(No Model.)

H. A. SPILLER.

MECHANISM FOR EXTRACTING AND INSERTING BREECH PLUGS OF HEAVY GUNS.

No. 458,508. Patented Aug. 25, 1891.

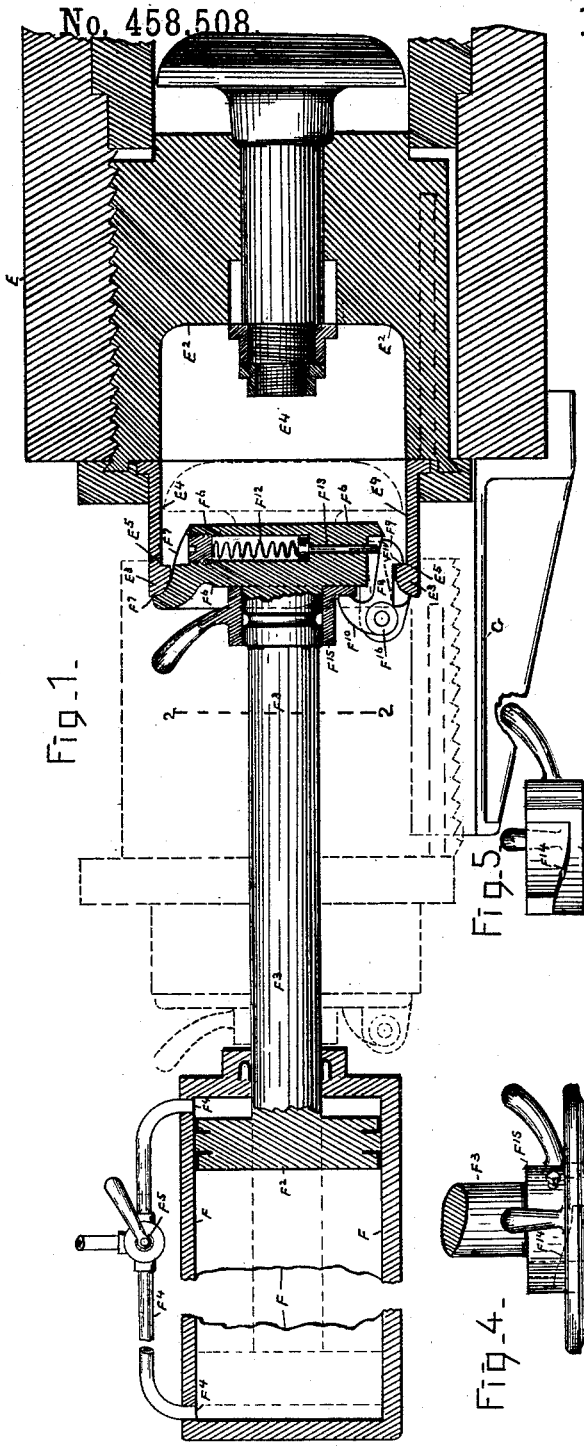

Fig. 1.

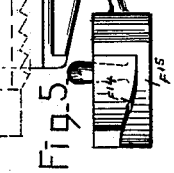

Fig. 5.

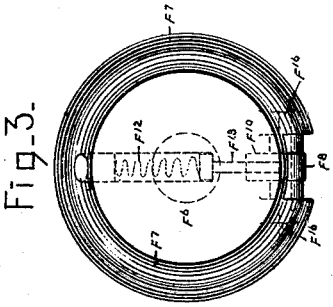

Fig. 3.

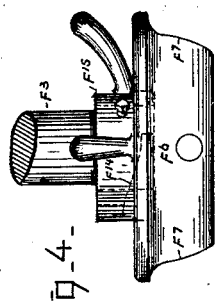

Fig. 4.

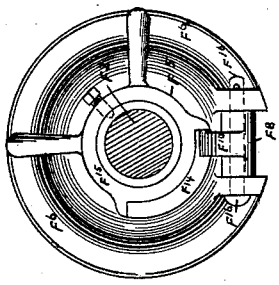

Fig. 2.

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UNITED STATES PATENT OFFICE.

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MECHANISM FOR EXTRACTING AND INSERTING BREECH-PLUGS OF HEAVY GUNS.

SPECIFICATION forming part of Letters Patent No. 458,508, dated August 25, 1891.

Application filed October 3, 1889. Renewed December 4, 1890. Again renewed July 16, 1891. Serial No. 399,775. (No model.)

To all whom it may concern:

Be it known that I, HARRY A. SPILLER, a citizen of the United States of America, and a resident of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Apparatus for Inserting and Extracting Breech-Plugs of Guns, of which the following is a full, clear, and exact description.

This invention relates to breech-plugs of guns.

The object of the invention is to secure rapid and easy insertion and extraction of breech-plugs of heavy guns, using a fluid under pressure as the motive power; and to this end the invention consists, essentially, of a horizontal piston-cylinder suitably supported at the breech of the gun and adjacent to the bore of the gun and at its opposite ends adapted for an inlet and outlet of fluid under pressure, a piston-head to move forward and backward in and between the opposite heads of the piston-cylinder, a piston-rod held on the piston-head and projected, suitably packed, through one head of the cylinder toward the breech of the gun and designed to enter the bore of the gun or brought to rest against the breech-plug, and a catch held on the piston-rod, in combination with a breech-plug recessed at its outer or rear end for engagement of the catch and for the reception of the piston-rod.

In the drawings forming part of this specification, and in which like letters indicate corresponding parts, Figure 1 is a central longitudinal section of the breech-plug and of the mechanism of this invention to insert and extract the breech-plug. Fig. 2 is a transverse section, line 2 2, Fig. 1, and an outer end view; and Fig. 3 is an inner end view of the mechanism carried by the piston-rod for a rest of the piston-rod upon and its engagement with the breech-plug. Fig. 4 is an edge view of Fig. 2. Fig. 5 is a view in detail, as hereinafter appears.

In the drawings, E is the breech of the gun. E^2 is the breech-plug. F is the piston-cylinder, closed at its opposite ends. F^2 is the piston-head, designed to move forward and backward in piston-cylinder and having a piston-rod F^3 held thereon and projecting through one head of the piston-cylinder. F^4 is a way leading to the opposite end portions of the piston-cylinder F, and F^5 is a valve in way F^4 to open it to the inlet and outlet of a fluid, preferably air under pressure, at the opposite end portions of the piston-cylinder. The piston-cylinder is supported in any suitable manner in a position adjacent to the breech of the gun, and the piston-rod from one head projects toward the breech-plug, and its outer end is provided with a fixed concentric head or disk F^6. The disk F^6 is of a diameter less than that of the bore of the gun, and its edge F^7 is concave to a convex projection or bead E^3 around the rear end of a socket or recess E^4 around the rear end of a plug and preferably formed integral with the plug. The head E^3 at its inner side has a shoulder E^5, extending around the breech-plug, for the engagement of a catch F^8, held on the lower side of disk or head F^6. The catch F^8, as particularly shown, is a bell-crank lever, which is fulcrumed at its angle F^{16} on the disk F^6 and presents one of its arms F^9 in position to be entered into the recess E^4 of the breech-plug and its shoulder F^{11} to be engaged with the shoulder E^5 of said recess, and thereby to attach the piston-rod to the breech-plug and through the piston-rod to secure the withdrawal of the breech-plug from the gun, the plug having first been disengaged from the gun by rotating it sufficiently. The engagement of the catch with the breech-plug is insured by a spiral spring F^{12}, confined on the disk F^6 and arranged to act through a stem F^{13}, suitably located on the engaging arm F^9 of the catch, and thereby to press it outward into engagement. The other arm F^{10} of the catch rests on a cam-edge F^{14}, projecting from the face of a collar F^{15}, surrounding and confined endwise, but free to be turned on the piston-rod. The shape of the cam-edge F^{14} is such that by turning the collar in one direction it will secure the release of the catch from the breech-plug, and by turning it in the opposite direction it will leave the catch free to engage the breech-plug, as described.

Under the combination and arrangement of

parts described, with a fluid—such as air under pressure—admitted to and allowed to escape from the piston-cylinder at its opposite ends alternately, the piston-head is caused to move forward and backward in the cylinder in one direction to insert the breech-plug into the gun and in the other direction to extract or withdraw it therefrom. The insertion of the breech-plug is secured by the rest and action of the disk F^6 of the piston-rod on the breech-plug, as has been described. The withdrawal of the breech-plug is secured by the engagement of the catch F^8, carried by the disk F^6 of the piston-rod, with the breech-plug. The breech-plug in being withdrawn travels along over a horizontal table fixed, as shown, on the breech end of the gun, otherwise suitably supported, and on which it is finally deposited on the disengagement of the catch, preferably secured by a shock or jar, in any suitable manner, imparted endwise to the plug, but which in case the shock or jar imparted to breech-plug fails to disengage the catch, as stated, may be positively secured by rotating the collar F^{15} sufficiently for its cam-edge to lift the catch out of engagement.

The disengagement of the catch from the breech-plug by a jar or shock imparted to the plug in the movement of the plug to be withdrawn is assisted and practically insured by a location of the fulcrum of the catch above the plane of engagement of the catch with the plug, (see Fig. 1,) and such an arrangement constitutes one of the features of this invention.

The annular shoulder E^5 of breech-plug E^2 for engagement of catch F^8, as has been explained, insures in all positions of the plug and of the catch relative to the axis of the plug the engagement of catch with plug, a very important feature. The disk F^6, with its piston-rod F^3 for inserting and extracting the breech-plug, all as has been described, may be also used as a ramrod to force and ram ammunition into the gun.

It is best in all cases in the use of the mechanism of this invention to insert and extract breech-plugs, as has been explained, to provide a suitable support for the plug before being inserted and after being extracted, and a support for such purpose, in combination with mechanism to insert and extract the breech-plug, all as described, constitutes one of the features of this invention.

Preferably the head F^6 is constructed to perform, acting in co-operation with the breech-plug, a double duty—to wit, to insert and to extract the plug—all as has been explained; but obviously, however, separate heads suitable to be put on and taken off of the piston-rod F^3 may be provided for each part of the work, and, again, the breech-plug, while adapted to be extracted by means of the mechanism described, may be inserted by hand, or vice versa.

In conclusion, it will be observed that while air is the fluid specially mentioned as used for the operation of the mechanism of this invention as herein described the invention is not to be limited in that regard.

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

1. As a means for inserting and extracting breech-plugs of guns, a horizontal piston-cylinder adapted for the inlet and outlet of fluid under pressure and suitably supported adjacent to the breech coincident with the axis of the gun, a piston-head to move forward and backward in said cylinder, a rod to said piston-head projected through the head of the cylinder toward the gun, and a breech-plug, in combination with means held on the projecting end portion of the piston-rod and the breech-plug to engage and thereby to connect piston-rod and breech-plug, substantially as described.

2. As a means for inserting and extracting breech-plugs of guns, a horizontal piston-cylinder adapted for the inlet and outlet of a fluid under pressure and suitably supported at the breech and axially coincident vertically with the axis of the gun, a piston-head to move forward and backward in said cylinder, a rod to said piston-head projected through the head of the cylinder toward the gun, and a breech-plug of the gun, in combination with means held on the projecting end portion of the piston-rod and the breech-plug to engage and thereby to connect piston-rod and breech-plug, and consisting of a head or disk held on the piston-rod, a shouldered catch held on said disk, the breech-plug having a recess and a shoulder, and a head and a recess relatively shaped for a rest of said head on the plug, substantially as described.

3. As a means for inserting and extracting breech-plugs of guns otherwise suitably adapted therefor, a horizontal piston-cylinder adapted for the inlet and outlet of a fluid under pressure and suitably supported at the breech and axially coincident vertically with the axis of the gun, a piston-head to move forward and backward in said cylinder, a rod to said piston-head projected through the head of the cylinder toward the gun, and a breech-plug of the gun, in combination with means held on the projecting end portion of the piston-rod and the breech-plug to engage and thereby to connect piston-rod and breech-plug, and consisting of a head or disk F^6, held on the piston-rod, a shouldered catch held on said disk, a concentric recess of the breech-plug and having a concentric shoulder, and the head and the recess relatively shaped for a rest of said head on the plug, substantially as described, for the purposes specified.

4. As a means for inserting and extracting breech-plugs of guns otherwise suitably adapted therefor, a horizontal piston-cylinder adapted for the inlet and outlet of a fluid under pressure and suitably supported at the breech and adjacent to the gun, a piston-

head to move forward and backward in said cylinder, a rod to said piston-head projecting through the head of the cylinder toward the gun, a breech-plug of the gun, and means held on the projecting end portion of the piston-rod and the breech-plug to engage and thereby to connect piston-rod and breech-plug, consisting of a disk or head to the piston-rod, a bell-crank-lever catch having an arm provided with a shoulder, a fulcrum on the lower side of said head and above the shoulder of the arm, a recess of the breech-plug, and having a shoulder, and the head and the recess relatively shaped for a rest of said head on the plug, substantially as described, for the purposes specified.

5. As a means for inserting and extracting breech-plugs of guns otherwise suitably adapted therefor, a horizontal piston-cylinder adapted at its opposite end portions for the inlet and outlet of a fluid under pressure and suitably supported at the breech and axially coincident vertically with the axis of the gun, a piston-head to move forward and backward in said cylinder, a rod to said piston-head projected, suitably packed, through the head of the cylinder toward the gun, a breech-plug of the gun, and means held on the projecting end portion of the piston-rod and the breech-plug to engage and thereby to connect piston-rod and breech-plug, consisting of a disk or head held on the piston-rod, an angular lever-catch fulcrumed on said head and having arms, one of which is shouldered, a recess of the breech-plug, and having a shoulder, and the head and recess relatively shaped for a rest of said head on the plug, in combination with a collar held and rotating on piston-rod and having a cam-face to act on the arm of the lever-catch, substantially as described, for the purposes specified.

6. As a means for inserting and extracting breech-plugs of guns otherwise suitably adapted therefor, a horizontal piston-cylinder adapted at its opposite end portions for the inlet and outlet of fluid under pressure and suitably supported at the breech and axially coincident vertically with the axis of the gun, the piston-head to move forward and backward in said cylinder, a rod to said piston-head projected, suitably packed, through the head of the cylinder toward the gun, and a breech-plug of the gun, in combination with means held on the projecting end portion of the piston-rod and the breech-plug to engage and thereby to connect piston-rod and breech-plug, and a support located at the breech of the gun to receive and support the breech-plug when to be and as it is inserted in and extracted from the gun, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

HARRY A. SPILLER.

Witnesses:
ALBERT W. BROWN,
HENRY F. MCKEEVER.