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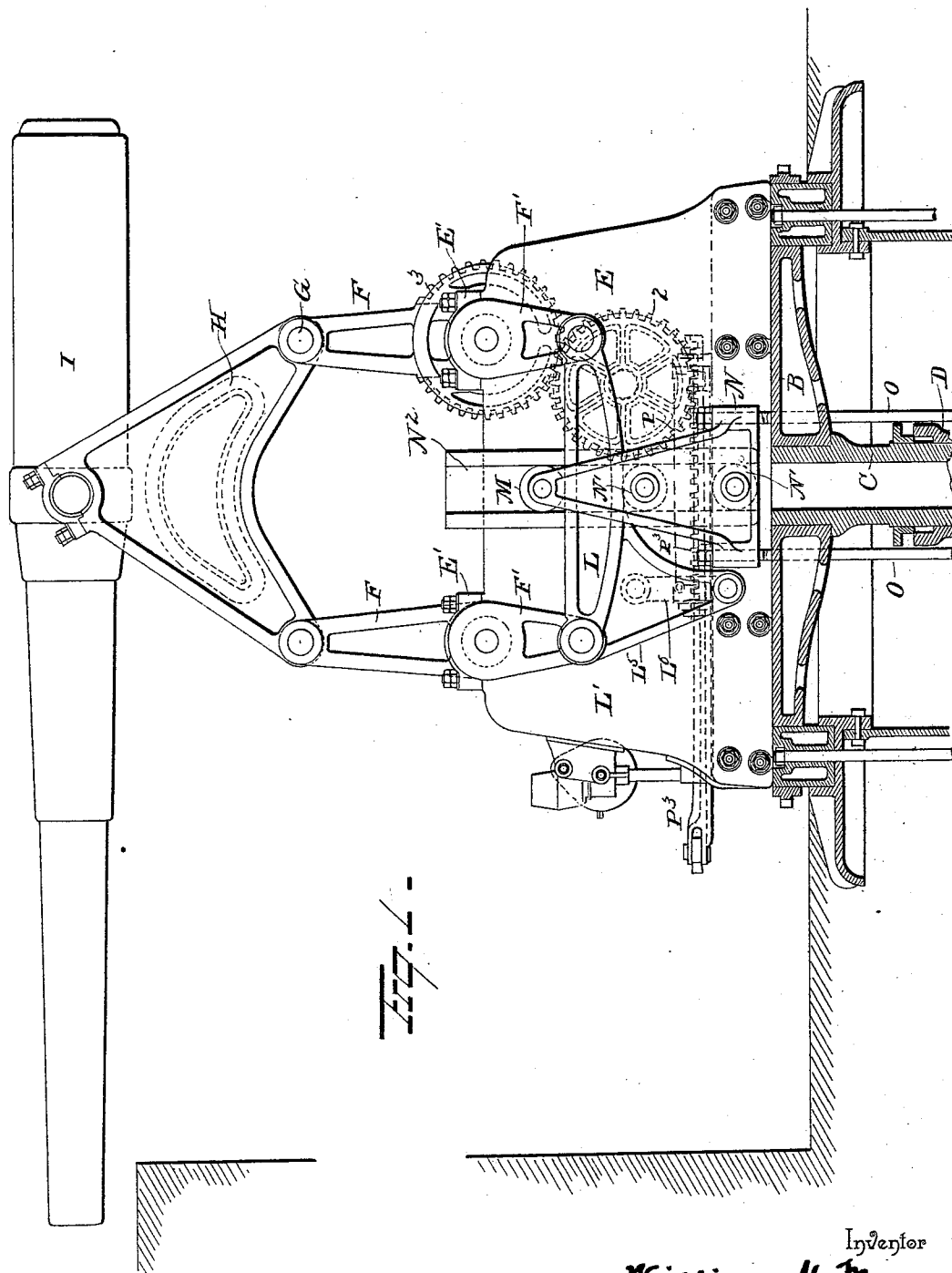
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W. H. MORGAN.

DISAPPEARING COUNTERPOISE GUN CARRIAGE.

No. 569,223

Patented Oct. 13, 1896.



Witnesses

E. Nottingham,
G. F. Downing.

Inventor

William H. Morgan

By H. A. Seymour
Attorney

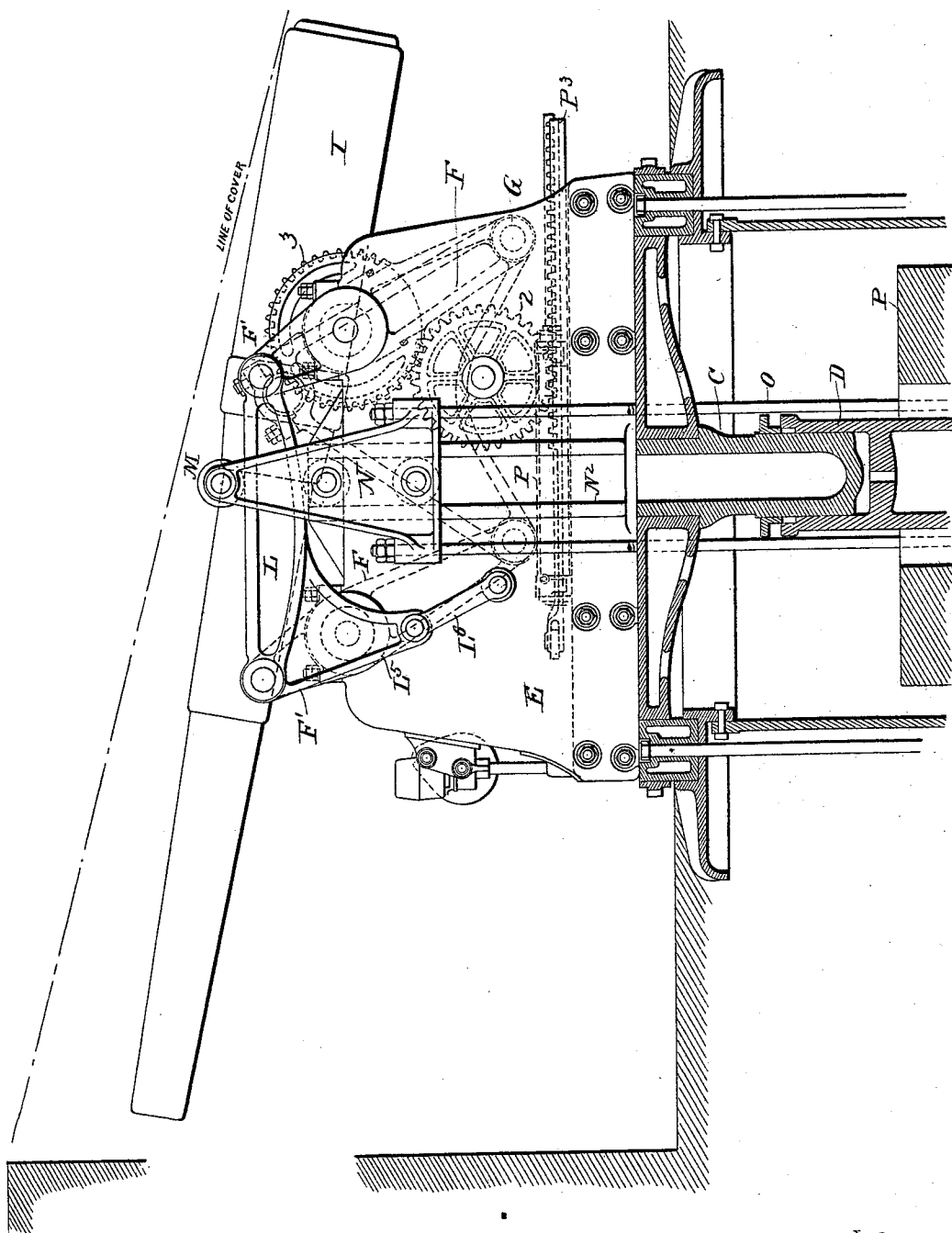
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Witnesses
E. J. Nottingham
G. F. Downing.

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Inventor
William H. Morgan
By H. A. Seymour
Attorney

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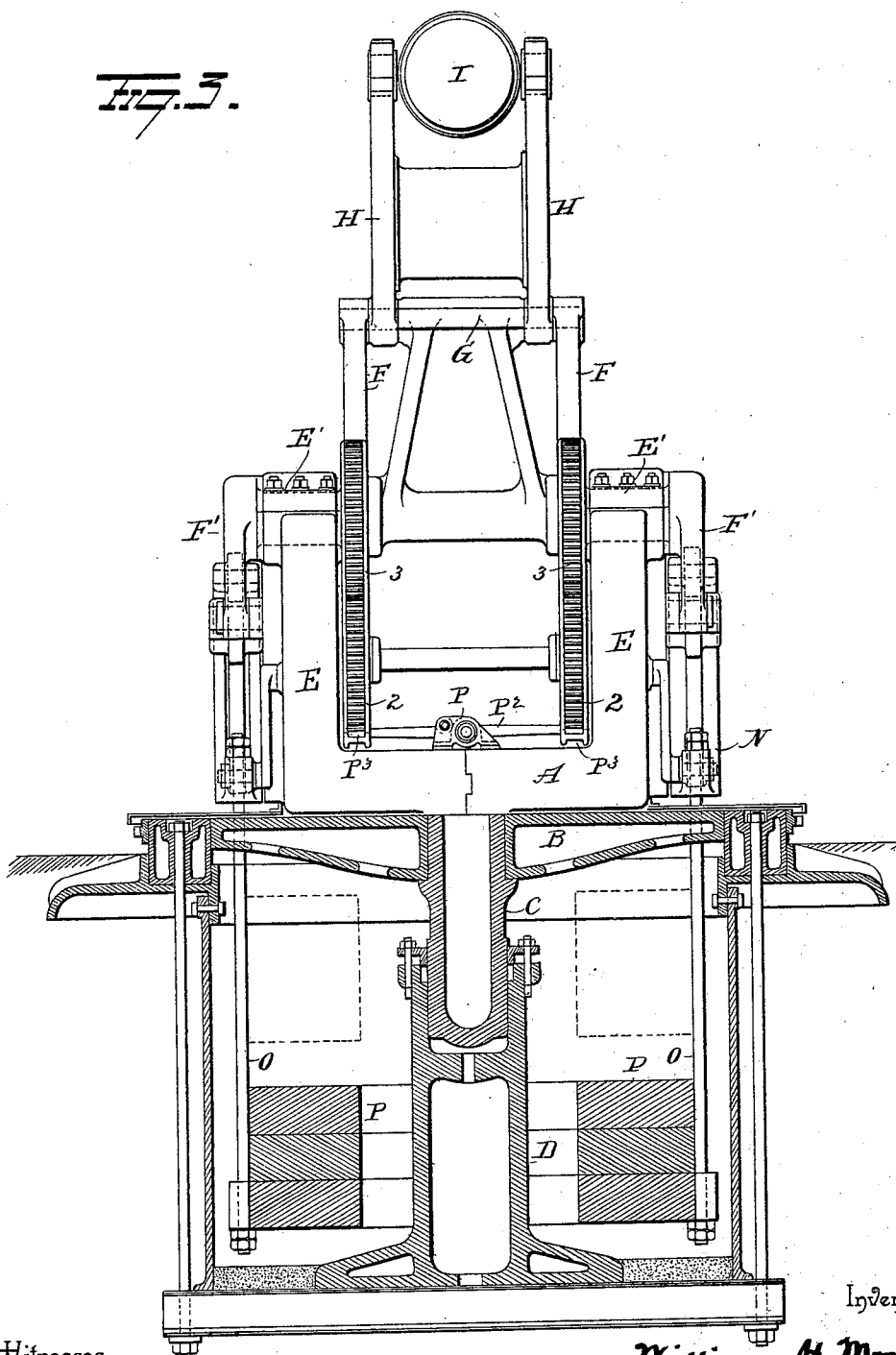
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G. F. Downing

Inventor
William H. Morgan
By *H. A. Seymour*
Attorney

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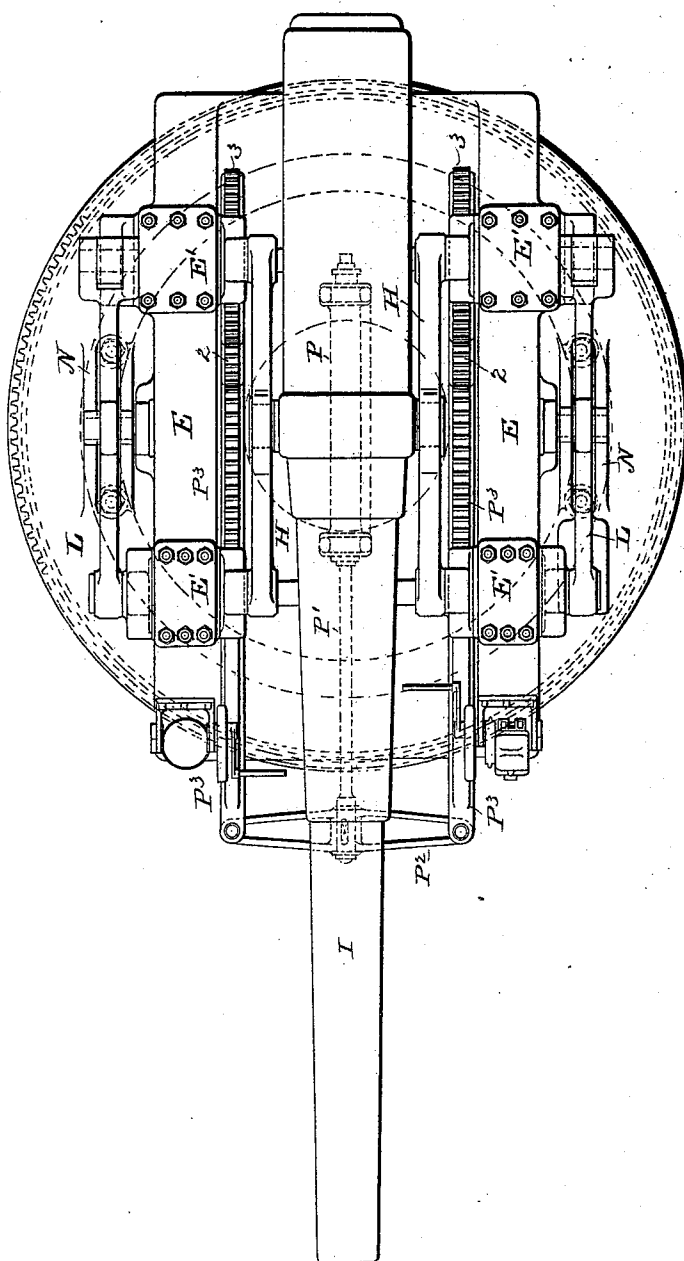
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Witnesses
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G. F. Downing.

W. H. M.

Inventor
William H. Morgan
By H. A. Seymour
Attorney

UNITED STATES PATENT OFFICE.

WILLIAM HENRY MORGAN, OF ALLIANCE, OHIO.

DISAPPEARING COUNTERPOISE GUN-CARRIAGE.

SPECIFICATION forming part of Letters Patent No. 569,223, dated October 13, 1896.

Application filed February 12, 1896. Serial No. 579,060. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM HENRY MORGAN, of Alliance, in the county of Stark and State of Ohio, have invented certain new and useful Improvements in Disappearing-Gun Carriages; 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 improvement in disappearing-gun carriages, and discloses the essential features of and is designed, primarily, as an improvement on the Gordon gun-carriage disclosed and claimed in United States Patent No. 497,999, granted May 23, 1893. In the patent above referred to the top carriage carrying the gun is mounted on the upper ends of two pairs of arms or double cranks journaled in the side frames of the main carriage and is counterbalanced by weights mounted on the lower ends of said double crank-arms. As the gun is fired the recoil moves it rearwardly and downwardly until it is under cover behind the parapet, while the counterweights carried by said arms are moved forwardly and upwardly. As the gun and counterweights are mounted on the double cranks and as there is no movement of one independent of the other it follows that the counterweights must move with and at the speed proportionate to the speed of the gun during recoil. Hence the stress on the parts between the gun and counterweights at the moment of firing or at the commencement of recoil is considerable, as the counterweights are in a state of rest. This stress or strain on the parts tends to tip or overturn the carriage, and the object of this invention is to overcome this tendency by so connecting counterweights to the double crank-arms that at the commencement of recoil the movement of the counterweight is gradual and more limited than the movements of the gun and is accelerated gradually as the gun descends.

My invention consists, broadly, of two pairs of pivoted arms or double cranks, a top carriage supported upon the upper ends of said pivoted arms or cranks, bars connecting the lower ends of said arms or cranks, and a vertically-movable weight mounted on said arms.

My invention further consists in the parts

and combinations of parts, as will be more fully described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a view in side elevation of the gun-carriage, showing the gun in its elevated position or position for firing. Fig. 2 is a similar view showing the position of the parts after recoil. Fig. 3 is an end view looking toward the breech of the gun, and Fig. 4 is a plan view.

A represents a base or bed plate constructed in any desired manner and resting on a pivot-plate B, which latter is carried by the hydraulic plunger C for traversing. This plunger rests in cylinder D and can be elevated, carrying with it the pivot-plate and the gun-carriage thereon. When in this elevated position, the carriage rests on the hydraulic pivot thus formed and the traversing can be readily and quickly accomplished. After the carriage has been turned to the desired position the pivot-plate is lowered until the carriage is solidly seated on its support.

The side frames E of the carriage are permanently fastened to the bed-plate A, and each is provided on its upper edge with bearings E', in which are mounted the crank-arms. These arms are arranged parallel, two to a side, and are connected at their upper ends to shafts which pass through the cheek-pieces H of the top carriage. The top carriage is composed of two cheek-pieces H, rigidly braced a suitable distance apart to receive the gun between them, each piece having a trunnion-bearing for the reception of the trunnions of the gun I.

The shafts G pass through the top carriage from side to side and are journaled therein, one in front and one in the rear, and are rigidly fastened at their outer ends to the parallel arms F of the double cranks. These arms are each, in effect, two cranks, the inner cranks F, which, as clearly shown, are located in planes inside the inner faces of the side frames and support the top carriage, and the outer cranks F' rest on the outside of the side frame and support connecting-bars carrying a counterweight, which latter counterbalances the weight of the gun.

The connecting-bars L, one to a side, are journaled on the wrist-pins L' of the cranks F', and as the cranks of the two sides are locked together it follows that an independ-

ent movement of any of the cranks is impossible. The upper surfaces of the bars L are horizontal, forming smooth trackways for the rollers M, journaled in bearings at the upper ends of the yokes N. Each yoke N is slotted vertically, so as to embrace its respective bar L, and is provided on its inner face with guiding-rollers N', which latter move in the guides N², formed in the adjacent side frames E. These guiding-rollers prevent any swaying or swinging of the yokes and also prevent the yokes from moving laterally or in the direction of the length of the bars L as the latter move forwardly and upwardly under recoil, but leave the yokes free to move vertically as the bars L are raised.

As the bars L move forwardly and upwardly it will be seen that they move longitudinally under the rollers M and simply transmit their vertical movement to the yokes.

Rigidly secured to and depending from each yoke N are the rods O, two to each yoke. These rods O terminate in a pit below the carriage and are secured at their lower ends to the counterweight P. This counterweight P can be rectangular, cylindrical, or any other suitable shape, and is cut away centrally to accommodate the hydraulic cylinder.

From the foregoing it will be seen that as the gun moves rearwardly and downwardly under recoil the bars L, connecting the crank-arms F', move forwardly and upwardly, while the yokes N, which are carried by the bars L and carry the counterweights, move vertically. In the patented device above referred to the counterweights were journaled directly on the crank-arms, and hence moved simultaneously with and at the same rate of speed. With that device the firing of the gun was felt immediately and the tendency was to move the counterweights at their maximum velocity from the start. The resistance to this instantaneous movement due to the inertia of the mass produced a horizontal effect at right angles on the crank-trunnions, which tended to lift the carriage from its foundation.

With the device disclosed in this application there is practically no resistance to the bars supporting the counterweights moving out longitudinally, and what there is is due to the friction of the rollers M. All the other thrusts due to lifting the counterweights tend to hold the bearings to the foundation, and as the bars can move longitudinally within the yokes it follows that when the cranks begin their movement under recoil there is but slight vertical movement of the bars. Hence the lifting of the counterweights is gradual at the start and the speed accelerated as the gun descends.

The gun moves under recoil from the position shown in Fig. 1, which is its firing position, to its loading position below the parapet, as shown in Fig. 2, and to prevent abnormal movement of the gun I have provided a

hydraulic brake or check consisting of a cylinder P' and piston, either provided with means whereby the fluid in the cylinder is free to pass from the cylinder at the commencement of the recoil, but its egress is gradually retarded as the gun approaches its limit of movement and is finally checked, thus bringing the parts gradually to a state of rest. The piston is connected by its rod P' and cross-head P² to the rack-bars P³, which latter rest on the base of the lower carriage adjacent to the side frames E. Meshing with the rack-bars P³ are the gear-wheels 2, journaled to the side frames E. These wheels 2 engage the segments 3 integral with the double crank-arms, and hence it follows that when the cranks are moved under recoil the piston is moved into its cylinder and operates to check the movements of the parts, as above described.

In order to prevent the bars L from tipping or tilting while passing the dead-center, I have provided each bar with an extension or bracket L⁵ and connected the same to the adjacent side frame E by crank L⁶. These cranks L⁶ are of the same length as the cranks F' and are parallel thereto, and hence as the bars L rotate the cranks L⁶ move simultaneously with and in the same direction as the cranks F', and hence hold the bars L horizontal.

It is evident that numerous slight changes might be made in the general form and arrangements of parts herein shown without departing from the spirit and scope of my invention, and hence I would have it understood that I do not limit myself to the precise details shown and described, but consider myself at liberty to make such changes as fairly fall within the scope of my invention.

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

1. The combination with two pairs of arms pivoted at points between their ends, of a top carriage supported by the upper ends of said arms, bars connecting the lower ends of said arms and counterweight-suspending devices mounted on said bars.

2. The combination with two pairs of arms pivoted at points between their ends, of a top carriage supported by the upper ends of said arms, bars connecting the lower ends of said arms and counterweight-suspending devices guided to move vertically and resting on said bars, substantially as set forth.

3. The combination with two pairs of arms pivoted at points between their ends, of a top carriage supported by the upper ends of said arms, devices connecting the lower ends of said arms, yokes guided to move vertically and resting on said devices and counterweights suspended from said yokes.

4. The combination with two pairs of arms pivoted at points between their ends, of a gun supported by the upper sections of said arms, devices connecting the lower sections, yokes

each carrying a roller which rests on the upper surfaces of said devices and counterweights carried by said yokes.

5 5. The combination with two pairs of arms pivoted at points between their ends, of a gun supported by the upper sections of said arms, devices connecting the lower sections, yokes mounted on said devices and guided to move vertically and counterweights suspended
10 from said yokes.

6. The combination with two pairs of arms pivoted at points between their ends, of a gun

supported by the upper sections of said arms, bars connecting the lower sections, counterweights supported by said bars, and a crank 15 connecting each bar with the adjacent side frame.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

WILLIAM HENRY MORGAN.

Witnesses:

W. C. LLOYD,

FRANK E. DUSSEL.