Aug. 5, 1941. A. SCHMIDT 2,251,836

PNEUMATIC MACHINE GUN ADAPTER FOR PRACTICING

Filed Sept. 16, 1937 2 Sheets-Sheet 1

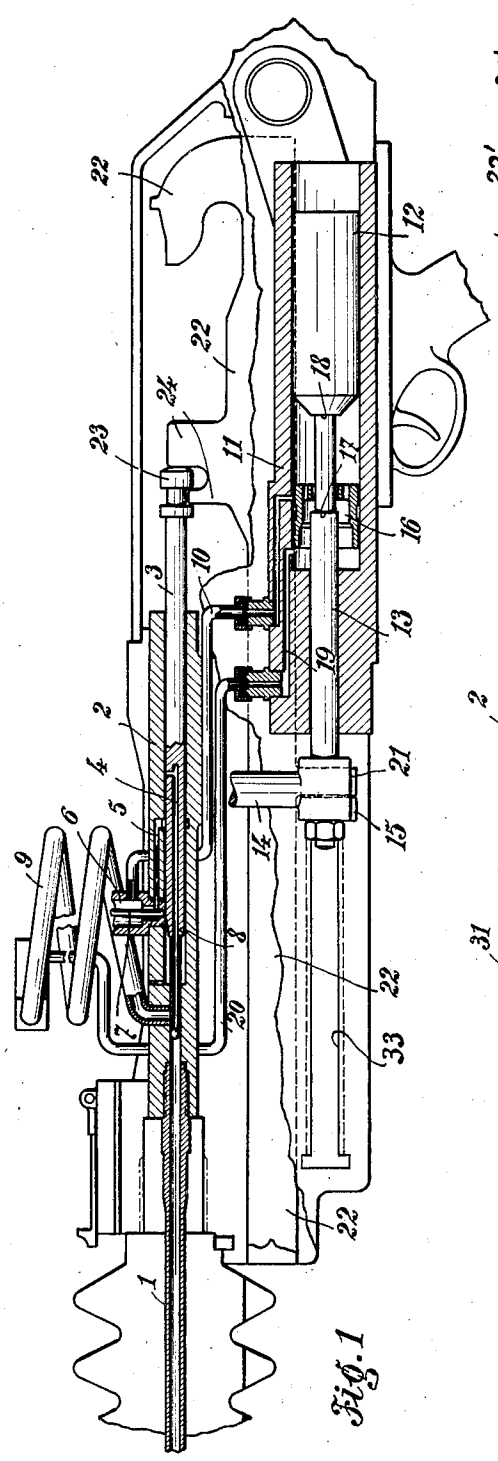


Fig. 1

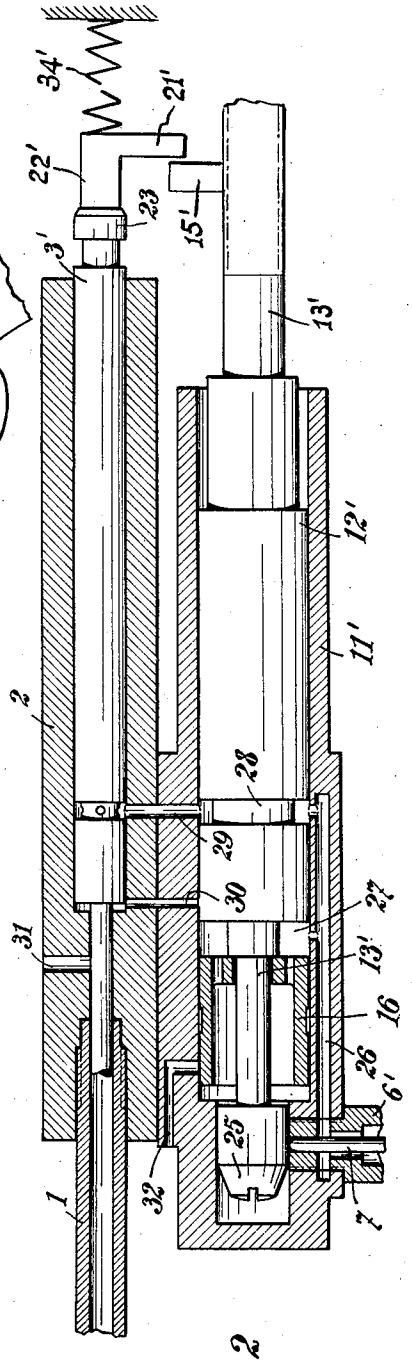


Fig. 2

INVENTOR
ADAM SCHMIDT
BY Karl A. Mayr.
ATTORNEY

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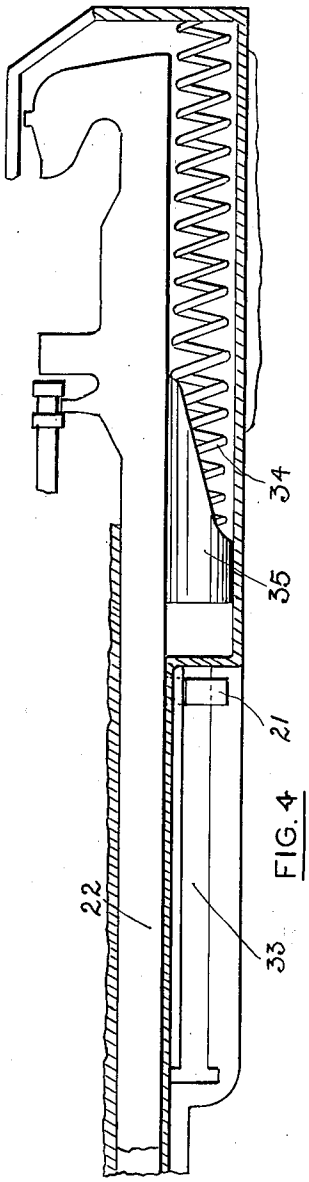


FIG. 4

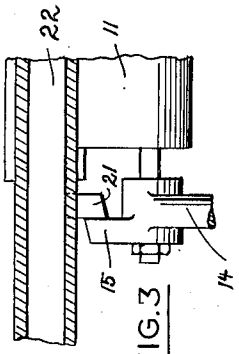


FIG. 3

INVENTOR:
ADAM SCHMIDT
BY Karl A. Mayer
ATTORNEY.

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UNITED STATES PATENT OFFICE

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PNEUMATIC MACHINE GUN ADAPTER FOR PRACTICING

Adam Schmidt, Vienna, Austria

Application September 16, 1937, Serial No. 164,094
In Austria August 26, 1937

9 Claims. (Cl. 89—6)

This invention relates to means for adapting machine-guns and machine-rifles for shooting pellets with the aid of compressed air for practicing purposes, and provides a particular construction of the adapting mechanism disclosed in the copending application Serial Number 113,216 filed November 28, 1936 which matured into Patent No. 2,110,509, with the object of enabling the adapting mechanism to be also fitted to machine firearms of the type in which there is no space axially behind the barrel for the provision of a recoil piston operated by compressed air. In a large number of the known types of machine-gun and machine-rifle, the repeating action when firing live ammunition is produced by conducting the high pressure gases behind the projectile in the barrel into a cylindrical chamber adjacent the barrel, where they impinge against the end of a recoil piston or recoil rod and force this latter back against the action of a restoring spring. The port opening out of the barrel and communicating with the gas recoil chamber is generally provided approximately within the foremost third of the length of the barrel. In firearms of this description the reciprocating movement of the recoil piston or recoil rod under the influence of the restoring spring and of the recoil impulses set up by the gas expansion in the recoil chamber effects the movement and the opening and closing of the breech. Owing to the positioning of the repeating mechanism at the side, out of alignment with the barrel there is no room in these firearms, directly behind the barrel, for the provision of adapting means according to Patent Number 2,110,509. For this reason the adapting means are so modified, in accordance with the present invention, that they are also suited for use in connection with firearms of the described type. For this purpose the loading and shooting off rammer, which moves the pellets forward in the barrel, is separate and distinct from the control piston which effects the movement of the breech-closing mechanism and which produces the recoil kick. The firing-off rammer and the control piston are disposed in different cylinders, the firing-off rammer being longitudinally movable behind and in axial alignment with the barrel of the firearm, while the control piston, and a controlling slide valve if such be used, works in a cylinder mounted in any desired position, for instance at the side of the firearm.

A form of construction embodying the invention is shown by way of example in the accompanying drawings, in which:

Fig. 1 shows, in longitudinal section and partly in side elevation, a machine-gun with the adapting means according to the invention fitted thereon.

Fig. 2 shows, likewise in section, a modified form of the adapting means according to the invention.

Fig. 3 shows a detail of the mechanism illustrated in Fig. 1.

Fig. 4 shows another detail of the mechanism according to Fig. 1.

Referring to the drawings there is provided adjoining the rear end of the barrel 1, which is generally furnished with a liner to reduce the calibre for the purpose of practice shooting with pellets, a cylinder 2 in which the firing-off rammer is longitudinally movable. This firing-off rammer, 3, slides, during its movement, with its front end past the discharge aperture or orifice of the pellet magazine into the barrel, and is provided, for the purpose of expelling the pellets from the firearm, with a passage 4 into which the compressed air can enter through the port 5 in the cylinder 2. The port 5 communicates with the compressed air admission valve 6. This valve is controlled, through the intermediary of a stem 7, by the firing-off rammer itself which for this purpose is provided with oblique surfaces 8. Behind the compressed air admission valve there is branched off a compressed air pipe 10 which leads to a cylinder 11 mounted at the side of the machine-gun. In this cylinder operates the control piston 12 which generates the recoil kick. A spindle 13 is attached to the piston 12 and extends out of the cylinder in front; its forward end carries to the lever 14 of the repeating mechanism which lever is provided a lug 15. Within the cylinder 11 there is mounted, longitudinally movable on the spindle 13, a slide valve 16 for controlling the admission of air into the cylinder. The slide valve 16 is moved to and fro by abutments or shoulders 17, 18 provided, respectively, on the spindle and on the end of the piston. The outlet for the compressed air from the cylinder 11 leads through the port 19 and the pipe 20 to the pellet magazine 9, so that the intermittent impulses of the exhaust are utilized for driving the pellets forward towards the barrel of the firearm. Parallel with this air pipe there may also be provided an exhaust pipe discharging directly into the open.

The lug 15 reciprocated with the piston 12 and spindle 13 coacts with a lug 21 provided

in the usual manner on the recoil rod 22 of the firearm when adapted for firing live ammunition in which case this rod fulfils the function mentioned above. Lug 21 moves in a slot 33 and projects therefrom. Rod 22 extends with its front end (not shown in the drawings) into a cylinder disposed adjacent the barrel of the firearm, into which the gases generated in the barrel are conducted, and is forced back by these gases against the force of the restoring spring 34 disposed inside the firearm substantially parallel to the cylinder 11. Spring 34 abuttingly engages rod 22 which, for this purpose, is provided with a projection 35. This is illustrated in Figure 4. During this rearward movement the recoil rod effects, by means of various lugs and bears surfaces, the movement of different parts of the firing-off mechanism required in the course of the firing operation. The described adapting means, for converting the machine-guns into a pellet-shooting practising firearm, makes use of the recoil rod 22 in the first place to effect a coupling between the piston 12 and the firing-off rammer 3, in that the firing-off rammer 3 is held fast with its knob-like rear end 23 between lugs 24 on the recoil rod while the piston 12 is coupled, by means of the lugs 15 and 21, for reciprocal movement with the recoil rod. In addition, the pressure of the restoring spring is transmitted, through the recoil rod 22 and lug 21, to the control piston 12.

The mode of operation of the adapting means according to the present invention is the same as that of the device disclosed in the co-pending application Serial Number 113,216, which matured into Patent No. 2,110,509. When the trigger is pulled the recoil rod moves forward under the influence of the restoring spring, and takes the firing-off rammer 3 and the control piston 12 along with it in this movement. In moving forward, the firing-off rammer opens the compressed air admission valve 6. As soon as the entire moving mechanism reaches approximately its foremost end position the compressed air can pass through the opened admission valve on the one hand through the port 5 into the passage 4 in the firing-off rammer to shoot the pellet out of the barrel, and on the other hand through the pipe 10 into the cylinder 11 where in the meantime the slide valve 16 has been moved into its foremost position so that the exhaust pipe 19 is closed off and the entering compressed air drives the piston 12 back and thereby operates the entire firing-off mechanism. This rearward movement which, in consequence of the large cross-section of the piston 12, produces just as powerful a kick as the recoil movement of the firing mechanism in the normal firearm when using live ammunition takes the piston 12 and also the recoil rod 22 and the firing-off rammer 3, against the force of the restoring spring, into their rearmost end position. Just before this position is reached, the slide valve 16 opens the exhaust pipe 19, 20, so that a puff of compressed air enters the pellet magazine and pushes the train of pellets on towards the barrel of the firearm, after which the described cycle may be repeated.

In a modified machine-gun design it is possible to place the cylinder 2 for the firing-off rammer and the cylinder 11' for the control piston directly adjacent each other (see Fig. 2). In this case the paths along which air is conducted between the two cylinders are simplified. The loading rammer is denoted by 3' and the control piston by 12', and these two parts are interconnected by suitable parts of the firing-off mechanism, for example by means of a lug 21' of the recoil rod 22' which lug engages lug 15' of piston rod 13'. In this case the compressed air admission valve 6' discharges directly into the cylinder 11' and is controlled by sloping surfaces 25 provided on an element attached to the spindle or stem 13' of the control piston. From the valve 6' a passage 26 leads on the one hand into the space 27 in front of the piston, and on the other hand through a recess 28 in the piston to the port 29 and thence into the firing-off passage of the rammer 3'. 30 denotes a port which is intended to establish equality of pressure between the spaces in front of the control piston and the firing-off rammer, 31 denotes the pellet feed passage, and 32 the exhaust port. The exhaust port 32 may either discharge into the open as indicated in Fig. 2 or be connected up to the pellet magazine in a manner similar to that shown in Fig. 1. A further possibility is to close the pressure equalizing port 30 and to take the exhaust passage into the space in front of the firing-off rammer 3' and only from there to the pellet magazine.

When the firing-off mechanism is released by pulling the trigger this mechanism is forced forward by the action of the restoring spring 34' which is diagrammatically shown only, until the control piston 12' is near its foremost end position and the compressed air admission valve 7 is opened by the sloping surfaces 25. The compressed air then flows through the passage 26, past the recess 28 in the control piston, through the communicating port 29, to the firing off rammer, and passes through the passage in this latter into the barrel so that the pellet at the rear end of the barrel is shot out. At the same time compressed air passes into the space in the cylinder in front of the control piston, and forces this latter back until the slide valve longitudinally slidable on the control piston uncovers the exhaust port 32. In the meantime the control piston, together with the remaining movable parts of the firing-off mechanism, has again reached its rearmost end position, and a fresh pellet has come into position in the barrel through the feed pipe 31, so that the next shot can be fired in the same manner as the last.

I claim:

1. A mechanism for adapting machine firearms for shooting pellets with the aid of compressed air for practicing purposes, comprising a cylinder, a loading and firing-off rammer operating in said cylinder, a second cylinder having an axis spaced from and parallel to the axis of said first mentioned cylinder, a piston mechanically connected with said rammer and disposed in said second cylinder, compressed air inlet means and compressed air outlet means connected with said second cylinder forward of said piston, compressed air flow control means disposed within said second cylinder forward of said piston and adapted to be operated by said piston and to admit compressed air from said inlet means to said second cylinder and to simultaneously close said compressed air outlet means for forcing said piston and said rammer into loading position by means of compressed air.

2. A mechanism for adapting machine firearms for shooting pellets with the aid of compressed air for practicing purposes, comprising a cylinder, a loading and firing-off rammer operating in said cylinder, another cylinder having an axis

which does not coincide with the axis of said first mentioned cylinder, a piston operating in said other cylinder and being mechanically connected with said rammer, a source of compressed air, an inlet port connected with said source and being positioned in said other cylinder, and an outlet port for compressed air connected with said other cylinder, a slide valve in said other cylinder associated with and operated by said piston and opening said inlet port and admitting compressed air to said other cylinder and simultaneously closing said outlet port whereupon the compressed air forces said piston and said rammer connected therewith back into loading position.

3. A mechanism for adapting machine firearms for shooting pellets by means of compressed air, comprising a reciprocatingly operating loading and firing-off rammer mechanism comprising a laterally projecting lug, a cylinder, a piston operating in said cylinder and having an extension provided with a laterally projecting lug engaging said first mentioned lug and mechanically interconnecting said piston and said rammer mechanism, a source of compressed air, an inlet port connected with said source and being positioned in said cylinder, and an outlet port for compressed air in said cylinder, port control means associated with and being operated by said piston and opening said inlet port and admitting compressed air to said cylinder and simultaneously closing said outlet port, whereupon the entering compressed air forces said piston and said rammer connected therewith back into loading position.

4. A mechanism for adapting machine firearms for shooting pellets by means of compressed air, comprising a cylinder, a piston operating in said cylinder and having a loading and firing-off rammer connected therewith, another cylinder having an axis which does not coincide with the axis of said first mentioned cylinder, a piston operating in said other cylinder and being mechanically connected with said first mentioned piston, resilient means connected with one of said pistons, a source of compressed air, an inlet port connected with said source and being positioned in said other cylinder, and an outlet port for compressed air in said other cylinder, port control means associated with and being operated by said piston and opening said inlet port and admitting compressed air to said other cylinder and simultaneously closing said outlet port, whereupon the entering compressed air forces said piston and said rammer connected therewith back into loading position against the action of said resilient means.

5. A mechanism for adapting machine firearms for shooting pellets by means of compressed air, comprising a cylinder disposed coaxially and connected with the barrel of the firearm, a loading and firing-off rammer reciprocatingly movably disposed in said cylinder and having a compressed air channel for conducting compressed air to and firing a pellet, a second cylinder, compressed air supply means connected with both said cylinders, an air admission valve in said supply means adapted to be directly operated by said rammer for admitting compressed air to said first mentioned cylinder and to said air channel when said rammer is in firing-off position, and a compressed air actuated piston laterally operatively connected with said rammer and adapted to move said rammer back into loading position after firing of a pellet.

6. A mechanism for adapting machine firearms for shooting pellets by means of compressed air, comprising a cylinder, a piston reciprocatingly operating in said cylinder, another cylinder, a piston operating in said other cylinder and being laterally operatively connected with said first mentioned piston, a source of compressed air connected with one of said cylinders, an air admission valve connected with said source and being operatively connected with and operated by one of said pistons and being opened and admitting compressed air from said source into both said cylinders when said piston with which said valve is connected is in firing-off position, the compressed air admitted to said first mentioned cylinder firing-off a pellet and the air admitted to said second mentioned cylinder returning said pistons to loading position.

7. A mechanism for adapting machine firearms for shooting pellets by means of compressed air, comprising a cylinder, a loading and firing-off rammer reciprocatingly operating in said cylinder, another cylinder, a piston operating in said other cylinder and being laterally operatively connected with said rammer, a source of compressed air connected for air flow with said cylinders, an air admission valve connected for air flow with said source and being operatively connected with and operated by said rammer and being adapted to be opened and to admit compressed air from said source into both said cylinders when said rammer is in firing-off position, the compressed air admitted to said first mentioned cylinder firing-off a pellet and the air admitted to said second mentioned cylinder returning said piston and rammer into loading position.

8. A mechanism for adapting machine firearms for shooting pellets by means of compressed air, comprising a reciprocatingly operating loading and firing-off rammer, a cylinder, a piston operating in said cylinder, said rammer and piston being abuttingly connected with one another, a source of compressed air, an inlet port and an outlet port for compressed air positioned in said cylinder and being connected with said source, port control means in said cylinder and being operatively connected with and operated by said piston, said control means, in firing-off position of said piston, opening said inlet port and the compressed air entering said cylinder forcing said piston and said rammer cooperating therewith back into loading position.

9. A mechanism for adapting machine firearms for shooting pellets by means of compressed air, comprising a reciprocatingly operating loading and firing-off rammer, a cylinder, a piston operating in said cylinder, said rammer and piston being disconnectably connected with one another, a source of compressed air, an inlet port and an outlet port for compressed air disposed in said cylinder and being connected with said source, port control means disposed in said cylinder and being operatively connected with and operated by said piston, said control means, in firing-off position of said piston, opening said inlet port and the compressed air entering said cylinder forcing said piston and said rammer cooperating therewith back into loading position.

ADAM SCHMIDT.