MACHINE GUN TRAINER


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4 Claims. (Cl. 42—75)

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

This invention relates to a trainer type of machine gun, more particularly to a device for firing frangible ammunition in recoil operated automatic firearms.

In training troops in target practice or in the operation of firearms, it is generally best to fire live ammunition in such firearms. However, due to the extremely powerful cartridges utilized in military firearms, it is inadvisable to use such cartridges because of possible damage to property or injury to personnel. Frangible ammunition with a lower chamber pressure and muzzle velocity than the regular ammunition is used to simulate combat conditions.

Unfortunately, when low powered ammunition is used in conventional recoil operated automatic firearms, such ammunition will not properly function the firearm because of the low breech pressure developed by the low powered cartridge. Various devices have been resorted to in order to make the conventional firearm function properly when utilizing frangible ammunition, but generally such devices have proved to be cumbersome, unreliable and inadequate. A particular application of frangible ammunition is that utilized for training airplane pilots in marksmanship while shooting at targets, particularly armored target airplanes. Such ammunition is loaded with a frangible bullet which readily breaks into small pieces upon striking the target. Obviously, cartridges loaded with frangible bullets to be fired at an armored target plane for practice purposes must necessarily be of comparatively low power in order that the pilot of the target plane will not be injured or the plane damaged.

Another application of frangible ammunition is used for training ground troops when firing at moving tanks, armored vehicles and the like.

Accordingly it is an object of this invention to provide a device permitting conventional recoil operated automatic firearms to utilize frangible ammunition.

A particular object of this invention is to provide a device for a firearm of the type known as the U. S. Browning machine gun, cal. .30, to permit the conversion to a firearm capable of firing frangible ammunition without altering any of the parts and the firearm can be restored to its normal condition by removing the device and reassembling the parts removed.

The specific nature of this invention as well as other objects and advantages thereof will clearly appear from a description of a preferred embodiment as shown in the accompanying drawings in which:

Fig. 1 is a fragmentary side elevational view of a firearm embodying this invention shown partly in longitudinal section;

Fig. 2 is an exploded perspective view illustrating the elements of this invention;

Fig. 3 is a detail side elevational view of the actuator shown partly in longitudinal section;

Fig. 4 is a cross sectional view taken along the line 4—4 of Fig. 3;

Fig. 5 is an enlarged detail view of the muzzle gland shown in longitudinal section;

Fig. 6 is an enlarged fragmentary detail view of the forward end of the barrel jacket showing the manner of securing the muzzle gland thereto; and

Fig. 7 is a right end elevational view of Fig. 6.

In Fig. 1 there is shown in assembled relation a firearm embodying this invention. While the embodiment of this invention is incorporated in a firearm of the type known as the caliber .30, U. S. Browning machine gun, it is desired to point out that this invention can be readily applied to any automatic firearm utilizing a recolling barrel action. The firearm shown in Fig. 1 comprises essentially a trunnion block 1, a receiver 2, and a bolt 3. A barrel jacket 4 horizontally disposed to trunnion block 1 is secured thereto by threads 5. The remaining structure and the operation of such firearm is well known and will not be described in detail.

In accordance with this invention the conventional barrel of the firearm is replaced by essentially a two-piece barrel comprising a barrel portion 6 and an actuator 7. The actuator 7 is generally similar in external dimensions to the rear end of the conventional barrel. That is, such actuator is provided with a chamber 8, a threaded exterior portion 9, which screws into the conventional barrel extension 10 of the firearms, and a plurality of equally spaced notches 11 about the periphery of actuator 7. An axial counterbore 12 is provided in the forward end of actuator 7 as shown in Figs. 1 and 3. Such counterbore extends rearwardly to the forward edge 13 of chamber 8 as illustrated in Figs. 1 and 3. A
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peripheral groove 14 is provided in the bottom of counterbore 12 for a purpose to be later described. The exterior of the forward end of actuator 7 is conically shaped as shown at 18. A polygonally shaped bored out of reduced diameter as shown at 16 which cooperates in bearing relation with counterbore 12 of the actuator 7, thus providing a telescoping connection between the two barrel portions. A conical taper 17 is provided at the termination of the reduced end diameters 16 of barrel 6 and grooves 2. The forward end of barrel 6 is polygonally formed as shown at 18 to permit a wrench to be placed thereon for turning the barrel for a purpose to be later described. A threaded portion 19 is provided on the end of barrel 6 immediately to the rear of polygonally formed end 18. A gland 20 is screwed on to the end of such barrel.

The gland 20 is provided with exterior threads 21 which engage threads 22 provided on the inside of barrel jacket 4 on the forward end thereof as shown in Fig. 1. Interior threads 23 are provided on gland 20 which engage threads 19 of barrel 6 to lock barrel 6 to jacket 4 as will be presently described. A polygonally shaped end 24 is provided on the forward end of gland 20 to facilitate turning gland 20 and threads 23. A plurality of spaced radial notches 27 are provided in flange 25, two of which are arranged to be engaged by a barrel lock 26 in a manner to be shown.

Barrel lock 26 is a washer-like member and is provided with two oppositely disposed, spring-like arms 29. Arms 29 are bent at right angles to the body of lock 26 as shown in Figs. 1 and 2, and the ends of such arms are bent inwardly as shown at 30. Arms 29 are substantially narrower than the body of lock 26. A polygonally shaped hole 31 is provided in the center of lock 25 corresponding to the polygonally shaped end 18 of barrel 6.

The trainer device herein described is readily assembled to a firearm of the type previously mentioned. Actuator 7 is screwed into barrel extension 2 for operating the breech mechanism. The breech mechanism is then assembled and the head space of bolt 3 thereof is adjusted by rotating actuator 7 through the means of slot 11 in the usual manner. Barrel 6 is then placed within barrel jacket 4 from the muzzle end thereof so that the reduced diameter end 19 enters counterbore 12 of actuator 7. Thus the reduced end 19 of barrel 6 cooperates with actuator 7 in much the same manner as a piston cooperates with a cylinder. Gland 20 is then screwed into the muzzle end of barrel 6. The gland 20 provided on the interior of gland 20 simultaneously engage threads 19 provided on the forward end of barrel 6. Gland 20 is then tightened by means of a wrench placed against the polygonally shaped end 24 until an oppositely disposed pair of notches 15 align with corresponding notches 22 provided on the forward end of barrel jacket 4. Barrel 6 is then screwed inwardly until the breech end of such barrel strikes the bottom of counterbore 12 in actuator 7. Barrel 6 is then backed off approximately one-half turn whereupon gland 20 is snapped in place over the muzzle end of barrel 6. Arms 29 on lock 26 engage two of the diametrically disposed notches 25 provided on the end of gland 20. Arms 29 likewise engage notches 27 in flange 25 of gland 20 and the inwardly bent ends 30 of such lock engage two oppositely disposed notches 22 provided on the reduced end of gland 20.

Thrust lock 28 secures gland 25 and barrel 6 against turning. Unscrewing barrel 6 a half turn as above described provides a small chamber space between the end of barrel 6 and the bottom of counterbore 12 to compensate for any elongation of barrel 6 due to temperature rise while firing and to prevent interference with headspacing and for another reason to be presently described.

When a cartridge is inserted in chamber 8 and the cartridge discharged, the bullet is forced along the barrel and out of the bore. A rearward reaction force is, of course, produced on the face of the bolt and hence on actuator 7 which is locked to the bolt in conventional manner.

In addition, a portion of the powder gases enters the space between the breech end of barrel 6 and the bottom of counterbore 12. Thus the gases act in conventional manner between the rear face of the barrel and against the bottom of gland 20 by a wrench to be applied to barrel jacket 4 by means of the gland 20, barrel 6 cannot be moved by the action of the gases impinging on the rear face of such barrel. Therefore actuator 7 is driven rearwardly by the combined action of the rearward forces on the bolt and the force of the gases impinging on the bottom of counterbore 12. Furthermore, the combined mass of the bolt, barrel extension and actuator which must be accelerated rearwardly to function the weapon is substantially reduced from the combined mass of the bolt, barrel extension and conventional barrel.

It should be noted that actuator 7 is always retained on the barrel so that there is no question of misalignment of these two members. In the conventional Browning machine gun, the barrel of such firearm recoils approximately 5/16" prior to unlocking of the breech block. Such is also the case when utilizing this attachment, that is, actuator 7 is driven rearwardly approximately 5/16" prior to unlocking the breech block.

More than adequate power is developed by this trainer to maintain the fire performance. Therefore a new type of recoiling barrel type in highly satisfactory manner. The groove 14 in counterbore 12 serves to accumulate carbon and the deleterious deposits from the gases and eliminates sticking of the rear barrel portion to the front barrel portion.

When frangible ammunition is utilized in the conventional Browning machine gun, there is insufficient force to set the breech member in motion to effect operation of the firearm. From the above description of the trainer device it is readily apparent that additional power is derived from the bullet propulsion gases to act rearwardly against actuator 7 to supplement the normal recoil force to actuate the breech mechanism of the firearm. Hence frangible ammunition can be utilized in such a weapon employing the trainer device herein described to properly operate the breech mechanism thereof.

It is apparent from the foregoing description that a trainer device for an automatic firearm is hereby produced into place over the muzzle end of barrel 6. Arms 29 on lock 26 engage two of the diametrically disposed notches 25 provided on the end of gland 20. Arms 29 likewise engage notches 27 in flange 25 of gland 20 and the inwardly bent ends 30 of such lock engage two oppositely disposed notches 22 provided on the reduced end of gland 20.
arm having a recoiling breech mechanism. Such attachment is easy and cheap to manufacture and will not readily get out of order. In addition, firearm barrels having imperfect chambers can be readily utilized in the manufacture of such an attachment and appreciable salvage saving obtained.

I claim:

1. A training attachment for an automatic recoil-operated firearm having a receiver, a barrel extension arranged for recoil movement in the receiver, and a barrel jacket projecting forwardly out of the receiver, comprising a barrel having two axially aligned non-integral portions, the forward barrel portion being rigidly secured to and supported by the barrel jacket, the rear barrel portion having a centrally disposed counterebore extending rearwardly from the front end thereof and bottoming in an annular groove of increased diameter, said rear barrel portion having a chamber formed therein in communication with said counterebore, said forward barrel portion having its rear end necked down and arranged to extend through said counterebore into said annular groove so as to define an enclosed gap in communication with said chamber and means for adjusting the position of said forward barrel portion to increase or decrease said gap whereby a sufficient portion of the gas pressure developed in said barrel portions upon the discharge of a cartridge actuates said rear barrel portion rearwardly to effect operation of the firearm.

2. For use in an automatic recoil-operated firearm having a receiver, a barrel extension reciprocably movable in the receiver, and a barrel jacket projecting forwardly out of the receiver, a device comprising a barrel having two axially aligned non-integral portions, the forward barrel portion being secured adjacent the front end of the barrel jacket, the rear barrel portion being secured to the barrel extension and movable therewith, said rear barrel portion having a cartridge chamber formed therein, said forward and rear barrel portions having a telescoping connection therebetween arranged to define an enclosed gap in communication with said cartridge chamber, and means for adjusting the position of said forward barrel portion to increase or decrease said gap between the rear end of said forward barrel portion and the front end of said cartridge chamber whereby a sufficient portion of the gas pressure developed upon the discharge of a cartridge is directed into said gap to actuate said rearward barrel portion and compensate for various powder loadings of the cartridges to be fired.

3. The construction defined in claim 2 including means for locking said forward barrel portion in any one of a plurality of said adjusted positions.

4. The construction defined in claim 2 including means for adjusting said rear barrel portion in any one of a plurality of headspaced positions.

CLARENCE E. SIMPSON.

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