

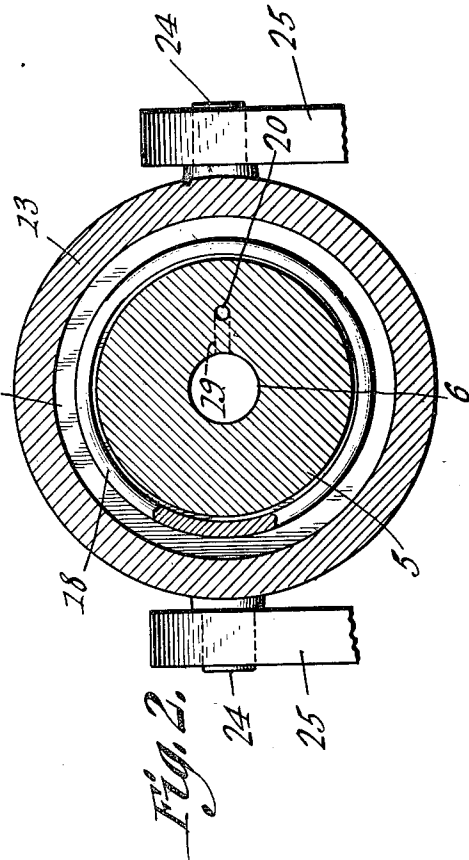
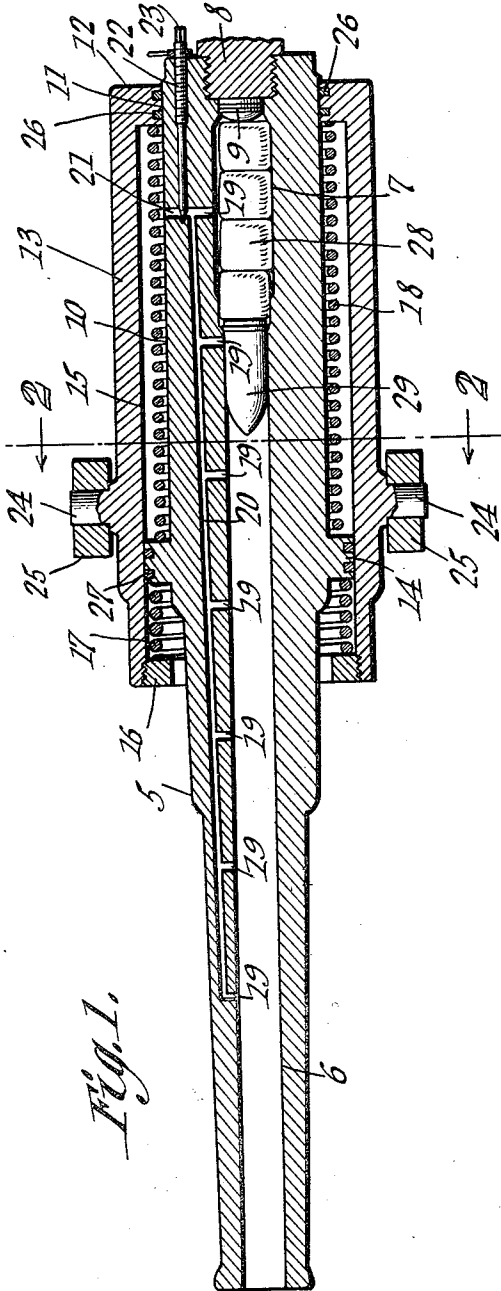
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E. M. DE MAINE

RECOIL CONTROLLING DEVICE

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RECOIL-CONTROLLING DEVICE.

Application filed February 8, 1923. Serial No. 617,307.

To all whom it may concern:

Be it known that I, ERNEST M. DE MAINE, a citizen of the United States, residing at Alexandria, in the county of Arlington and State of Virginia, have invented certain new and useful Improvements in Recoil-Controlling Devices, of which the following is a specification.

This invention relates to means for absorbing the shock of recoil of guns or cannon and has for an object the provision of means whereby the rapidly expanding gases of the exploded ammunition charge are utilized to coact with provided instrumentalities to exert a pressure upon the gun in a direction opposite to the direction of recoil.

Another object of this invention is to provide means for utilizing the force of the expanding gases of the explosive charge to create a gas pressure exterior of the gun body to counteract the pressure of the exploding charge within the gun barrel.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed, may be made within the scope of what is claimed, without departing from the spirit of the invention.

The invention has been illustrated in its preferred embodiments in the accompanying drawing, wherein:

Figure 1 is a longitudinal sectional view of a cannon showing the invention applied thereto; and

Figure 2 is a transverse sectional view taken on the line 2—2 of Figure 1.

Referring specifically to the drawing, there is shown a gun or cannon 5 of usual construction and including the bore 6, firing chamber 7, and breech block 8, which is provided with the usual gas check or obturator 9. A portion of the exterior of the cannon barrel 5 is cylindrical in shape, as shown at 10, and slides within the bore 11 of an annular end wall or head 12 of a cylinder or cradle 13, which surrounds a portion of the cannon barrel 5. An annular ring or piston 14 is carried by the cannon 5 and slides longitudinally within the cylindrical bore 15 of the cylindrical cradle 13. A stop

member or ring 16 is screwed or otherwise secured to the cylinder 13 and any counter-recoil means may be provided, and, in this illustration, there is shown a helical spring 17 mounted within the cylinder 13 and positioned between the stop member 16 and the piston 14. Mounted within the cylinder 13 and interposed between the piston 14 and cylinder head 12 is a recoil spring 18, which normally holds the piston 14 into engagement with the counter-recoil spring 17.

A series of passages or ports 19 extends radially from the bore 6 and firing chamber 7 of the cannon which ports communicate with a longitudinal port or conduit 20, and a radially disposed port 21 communicates with the interior of the cylinder 13 and the longitudinal port 20. The port 21 is controlled by a valve 22, which is operated from the exterior of the cannon, as shown at 23. The cylinder or cradle 13 is provided at diametrically opposed points intermediate its ends with radially extending trunnions 24 which are pivotally mounted within the usual gun supports 25 carried by the usual carriage, not shown.

Any preferred means may be employed to check the escape of the gases from within the cylinder 12 and in this instance there are shown suitable packing rings 26 carried by the cylinder head and positioned to slidably engage the cylindrical portion 10 of the cannon, and similar rings 27 carried by the piston 14 and positioned to cooperate with the bore of the cylinder 13, although it is to be understood that any other type of gas check may be employed.

In operation, the usual fixed or loose explosive charge 28 is positioned between the breech block 8 and the conventional projectile 29, and this charge is fired in the usual manner, according to the type of cannon or gun used. The rapidly expanding gases will rush into the cylinder 13 through the ports 19, 20 and 21 and exert a pressure upon the piston 14 in a direction toward the muzzle of the gun, thereby counteracting the recoil.

By providing a number of ports 19 extending from the bore and chamber of the gun, it is obvious that the gases will be delivered to the cylinder 13 very quickly, thereby checking the recoil before it has moved the gun rearwardly sufficient to

create excessive momentum, and these gases with the aid of the recoil spring 18 will return the gun to its normal or battery position and this movement is checked by the counter-recoil spring 17. The flow of the gases from the cannon into the cylinder 13 may readily be controlled by the valve 22, and the degree which this valve is to be adjusted is determined by the type of explosive charge employed, such as a fast or slow burning charge, and other consideration readily appreciated by those familiar with the science of interior ballistics and other phases of the art to which this invention appertains.

By surrounding a portion of the cannon with the cylinder 13, it is manifest that the pressure transmitted to the cylinder will, in a measure, counteract the terrific pressure "built up" within the firing chamber and bore of the gun, and the escape of the gases into the cylinder 13 need not affect the velocity of the projectile because a faster burning charge may be employed than is usually used in guns of the type employed.

What I claim is:—

1. A device of the class described including a cylinder, a gun slidable within the cylinder, a piston carried by the gun operable within the cylinder, and means for communicating the bore of the gun with the interior of the cylinder to permit the flow of the gases from the gun into the cylinder to check the recoils of the gun.

2. A device of the class described including a gun, a cylinder, a piston slidable within the cylinder and connected to the gun, said gun having a port leading through the barrel thereof into the cylinder to permit the flow of the gases from the gun into

the cylinder to thereby check the recoil of the gun.

3. A device of the class described including a gun, a cylinder, a piston slidable within the cylinder and connected to the gun, said gun having valve-controlled ports leading from the bore of the gun through the barrel thereof into the cylinder to permit the flow of the gases from the gun into the cylinder to thereby check the recoil of the gun.

4. A device of the class described including a gun, a cylinder, a piston slidable within the cylinder and connected to the gun, said gun having ports leading from different longitudinal points of the bore and firing-chamber thereof and communicating with a valve-controlled port which communicates with the interior of the cylinder to permit the flow of the gases from the gun into the cylinder, to thereby cooperate with the cylinder and piston to check the recoil of the gun.

5. A device of the class described including a cylinder, a gun slidable within the cylinder, a piston carried by the gun, said gun having ports leading from the bore and firing chamber thereof and communicating with the interior of the cylinder to permit the flow of gases from the gun into the cylinder and the piston to thereby check the recoil of the gun, said cylinder surrounding a portion of the bore and firing-chamber of the gun to permit the pressure communicated to the cylinder to counteract the pressure within the bore and firing-chamber of the gun.

In testimony whereof I affix my signature.
ERNEST M. DE MAINE.