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RECOILLESS GUN FOR SEPARATE LOADING AMMUNITION

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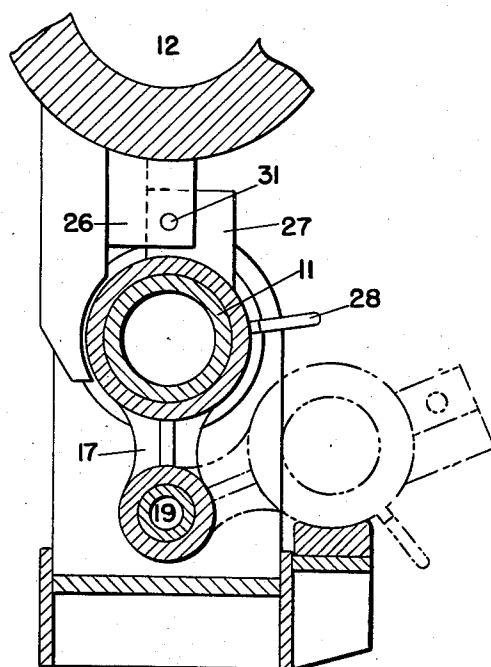


Fig. 2

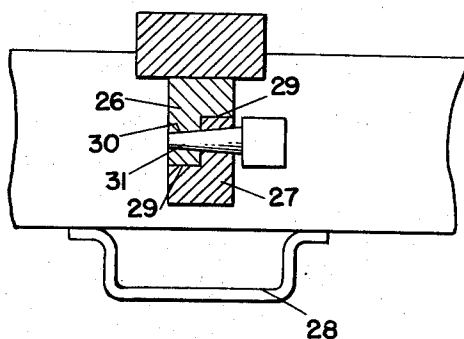


Fig. 3

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1

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RECOILLESS GUN FOR SEPARATE LOADING AMMUNITION

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1 Claim. (Cl. 89—1.7)

The invention described herein may be manufactured and used by or for the Government for governmental purposes without payment of any royalty thereon.

This invention relates to a rifle of the recoilless type using separately loaded ammunition and has for an object to provide a large caliber recoilless rifle which is adapted to be made automatic for high cyclic rates by reason of the ramming distance for the projectile having been appreciably shortened and also by reason of the opportunity for simultaneously loading the projectile and the propelling charge from opposite ends of the gun.

Another object is to reduce the loss of unburned particles of propelling charge being blown out the rear of the gun.

A further object is to provide a weapon for aircraft which is capable of being loaded from the front, is capable of being installed in a limited space, and is safer by reason of no personnel being needed behind the gun where the blast of rearwardly discharging gases can cause considerable harm to someone in its path.

The use of larger caliber rifles has been desired for airplanes but there have been several obstacles heretofore to such a proposal. For example, the ordinary artillery weapon is not readily adapted for that use because either the thrust of recoil is too severe on the plane structure or else when a recoil mechanism is added the total weight of the gun with that mechanism becomes prohibitive for large sizes. A larger size recoilless rifle is objectionably long because a substantial length of the gun is required in the rear of the projectile for a propelling charge from which the igneous gases issue.

According to this invention, a shorter than usual recoilless rifle is provided which is suitable for the larger caliber guns using separate loading ammunition. More specifically, this gun has a projectile loaded into a section that is moved laterally to one side and then moved back again into alignment with the main body portion of the rifle after being loaded. The chamber for the propellant charge is laterally displaced from the main body of the gun and from the projectile section just mentioned, whereby said charge may be loaded into such chamber from the front end instead of from the rear. A U-shaped passageway for burning gases leads into rear contact with the projectile and the customary venturi opening or openings for escape of thrust compensating jet or jets of gas. The purpose of the laterally displaced chamber with the interconnecting U-bend was to improve a positive forward momentum to the propellant charge in the direction of the projectile travel thereby decreasing the chance of unburned propellant particles being ejected through the rear since solid particles may have difficulties in negotiating the sharp, almost 180°, turn at the junction of the U-bend and the barrel.

Fig. 1 is a longitudinal section through one embodiment of this invention.

Fig. 2 is a section on the line 2—2 of Fig. 1.

Fig. 3 is a top view of the top of the projectile receiving chamber showing the locking latch.

2

In Fig. 1 is shown a longitudinal section through a portion of a gun embodying this invention in which the main body 10 has its muzzle (not shown), to the right of the portion indicated. A projectile receiving section 11 is capable of being swung laterally upward from the plane of the paper for the purpose of loading a projectile into this chamber. A propelling charge receiving chamber 12 is located laterally of the foregoing portions of the gun and is connected by a U-shaped passageway 13 connecting the chamber 12 with the rear portion of the projectile receiving chamber. A usual Venturi passageway 14 is located in rear of the projectile and the U-shaped connecting portion. A breechblock 15 is shown at the front end of the chamber 12 and is capable of being rotated and swung open in a usual manner enabling a propelling charge or cartridge to be inserted through a forward end of the chamber 12 when the breechblock 15 is opened. The portion 13 containing the U-shaped passageway is shown as being integral with the chamber 12 but may be separable.

The supports 17 and 18 as shown in Figs. 1 and 2 enable the gun section 11 to be swung laterally to one side for the purpose of loading the projectile into this section. Such swinging movement occurs about the axis of the rod 19 which is shown in Fig. 1 as being journaled in the bearings 20 and 21.

As shown in Fig. 1 the sliding seals 22 and 24 are each provided with spring holders 23 and 25 for the purpose of pressing the seals against the end of the projectile receiving section 11. As shown in Fig. 1 the end portions of this section 11 are slightly tapered so that when the section is swung back from its loading position to its firing position the slight taper on the ends enables the section to swing back and press the sliding seals away from it. The movement of these sliding seals is small and limited but nevertheless sufficient to enable a fairly gas tight seal to be made between the ends of the projectile section 11 and the sections 13 and 10.

As shown in Figs. 2 and 3, an abutment 26 secured to the bed of the gun support extends around the side of the section 11 opposite that toward which it swings outwardly. A cooperative stop or abutment 27 secured to the gun section 11 is arranged to engage the section 26 to insure the alignment of the section 11 with the main gun section 10 when in firing position. A handle 28 is secured on the outside of the section 11 whereby it may be conveniently grasped to be swung outwardly to its loading position. The meeting faces of the stops or abutments 26 and 27 are shown in Fig. 3 by the numeral 29. The abutment 26 is shown as having a projection extending to the right in which is located a recess 30 into which the slidable pin or bolt 31 fits to hold the gun section in its firing position. The degree of slope to the taper of the recess 30 and projection 31 is slight and only enough to enable the pin to push the section 11 into firm contact with the abutment 26, in other words to make the section 26 accurately aligned with the longitudinal axis of the section 10.

Among the advantages of this invention may be mentioned the shorter length for a recoilless rifle whereby separate loading ammunition is capable of being simultaneously inserted from opposite ends of the gun. A reduction of about 20% in the quantity of unburned particles of propellant blown out the rear of the gun has been indicated, as compared with the quantity of propellant ejected from the conventional recoilless gun, due largely to the U-bend between the propelling charge and the projectile. This is believed to be due to a longer burning time from two causes. One such cause is the longer path required for movement through the sides and gradual curve illustrated than would be a shorter path with one or more 90° changes in direction needed. An-

other factor contributing to longer burning is the fact that unburned particles of propellant are given a forward velocity as pointed out above, requiring them to be slowed and then moved in an opposite and rearward direction giving more of them time to be completely burned.

We claim:

In a recoilless rifle for separate loading ammunition, having a gun barrel, a projectile receiving chamber movable laterally into alinement with the gun barrel for firing and movable from such position of alinement for loading a projectile therein, a venturi passageway in substantial alinement with said gun barrel and in rear of said projectile receiving chamber when in firing positions, a propellant receiving chamber fixed with respect to said gun barrel and positioned laterally of said projectile receiving chamber in firing position, and a breech closure at a forward end of said propellant receiving chamber, the combination therewith of the improvement for reducing the loss of unburned propellant through said venturi passageway without danger of changing the recoilless characteristic of said rifle by impeding the movement of gas through said venturi passageway, said improvement including a gradual U-shaped passageway connecting rear portions of said propellant receiving chamber and said

projectile receiving chamber, said U-shaped passageway being fixed with respect to said gun barrel, and terminating in substantial alinement with said gun barrel forwardly of said venturi passageway whereby any unburned particles of propellant leaving said propellant receiving chamber have a reduced tendency to be ejected rearwardly due to two causes, contributing to longer burning time, namely, a forward movement imparted to any unburned particles of propellant when they reach a position of general alinement with said gun barrel requiring movement of such particles to be slowed and reversed providing time for more of the propellant particles to be completely burned and also the long path of movement through the sides and curve of said U-shaped passageway.

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