

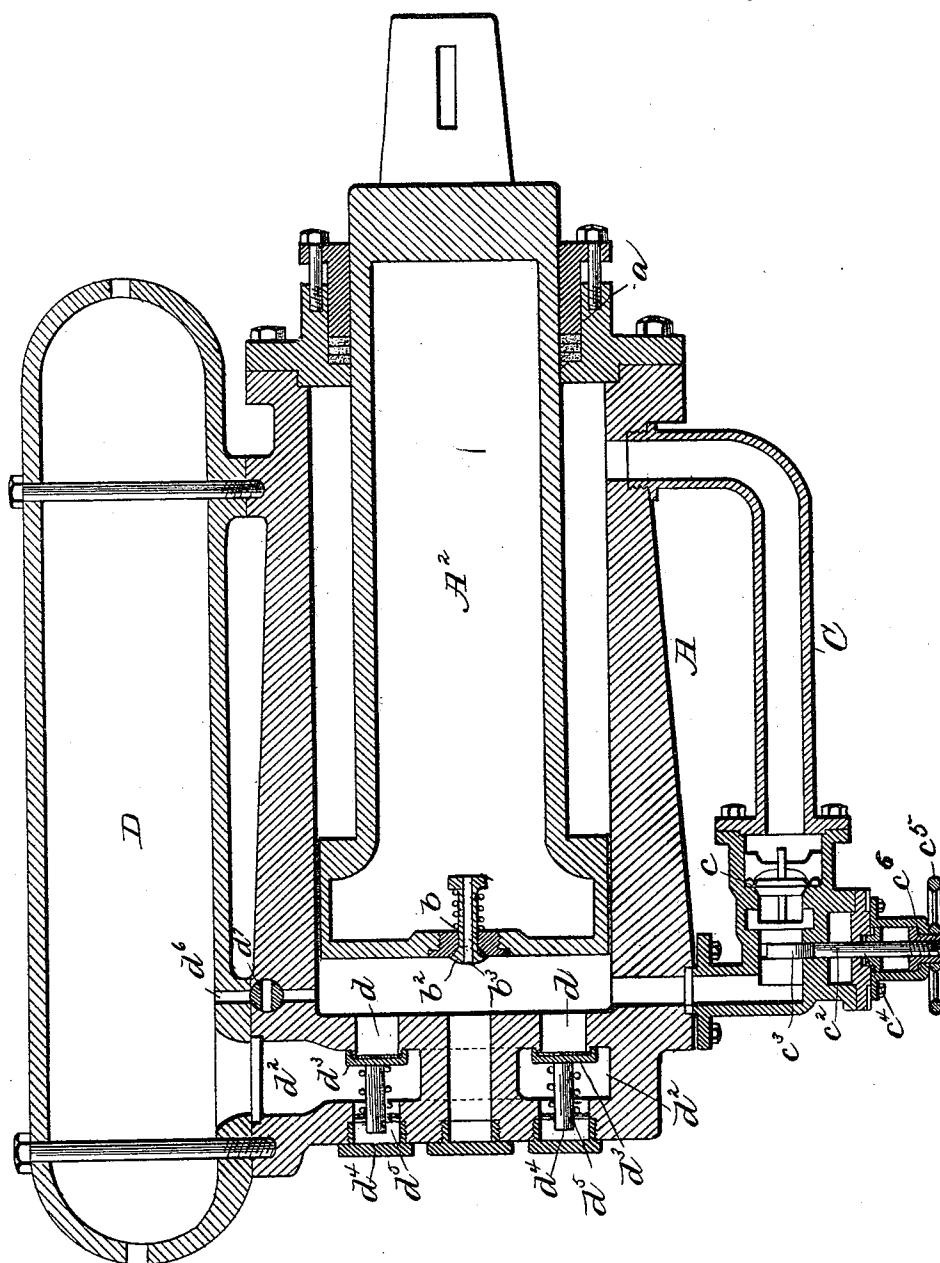
(No Model.)

H. A. SPILLER.

PNEUMATIC RECOIL CHECK FOR GUN CARRIAGES.

No. 535,928.

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UNITED STATES PATENT OFFICE.

HARRY A. SPILLER, OF BOSTON, MASSACHUSETTS.

PNEUMATIC RECOIL-CHECK FOR GUN-CARRIAGES.

SPECIFICATION forming part of Letters Patent No. 535,928, dated March 19, 1895.

Application filed October 4, 1892. Serial No. 447,780. (No model.)

To all whom it may concern:

Be it known that I, HARRY A. SPILLER, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Pneumatic Recoil-Checks for Gun-Carriages; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to pneumatic recoil checks for gun carriages.

The object is to produce a pneumatic recoil check for gun carriages, by which the recoil and counter-recoil of the gun will be taken up and the gun run into battery without shocks or dangerous jars to the structure and without liability of derangement of the parts; furthermore, to produce a pneumatic recoil check, by which the gun may be elevated or depressed rapidly and with little manipulation of parts.

With these objects in view, the invention resides in a pneumatic recoil check for gun carriages, comprising a cylinder, a piston arranged in the cylinder, and connected to a moving part of the carriage, a receiver arranged adjacent to the cylinder, a passage connecting the cylinder and receiver, and valves arranged in the passage; furthermore, in a pneumatic recoil-check for gun carriages, comprising a cylinder and a piston arranged in the cylinder and provided with a chamber, a receiver, and a connection between the receiver and the cylinder; furthermore, in a pneumatic recoil check for gun carriages, comprising a cylinder, a piston arranged in the cylinder and provided with a chamber, a valve regulating the entrance to the chamber, a receiver, and a connection between the receiver and the cylinder, controlled by valves; furthermore, in a pneumatic recoil-check for gun carriages, comprising a cylinder, a piston arranged therein and provided with a chamber, valves regulating the openings in the chamber, a receiver, and two connections between the receiver and the cylinder controlled by valves; and, finally, in a pneumatic recoil-check for gun carriages,

comprising a cylinder, a piston therein provided with a chamber, a receiver arranged adjacent to the piston and connected therewith, a pipe connecting the two ends of the cylinder and provided with valves, whereby movement of the piston is cushioned and injury to the mechanism in rapid operation avoided.

The invention is illustrated in the accompanying drawing, in which the figure represents a central, longitudinal, vertical sectional view of a pneumatic recoil check constructed in accordance with my invention.

In the drawing, A represents a cylinder which is to be mounted in a suitable position relative to a gun, and, in the case of a disappearing gun, the cylinder is provided with suitable trunnions, allowing it the necessary movements in operation. The cylinder is provided, at one end, with a packing-gland a , which is then around the piston-rod A^2 , to prevent the escape of air or other fluid to be confined in the cylinder. The piston is so constructed as to adapt it for connection with a gun, either directly, or through a suitable system of levers whereby motion of the gun is imparted to the piston and vice versa. The piston-rod is made hollow, forming a chamber designed to receive the air or other compressible fluid and this chamber communicates with the space at the end of the cylinder by a passage b controlled by a check-valve b^2 , the valve having a small opening b^3 , extending entirely through it so that there will, at all times, be a communication between the chamber in the piston and the end of the cylinder. The two ends of the cylinder are connected by a return-pipe C having a check-valve c arranged therein, whereby passage of air therethrough from the forward to the rear end of the cylinder is prevented, and, also, provided with a slide-valve c^2 . This slide-valve consists of a slide c^3 , a stem c^4 , connected thereto, and having its outer end screw-threaded, and a hand-wheel, c^5 , having a screw-threaded hub, c^6 , on the screw-threaded end of the stem. By the valve c^2 , the opening in the return-pipe may be regulated at will to regulate the passage of the quantity of air or other fluid from the rear to the front end of the cylinder at the time of the recoil to

regulate the working area according to the size of the charges fired in the gun, and to insure the passage of a sufficient quantity of compressed-air to the forward end of the cylinder to aid in preventing the counter-recoil of the gun.

D represents a receiver placed adjacent to or attached to the cylinder A and the end of the cylinder is provided with a passage d^2 , which communicates with the cylinder through ports d controlled by suitable automatic non-return-valves d^3 . Each of these valves is provided with a flat circular head which holds any suitable packing and has a stem d^4 held in some suitable guide and surrounded by a coil-spring d^5 . The springs hold the valves in a closed position. The passage d^2 communicates directly with the receiver D. Thus, it will be seen, that, on the movement of the piston toward the end containing the valves, the air will overcome the resistance offered by the springs d^5 and force the valves open, thereby allowing the air to enter the passage d^2 , and pass through to the receiver D, where it is trapped. The passage d^6 , controlled by a suitable hand-valve d^7 connects the receiver and cylinder and allows the introduction of air from the receiver to the cylinder for the purpose of operating the piston.

The operation of the device is as follows: The gun being in loading position, and, therefore, the piston being at the end of the cylinder containing the valves, air is admitted from the receiver to the space between the piston and the end of the cylinder, overcoming the pressure on the outer side of the piston, thus causing the piston to ascend. The air in the annular space around the piston, at the other end, will be gradually compressed and thereby offer an increasing amount of resistance, thus forming an elastic cushion and preventing the piston from striking the head of the cylinder violently. When the pressure at the upper end increases by the lifting of the gun, the air escapes around the piston-head the piston fitting loosely in the cylinder, thus permitting the escape of air, between it and the cylinder, to the lower end thereof. By this gradual displacement of air, the lifting of the gun is effected and the gun moves into battery without shocks and danger of deranging the parts composing it. On the recoil of the gun, the pressure overcomes the resistance of the non-return-valves in the end of the cylinder and the air is forced into the receiver, where it is trapped until the gun is again loaded, and righted, ready to run into battery. As the gun nears the end of the recoil, the resistance offered by the air below the cylinder is overcome, the non-return-valves open and a quantity of air is trapped below the cylinder while a portion of the air compressed, passes into the chamber in the piston through the opening b^3 in the check-valve, thus allowing the gun to settle on its buffers without shock after the recoil is taken

up. During the recoil of the gun, a portion of the compressed-air or other fluid will pass between the piston and the cylinder and through the return-pipe to the other end of the cylinder ready to form a cushion when the piston is again forced forward to run the gun into battery. The opening b^3 in the valve allows the pressure of air in the piston and below the same to equalize, and thus the gun is ready for moving into battery a very short time after the recoil.

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

1. A pneumatic recoil check for gun carriages, comprising a cylinder, a piston having a closed chamber, and a valve-controlled opening leading thereto from the end of the piston, a receiver arranged adjacent to the cylinder and a passage connecting the cylinder and the receiver, substantially as described.

2. A pneumatic recoil check for gun carriages, comprising a cylinder, a piston arranged therein and provided with a closed chamber, a valve controlling the opening thereto, and having a passage through it, and a receiver communicating with the cylinder through a valve-controlled-passage, substantially as described.

3. A pneumatic recoil check for gun carriages, comprising a cylinder, a piston arranged therein, and provided with a chamber communicating with one end of the cylinder, a receiver connected to the cylinder, and a pipe having a check-valve connecting the ends of the cylinder, substantially as described.

4. A pneumatic recoil check for gun carriages, comprising a cylinder, a piston arranged therein, a receiver connected to the cylinder, and a pipe provided with a hand-valve and a check valve, arranged adjacent to and connecting one end of the cylinder with the other, substantially as described.

5. A pneumatic recoil check for gun carriages, comprising a cylinder, a piston arranged in the cylinder and connected to a moving part of the carriage, a valve-controlled passage connecting the cylinder with a receiver and a pipe provided with a check-valve connecting one end of the cylinder with the other, substantially as described.

6. A pneumatic recoil check for gun carriages, consisting of a cylinder, a piston arranged therein and provided with a chamber, a valve arranged in the passage to the chamber, the valve having a passage through it, a receiver arranged adjacent to the cylinder, two passages connecting the cylinder and the receiver, one passage provided with automatic valves, and the other with a hand-valve, a pipe connecting the ends of the cylinder, and having a check-valve and a hand-valve, substantially as described.

7. A pneumatic recoil check for gun car-

riages, comprising a cylinder, a piston arranged therein, provided with a closed chamber, having a communicating passage thereto, an annular chamber formed by the piston in
5 one end of the cylinder and a chamber in the other end thereof, a receiver adjacent to the cylinder and connected to the chamber by suitable outlet and inlet passages, and a pas-

sage connecting the chambers at the ends of the cylinder, substantially as described. 10

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

HARRY A. SPILLER.

Witnesses:

DAVID H. MEAD,
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