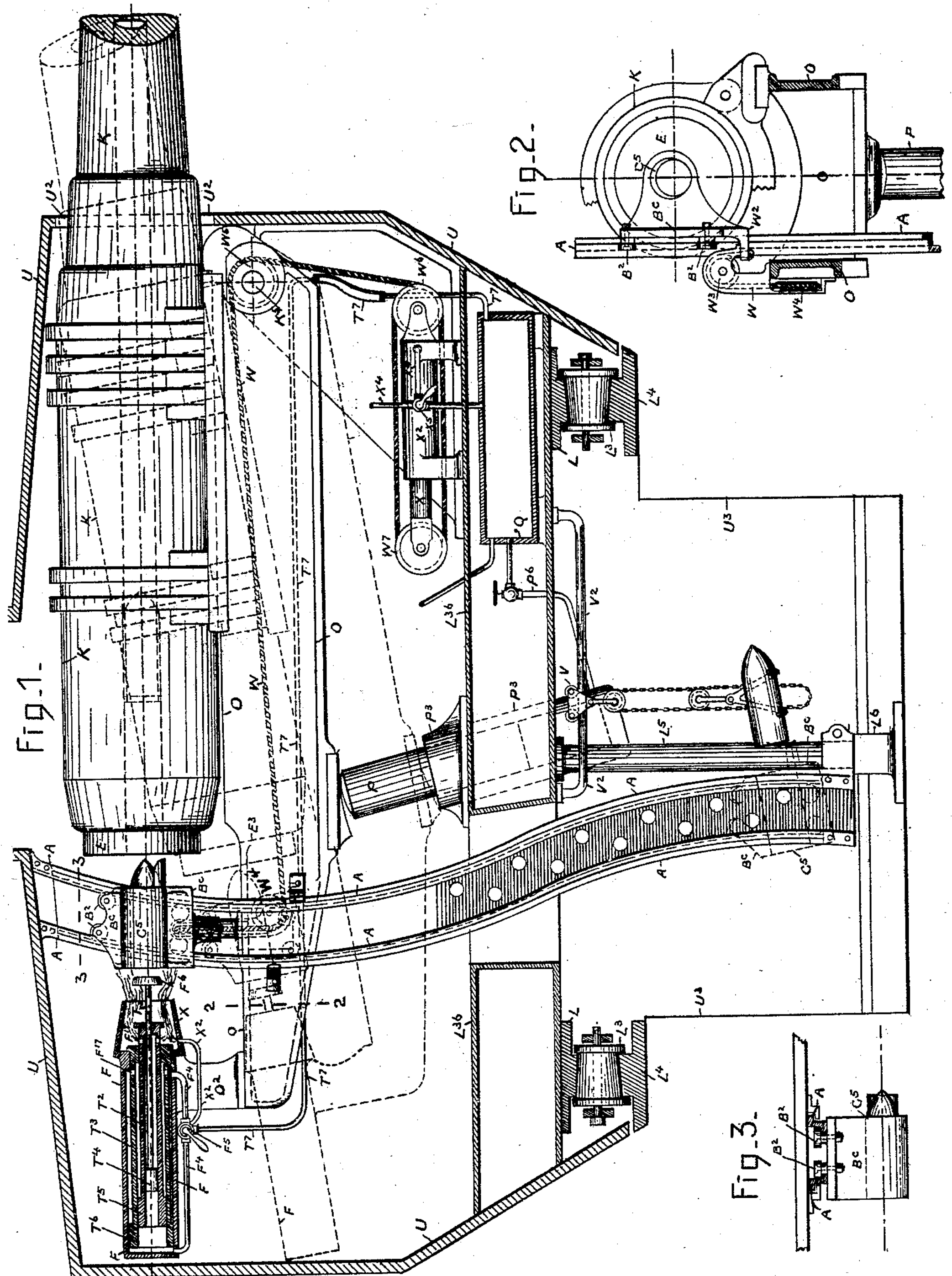
(No Model.)

H. A. SPILLER.

LOADING ATTACHMENT FOR GUNS.

No. 457,293. Patented Aug. 4, 1891.



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LOADING ATTACHMENT FOR GUNS.

SPECIFICATION forming part of Letters Patent No. 457,293, dated August 4, 1891.

Application filed October 3, 1889. Serial No. 325,859. (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 Loading Attachments for Guns, of which the following is a full, clear, and exact description.

This invention relates to gun-loaders, and particularly to the loading of heavy guns.

The invention consists in the combination, with a gun adapted to be elevated and depressed at its muzzle and to be moved horizontally for changing its line of direction and to be supported in both its vertical and horizontal positions, of a rail or other suitable guideway, one end located at and extending from the breech of the gun to a point below it and held on the support of the gun in order to be turned therewith, and an ammunition-car having a chamber or chambers open at both ends to receive ammunition and held on and arranged to travel along said guideway to be brought into a position behind the breech of the gun and to present an ammunition-chamber in proper relation to the gun and in loading to be moved to a position below the gun when not in use.

It consists, furthermore, in the combination, with a gun, of a support for the gun journaled at its forward end on a suitable support, so that the gun may be elevated and depressed at its muzzle and supported at different elevations, a rail or other suitable guideway located at and extending from a point adjacent to the breech of the gun attached to the support of the gun and preferably extending in a curvilinear direction concentric, or approximately so, with the axis of motion of the gun on its support, an ammunition-car having an open chamber or chambers to receive ammunition and held on and arranged to travel along the guideway and designed to be brought into a position behind the breech of the gun and to present an ammunition-chamber to the breech of the gun and also to travel to a position below the gun, and mechanism for the run of the car upward and downward on its guideway, consisting, essentially, of a rope, chain, or the like, and of pulley-wheels or other suitable guides for the run of the rope and held on the car, the guideway being substantially coincident with the axis of motion of the gun on its journals.

The invention consists, furthermore, in the combination, with a gun, of a guideway or rail suitably arranged with reference to the gun, a car designed to run on the guideway or rail to be brought into proper position to permit the transfer of a charge from the carriage to the gun, and a cylinder having its piston-rod operated by compressed air, steam, or the like and connected by rope, chain, or other connection with the car, whereby the latter may be drawn up to the breech of the gun and moved away from the same.

In the accompanying drawings, forming part of this specification, Figure 1 is a side elevation of the gun, the journaled support, and a horizontally-rotating gun-carriage supporting a beam, and which in some parts is in vertical section, and also a side elevation of the ammunition-car, its supporting rail or guideway and mechanism for moving the ammunition-car up, and a central vertical section of the telescoping sectional ramrod and cylinder for operating the same, and, furthermore, side elevations and vertical sections of other parts, but which constitute no portion of this invention, being only shown for better illustration of mechanism for handling a gun and the ammunition with which it is to be loaded. Fig. 2 is an enlarged view of the ammunition-car at its end presented toward the ramrod and a transverse vertical section on line 2 2 of Fig. 1 of the gun-support. Fig. 3 is a horizontal section on line 3 3 of Fig. 1 and a plan view of the ammunition-car.

In the drawings, K represents the gun. The gun lies lengthwise of and is supported on a beam or other suitable support O, which is journaled at its end toward the muzzle of the gun on a support L, which is preferably a rotating carriage, though, if desired, it may be a support which is stationary. The beam O extends beyond the breech E of the gun, and its end has a riser or standard O^2 to support the ramrod T and mechanism for its opera-

tion, as will hereinafter fully appear. The beam O below and near the breech of the gun rests on the upper end of a solid cylindrical ram P, preferably rounded on its top and arranged to be supported on a water column, confined in a vertically and obliquely located cylinder P^3, held on the gun-carriage and adapted otherwise to be raised and lowered by the rise and fall in height and pressure of the water column. This need not be herein particularly described, as it forms no part of the present invention.

L^3 L^3 are friction-rollers held on the gun-carriage and turning on a stationary bed-plate and guideway L^4, surrounded by a casement U, which is held on and rotates with the gun-carriage and is constructed to inclose the gun, except its muzzle, which projects through a port-hole U^2 of the casemate and the operating and stationary mechanisms connected therewith, some parts of which have already been described or specially referred to, and which, as well as others, will be hereinafter described, in so far as they constitute parts or are necessary to a full understanding of this invention.

The gun-carriage, otherwise than its support by the friction-rollers L^{13} on the stationary guideway L^4, as stated, has a central vertical spindle L^5, resting and turning in a suitable bearing of a stationary step or block L^6.

A A is a rail or guideway located just back of the breech E of the gun and extending vertically and in a curvilinear direction, preferably practically concentric, or approximately so, with the axis of the vertical motion of the gun. The railway A A is held on the rotating gun-carriage, and is attached at its upper end to the casement U and at its lower end to the central vertical spindle L^5 of the gun-carriage, all so as to rotate with the gun-carriage. It extends from a plane just above the breech of the gun downward to a plane below the gun-carriage and guideway L^4 therefor, ending in a pit U^3, surrounding the gun-carriage spindle L^5 and below the casement U. Otherwise than as stated the running-plane of the railway A A is practically in a vertical plane parallel with and at one side of the vertical plane of the axis of the gun.

B C is an ammunition-car. This car has traction-wheels B^2, which are held and turn on it and are adapted to engage and run and hold the car on the railway, and, as particularly shown, it has a single open horizontal cylindrical-shaped chamber or compartment C^5, which when placed at the breech of the gun will coincide therewith. This chamber C^5 is to receive ammunition, and, if it be a shot, with its point presented toward the bore of the gun.

The drawings illustrate a block-and-tackle mechanism for handling a shot to place it in the chamber of the ammunition-car. This mechanism depends from a car V, which is arranged to roll along and to be held on a horizontal track-rail V^2, held on the gun-carriage. Neither this mechanism nor the ammunition-car described forms any part of the present invention.

The car is loaded with ammunition when in the pin U^3, and from the pit it is run up the railway A A and brought to proper position at the breech of the gun for its load of ammunition (shown in the drawings as a shot) to be then removed from the car and forced or rammed into the gun, after which the car is run down the railway to the pit U^3, to be again charged with ammunition and again run up the railway, and so on, as before.

Under this invention the ammunition-car is run up and down the railway, and the ammunition is forced from the car and rammed into the gun by separate mechanisms constituting parts of this invention, and the former is now to be described.

W represents a rope fastened to an ear-piece W^2, held on and projecting from the rear side of the ammunition-car, and there it passes over the upper side of a vertically-located guide pulley-wheel W^3, held and turning on the rear side of the car and having its axis of rotation horizontal and parallel with the vertical running-plane of the car on the railway. From this pulley-wheel W^3 of the car the rope passes down and around the under side of a vertical pulley-wheel W^4, held and turning on the gun-carrying beam O in rear of the breech of the gun. The rope passes horizontally along the side and toward the forward end of the beam O from the pulley-wheel W^4 and over the upper side of a guide pulley-wheel W^5, held and free to turn with the beam supporting the gun. From this pulley-wheel the rope runs downward and around the under side of a vertical guide pulley-wheel W^6, held and turning on the horizontal platform L^{36} of the gun-carriage, and then along the platform and then partially around a vertical pulley-wheel W^7, held and turning on the projecting end of a horizontal piston-rod X of a horizontal piston-cylinder X^2 of an air-engine and back to and rigidly fastened on and at the periphery of the pulley-wheel W^6 of said platform L^{36}.

The air-engine above referred to is of any ordinary or other suitable construction for imparting a reciprocating motion, using air or steam under pressure to move the piston-rod X, and as the construction and arrangement of such air-engines are well known it neither needs any special illustration in the drawings nor particular description herein.

X^4 is a pipe for conducting air to the piston-cylinder, being suitably connected with an air-supply pipe. (Not shown.)

Under the in-and-out movement of the piston-rod X, by the operation of an air-engine, as referred to, the guide pulley-wheel W^7, carried by the piston-rod, is made to move toward and away from the opposed guide pulley-wheel W^6 of the carriage-platform L^{36}, and thus in the one instance the rope W is length-

ened, as it were, allowing the ammunition-car to run down the railway A A, and in the other instance it is shortened, as it were, drawing the car up the railway and in whatever direction the car is moving, and when not moving by having stopped the operation of the air-engine by closing the valve X^5 of the air-supply pipe the ammunition-car is always supported and held against accidental movement in either direction up or down the railway and the rope is always at a tension.

Under an arrangement of mechanism such as above described for moving the ammunition-car up and down the railway A A, in cooperation with the concentric curvilinear direction of the railway relative to the swing of the gun-carrying beam O, plainly, whatever may be the direction of the gun, said mechanism is always in proper position for use and action, is free in movement, and it and the car and railway are under no undue strain, and the power required is practically but slightly in excess of that for balancing the weight of the car and of its contents.

The ramrod T, as particularly shown, is in three separate telescoping sections T T^2 T^3, severally concentrically arranged within and held on a horizontal cylinder T^4, common to them all, and which is immovably held on the standard of the gun-carrying beam O and axially coincident with the axial line and at the rear of the breech of the gun, so that when suitably actuated therefor, and as hereinafter appears, to force the ammunition presented by the ammunition-car B C in the line of the bore of the gun forward and thereby to enter the gun. The section T is the inner of the three sections T T^2 T^3, and it has at its end projected toward the gun a ramming-head F^6, suitable for the work to be performed by it in ramming a gun, and at its opposite end portion a solid head T^4 to serve as a piston-head, and between these heads it works as a piston-rod F^3 to the section T^2 next surrounding it, and all so as to move forward and backward in the section T^2 on the admission of air under pressure to one end of said section T^3 and exhausting air from the other end, and vice versa. The same is true in substance of the section T^2 as to the section T^3 next surrounding it, and also of the section T^3 as to the air-cylinder F next surrounding it, except that the piston-heads T^5 and T^6 of the sections T^2 and T^3, respectively, are opened, whereas the piston-head T^4 of the inner section T is closed to the rear head of the cylinder F.

The several sections T T^2 T^3, constructed and arranged as described, on the admission of air under pressure to the piston-cylinder F at its head, toward which the open piston-heads of the section are presented, as stated, are simultaneously forced forward through the cylinder F and toward the gun, and then separately or conjointly, two or more, as the case may be, according as each reaches the limit of its movement in that direction within the section by the abutment of its head against the forward head thereof, and all the sections are in abutment with each other and the outer section with the forward head of the air or piston cylinder F, on which the distension or lengthening out, as it were, of the telescoping-sections is completed. The several sections are returned or telescoped within each other and within the cylinder F by shutting the air-supply off from the rear ends of the cylinder and of the telescoping sections and leaving the air then in the cylinder free to exhaust from it each of the sections, and then admitting air under pressure to the forward head of the piston-cylinder and similarly to the opposite or forward heads of the several telescoping sections, excepting the inner section T.

F^4 is a pipe for supplying air under pressure to the air-cylinder and the telescoping sections T T^2 T^3 of the ramrod, as above described. This pipe F^4 is connected with any suitable supply, and it leads to the opposite ends of the cylinder and has a valve F^5, of suitable construction and arrangement, and, as well known, for opening and closing its connection with the ends of the piston-cylinder F and the air-supply and for the exhaust of air from the cylinder and the telescoping sections.

In the distention of the ramrod the air admitted to the air-cylinder acts directly on each telescoping section and on all from within the cylinder F; but in the closing of the ramrod the air then admitted to the cylinder F acts within the cylinder only on the outer telescoping section and on the others, except the innermost section within each, respectively, and communication is had therefor between each of the sections and cylinder F through an air port or ports F^{17}, leading through the walls of the several sections.

A ramrod in telescoping sections arranged together and within an air-cylinder F, all substantially as described, is important, in that a ramrod is secured of a maximum length and requiring, comparatively considered, a minimum amount of space, and the importance of which is all the more manifest with the limited room available for the location and operation of ramrods for heavy guns surrounded by a casement.

X is a hood or nozzle held on the forward head of the operating piston-cylinder F for the telescoping ramrod T. This hood is concentric with said cylinder and gun, and it projects forward from the cylinder-head toward the breech of the gun.

X^2 is a pipe leading into the hood X and to be connected in any suitable manner with the air-supply under pressure and to have a suitable valve to open and close it. The hood and pipe for supplying air under pressure, as explained, furnish a ready means for blowing air through the bore of the gun from the breech to the muzzle, and thereby to discharge the gases remaining in the gun after it has

been fired from the gun at the muzzle, a very desirable and important adjunct, as is obvious.

The air-supply pipe X^2 for the hood may, as shown, be a branch of the air-pipe F^4 for the operating piston-cylinder F for the telescoping ramrod T and under the control of the valve F^5 for regulating the air-supply to said cylinder. Again, the air-supply pipe F^4 for the operating-cylinder F of the telescoping ramrod may be connected, as shown, by a pipe T^7 for the air to be supplied to it from a chambered cylinder Q, and which is a cylinder having air and water compartments and a movable piston-head, (not shown,) and also having its water-compartment connected by a water-passage P^6 with the cylinder P^3, containing the ram P, to support, elevate, and depress and receive the recoil of a gun.

Pulley-wheels, for obvious reasons, are more preferable as guides for the operating-rope *w* of the ammunition-car B *c;* but other well-known forms of guides for the rope may be substituted for the rope. A rope, however, is practical and efficient.

An air-engine is more preferable for the motive power for operating the rope; but other well known or suitable forms of motive power may be employed.

Preferably the gun, as has been particularly described, is supported on a beam journaled on a suitable support; but obviously, for the operation of some parts of the invention, the gun may be journaled directly upon the support itself, adapted, as well known or otherwise, for the gun to be elevated and depressed at its muzzle.

In conclusion, it will be observed that while air has been specially mentioned as the fluid used for the operations of the mechanism of this invention, and, as particularly explained, the invention is not to be limited in that regard.

While I have particularly described a special form of ramrod for use in connection with my invention, and also a device for supplying and forcing air through the bore of the gun and the passage leading thereto, I do not herein claim the same, subject-matter referring particularly to these parts being covered by separate applications for patents.

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

1. The combination, with a gun adapted to be elevated and depressed and to be moved horizontally for changing its line of direction, of a rail or other suitable guideway located at and extending from a position adjacent to the breech of the gun and attached to the support for the horizontal adjustments of the gun, and an ammunition-car held on and arranged to travel along said guideway, to be brought into a position behind the breech of the gun and into a position below the gun, substantially as described, for the purposes specified.

2. The combination, with a gun adapted to be elevated and depressed and to be moved horizontally for changing its line of direction, of a rail or other suitable guideway located at and extending from a position adjacent to the breech of the gun and attached to a support for the horizontal adjustments of the gun, and an ammunition-car having an open chamber or chambers to receive ammunition and held on and arranged to travel along said guideway, to be brought into a position behind the breech of the gun to present an ammunition-chamber to the breech of the gun and into a position below the gun, substantially as described, for the purposes specified.

3. The combination, with a gun and a beam directly supporting the gun, journaled at its forward end on a suitable support, of a rail or other suitable guideway located at and extending from to below the breech of the gun and held on said support, an ammunition-car having an open chamber or chambers to receive ammunition and held and arranged to travel along said guideway, to be brought into a position behind the breech of the gun and to present an ammunition-chamber to the breech of the gun and into a position below the gun, and means to operate said ammunition-car, consisting, essentially, of a rope or other line at one end attached to the car and at the other end attached to the piston-rod of a suitable cylinder, substantially as described.

4. The combination, with a gun and a beam directly supporting the gun, journaled at its forward end on a suitable support, so that the gun may be elevated and depressed at its muzzle and supported in its vertical positions, of a rail or other suitable guideway extending from the breech of the gun and held on and arranged to travel along said guideway, and thereby to be brought into a position behind the breech of the gun and to present an ammunition-chamber to the bore and into a position below the gun, and means to operate said ammunition-car, consisting, essentially, of a rope or other line at one end attached to the car and at the other end held in said support for said beam, and guides for the run of said rope from the car to said beam supporting the gun, and one of which guides axially, or substantially so, coincident with the axis of the journals journaling the gun on its said supporting-beam, substantially as described, for the purpose specified.

5. The combination, with a gun and a beam directly supporting the gun, journaled at its forward end portion on a suitable support, and all so that the gun may be elevated and depressed at its muzzle and supported in its vertical positions, of a rail or other suitable guideway located at and extending below the breech of the gun and held on said support for said beam and having a curvilinear concentric, or substantially so, with the journals journaling the gun on said beam, an ammunition-car having an open chamber or

chambers to receive ammunition and held on and arranged to travel along said guideway, and thereby to be brought into a position behind the breech of the gun and to present an ammunition-chamber to the bore and into a position below the gun, and means to operate said ammunition-car, consisting, essentially, of a rope or other line at one end held on the car and at the other end held on said support for said beam and located and held on the car, its guideway, and the beam supporting the gun, and one of which is axially, or substantially so, coincident with the axis of the journals journaling the gun on its said supporting-beam, substantially as described, for the purpose specified.

6. The combination, with a gun and a beam directly supporting the gun, journaled at its forward end portion on a suitable support, and all so that the gun may be elevated and depressed at its muzzle and supported in its vertical positions, of a rail or other suitable guideway located at and extending from to below the breech of the gun and held on said support for said beam, an ammunition-car having a chamber or chambers open from end to end to receive ammunition and held on and arranged to travel along said guideway, and thereby to be brought into a position behind the breech of the gun and to present an ammunition-chamber end to end in relation to the bore and into a position below the gun, and means to operate said ammunition-car, consisting, essentially, of a rope or other line at one end held on the car and at the other end held on said support for said beam, an air-engine held on said support for said beam and having a reciprocating piston-rod, and guides for the run of said rope from the car to said beam and located and held on the car, its guideway, beam supporting the gun, and piston-rod of the air-engine, substantially as described, for the purpose specified.

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

HARRY A. SPILLER.

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