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F. F. FLETCHER.

MOUNTING FOR RAPID FIRE GUNS.

No. 457,641. Patented Aug. 11, 1891.

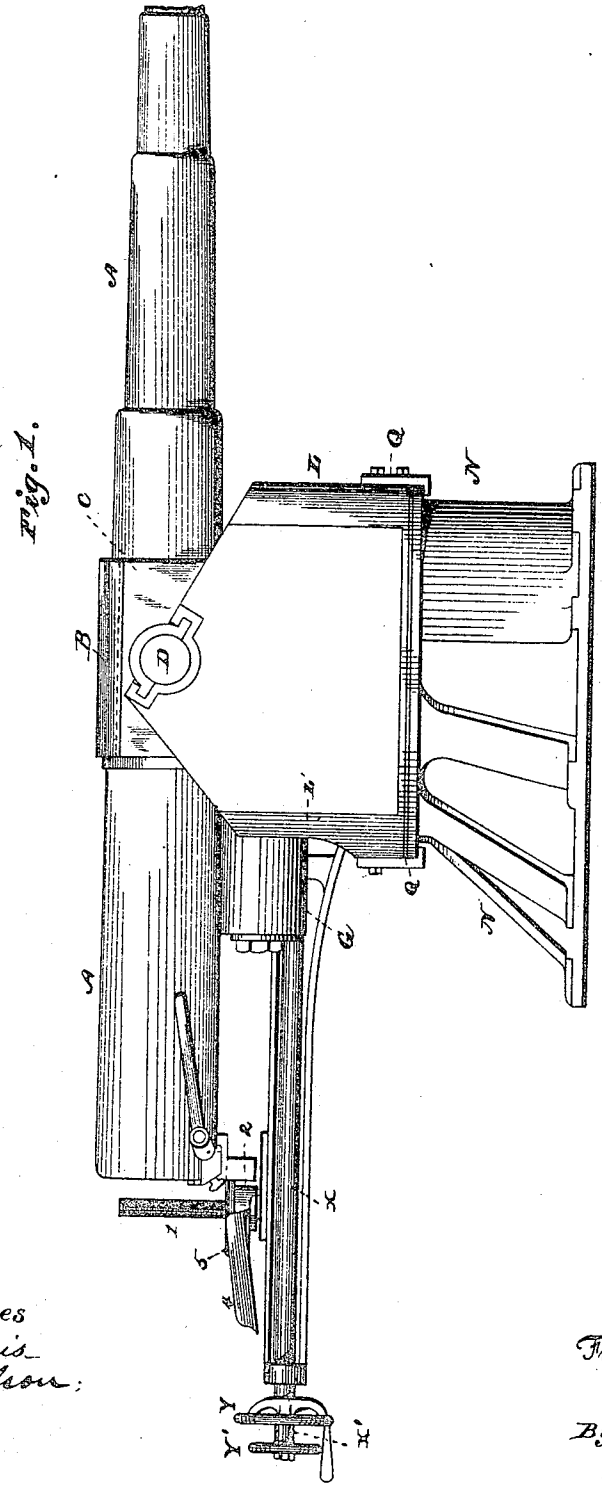

Fig. 1.

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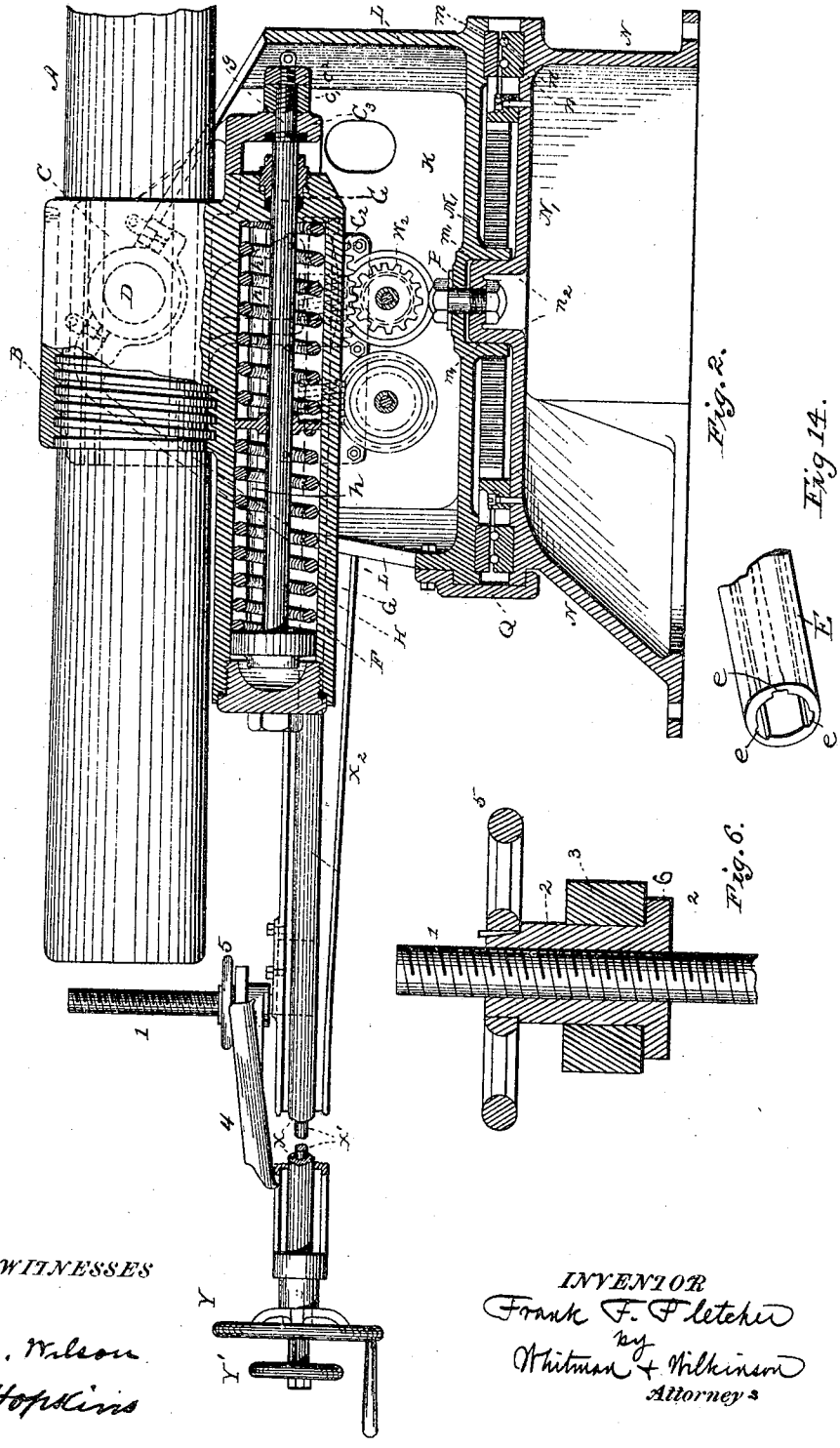

Fig. 2.

Fig 14.

Fig. 6.

WITNESSES

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MOUNTING FOR RAPID FIRE GUNS.

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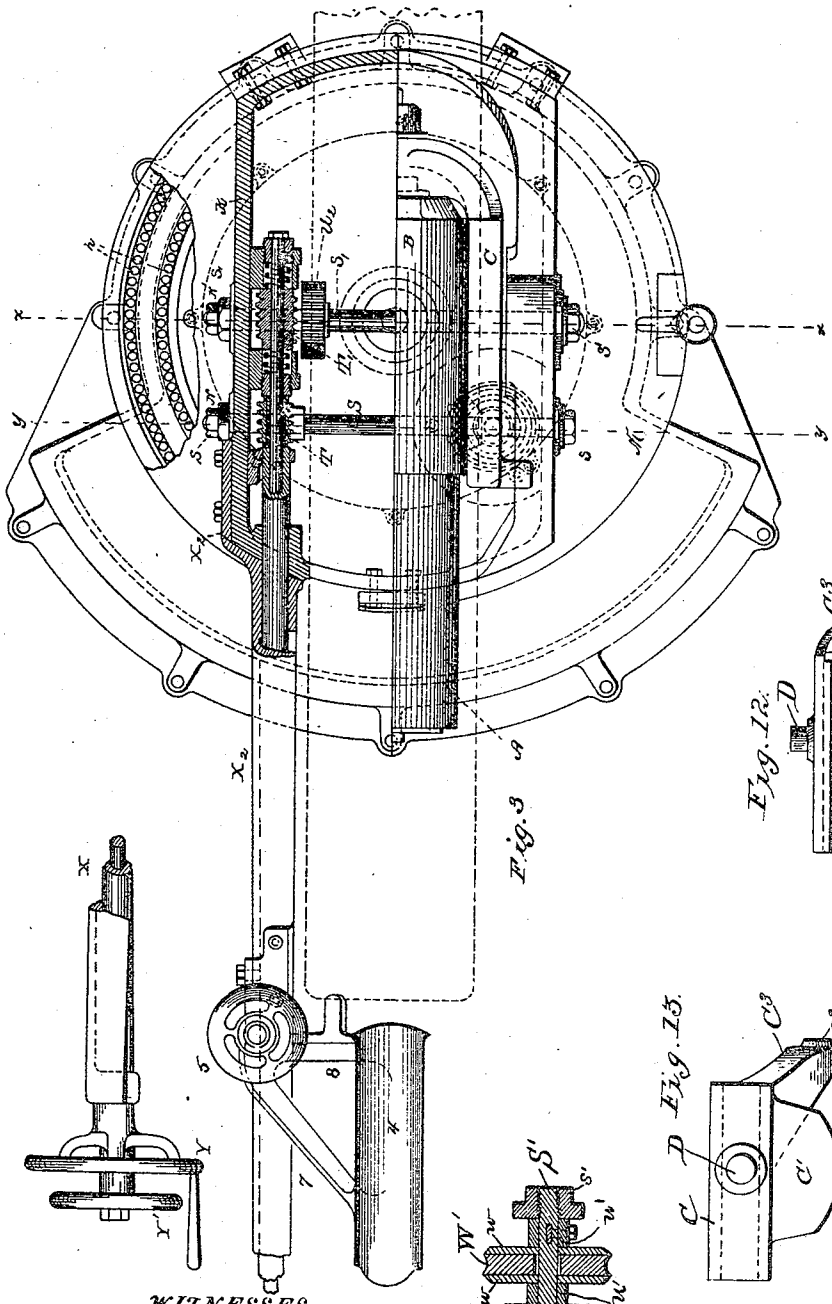

Fig. 3

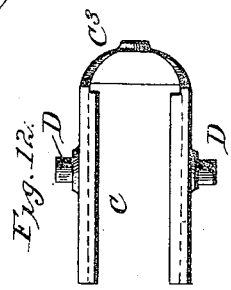

Fig. 12.

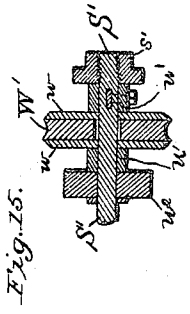

Fig. 15.

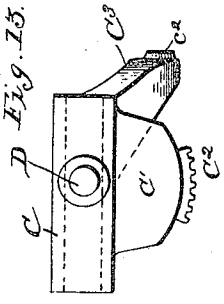

Fig. 13.

WITNESSES

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MOUNTING FOR RAPID FIRE GUNS.

No. 457,641. Patented Aug. 11, 1891.

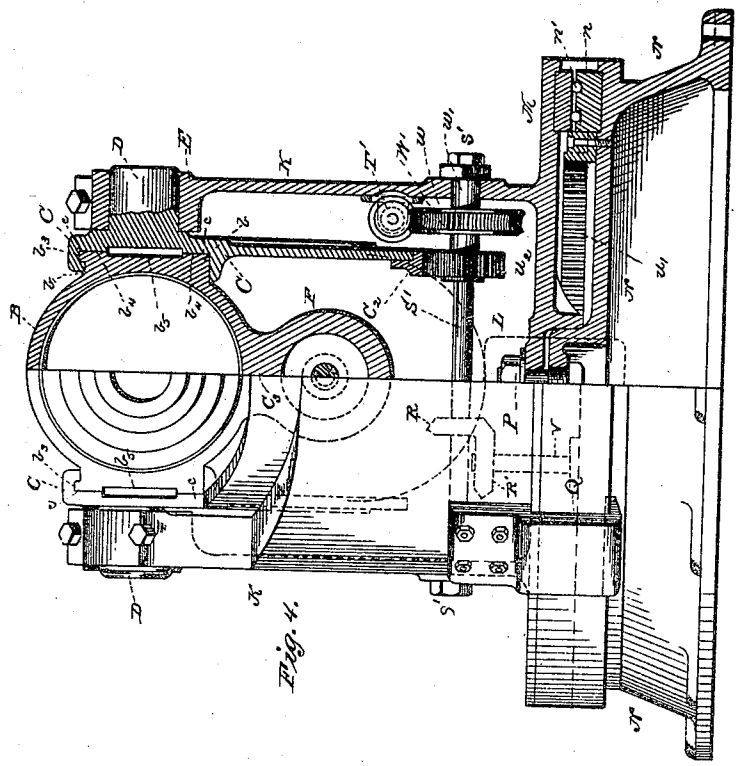

Fig. 4.

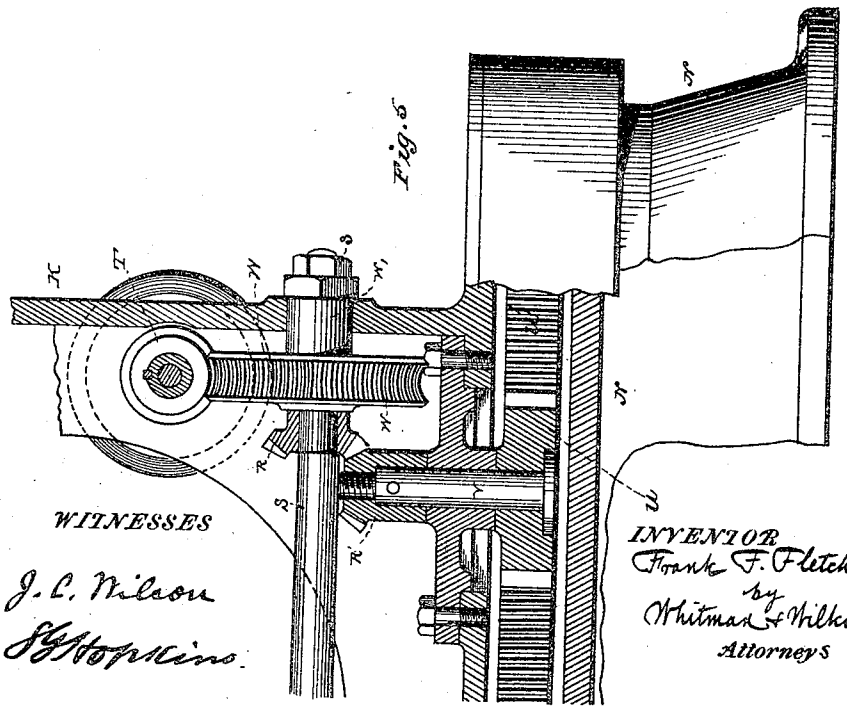

Fig. 5.

WITNESSES

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MOUNTING FOR RAPID FIRE GUNS.

No. 457,641. Patented Aug. 11, 1891.

Fig. 7.

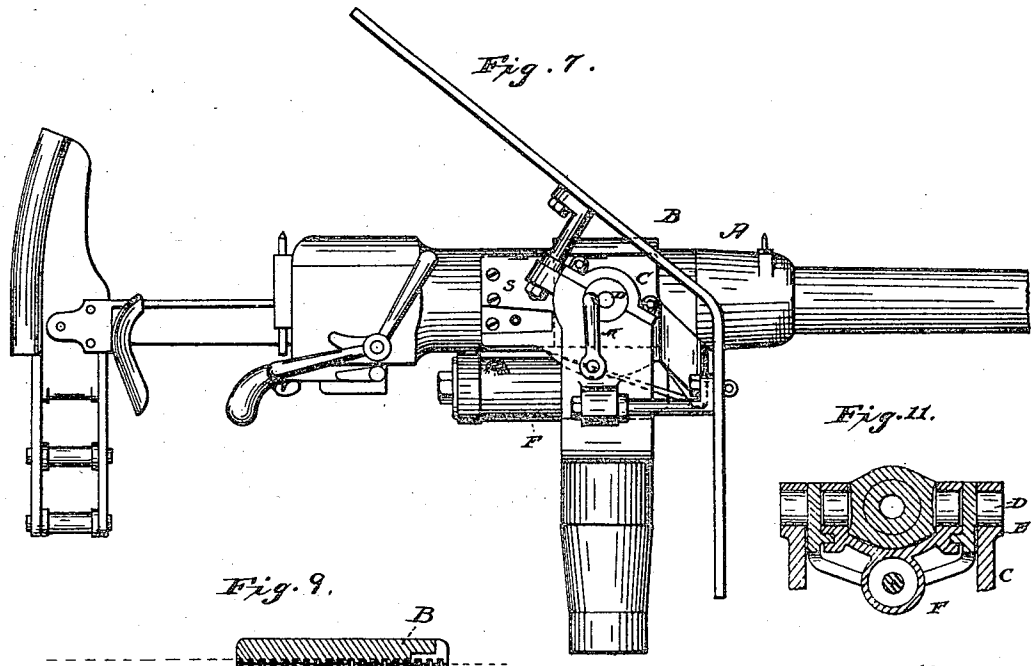


Fig. 11.

Fig. 9.

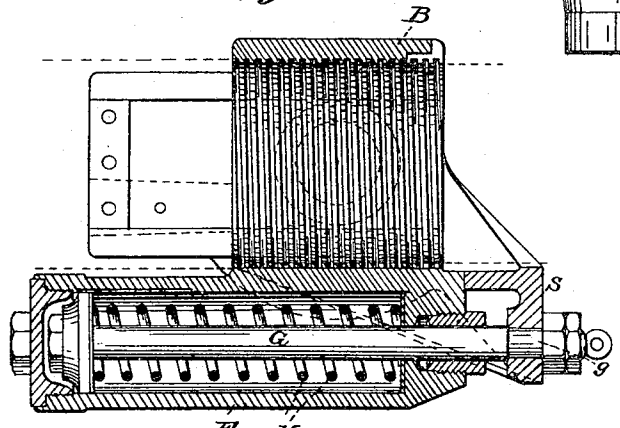


Fig. 10.

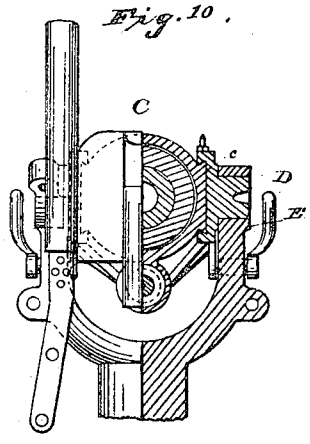
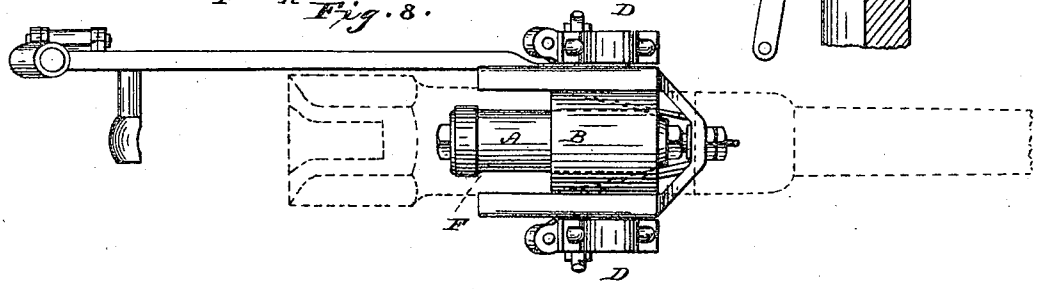


Fig. 8.



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UNITED STATES PATENT OFFICE.

FRANK F. FLETCHER, OF WASHINGTON, DISTRICT OF COLUMBIA.

MOUNTING FOR RAPID-FIRE GUNS.

SPECIFICATION forming part of Letters Patent No. 457,641, dated August 11, 1891.

Application filed February 18, 1891. Serial No. 381,861. (No model.)

To all whom it may concern:

Be it known that I, FRANK F. FLETCHER, lieutenant United States Navy, a citizen of the United States, and stationed at Washington, in the District of Columbia, have invented certain new and useful Improvements in Mountings for Rapid-Fire Guns; 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.

My invention relates to an improved mounting for rapid-firing guns, and it has for its object the diminution of the cost and the simplifying the construction of the gun-mounts as well as the increase in efficiency of the gun, due to the ease with which the movements of the gun are controlled and the rapidity and precision of fire gained thereby.

My invention consists of the devices hereinafter described and claimed.

Reference is had to the accompanying drawings, wherein the same parts are indicated by the same letters.

Figure 1 represents a side elevation of the gun and mounting. Fig. 2 represents a profile view, partly in section, of the gun and mounting. Fig. 3 represents a ground plan, partly in section. Fig. 4 represents a front view, partly in section, through x x, Fig. 3, looking from the muzzle toward the breech. Fig. 5 represents a front view, mainly in section, through y y, Fig. 3, of my improved training-gear. Fig. 6 represents a section of my loading-tray and attachments. The figures on Sheet V represent my improved rocking slide and recoil-cylinders attached to smaller guns. Fig. 7 represents a profile view of a light rapid-fire gun. Fig. 8 represents a ground plan of my improved rocking slide, the gun being shown in dotted lines. Fig. 9 represents a central longitudinal section of my gun-band and recoil-cylinder. Fig. 10 represents a rear view of the gun, partly in section. Fig. 11 represents my method of attaching the recoil-cylinder to guns already provided with trunnions. Fig. 12 represents a plan view of the rocking frame detached on a smaller scale. Fig. 13 represents a side view of the same. Fig. 14 represents a perspective view of a portion of the recoil-cylinder, showing the contracting grooves. Fig. 15 represents a section of the worm-wheel and frictional disks along the center of the shaft.

The shield is omitted from all the figures, except Fig. 7.

A represents the gun.

B represents my improved band, which is screwed on over the body of the gun at or about its center of gravity. This band B carries the recoil-cylinder F, preferably of bronze and cast in one therewith. The said band B (see Fig. 4) has projections b', b^2, and b^3 on each side thereof, held by and sliding in corresponding recesses in the rocking frame C. The space b^5, between the faces b^4, is cut away somewhat to diminish the bearing-surface between B and C, and so to diminish the friction in the return of the gun to the initial position after firing.

The rocking-frame C has two parallel sides open to the rear and connected at the front by a curved portion preferably cast in one with the parallel sides. The rear of the rocking slide is open and the said projections b', b^2, and b^3 on the gun are slid from the rear into corresponding recesses in the said parallel sides. The gun during the recoil is prevented from being thrown out of the open ends of the said slides by the contents of the hydraulic cylinder, as will be hereinafter explained.

The rocking frame has a long quadrantal arm C′, to which the curved rack C^2 is attached. Integral with the rocking frame are the trunnions D, supported by suitable rests E on the brackets K of the upper carriage. The axes of these trunnions are in the plane of the line of fire of the gun. At C^3, where the two sides of the rocking frame come together beneath the gun and forward of the recoil-cylinder F, the forward end of the piston-rod G is attached. c' and c^2 are right and left handed nuts fitting on right and left handed screws on the forward end of the said piston-rod.

Within the recoil-cylinder is placed a spring H. This spring is put in under sufficient initial tension to retain the gun in the firing-position, and is made strong enough to run the gun back to the firing position after each recoil. The violence of the recoil is checked by the liquid being forced by the said recoil

in the cylinder E from the forward to the rear side of the piston through suitably-arranged escape-openings *e*.

When the gun is fired, it recoils, carrying the cylinder F with it and compressing the spring H between the piston and the end of the cylinder. The energy thus stored up in the spring will return the gun to the firing-position.

The top carriage has two parallel brackets K, supporting the trunnions and the transverse shafts for the training and elevating gear, while the forward transom L and after transoms L′ connect the said side brackets together and give strength to the carriage. The brackets and transoms are attached to or integral with a circular base-plate M. This base-plate has a cylindrical recess in the center thereof with shoulders m', inclosing a cylindrical projection n^2 in the upper portion of the pivot-stand N. The pivot-bolt P, passing through the centers of the base-plate M and the upper circle N′ of the pivot-stand N, holds the two circular plates together, assisted by clips Q, two of which are forward of the upper carriage and one to the rear thereof. The function of these clips and the pivot-bolt is more, however, to prevent the gun and carriage from tilting over than to receive the shock of the discharge, the latter being taken up by the cylindrical surfaces m' and n^2 and the ball-bearings, and by them transmitted to the pivot-stand N and the firing-platform, on which said pivot-stand is secured.

In the lower face of the circular plate M a ring *m* is secured, and in the upper surface of the circular plate N′, I have a ring *n*. In the upper portion of this ring are grooves filled with steel balls *n*′. These balls take the place of trucks and form a ball-bearing for the upper carriage, upon which it revolves easily with very little friction.

For training the gun, I provide a shaft S, journaled in the brackets K and carrying the pinion R and worm-wheel W. The said pinion may be near either end of the said shaft. Thus I have shown it clearly at one end of the shaft in Fig. 5, and indicated it as at the opposite end of said shaft (to avoid complexity in the drawings) in Figs. 3 and 4.

Working in the worm-wheel W is a worm T, secured to the end of the hollow training-shaft X. The training-shaft X carries a hand-wheel Y on its outer end and to rear of the gun. The pinion R on the shaft S engages a pinion R′ on a vertical shaft V, Fig. 4. At the lower end of this shaft V, I have keyed a gear-wheel U, meshing with the interior of a circular rack U′, bolted to the pivot-stand N. By turning the hand-wheel Y on the training-shaft X to the right or left the worm T causes the worm-wheel W to revolve, which puts in operation the pinions R and R′, and gear-wheel U, and so causes a corresponding circular motion of the top carriage and gun around the central pivot P of the pivot-stand.

Elevation or depression is given by a similar train of gearing thus: Journaled in the brackets of the top carriage I have a second shaft S′, carrying near one end the worm-wheel W′. Working in this worm-wheel W′ is a worm T′, secured to the end of the elevating-shaft X′. This shaft X′ extends to the rear through the hollow training-shaft X and carries on its rear end a hand-wheel Y′ concentric with the training-wheel Y. X^2 is a stout arm bolted to one side of the carriage and projecting to the rear. On the shaft S is a cog-wheel U^2, which engages in the rack C^2, attached to the rocking-frame C. By turning the hand-wheel Y′ to the right or left this train of mechanism is put into operation, the rocking frame is moved through a vertical angle, and the breech of the gun is moved up or down, giving the desired "elevation."

To prevent any excessive strain (due to the shock of firing or other causes) from being thrown upon the elevating or training gearing at any time, the worm-wheels W and W′ are loose on the shafts S and S′, and are held between frictional disks *w*. These disks are held between or integral with the sliding collar w' and the set-collar w^2. By screwing down on the nuts *s* and *s*′ the frictional disks are bound against the worm-wheels and throw them in action. By easing up on the nuts, the worm-wheel is loosened on the shaft and turns freely, enabling the gun to be worked independently of the gearing. Thus it will be seen that the gun captain, from his place in the line of sight, by turning either of the wheels Y or Y′ may bring his gun to or keep it pointed on an object with great facility, while by my arrangement of spring and recoil cylinder no time is lost in running out after each fire.

In order to insure the only remaining factor to quick firing, (quick loading,) I have provided the loading device shown in Figs. 2, 3, and 6. 1 is a screw firmly attached to the arm X^2 protruding from the rear of the upper carriage. 2 is a threaded collar or circular nut turned by the hand-wheel 5 keyed thereon, and so moved up and down on the screw 1. 3 is a loose collar, bearing the tray 4, said collar being supported by the flange 6 on the bottom of the circular nut 2. 7 and 8 are arms connecting the tray to the said collar 3. The hand-wheel 5 is turned so that the tray may be at the proper height for loading the gun after it has been fired without altering the elevation of the gun. For this purpose the charge or round of fixed ammunition is placed upon the tray, which is at that time turned away from the gun. As soon as the gun is fired and while the spring H is forcing it back into firing position the tray is swung round and the charge placed in the breech of the gun.

The breech-closing mechanism is not shown in the drawings.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. In a gun-mounting, the combination, with a gun, of a band screwed thereon near the center of gravity of the gun, said band having projections on either side thereof, a rocking frame having trunnions supported on a suitable carriage with parallel recesses adapted to receive the said projections on the said band, a hydraulic recoil-cylinder rigidly attached to the said band, and a piston and piston-rod rigidly attached to the said rocking frame, substantially as described.

2. In a gun-mounting, the combination, with a gun A, of a band B, screwed thereon near the center of gravity of the gun, said band having projections b' and b^2 with shoulder b^3 on either side thereof, a rocking frame C, having trunnions D supported on a suitable carriage, parallel recesses c in the said rocking slide adapted to receive the said projections and shoulders on the said band, a hydraulic recoil-cylinder F rigidly attached to the said band, a piston and a piston-rod G, attached to the said rocking frame, and a coil-spring H inserted under initial tension between the said piston and the said cylinder-head, substantially as described.

3. In a gun-mounting, the combination, with a gun, of a band secured thereon, arms having guide-faces parallel with the axis of the gun on the said band, a hydraulic recoil-cylinder also on the said band, a rocking frame having parallel side walls connected together in front of and beneath the gun, longitudinal guides cut in the said side walls closed at their forward end and open to the rear, trunnions attached to the said rocking frame, a piston-rod connecting the forward portion of the rocking frame to the piston of the hydraulic cylinder, and a gun-carriage supporting said trunnions, substantially as described.

4. In a gun-mounting, the combination, with the gun, band, rocking frame, and carriage, substantially as described, of the elevating-gear consisting of an arm extending downward from the side of the said rocking frame, a quadrantal rack on the said arm, a cog-wheel gearing in the said rack and keyed on a transverse shaft journaled in the carriage beneath the gun, a worm-wheel held securely but not rigidly on the said shaft, a worm engaging in the said wheel, and a shaft from the said worm to the rear of the carriage with a band-wheel thereon.

5. In a gun-mounting, the combination, with a pivoted gun-carriage, of the training-gear consisting of a circular rack having vertical teeth on the interior face thereof, said rack being rigidly attached to the pivot-stand or firing-platform, of a cog-wheel meshing with the said rack, a vertical shaft journaled in the gun-carriage and carrying the said cog-wheel at one end and a pinion at the other, a second pinion on a shaft journaled across the carriage engaging the first pinion, a worm-wheel firmly but not rigidly held on the said transverse shaft, a worm engaging the said worm-wheel, and a shaft connecting the said worm-wheel to a hand-wheel at the rear of the carriage, substantially as described.

6. In a gun-mounting, the combination, with an arm X^2, protruding from the rear of the carriage, of a screw mounted thereon, a cylindrical nut and hand-wheel mounted on the said screw, and a swinging loading-tray revolubly attached to said nut and vertically adjusted thereby, substantially as and for the poses described.

7. In a gun-mounting, the combination, with an arm X^2, protruding from the rear of the carriage, of a screw 1 mounted thereon, a cylindrical nut 2, a hand-wheel 5, keyed on said nut, a flange 7 at the base of said nut, and loose collar 3, connected by arms to the loading-tray, substantially as and for the purposes described.

8. In a gun-mounting, the combination, with the carriage, of an arm X^2, protruding to the rear, secured thereto, and two concentric shafts journaled at one end in the said arm and connected at the other by means of a worm to suitable mechanism for elevating the gun and training the carriage, respectively, and a screw mounted on the said arm and carrying a circular nut and loading-tray revolubly attached to the said nut, substantially as described.

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

FRANK F. FLETCHER.

Witnesses:
S. G. HOPKINS,
JOHN C. WILSON.