

UNITED STATES PATENT OFFICE.

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MEANS FOR CONTROLLING THE RECOIL OF GUNS.

SPECIFICATION forming part of Letters Patent No. 749,215, dated January 12, 1904.

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To all whom it may concern:

Be it known that I, SAMUEL N. McCLEAN, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Means for Controlling the Recoil of Guns, of which the following is a description, reference being had to the accompanying drawings, and to the figures of reference marked thereon.

My invention relates to means for utilizing the force of the discharge to control the recoil of guns or cannon, including field-guns, machine-guns, quick-firing ordnance, and the primary and secondary batteries of forts and ships.

Most specifically stated, my invention relates to devices by which the gases of discharge are caused to supply an elastic medium by which the recoil of the gun is so counteracted or balanced and controlled that the shock of recoil will be taken up and the least possible rearward movement of the gun be permitted, any such movement being checked and the gun restored to its original position without undue strain upon the gun-mount.

In the accompanying drawings, Figure 1 is a view, partly in elevation and partly in longitudinal section, showing a field-gun embodying my invention; and Figs. 2 and 3 are similar views showing modifications.

In the drawings, 1 is the gun and is shown as an ordinary form of built-up field-cannon. It is mounted on an ordinary form of field-carriage, having a tailpiece or trail 2 and the usual type of wheel-mount. The gun is provided at its forward part with a gas-chamber 3, secured to its muzzle, preferably by screw-threads, as shown. This chamber is provided with a central forward opening 4 in line with the bore of the barrel to permit the passage of the projectile.

At a point preferably about midway of its length a band 5 is secured to the gun, carrying a downwardly-projecting arm 6, to which a hollow piston-rod 7 is secured. At the rearward end of the piston-rod within the recoil-cylinder 8 is the piston 9. The recoil-cylinder 8 is closed at its rear end and is provided with a downward extension 10, carried by the

axle 11 of the gun-carriage, and at its rear is provided with a socket 12, in which the end of the elevating-screw 13 is secured. The gun 1 is carried by the recoil-cylinder and is free to move thereon.

Through the hollow piston-rod 7 extends a horizontal tube 14, connected by means of a coupling 15 with a tube 16, leading from the gas-chamber 3. The rear end of the tube 14 opens into the recoil-cylinder in rear of the piston 9.

In this construction when the gun is fired the gases of discharge will act upon the front end of the gas-chamber to overcome to a large extent the force of the recoil. A portion of the gases of discharge will pass into the recoil-cylinder in rear of the piston 9 and exert a forward pressure on the piston and through the piston rod and band 5 will yieldingly check the rearward movement of the gun. The gun will thus be practically locked against movement, the action of the gases being prolonged by reason of the fact that before they can escape they must travel forward through the tube into the gas-chamber, where whatever force they may still retain will act in a forward direction on the gas-chamber.

If desired, the tube 14 may be provided with a check-valve to prevent the return of the gas from the recoil-cylinder 8, in which case the recoil-cylinder should be provided with a relief-valve.

In Fig. 2 I have shown a modification in which the hollow piston-rod 7 is dispensed with, the piston being carried by the tube 14, the tube being secured in the extension 6 of the band 5.

In Fig. 3 I have shown a further modification. In the construction shown in this figure the gas-chamber 3 is arranged to have a limited longitudinal movement on the end of the gun, the front end of the gun having a cylindrical or non-tapering portion 17 to carry the chamber and permit its movement and being provided with a retaining-flange 18, which is screwed or otherwise retained on the end of the gun. The gas-chamber 3 in this form of my device is also provided at its rear end with a downward extension 19, through which the tube 14 passes and in which it is

preferably secured by screw-threading or otherwise. The tube 14 is prolonged to the rear of the piston 9 and carries at its end a solid piston 20. At points between the piston 5
20 and the piston 9 the tube 14 is provided with openings 21 for the escape of the gases of discharge. In this form of my device on the gun being fired the gases of discharge will first act to drive the gas-chamber forward, giving to it and to the piston 20, through the tube 14, a certain momentum. A portion of the gases will instantly be discharged through the openings 21 in the tube 14 into the recoil-chamber 8 between the piston 20 and the piston 15
9, counteracting the forward movement of the gas-chamber 3, and at the same time, by acting against the piston 7, counteracting the rearward recoil of the gun. The forward momentum thus imparted to the gas-chamber and the piston 20 will be yieldingly opposed to the rearward movement of the mass of the gun. The gas-chamber is necessarily of much less mass than the gun itself, but by reason of this less mass will be more quickly started and will be 25
given forward movement to a substantial extent before the gun, which is of greater mass, and therefore less quickly moved, begins its rearward movement. Before the gun moves rearwardly an appreciable distance the gases of 30
discharge will enter the chamber 8 between the pistons 20 and 7 and will form a yielding cushion by which the recoil will be counteracted and a balance between the movement of the gas-chamber and the gun will be secured, with the 35
result that the gun will not move rearwardly any appreciable distance.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

40 1. The combination with the carriage, bar-

rel movable on the carriage, the recoil-cylinder and piston of a gun, the cylinder or piston attached to the carriage, of a channel connecting the bore of the gun and said cylinder to permit the flow of gases from the gun into 45
said cylinder to reduce recoil and return the gun to battery on the carriage.

2. The combination of a gun-mount, a gun movable thereon, a device secured to the mount, a device secured to the gun, means inclosing the space between the two devices and means for introducing a portion of the gases of discharge into said space between the two devices. 50

3. The combination of a gun-mount, a gun 55
movable thereon, a gas-chamber movable on the gun, a recoil-cylinder secured to the mount, a piston secured to the gun and movable within the cylinder, a second piston secured to the gas-chamber and movable within the cylinder, 60
and means for introducing a portion of the gases of discharge into the cylinder between the two pistons.

4. The combination of a gun-mount, a gun 65
movable thereon, a recoil-cylinder secured to the mount, a piston secured to the gun and movable within the cylinder, a second piston movable within the cylinder, means of less mass than the gun actuated by the gases of discharge for effecting a movement of said 70
second piston in advance of the rearward movement of the gun, and means for introducing a portion of the gases of discharge into the cylinder between the two pistons.

In testimony whereof I affix my signature 75
in presence of two witnesses.

SAMUEL N. McCLEAN.

Witnesses:

FRANK D. BLACKSTONE,
GEO. C. EVANS.