

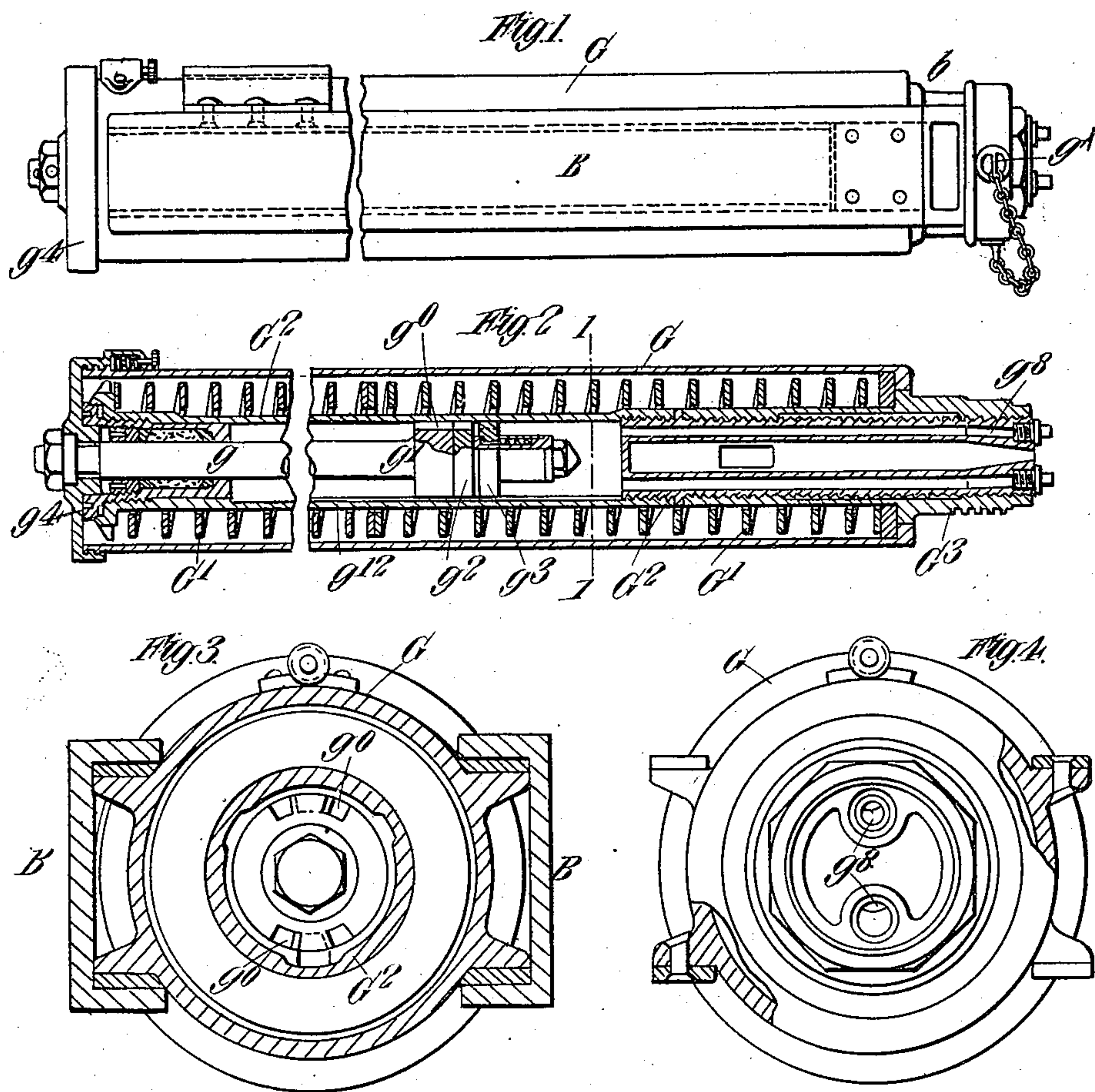
No. 897,821.

PATENTED SEPT. 1, 1908.

A. T. DAWSON & G. T. BUCKHAM.
RECOIL APPARATUS FOR GUNS.

APPLICATION FILED NOV. 14, 1907.

2 SHEETS—SHEET 1.



Witnesses:

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C. D. Stetler

Inventors

Arthur T. Dawson
George T. Buckham
James L. Norris

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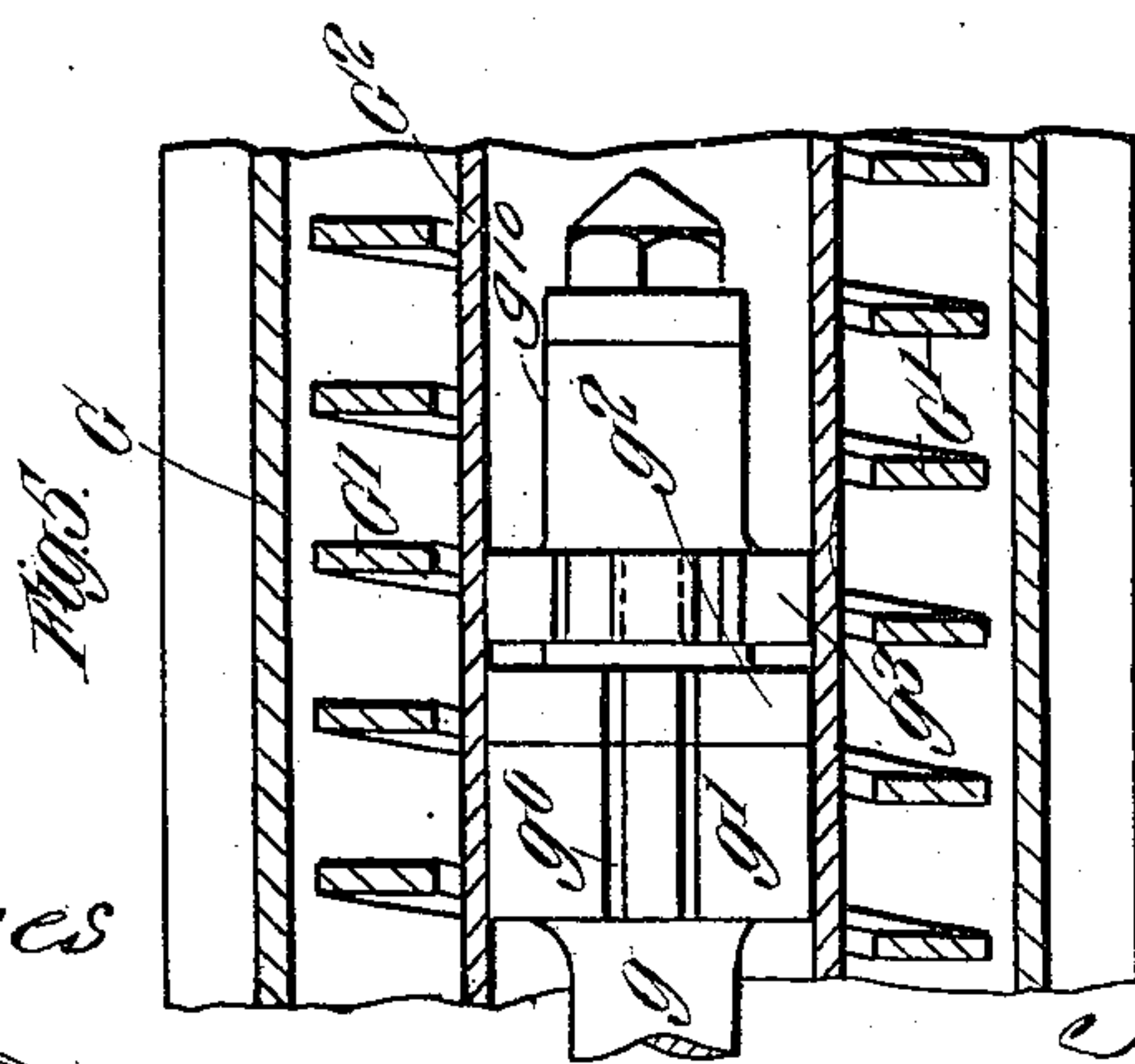
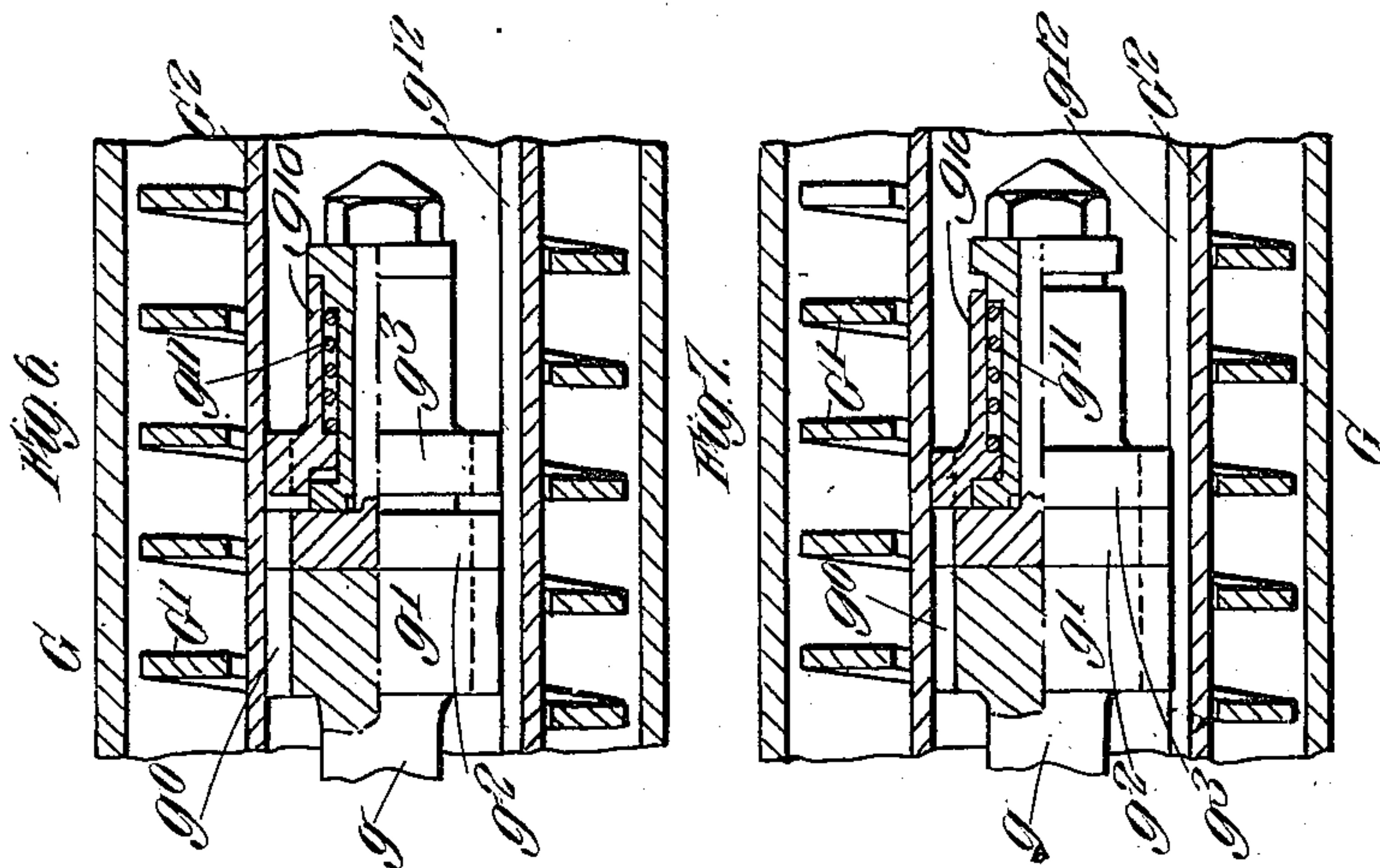
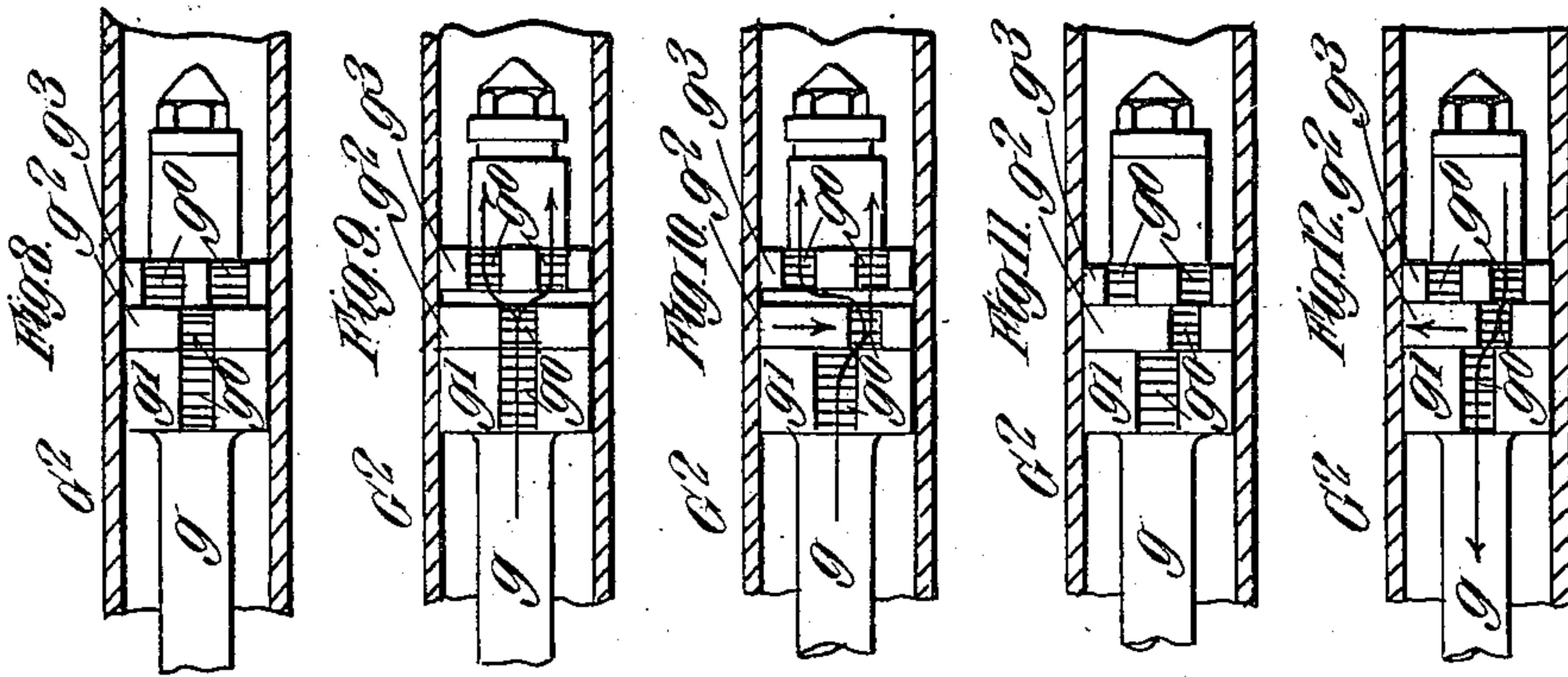
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RECOIL APPARATUS FOR GUNS.

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2 SHEETS—SHEET 2.



Witnesses

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UNITED STATES PATENT OFFICE.

ARTHUR TREVOR DAWSON AND GEORGE THOMAS BUCKHAM, OF WESTMINSTER, LONDON, ENGLAND, ASSIGNORS TO VICKERS SONS & MAXIM LIMITED, OF LONDON, ENGLAND.

RECOIL APPARATUS FOR GUNS.

No. 897,821.

Specification of Letters Patent.

Patented Sept. 1, 1908.

Original application filed September 27, 1906, Serial No. 336,423. Divided and this application filed November 14, 1907. Serial No. 402,148.

To all whom it may concern:

Be it known that we, ARTHUR TREVOR DAWSON, lieutenant Royal Navy, director and superintendent of ordnance works, and
5 GEORGE THOMAS BUCKHAM, engineer, both subjects of the King of Great Britain, residing at 32 Victoria street, Westminster, in the county of London, England, have invented certain new and useful Improvements in or
10 Relating to Recoil Apparatus for Guns, of which the following is a specification.

This invention relates to recoil apparatus for guns and has reference to the class of
15 such apparatus in which the recoil buffer cylinder is surrounded by the return spring casing and in which a three-part buffer piston is employed, the said piston having one
20 part fixed to the piston rod, one part capable of angular displacement by the recoil and return movements of the buffer cylinder and another part adapted to slide longitudinally on the said rod against the resistance of a spring. The said piston is connected with
25 the front end of the return spring casing and the rear end of the buffer cylinder is connected with the gun cradle by means of a sleeve nut.

In three-part pistons as hitherto proposed, the angularly displaceable part has
30 been located remote from the sliding part, with the result that when said sliding part assumes its closed position relatively to the ports in the fixed part, which it does during the return movement of the gun after recoil-
35 ing, the liquid in the buffer cylinder flows through the ports of the piston with a practically constant volume.

It is an important feature of our invention that the aforesaid angularly displaceable
40 part of the piston occupies a position close to the sliding part, the fixed part being situated remote from the sliding part. By thus arranging the parts the passage of the liquid past the piston during the return movement
45 of the gun, can be so regulated that at the first part of the return movement, the maximum quantity of liquid will pass the piston, this quantity being gradually diminished during the advance of the gun, by the move-
50 ment of the angularly displaceable part, thereby permitting the return of the gun without shock. We are of course aware that it has before been proposed to employ a three-part piston comprising two sliding por-

tions and an intervening rotary portion so
55 arranged that by imparting angular motion to the piston rod by the change in elevation of the gun the said sliding portions carried by the piston rod may be caused to regulate the
60 recoil and the advance of the gun to the firing position after recoil by the relative angular movement between the said sliding portions and the rotary portion. In our arrange-
65 ment however we do not impart any angular movement to our sliding portion nor to the piston rod on which it slides.

In order that our said invention may be clearly understood and readily carried into
70 practice we will describe the same more fully with reference to the accompanying drawing, in which:—

Figure 1 is a side elevation of the recoil buffer and return spring. Fig. 2 is a longitudinal section of the same. Fig. 3 is a cross
75 section on a larger scale taken on the line 1—1 and Fig. 4 is a sectional end view as seen from the right of Fig. 2. Fig. 5 is a longitudinal sectional view taken at right angles to Fig. 2 and showing the buffer piston in plan. Fig. 6 is a vertical section of the said buffer
80 piston showing the position of the sliding part during the recoil of the gun. Fig. 7 is a view similar to Fig. 6 showing the position of the sliding part, as the gun runs home. Figs.
85 8 to 12 are diagrams showing the position the ports of the three-part piston assume during the recoil and return movements of the gun.

G is the buffer and return spring casing; g^1 g^2 g^3 are the three-part piston g is the piston
90 rod connected at its forward end to the cap g^4 .

G^1 G^1 are the return springs surrounding the buffer cylinder G^2 .

G^3 is the sleeve nut which is secured to the cross head b of the gun cradle B by means of
95 an interrupted screw and prevented from turning by a spring pin g^x .

The piston consists of the three parts, g^1 , g^2 , g^3 , one (g^1) fixed to or formed solid with
100 the piston rod, one (g^2) free to turn angularly on the rod, and one (g^3) free to move longitudinally against the resistance of a spiral spring g^{11} on the rod and disposed within the sleeve g^{10} of the slide portion, which
105 spring tends to return said movable part to its initial position after displacement. Each of said portions has ports g^0 in its circumference, and the angularly movable part g^2 has a projection which fits into a rifled groove g^{12}

which is formed in the cylinder. When the gun is in the firing position, the ports in the fixed parts g^1 and angularly movable part g^2 coincide, but are almost closed by the sliding part g^3 as shown by Fig. 8. At the commencement of the recoil of the gun and cradle, the liquid passes through the ports in the fixed and angularly movable parts, and forces back the sliding part as shown at Fig. 9 with the result that the ports are all fully open so that a passage sufficiently large for the ready flow of the liquid from front to rear of the piston is obtained. During the recoil the angularly movable part g^2 is moved by the aforesaid rifled groove and gradually but not quite closes the passage through the ports in the parts g^1 g^2 by setting these ports out of coincidence as shown by Fig. 10. The buffer-piston is thus caused to exert resistance to the recoil movement, such resistance varying with the stability of the carriage. At the commencement of the return motion of the gun and cradle after recoil, the sliding part g^3 of the piston is forced by its spring against the angularly movable part g^2 , and the flow of the liquid through the port in the part g^1 then takes place in the reverse direction to that above stated, one of the ports in the sliding part g^3 being at this time fully open to the port in the angularly movable part g^2 which latter port is only slightly open to the port in the part g^1 (see Fig. 11) thus the flow of the liquid is at the minimum at this time. As the return movement continues however the angularly movable part g^2 under the influence of the said groove g^{12} moves in a direction to cause a gradual opening of the ports to the maximum (Fig. 12) followed by a gradual cut off due to the closing of the ports in the parts g^2 g^3 , thus permitting the return of the gun to take place without shock as the parts of the piston resume the position shown by Fig. 8. The said sliding part of the piston may have extra openings to facilitate the flow of the liquid past it if found desirable.

What we claim and desire to secure by Letters Patent of the United States is:—

1. In recoil apparatus for guns the combination with a recoil buffer cylinder of a piston rod carrying a piston comprising a part fixed to the piston rod, another part adapted to slide longitudinally thereon, and a third part capable of angular displacement said third part being situated between the fixed and sliding parts, the three parts comprising the piston being provided with ports, substantially as set forth.

2. In recoil apparatus for guns the combination with a recoil buffer cylinder of a piston rod carrying a piston comprising a part fixed to the piston rod, another part adapted to slide longitudinally thereon, and a third part capable of angular displacement, said

third part being situated between the fixed and sliding parts, the three parts comprising the piston being provided with ports in their peripheries, substantially as set forth.

3. In recoil apparatus for guns, the combination with a recoil buffer cylinder of a piston rod, and a piston carried by the rod and comprising a part fixed to the rod, another part adapted to move longitudinally thereon, means for returning the said part to its initial position, and a third part situated between the fixed and sliding parts and capable of angular displacement upon the piston rod, the three parts comprising the piston being provided with ports, substantially as set forth.

4. In recoil apparatus for guns the combination with a recoil buffer cylinder of a piston rod, and a piston carried by the rod and comprising a part fixed to the rod, another part adapted to move longitudinally thereon, means for returning the said part to its initial position and a third part situated between the fixed and sliding parts and capable of angular displacement upon the piston rod, the three parts comprising the piston being provided with ports in their peripheries, substantially as set forth.

5. In recoil apparatus for guns the combination with a recoil buffer cylinder of a piston rod, a piston carried by the rod said piston comprising a part fixed to the rod, another part adapted to slide longitudinally thereon, a sleeve on said sliding part, a helical spring arranged in said sleeve, and a third part capable of angular displacement said third part being situated between the fixed and sliding parts the three parts comprising the piston being provided with ports, substantially as set forth.

6. In recoil apparatus for guns the combination with a recoil buffer cylinder of a piston rod, a piston carried by the rod said piston comprising a part fixed to the rod, another part adapted to slide longitudinally thereon, a sleeve on said sliding part, a helical spring arranged in the said sleeve, and a third part capable of angular displacement said third part being situated between the fixed and sliding parts the three parts comprising the piston being provided with ports in their peripheries substantially as set forth.

7. In recoil apparatus for guns the combination with a recoil buffer cylinder formed with a rifled groove in its inner face, of a piston rod, a piston carried by the rod said piston comprising a part fixed to the rod, another part adapted to slide longitudinally thereon and means for returning the said sliding part to its initial position, a third part situated between the fixed and sliding parts and capable of angular displacement, and a projection on the third part adapted to engage with the rifled groove in the inner face

of the cylinder, the three parts comprising the piston being provided with ports substantially as set forth.

5 8. In a recoil apparatus for guns the combination with a recoil buffer cylinder formed with a rifled groove in its inner face, of a piston rod, a piston carried by the rod said piston comprising a part fixed to the rod, another part adapted to slide longitudinally
10 thereon and means for returning the said sliding part to its initial position, a third part situated between the fixed and sliding parts and capable of angular displacement, and a

projection on the third part adapted to engage with the rifled groove in the inner face 15 of the cylinder, the three parts comprising the piston being provided with ports in their peripheries substantially as set forth.

In testimony whereof we have hereunto set our hands in presence of two subscribing 20 witnesses this fourth day of November 1907.

ARTHUR TREVOR DAWSON.

GEORGE THOMAS BUCKHAM.

Witnesses:

HENRY KING,

ALFRED PEAKS.