Feb. 20, 1968 H. MENNEKING ET AL 3,369,453

RECOIL BOOSTER FOR FULLY AUTOMATIC, SEMI-AUTOMATIC AND/OR SINGLE-SHOT FIRING WEAPONS

Filed Dec. 10, 1965

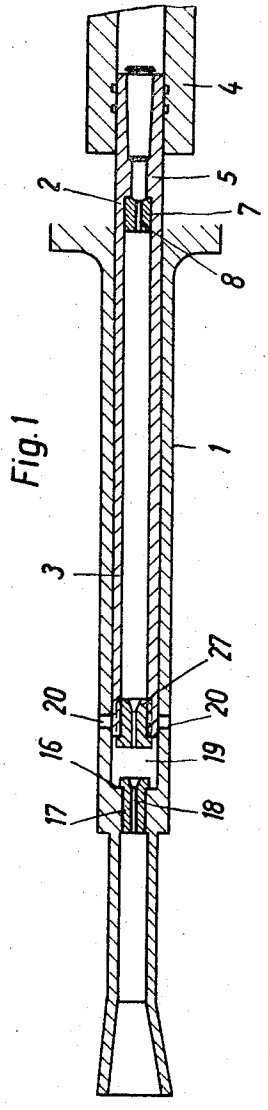

Fig. 1

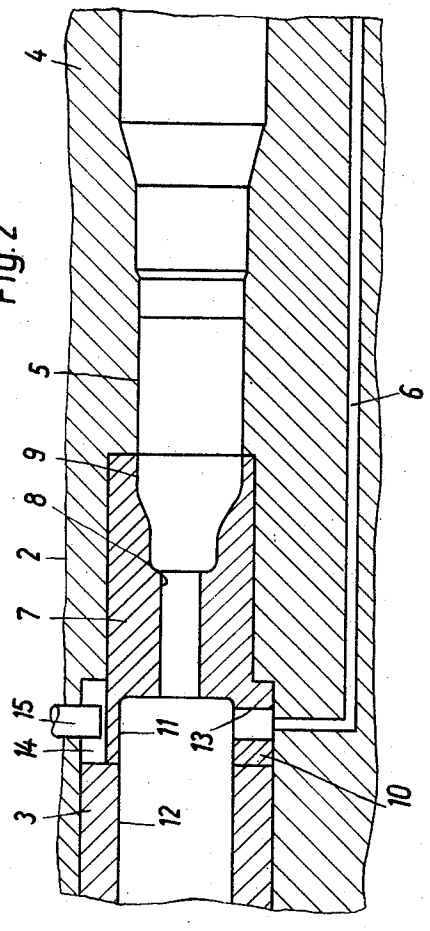

Fig. 2

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United States Patent Office 3,369,453 Patented Feb. 20, 1968

3,369,453

RECOIL BOOSTER FOR FULLY AUTOMATIC, SEMI-AUTOMATIC AND/OR SINGLE-SHOT FIRING WEAPONS

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Filed Dec. 10, 1965, Ser. No. 512,900
Claims priority, application Germany, Dec. 19, 1964, R 39,505
3 Claims. (Cl. 89—14)

ABSTRACT OF THE DISCLOSURE

A recoil booster for fully or semi-automatic and single shot firing weapons in which the barrel of the weapon has a mouthpiece arranged near the front end of the barrel and a stub barrel is inserted in the weapon barrel with a mouthpiece in the rear end of the stub barrel. The mouthpieces have nozzle-like bores which are coaxial with each other.

The invention relates to a recoil booster for fully automatic, semi-automatic and/or single-shot firing weapons.

In self-loading weapons in which the recoil and/or the gas pressure is utilized for feeding the ammunition or for actuating the breechblock, the explosive forces produced in the barrel are not sufficient to open the breechblock fully when firing takes place with plastics ammunition used for training purposes, because the resistance of the breechblock is adjusted to the higher forces occurring in firing with live ammunition.

Recoil boosters have already been developed in which the recoil is produced by constriction of the outlet path for gases produced when training ammunition is fired.

Thus, a proposed recoil booster for a machine pistol, or submachine gun, consists of a plain barrel whose bore, which is constant throughout, is smaller in diameter than the bore of a barrel intended for live ammunition. By means of the smaller size of the bore, it is endeavoured, with wooden projectiles of the same size as those used in live ammunition, to produce by compression of the wooden projectile in the smaller bore barrel as high a gas pressure as possible and which will be sufficient to ensure the automatic operation of the weapon. The effect intended does not, however, occur in the recoil booster mentioned, because the resistance of the wooden projectile on entry into the bore of the plain barrel which sometimes leaves the wooden projectile completely intact, is by no means sufficient to ensure the recoil required for satisfactory operation of the breechblock.

Another drawback of this proposed device is that, in order to create the same conditions for practice firing as for the firing of live ammunition, the practice ammunition has the same dimensions as the live ammunition. Hence there is the danger of live ammunition being fired by mistake from the practice weapon instead of practice ammunition and, in the most favourable case, when fuseless small projectiles are used, the projectile remains jammed in the barrel, while in the case of fused shells bursts in the barrel are the inevitable result.

Removal of the above-mentioned disadvantages and drawbacks is the object of the present invention, according to which the constriction of the cross-section of the barrel fast with the weapon, which constriction is utilized for the recoil, consists of at least two coaxially arranged mouthpieces substantially defining the front and rear ends of the barrel and provided with nozzle-like bores, one of which mouthpieces is arranged in the region of the chamber and the other in the barrel part which is disposed in front of the barrel muzzle and which is fast with

the cradle of the weapon. The gas formed on firing causes the tips of the projectiles to split and to obstruct the front mouthpiece so that the gas leaks slower through the interior of the barrel into a pressure chamber enclosed by the barrel part fast with the cradle and by the barrel guided slidably therein. The pressure developed in the said pressure chamber is directed against the slidable arrangement fast with the weapon, on the rearward movement of which arrangement the automatic ammunition feed and the actuation of the breechblock are set in operation. The excess pressure obtaining during this process can escape through the rear mouthpiece.

Preferably, the front mouthpiece is arranged immediately adjacent the chamber, which makes it possible to locate in that part of the mouthpiece which faces the chamber a profiled recess in which the tip of the projectile which tip consists, for example, of a plastics material, is accommodated so that it is fully supported. The tip, which is split on firing but does not break up, is applied with a sealing action against the profiled recess and thereby prevents the gases escaping in the direction of the breechblock.

In one embodiment, the front mouthpiece and its recess are so dimensioned and designed that it is not possible either to accommodate the tip of the projectile of a live round of ammunition in the recess, or to accommodate a complete live round of ammunition in the shortened chamber when the breech is closed. As a result of this precaution, serious accidents occasioned by mistaking live ammunition for practice ammunition are reliably avoided.

An embodiment of the invention will now be described in detail with reference to the accompanying drawings of which:

FIG. 1 shows diagrammatically in longitudinal section a gas-operated gun with rearward movement of the housing and having a recoil-boosting arrangement embodying the invention, and,

FIG. 2 shows a portion of FIG. 1 on a larger scale.

FIG. 1 shows that there are, slidably mounted in a barrel part **1** of the gun and fast with a gun cradle, a stub barrel **2** and a barrel **3** inserted in the barrel **1** and fast with the weapon, and also a breechblock **4**. Reference number **5** represents the chamber of the gun and the reference number **6** the gas duct required for driving the breechblock. Between the chamber **5** and the barrel **3** there is a mouthpiece **7** which, after the barrel **3** has been removed for cleaning and exchange purposes, can readily be removed and replaced. The mouthpiece **7** has a very narrow bore **8** which is adjoined in the direction of the chamber **5** by a profiled recess **9**. In the firing direction, the mouthpiece **7** has a collar **10**, the bore **11** of which matches that of the barrel **3**. Also disposed in the side of the collar **10** is an opening **13** for tapping off gas, and a longitudinal slot **14** co-operating with a pin **15** for the purpose of locating the mouthpiece in a circumferential direction.

The length of the mouthpiece **7** is so chosen that it projects into the chamber **5**. In this way, both the insertion of a live round of ammunition in the chamber **5** and the accommodation of a live round of ammunition in the recess **9** are safely prevented. Of course, the mouthpiece **7** may also be so designed that it does not merely receive the tip of the projectile of the round, but the entire round, in which case, the mouthpiece extends over the whole of the chamber **5**. In the chamber **5**, the long part facing the breechblock is in the form of a cylindrical bore. This is intended to achieve the longest possible sealing off of the powder gases in closure systems which open early and to prevent gas creeping to the rear.

Beyond the mouth of the barrel **3** there projects the extended barrel part **1**, into the drilled end wall **16** of

which there is let a mouthpiece **17** with a nozzle-like bore **18**. The space enclosed between the mouth of the barrel and the end wall **16**, on the one hand, and the inside of the wall of the barrel part **1**, on the other hand, forms a pressure chamber **19**. Moreover, in the barrel part **1** there is a plurality of venting orifices **20** for the escape of the gases which are not required for the operation of the weapon, and which are normally covered by the barrel **3**. After a certain rearward movement of the barrel **3**, these orifices **20** are exposed and their effectiveness can be varied by twisting a cover ring arranged thereover but not shown in the drawing. In order to prevent the gases flowing back rapidly out of the pressure chamber **19** into the interior of the barrel, a mouthpiece **27** may be inserted in the mouth of the barrel **3**.

As the mouthpieces **7**, **17** and **27** exposed to the stream of gas and their nozzle-like bores are subjected to heavy wear, it is advantageous to arrange them as interchangeable inserts which are fixed in the barrels **1** and **3** so that they can easily be detached and replaced.

The recoil booster operates in the following manner:

On firing, the tip of the plastics projectile splits open without breaking up and is applied so tightly against the recess **9** that no gases can escape in the direction of the breechblock **4** and become ignited in so doing. The gas produced on firing temporarily obstructs or damms up the mouthpiece **7** and leaks slowly through the narrow bore **8** into the pressure chamber **9**. In this way the result is obtained that although the average gas pressure is the same, the peak of the gas pressure and thereby the peak force acting on the barrel part **1** is substantially lower than in recoil bosters of known type. The pressure directed against the stub barrel **2** during this process causes rearward movement thereof and thereby also that of the rest of the arrangement fast with the weapon, namely of the parts **3** and **4**, whereby the automatic ammunition feed is initiated. At the same time, any excess pressure present escapes to the outside through the mouthpiece **17**.

On the other hand, the tapping off and supply of the gases for the purposes of actuating the breechblock **4** is effected by way of the opening or port **13** and the duct **6**. After the energy has been delivered, the gas can escape in addition through the venting bores **20** after suitable rearward movement of the barrel **3** fast with the weapon.

The recoil booster just described is not applied to a specific weapon system only. It may be employed both in recoil-operated guns with rearward movement of the barrel, and in gas-operated guns with or without rearward movement.

We claim:

1. A fully or semi-automatic and single shot firing weapon comprising a weapon barrel, a mouthpiece arranged near the front end of the barrel, a stub barrel inserted in the weapon barrel, a breech block into which the stub barrel projects, a mouthpiece in the rear end of the stub barrel, said mouthpieces having nozzle-like bores which are coaxial with each other, and a further mouthpiece in the front end of the stub barrel which has a nozzle-like bore coaxial with the other bores.

2. Gas pressure intensifier for fully or semi-automatic and single shot firearms comprising a barrel part having a mouthpiece with a nozzle-like bore therein in an end wall of the barrel part, a barrel movably mounted in the barrel part and having a mouthpiece secured in one end thereof with a nozzle-like bore therein, said mouthpieces forming a pressure chamber in the barrel part, and a mouthpiece in the approximate other end of the barrel and having a nozzle-like bore therein, said mouthpieces being in coaxial relationship with each other as to the bores therein.

3. Gas pressure intensifier according to claim **2**, in which the mouthpieces are arranged as interchangeable inserts fixed in the barrel part so that they can be detached and replaced.

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