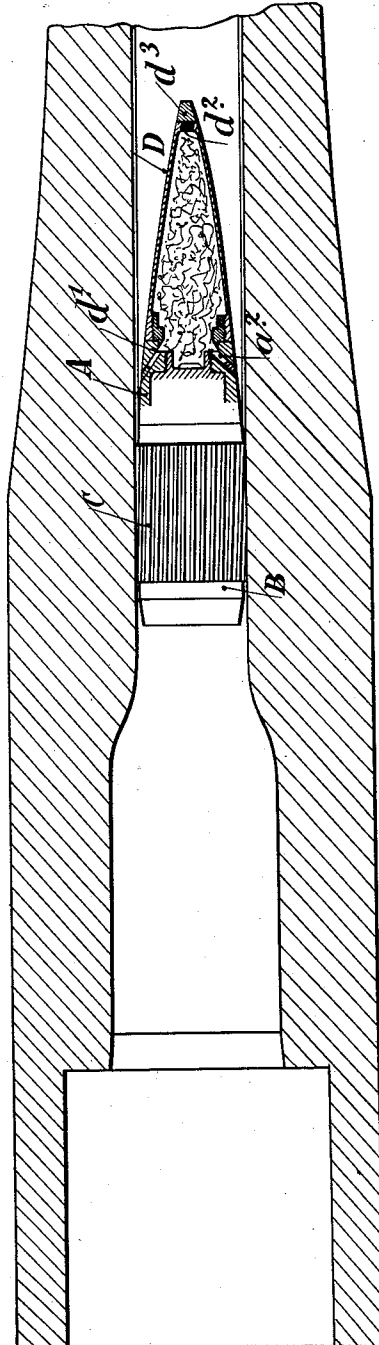
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APPARATUS FOR LUBRICATING THE BORE OF FIREARMS DURING FIRING

Filed Sept. 19, 1923

2 Sheets-Sheet 1

Fig. 1.



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Fig. 2.

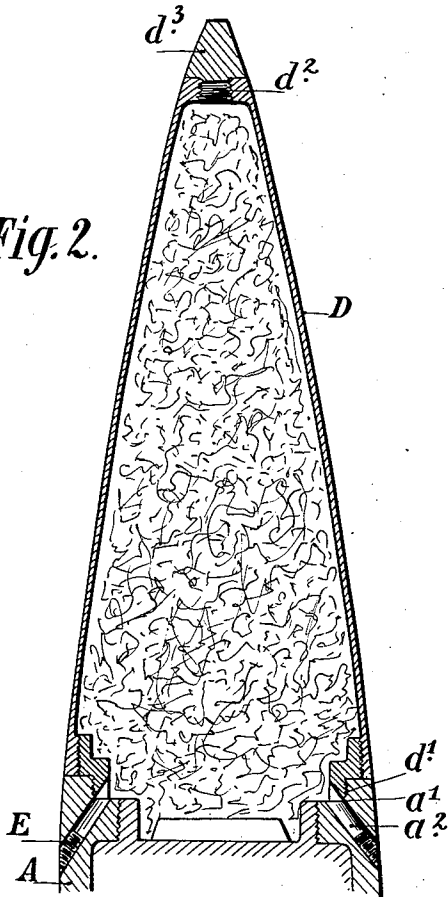


Fig. 3.

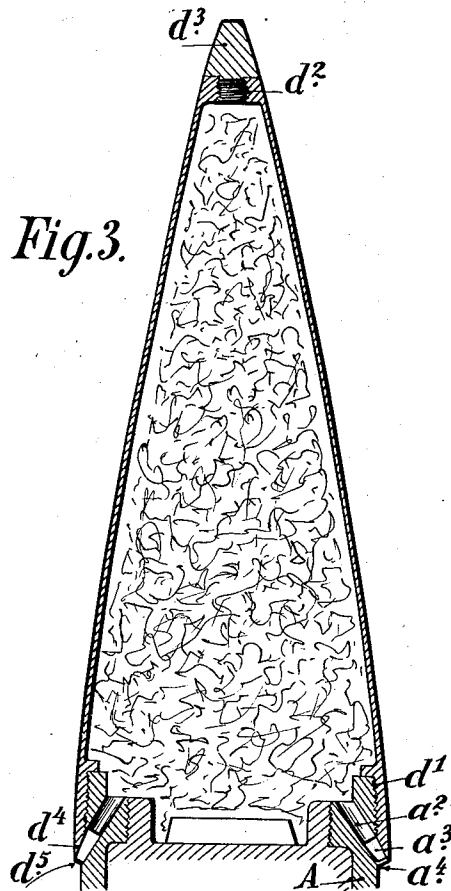
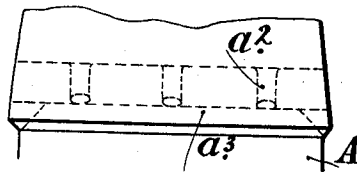


Fig. 4.



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# UNITED STATES PATENT OFFICE.

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## APPARATUS FOR LUBRICATING THE BORE OF FIREARMS DURING FIRING.

Application filed September 19, 1923. Serial No. 663,661.

*To all whom it may concern:*

Be it known that I, EUGÈNE SCHNEIDER, a citizen of the Republic of France, resident of Paris, France, have invented new and useful Improvements in Apparatus for Lubricating the Bore of Firearms During Firing, which is fully set forth in the following specification.

In gun barrels when firing with charges giving a high initial velocity to the projectile the friction of the driving band of the projectile in the rifling, has apart from the rise in the temperature of the gun tube, the result of causing a breaking away or erosion of the bore, which primarily has a detrimental effect upon the accuracy of the firing and in time shortens the useful life of the gun.

With the object of remedying that drawback it has already been proposed to lubricate the bore of the gun with a lubricant, such as graphite, contained in a cartridge placed between the base of the projectile and the front of the powder charge contained in the cartridge case.

That known means certainly allows of spreading the lubricant over the bore of the gun, but its arrangement at the rear of the projectile prevents the lubricant from passing to the front of the driving band of the projectile so that the resulting lubrication is quite insufficient.

Moreover the said arrangement necessitates the employment of a complete cartridge so that it cannot be employed with the guns where the firing takes place with high initial velocity and with projectiles separated from their propelling charges.

The present invention has for its object to provide an improved apparatus for lubricating the bore of guns and other fire-arms in such a manner as to obviate the drawbacks hereinbefore mentioned.

According to this invention the lubricant is contained in the actual projectile in front of the driving band. For instance a reservoir of lubricant may be constituted by the internal cavity of the usual nose which is attached to the front end of the projectile and is designed to facilitate the penetration of the latter through the air. Outlet orifices provided in the periphery of the projectile and behind the base of the said nose allow the lubricant to flow out by the

action of inertia immediately the gun is fired.

The accompanying drawings illustrate by way of example two constructional forms of the improved apparatus of this invention.

Figure 1 is a longitudinal axial section of a gun barrel and of the projectile in position for firing. The improved apparatus is shown applied to a shell for firing at long range, comprising for instance an elongated driving band, previously rifled.

Figure 2 is an axial section taken of the front portion of a projectile provided with its nose, fitted with the improved apparatus of this invention.

Figure 3 is a similar section of a modification.

Figure 4 is a partial side view corresponding to Figure 3.

In these figures: A is the ogival body of a projectile B bearing a driving band C made in one or more parts previously rifled or not.

D is the usual nose of elongated shape for facilitating the penetration of the projectile through the air; it is attached to the ogival body of the projectile, for instance by means of screwthread  $d^1$ .

According to this invention, the front end of the nose D has an aperture  $d^2$  for the introduction of the lubricant into the empty space situated between the front end of the projectile and the walls of the said nose. This aperture is closed by a screw plug  $d^3$  which may eventually be pierced with air inlet passages closed by wax plugs before inspection of the projectile and during the time the projectile, with its contained lubricant, is stored away. Further, at the base of the part  $a^1$  of the ogival body which receives the corresponding screw-threaded portion of the nose, there is pierced a series of passages  $a^2$  which are inclined to the rear where they open at the periphery of the projectile. These passages  $a^2$  are designed to allow the lubricant to pass out and be projected into the bore of the gun in front of the driving band of the projectile. These passages may be closed by any suitable means in order to prevent any escape of the lubricant before the shot is fired. For this purpose there may be employed, for instance lead plugs E screwed into the passages  $a^2$  and adapted to be ejected by the action of the inertia of the lubricant.

In the modification illustrated in Figures 3 and 4, the base of the nose is assumed to be screwed upon the outside of the projectile. Passages  $a^2$  are provided, as in the preceding example, but they open at their rear into a circular groove  $a^3$  formed in the ogival body of the projectile. Further, the nose is extended rearwardly behind its screwthread  $d^1$  in the form of a bevelled edge or lip  $d^4$  for covering the groove  $a^3$ . The annular reservoir thus formed is closed by means of a solder seal  $d^5$  between the lip  $d^4$  of the nose and the edge  $a^4$  of the ogive.

The operation of the improved apparatus is as follows:—

The lubricant is charged into the reservoir space of the nose D. When the gun is fired, and immediately the projectile begins to move, the inertia of the mass of lubricant forces the leaden closing plugs E to the rear, or breaks the solder seal  $a^4$  (Fig. 3). These plugs or the seal are melted and then swept away by the driving band of the projectile. The inertia has then the effect (and this effect is continuous during the whole travel of the projectile in the bore of the gun) of projecting lubricant to the rear of the projectile through the passages  $a^2$ . This lubricant is then distributed over the bore of the gun in front of the driving band of the projectile and over its entire periphery.

The improved apparatus shown in Figure 3 effects even an actual spraying of the ring of lubricant escaping through the gap between the lip  $d^4$  of the nose and the edge  $a^4$  of the ogival body. It is to be noted that the distribution of the lubricant takes place without being hindered by the propelling gases which are kept behind the driving band, and consequently without interfering with the regularity and certainty of working of the improved apparatus.

As the lubricant there may be employed graphite, grease, vaseline or a mixture of these substances, etc.

The charging of the lubricant into the lubricant reservoir may be effected at any desired time before the projectile is to be fired, because the air-tight closure of the reservoir assures an indefinite preservation of the lubricant contained therein.

It should be noted that the improved lubricating apparatus is fixed to the ogive of the projectile and is completely independent of the propelling charge as well as of the container or case of said charge; it can therefore be employed with guns firing with cartridges or bags.

It is to be understood that this invention is applicable to all kinds of fire-arms of the rifled or nonrifled type and of all calibres. It is also obvious that in cases where it is desired to employ the improved apparatus with projectiles unprovided with

a nose, such projectiles may be previously fitted with a lubricant reservoir having the same function as the said nose.

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 projectile comprising, in combination, a body portion, a hollow member secured to the forward end of said body portion having communication with peripheral passages therein, a lubricant in the hollow member adapted to be forced through said passages by the force of inertia when the projectile is fired from a gun, and means normally maintaining said lubricant in the hollow member but adapted to be rendered inoperative when the projectile is fired.

2. A projectile having an ogival body provided in its forward end with a recess and openings extending from said recess and terminating at the periphery of the body in front of the driving band of the projectile, a nose portion secured in said recess and constituting a lubricant reservoir in communication with said openings, a charging plug removably secured in the wall of said reservoir, and plugs of relatively soft material closing said openings and adapted to be ejected therefrom when the projectile is fired.

3. A projectile comprising, in combination, a body portion, a member secured to said portion for reducing wind resistance during flight of the projectile, a body of lubricant in said member for lubricating the bore of the gun when the projectile is fired, said projectile being provided with rearwardly extending passages in communication with the body of the lubricant, and means normally preventing the escape of lubricant from said member but rendered ineffective when the projectile is fired.

4. A projectile having an ogival body provided with a rifled driving band and discharge openings terminating at the periphery of the body in front of said band, a nose portion secured on the forward part of said body and constituting a reservoir in communication with said openings, and a lubricant in the reservoir adapted to be discharged by inertia through said openings onto the surface of the gun bore when the projectile is fired.

5. A projectile having a body provided with a driving band and openings terminating at the periphery of said body in front of said band, and a nose portion secured onto the forward part of said body and constituting a lubricant reservoir in communication with said openings.

6. A projectile having a body provided therein with openings leading from its front face to the periphery of the body, and a nose portion secured on the forward

part of said body and constituting with said front face a lubricant reservoir in communication with said openings.

7. In a projectile, the combination of a body provided therein with openings inclined rearwardly from its front face and terminating at the periphery of the body, and a nose portion secured on the forward part of said body and constituting with its front face a lubricant reservoir in communication with said openings.

8. In a projectile, the combination of a body provided therein with openings inclined rearwardly from its front face to the periphery of the body, a driving band on said body positioned rearwardly of said openings, and a nose portion secured onto the forward part of said body and constituting with its front face a lubricant reservoir in communication with said openings.

9. In a projectile, the combination of a

body provided therein with openings inclined rearwardly from its front face and terminating at the periphery of the body, a nose portion secured to the forward part of said body and constituting with its front face a lubricant reservoir in communication with said openings, and a charging plug secured in the wall of said reservoir.

10. In a projectile, the combination of an ogival body provided with a driving band and discharge openings terminating at the periphery of said body in front of said band, a nose portion secured on the forward part of said body and constituting a lubricant reservoir in communication with said openings, and plugs of soft material secured in said openings and adapted to be ejected when the projectile is fired.

In testimony whereof I have signed this specification.

EUGÈNE SCHNEIDER.