

JAMES B. EADS.

Improvement in Gun-Carriages.

No. 128,130.

Patented June 18, 1872.

Fig. 1.

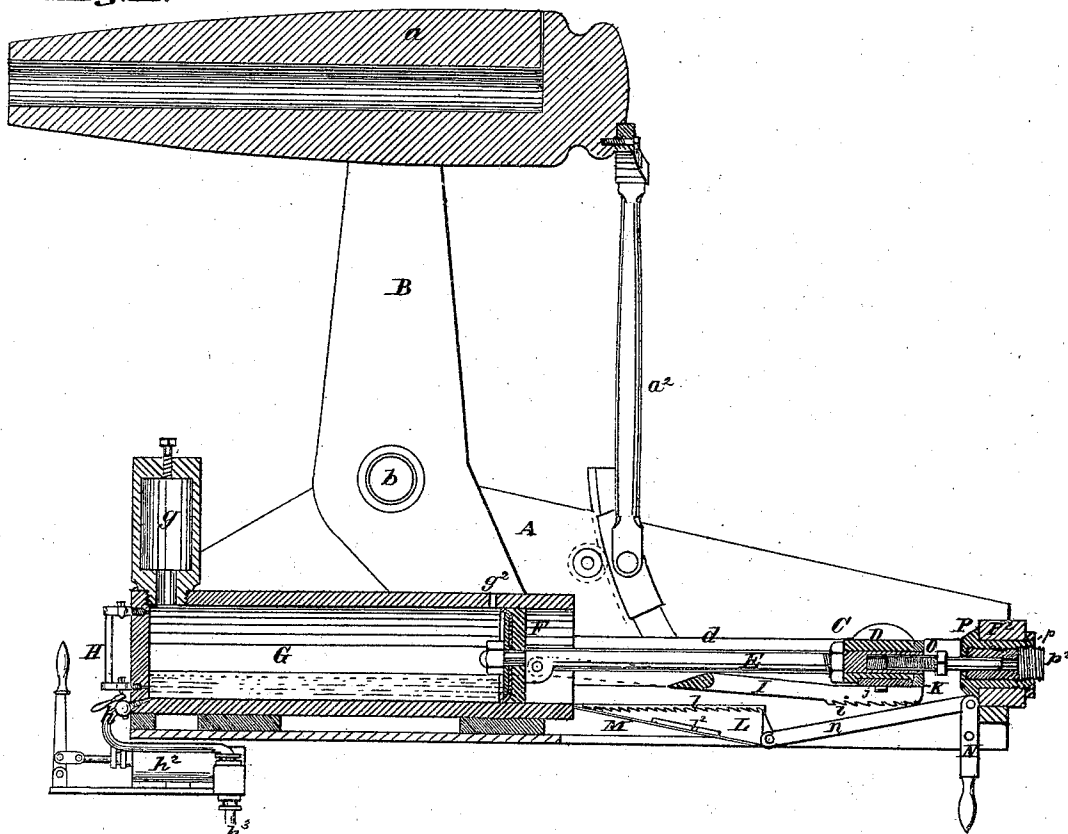
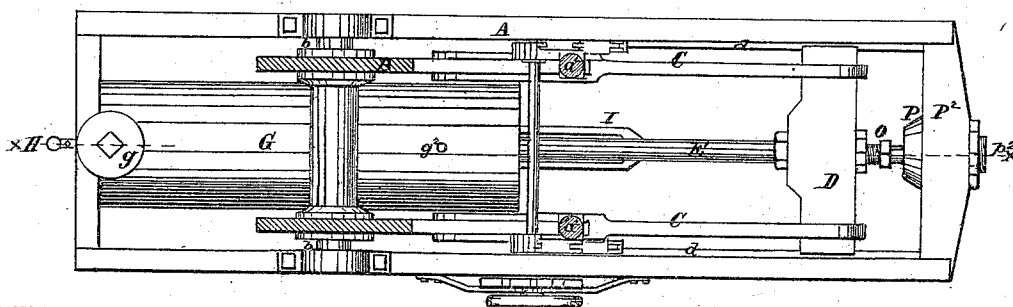


Fig. 2.



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Fig. 3.

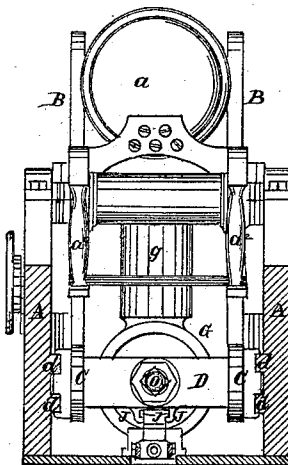


Fig. 4.

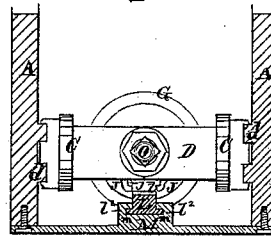
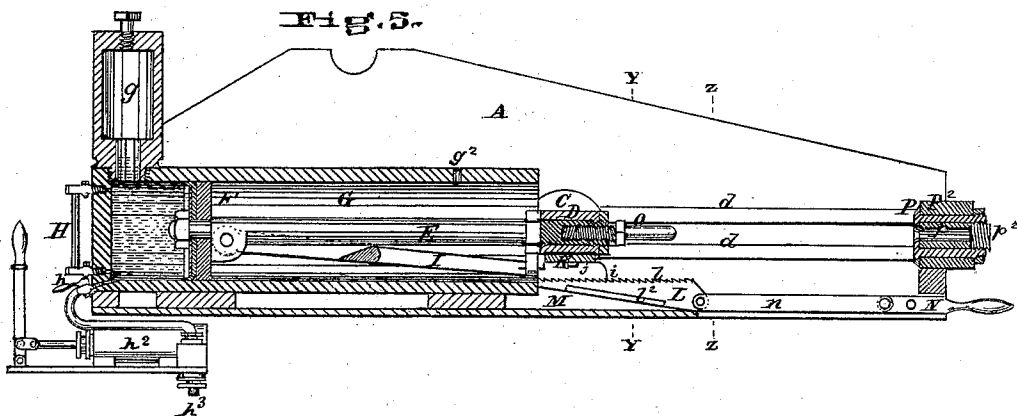


Fig. 5.



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Fig. 6.

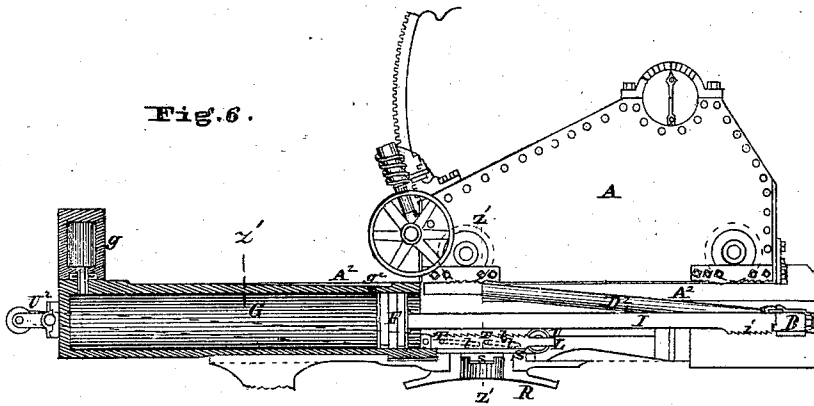


Fig. 7.

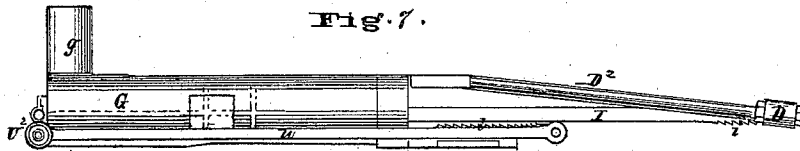


Fig. 8.

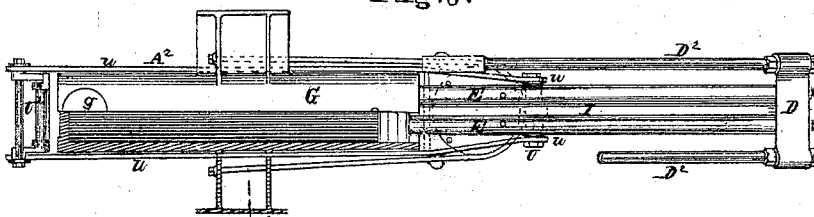


Fig. 9.

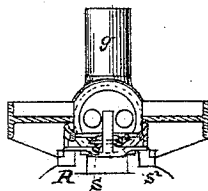
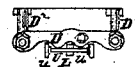


Fig. 10.



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UNITED STATES PATENT OFFICE.

JAMES B. EADS, OF ST. LOUIS, MISSOURI.

IMPROVEMENT IN GUN-CARRIAGES.

Specification forming part of Letters Patent No. 128,130, dated June 18, 1872.

To all whom it may concern:

Be it known that I, JAMES B. EADS, of the city and county of St. Louis and State of Missouri, have invented certain new and useful Improvements in Gun-Carriages, of which the following is a specification:

This invention relates to improvements on my reissue patent No. 4,472, and the first part of my present invention relates to devices for holding the gun in its loading position. These devices in my preferred form consist of a ratchet-bar, one end of which is pivoted to the piston or piston-rod of the air-cylinder, and at the other end is a ratchet which engages (when the gun has reached its loading-position) a ratchet upon a movable block supported on an inclined plane. The ratchet-block is advanced or retracted on the incline, to raise or depress it, so as to place it in position to engage the ratchet-bar, or to disengage it therefrom and allow the compressed air to force the piston back and raise the gun into its firing position. The second part of my invention relates to the means for checking the elevation of the gun at the proper point. This consists of an adjustable metallic plug projecting from the rear side of the cross-head of the piston-rod, the said plug entering a wood-lined cup or cylinder in a cross-bar at the rear end of the carriage.

Figure 1 is a longitudinal section of my gun-carriage at the line X X, Fig. 2, the gun being in the firing position. Fig. 2 is a top view of the carriage, the gun being removed and the parts in position shown in Fig. 1. Fig. 3 is a transverse section at the line Z Z, Fig. 5, the parts being in loading position. Fig. 4 is a transverse section at the line Y Y, Fig. 5, in loading position. Fig. 5 is a longitudinal section of the parts in loading position. Figs. 6, 7, 8, 9, and 10 show a modification of my improvement applied to guns having horizontal recoil. Fig. 6 is a longitudinal section in firing position. Fig. 7 is a side elevation of the cylinder, the parts in firing position. Fig. 8 is one half in horizontal section and the other half a top view of the cylinder, &c. Fig. 9 is a transverse section at the line Z' Z', Figs. 6, 7, and 8. Fig. 10 is an end view, showing the cross-head of the double piston-rod.

a is the gun, supported by its trunnions upon lever-arms B, fulcrumed at *b* to the carriage A. The lower ends of the levers are con-

nected by side rods C, to a cross-head, D, supported on slides *d*. The cross-head is connected, by a piston-rod, E, to the piston F, which works in an air-cylinder, G, the rear end of which may be open. *g* is an air-chamber in communication with the interior of the cylinder at its forward end. H is a glass gauge similar to that upon steam-boilers, &c., to indicate the surface-level of the liquid with which it is proposed to partly fill the cylinder. This liquid serves to lubricate the packing of the piston, but is more especially designed to cover the area of the piston when the piston is forced to the inner end of the cylinder, as shown in Fig. 5, thus admitting of the use of an ordinary leather packing, such as is used in hydraulic presses for the pistons, and which, when covered by the liquid, will effectually prevent the escape of air. *h* is a discharge-cock for the outflow of liquid from the cylinder into a basin or vessel conveniently located beneath the cylinder or about the carriage. *h*² is a force-pump whose suction-pipe *h*³ descends into the liquid in the said basin or vessel, and by which the liquid may be forced into the cylinder to raise the gun from the loading into the firing position in the first instance, the surplus liquid being allowed to flow out of the cylinder and back into the receiving-basin or other vessel before firing. *g*² is an orifice in the cylinder just in front of the rear position of the piston, to allow the entrance of air to compensate for any leakage that may have taken place, and to allow the entrance of air to take the place of surplus liquid flowing out. I is a bar, forked at the front end, where it is pivoted to the piston-rod or piston, and having at the rear end a ratchet, *i*. The rear end of the bar I is supported beneath the cross-head by claws J that take under lugs *j* upon the side of the bar. Above the bar may be placed a rubber or other spring, K, tending to force that end downward. L is a sliding block, whose upper side has a ratchet, *l*, to engage the ratchet *i* when the gun is in the loading position, and hold it in this position until the ratchet-block is drawn down into the position shown in Fig. 1, when the ratchets become disengaged. The ratchet-block L rests upon an inclined plane, M, and has guide-ribs *p* playing in channels *m* to insure the descent of the block when drawn backward. The ratchet-block L is moved backward and forward

by means of a lever, N, to which it is connected by a rod, *n*. O is a metallic plug screwed into the rear side of the cross-head so as to be adjustable therein by screwing inward or outward. The rear end of the plug may be made slightly tapering and rounded. The plug enters, as the gun assumes the firing position, a friction-cup or hollow cylinder, P, in the cross-bar P² of the carriage. This cup or cylinder has a lining, *p*, of wood or other suitable substance, that may be held in by a screw-plug, *p*². The breech of the gun is connected to the carriage by adjustable rods *a*².

The operation of my apparatus is as follows: The gun being supposed to be in the firing position, as shown in Fig. 1, the lever N is first raised into the position shown in Fig. 5, which raises the block L, as seen in that figure. The recoil of the gun when it is discharged draws out the plug O and forces the piston toward the front end of the cylinder, and compresses the air before the piston, the air retreating into the chamber *g*, and the liquid—which may be water, alcohol, oil, glycerine, &c.—being raised in the cylinder, lubricates the packing of the piston and effectually prevents the loss of the condensed air by being raised so high as to cover the piston. As the piston moves forward the ratchets *i* and *l* become engaged and prevent the retrograde movement of the piston. When the gun has been loaded the lever N may be moved into the position shown in Fig. 1, which draws the ratchet-block L backward and downward, and so disengages the ratchets; and the compressed air then forces the piston backward and raises the gun into the firing position. As the gun is about reaching its proper altitude the plug O enters the friction-cup or cylinder P and gradually stops the movement. The plug may be screwed inward or outward in the cross-head, to regulate the upward and forward movement of the gun. The positions of the plug and cup may be reversed.

In the modification shown in Figs. 6 to 10, in which the recoil is in a horizontal direction, the carriage A is supported on a chassis, A², to which my improved devices are also secured. The chassis turns on a tubular pivot, R, whose cavity receives a cylindrical projection, *s*¹, of the block S, in which the ratchet-block L is supported. The block L has two inclined slots, *t*, traversed by supporting-pins T passing through the guide-jaws *s*² of the pivot-blocks S. The rear end of the ratchet-block L is attached to a cross-head, U, whose ends are connected by rods *u* to a double crank, U², so that by moving the crank one-fourth of a revolution the

block may be raised or lowered similarly, and for a similar purpose, to the block L in Fig. 1. The ratchet-bar I in this modification, instead of being forked to embrace the piston-rod, is simply supported at both ends, but operates in the same manner as the ratchet-bar shown in Figs. 1, 2, &c. The piston-rod in this modification is shown double, the ratchet-bar resting between the two rods. The cross-head D is connected by rods D² to the carriage A, so that the recoil of the gun acts directly on the cross-head to force the piston into the cylinder. A similar friction-plug may be used in this modification to that shown in Figs. 1, 2, &c. The bar I, instead of the ratchet *i*, may have a simple rectangular or beveled end, that may be received in a single notch, or one of a series of notches, in the block L when the gun has descended to its loading position; or a drop-bar or catch may engage the cross-head or other moving part when the gun reaches the loading position. Of course the relative positions of these ratchets may be reversed; or one ratchet may be secured to the cross-head and the lower ratchet may be arranged to depress as the upper one passes over it.

To first elevate the gun to its firing position over the parapet or turret the small hydraulic jack or pump *h*² is employed. This pump forces the liquid into the cylinder, drawing its supply from a basin conveniently located beneath the cylinder or about the carriage. When the gun is thus raised by this hydrostatic pressure the liquid is permitted to flow back into the basin, enough being retained in the cylinder to insure covering the piston at its inner position in the cylinder. The carriage and gun is then ready for action.

I claim as my invention—

1. The combination, in a gun-carriage, of the hinged ratchet-bar I *i*, depressible ratchet-block L *l*, piston F, and cylinder G, the ratchet operating to retain the piston in its inner position in the cylinder until disengaged by the depression of the ratchet-block.

2. In combination with mechanism substantially as herein described for operating the gun, the adjustable friction-plug O and cup or socket P, to regulate the upward and forward movement of the gun and hold it steady in firing position, substantially as set forth.

In testimony of which invention I have hereunto set my hand.

JAMES B. EADS.

Witnesses:

SAML. KNIGHT,
GEO. C. FABIAN.