

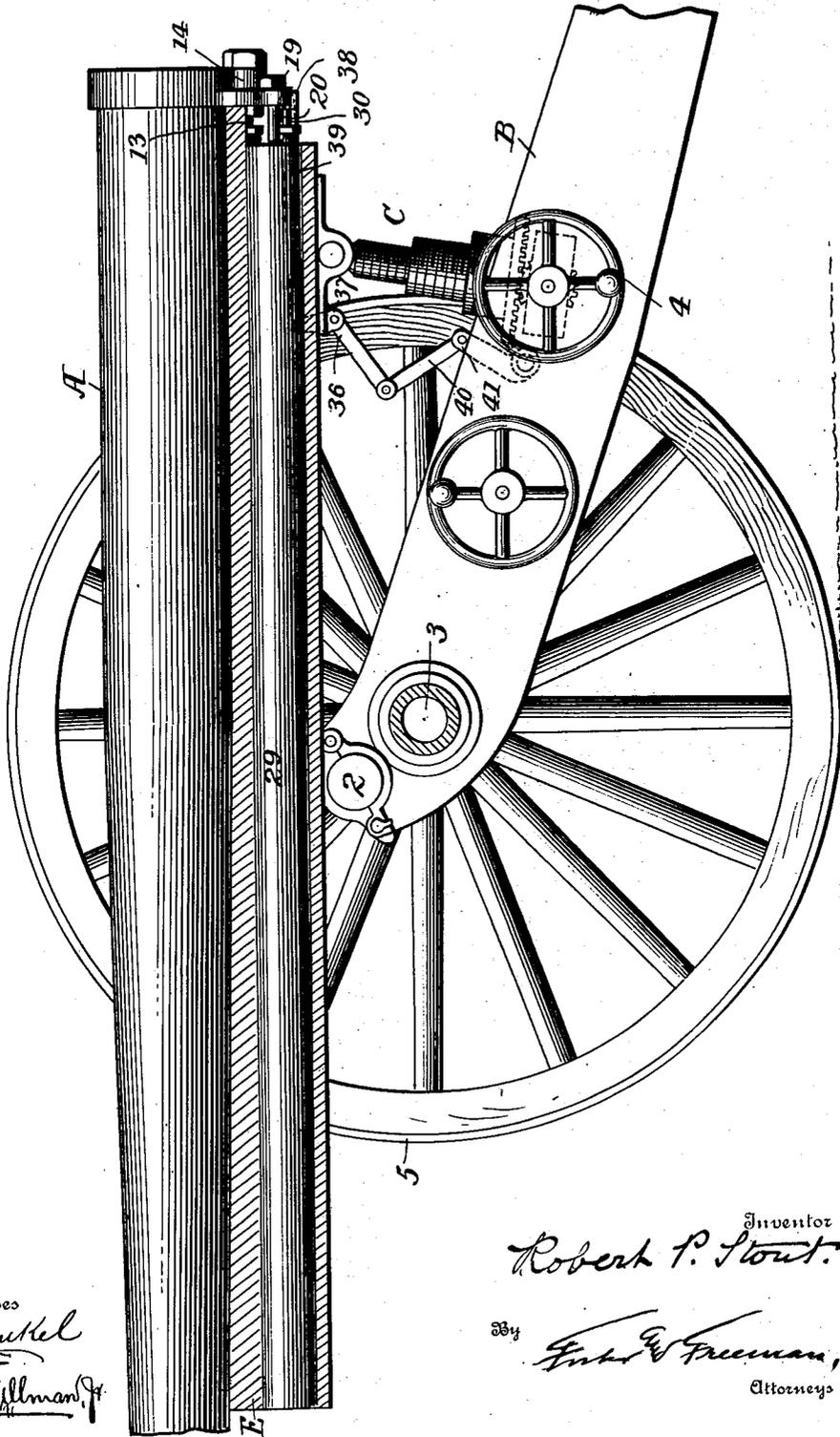
No. 782,883.

PATENTED FEB. 21, 1905.

R. P. STOUT.
RECOIL MECHANISM.
APPLICATION FILED NOV. 15, 1902.

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses
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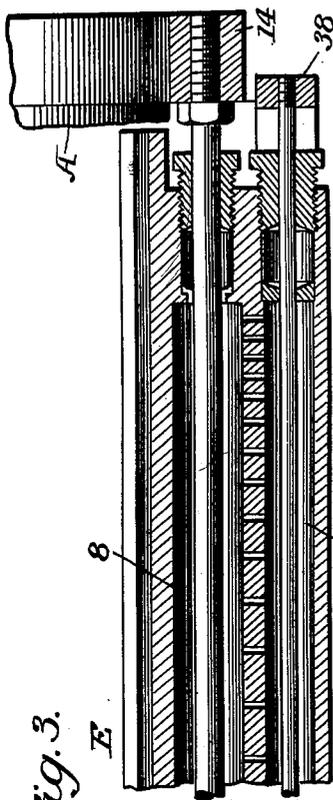


Fig. 3.

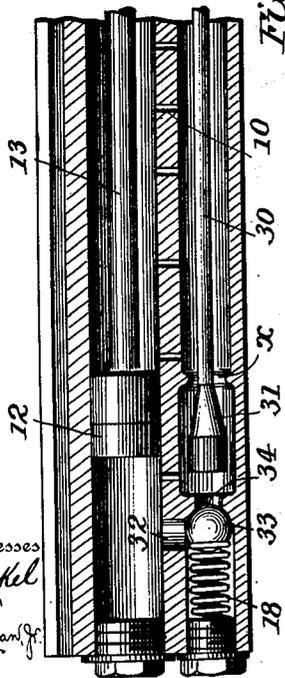


Fig. 4.

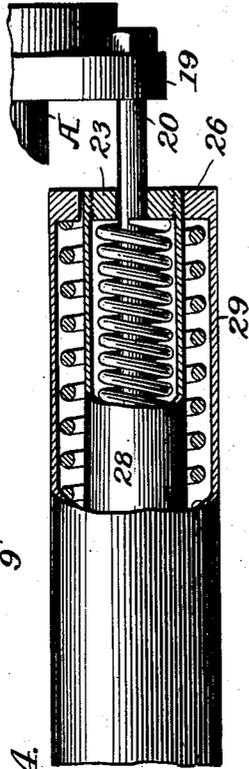


Fig. 5.

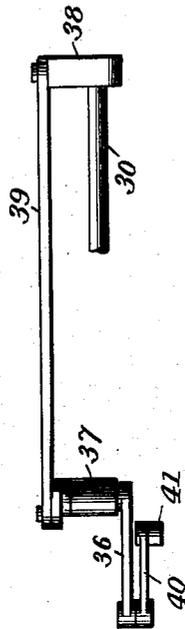


Fig. 6.

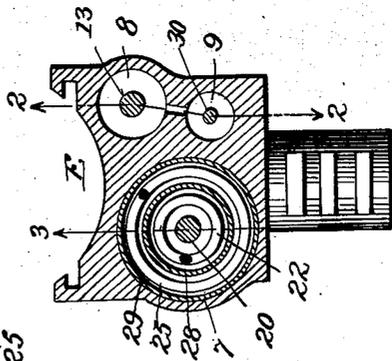


Fig. 7.

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UNITED STATES PATENT OFFICE.

ROBERT P. STOUT, OF BETHLEHEM, PENNSYLVANIA, ASSIGNOR TO BETHLEHEM STEEL COMPANY, OF SOUTH BETHLEHEM, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

RECOIL MECHANISM.

SPECIFICATION forming part of Letters Patent No. 782,883, dated February 21, 1905.

Application filed November 15, 1902. Serial No. 181,564.

To all whom it may concern:

Be it known that I, ROBERT P. STOUT, a citizen of the United States, residing at Bethlehem, in the county of Northampton and State of Pennsylvania, have invented certain new and useful Improvements in Recoil Mechanism, of which the following is a specification.

My invention relates to the recoil mechanism of a gun; and it consists of means whereby the energy of recoil is prevented from increasing as the result of elevating the gun and in certain details of construction fully set forth hereinafter and illustrated in the accompanying drawings, in which—

Figure 1 is a part sectional elevation of a field-gun with my improvements; Fig. 2, a transverse section through the cradle; Fig. 3, a longitudinal section on the line 2 2, Fig. 2; Fig. 4, a longitudinal section on the line 3 3, Fig. 2. Fig. 5 is a detail view of the valve-adjusting mechanism.

The gun A is supported upon a carriage B, having an axle 3, upon which turn the wheels 5, and the gun swings upon trunnions 2, being adjusted by means of elevating mechanism C of any suitable character operated by a hand-wheel 4. These features of the field-piece may be of any desired construction and do not in themselves constitute any part of the present invention. The gun rests, as usual where recoil devices are employed, in the seat of a cradle E, to which the trunnions are connected, and in the said cradle are three chambers or longitudinal recesses 7, 8, and 9, the chamber 7 receiving the recuperator-springs, which aid to gradually arrest the backward movement of the barrel, and the chambers 8 and 9 containing a fluid the more or less restricted movement of which flowing from one chamber to the other serves to regulate the movements of the gun through the medium of a piston connected therewith and fitting one of the chambers. As shown, the piston 12 is secured to a piston-rod 13, which passes through a stuffing-box at the rear end of the chamber 8 and is connected at its rear end to a lug 14, projecting from the gun A, and the

chamber 8 communicates with the chamber 9 through a series of openings 10 at the rear of the point of forward movement of the piston and with the said chamber through another opening, 32, forward of this point, the latter opening being larger than any one of the openings 10 and communication with the opening 32 being cut off at times by means of a ball-valve 33, closing a port 34, toward which it is pressed by a spring 18. To another lug 19, projecting from the gun, is connected the rear end of a rod 20, having a head 21 at the forward end, which head bears upon a spring 22, extending between the head 21 and a head 23 of a cylinder 28, that slides in a tube or casing 29, fitting the chamber 7, and at the forward end of the cylinder 28 is an annular head or flange 24, which bears against a spring 25, confined between the head 24 and the annular head 26 at the rear of the casing 29. As a result of this construction the rearward movement of the gun on the recoil first carries back the head 21 on the rod 20, compressing the spring 22 until the pressure is sufficient to move back the cylinder 28, the flange 24 of which then compresses the spring 25 against the end head or bearing 26 with a gradually-accumulating pressure. The gun is returned to forward position by the expansion of the springs, carrying the parts to the position shown in Fig. 4. Upon the rear movement of the gun the liquid is forced from the chamber 8 through the series of openings 10 at the rear of the piston 12, which gradually reduce in number as the piston 12 moves back, and passes into the chamber 9 and from the latter through the openings 10 and 32 forward of the piston 12 into the forward end of the chamber 8. As the openings 10 are arranged gradually closer together toward the rear, the reduction in port area as the piston moves to the rear is so compensated for as to secure a practically uniform resistance. As the gun is returned to position by the action of the springs the piston 12 moves forward, the valve 33 closes its port, and the fluid gradually passes from the space in front of the

piston through the openings 10 into the chamber 9 and then through the openings 10 at the rear of the piston into the chamber 8.

It will be seen that while a portion of the fluid flows from the chamber 9 into the chamber 8 forward of the piston 12 the greater portion of the fluid will pass by the valve 33 through the port 32, and it will be further evident that with the construction described the resistance to the backward movement of the piston 12 will be less when the gun is fired at a high elevation than when it is fired horizontally. As a result its recoil will then be too great.

In order that the possible energy of the rearward movement of the gun may be regulated in proportion to its elevation, I provide means whereby the passage to the port 32 is throttled in proportion as the muzzle of the gun is elevated. This is secured by means of a port x in the chamber 9, through which port extends a valve-stem 30, carrying a cylindrical or tapering valve 31, which when carried rearwardly contracts the said port. The valve-stem 30 is connected to a cross-head 38, which is connected by a connecting-rod 39 with the short arm of a bell-crank lever 36, swinging on a bracket 37 at the underside of the cradle, the other arm of the said lever being connected by a rod 40 to an ear 41 upon the carriage. As the result of this arrangement when the breach of the gun is depressed to increase the elevation of the fire the rod 30 is carried backward, carrying the valve 31 into the port x to a greater degree in proportion as the gun is further elevated, so that the passage through the port x is restricted in proportion to the elevation of the gun. When the gun is fired, the passage of liquid to the port 32 is throttled to an extent proportioned to the elevation of the gun, so that the effects of recoil are prevented from being increased by the increase of elevation.

It will be evident that various other forms of control devices may be used for the purpose of shifting the position of the valve to restrict or throttle the port x in proportion as the muzzle of the gun is elevated.

While the spring 25 may be arranged in the chamber 7, I prefer to make use of the casing 29, fitting the said chamber, as shown, whereby the entire body of the recoil devices may together be inserted in and removed from the chamber 7, which thereby may be formed by casting without that finishing which would be necessary if the chamber itself received the spring and sliding head 24. The casing 29 is secured in the chamber 7 in any suitable manner.

By forming the chambers 7, 8, and 9 in the cradle the parts can be readily assembled and

will always be maintained in proper relative position and are very effectively protected from the fire.

As the valve 33 closes on the forward movement of the piston 12 the gun is prevented from being returned abruptly or with any shock to firing position.

Without limiting myself to the precise construction and arrangement shown, I claim—

1. The combination with the gun, gun-carriage, cradle, elevating devices and recoil mechanism, of a control device regulating the recoil, and pivoted levers between the control device and the carriage, whereby the position of the control device is varied in proportion as the elevation of the gun is changed, substantially as set forth.

2. The combination with the piston connected to the gun, of a cylinder in which the piston moves, and a chamber communicating with said cylinder through passages traversed by the piston and near the forward end through a port of comparatively large area controlled by a valve arranged to close on the forward movement of the piston, substantially as set forth.

3. The combination with the piston connected to the gun, of a cylinder in which the piston moves, a chamber communicating with said cylinder through passages traversed by the piston, a port in said chamber and a valve, and means for carrying it toward said port as the elevation of the gun is increased, substantially as set forth.

4. The combination with the piston connected to the gun, of a cylinder in which the piston moves, a chamber communicating with said cylinder through passages traversed by the piston, a port in said chamber and a valve, a rod connected therewith and levers connected to the rod, the gun and to its carriage whereby to move the valve toward the port as the elevation of the gun is increased, substantially as set forth.

5. The combination with a gun, of a cradle having a chamber receiving the recuperator devices, and two chambers, one containing a piston connected with the gun, said chambers communicating through passages traversed by the piston and near one end through a port controlled by a valve, and means for shifting the valve to throttle the port according to the elevation of the gun, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ROBERT P. STOUT.

Witnesses:

EDWIN A. MILLER,
W. L. ACHENBACH.