

May 21, 1929.

J. DESTREE

1,713,955

AUTOMATIC FIREARM

Filed April 13, 1927

Fig. 1

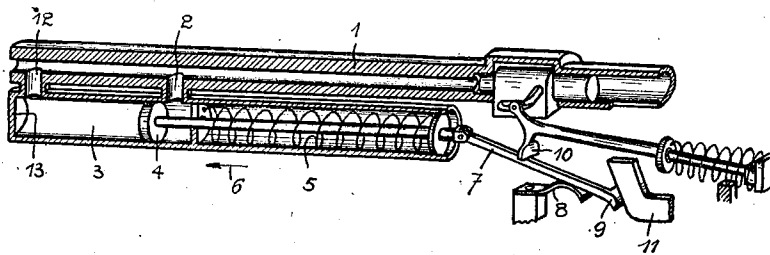


Fig. 2

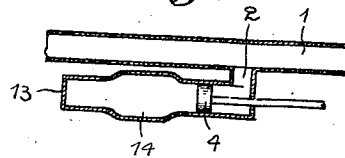
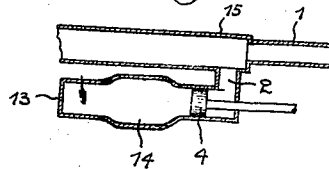


Fig. 3



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Patented May 21, 1929.

1,713,955

UNITED STATES PATENT OFFICE.

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AUTOMATIC FIREARM.

Application filed April 13, 1927, Serial No. 183,541, and in Belgium July 10, 1926.

The present invention relates to fire arm of the kind in which all the automatic operations are obtained by means of one or more springs which are stressed through the medium of a piston upon which the gases produced by the combustion of the powder are made to act.

Devices of this kind are known in which the gases are made to act upon the said piston in a cylinder by being led through a gas port. Although the aperture adopted is always small the piston and the springs it controls are shattered by the violent action of the gases. These devices have the further disadvantage of damping the return stroke of the piston on account of the small size of the gas outlet orifice. Moreover, this orifice becomes rapidly choked up by the deposits produced in it.

It has been proposed to brake the piston by the gases which expel the projectile. In the known devices of this kind the braking gases are forced against the braking mechanism from a main part of the cylinder with the result that the motive gases are considerably spent. This admission of the braking gases is further effected at the end of the stroke of the piston in a manner that moves it at a very great speed during the greater part of its stroke promoting damage to the parts operating in conjunction therewith.

The object of the present invention is to overcome these disadvantages while preventing the fracture of the parts.

With this object in view, the invention consists in leading in the gases through a fairly large orifice which allows the gases to pass away rapidly when the piston, makes its return stroke, the movement of the piston being gradually restrained during its forward stroke before it reaches the end of its stroke.

Due to this, the braking gases are taken directly from the barrel and are admitted to act from the moment when the piston has not travelled more than a small part of its stroke under the action of the motive gases. Furthermore, the admission of the motive gases and the braking gas is effected through passages which are of relatively large section.

This result may be obtained by forming, on the opposite side of the gas intake from the side where the breech is located, a second gas inlet formed by a fairly large orifice and by making the gases act upon the other

face of the piston as soon as the latter has begun its forward stroke.

The gases may also be made to act upon the opposite face of the piston to the one which the driving action is produced by forming at a determined point along the cylinder in which the piston moves, a recess permitting the compressed gases to pass round the piston and act upon the opposite face.

The single gas inlet necessary in this case may be formed by an orifice in the wall of the barrel of the fire arm or in a sleeve disposed at the outlet from the barrel and having a diameter a little larger than that of the projectile.

The accompanying drawings illustrate diagrammatically by way of example, some forms of the invention.

Fig. 1 is a perspective view, partly in section, of a device according to the invention with two gas inlets of fairly large dimensions, one of these inlets leading the compressed gases from the explosion upon the piston and the other admitting the gas exerting a braking action upon the piston.

Figs. 2 and 3 illustrate forms of the device wherein a single gas inlet of fairly large dimensions is provided, the gas inlet being formed in the first case in the wall of the gun barrel and in the second case in that of a socket or sleeve of larger diameter than the gun barrel, so as to make the compressed gases undergo a preliminary expansion.

Fig. 1 shows a gun barrel in the wall of which has been pierced a first fairly large aperture 2 leading the gas to one end of a cylinder 3 containing a piston 4 which compresses a spring 5 when it is displaced in the direction of the arrow 6. When this spring 5 expands it acts upon a lever 7 which is constantly pressed upwards by a spring 8. Under these conditions the end 9 of the lever 7 presses upon a stop 10 of the screw plate mechanism controlling the various automatic operations. The stop 10 is displaced towards the end of the recoil of the piston 4, until the moment when a cam 11 makes the lever 7 pivot downwards to press upon the spring 8.

The other end of the cylinder 3 also communicates through a fairly large aperture with the gun barrel 1. When the projectile is driven out of the gun barrel the gases are first of all admitted on to the right hand face of the piston 4 in Figure 1 through the aperture 2. But before the piston 4 has

reached the end of its stroke the projectile will have passed beyond the aperture 12 and the gases are admitted on to the other face of the piston, thus exerting a braking action 5 on the movement of the latter in the direction of the arrow 6 and preventing the fracture of the piston and the members which are attached to it, in spite of the high pressure action in the cylinder.

10 In order to reduce the braking action in case of need, a small port allowing the braking gases to escape directly into the atmosphere may be formed in the end 13 of the cylinder 3 near the second gas inlet or in 15 this inlet itself.

The device which has been described prevents the choking up of the gas inlets as well as the exertion of a braking action on the piston upon its return stroke when the 20 pressure of the gases in the fire arm falls after the projectile has passed out.

The same effect may be obtained in the device shown in Fig. 2 in which the gases are only admitted into the cylinder 3 through 25 one single gas inlet 2 but in which the cylinder 3 comprises, at a determined point along the stroke of the piston 4, a recess 14 permitting the gases to act between the end 13 of the cylinder and the face of the piston 30 4 which is opposite this end.

If it is considered necessary, the gas inlet 2 may be formed in a sleeve or socket 15 disposed at the outlet from a gun barrel and having an internal diameter a little 35 larger than the external diameter of the projectile. This arrangement has the advantage of allowing a preliminary expansion of the compressed gases to take place before they act upon the piston 4.

40 If it is desired to make the action of the gases less energetic holes communicating with the atmosphere may be formed in the cylinder 3, which holes will be situated in front of the recess 14 so as to be uncovered 45 after the piston 4 has moved a very short distance.

What I claim is:

1. An automatic fire arm comprising a fixed barrel, a cylinder, a plunger in this 50 cylinder acting on springs, a connection between these springs and the breech for operating the various automatic operations of the breech after the springs have been stressed by the plunger, means for admitting 55 directly the gases from the barrel on

one face of the plunger, means for admitting directly and subsequently the gases from the barrel on the opposite face of the plunger as soon as this plunger has travelled a small part of its stroke under the action 60 of the gases.

2. An automatic fire arm comprising a fixed barrel, a cylinder, a plunger in the cylinder acting on springs, a connection between these springs and the breech for operating the various automatic operations of 65 the breech after the springs have been stressed by the plunger, means for admitting directly the gases from the barrel on one face of the plunger, means for admitting 70 directly and subsequently the gases from the barrel on the opposite face of the plunger as soon as this plunger has travelled a small part of its stroke under the action of the 75 gases, these two means presenting fairly large sections for the passage of the gases.

3. In an automatic fire arm, in combination, a gun barrel having the bore provided with spaced outlet ports adapted to be successively uncovered by the passage of a projectile, a pressure cylinder in communication 80 with said ports, and a spring tensioned plunger operating within the cylinder and between the said ports, said plunger being adapted to be moved in one direction by 85 the gases entering the cylinder through one of the said ports and being adapted also to be almost instantly retarded in its movement by the gases subsequently admitted through 90 the other port.

4. In an automatic fire arm, in combination, a gun barrel having the bore provided with spaced outlet ports adapted to be successively uncovered by the passage of a projectile, a pressure cylinder in communication 95 with said ports, and a spring tensioned plunger operating within the cylinder and between the said ports, said plunger being adapted to be moved in one direction by the gases entering the cylinders through one of 100 the said ports and being adapted also to be almost instantly retarded in its movement by the gases subsequently admitted through the other port, said ports being of such 105 relative size that the plunger retarding gases are admitted into the cylinder having substantially the same pressure as the plunger moving gases.

In testimony whereof I affix my signature.

JOSEPH DESTREE.