

(No Model.)

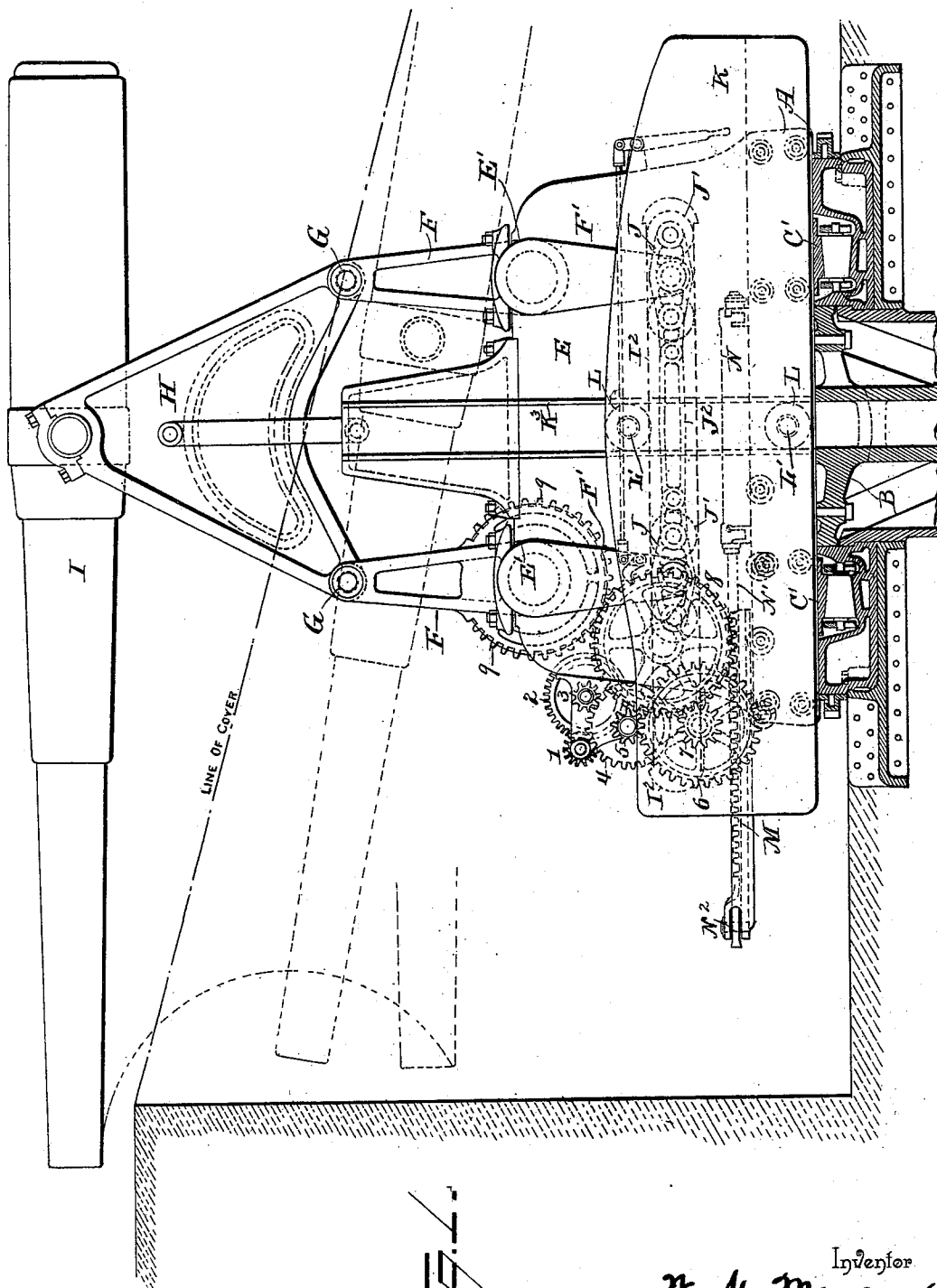
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COUNTERPOISE DISAPPEARING GUN CARRIAGE.

No. 569,222.

Patented Oct. 13, 1896.



Witnesses
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C. F. Downing

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(No Model.)

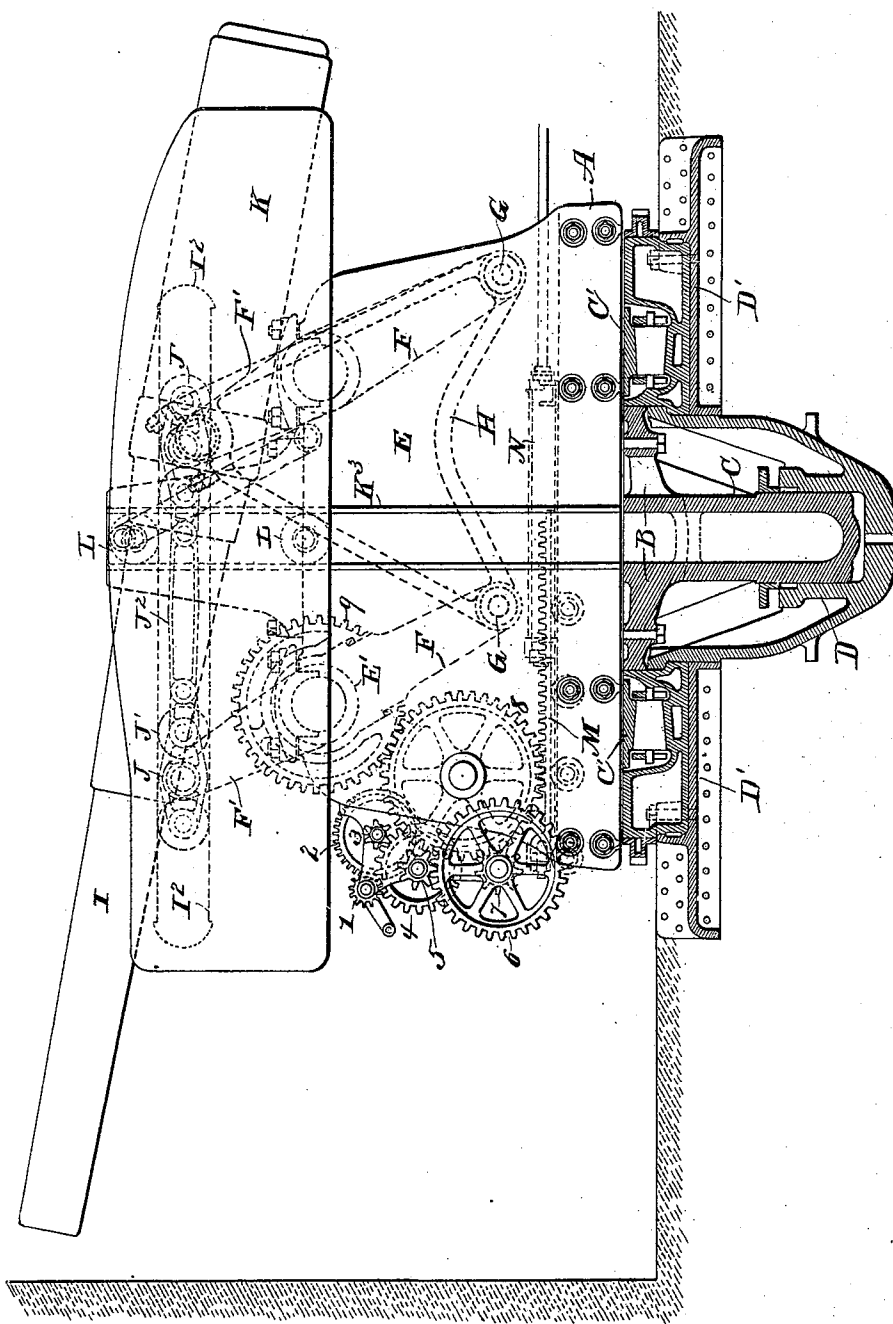
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Fig. 2.

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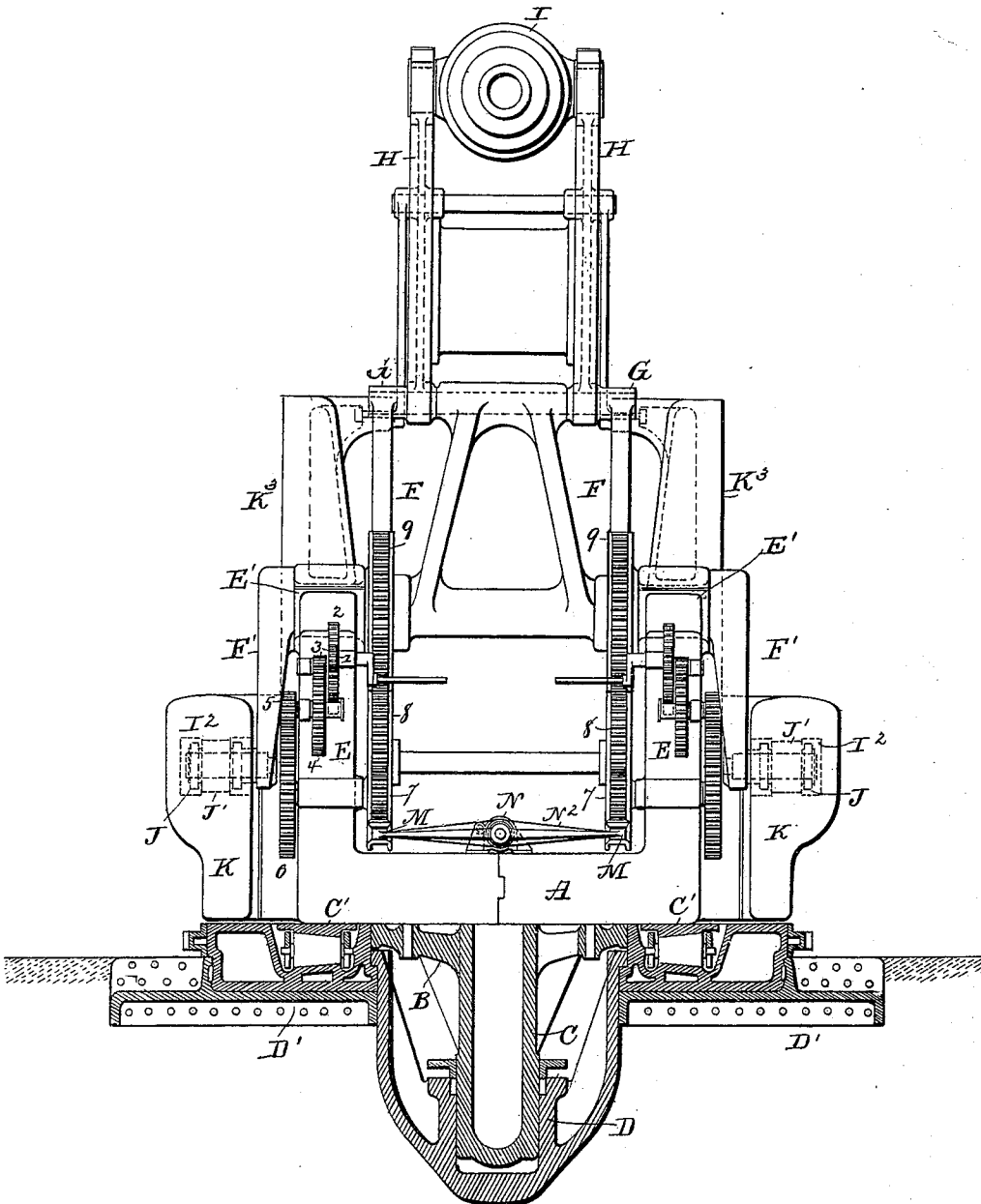


FIG. 3.

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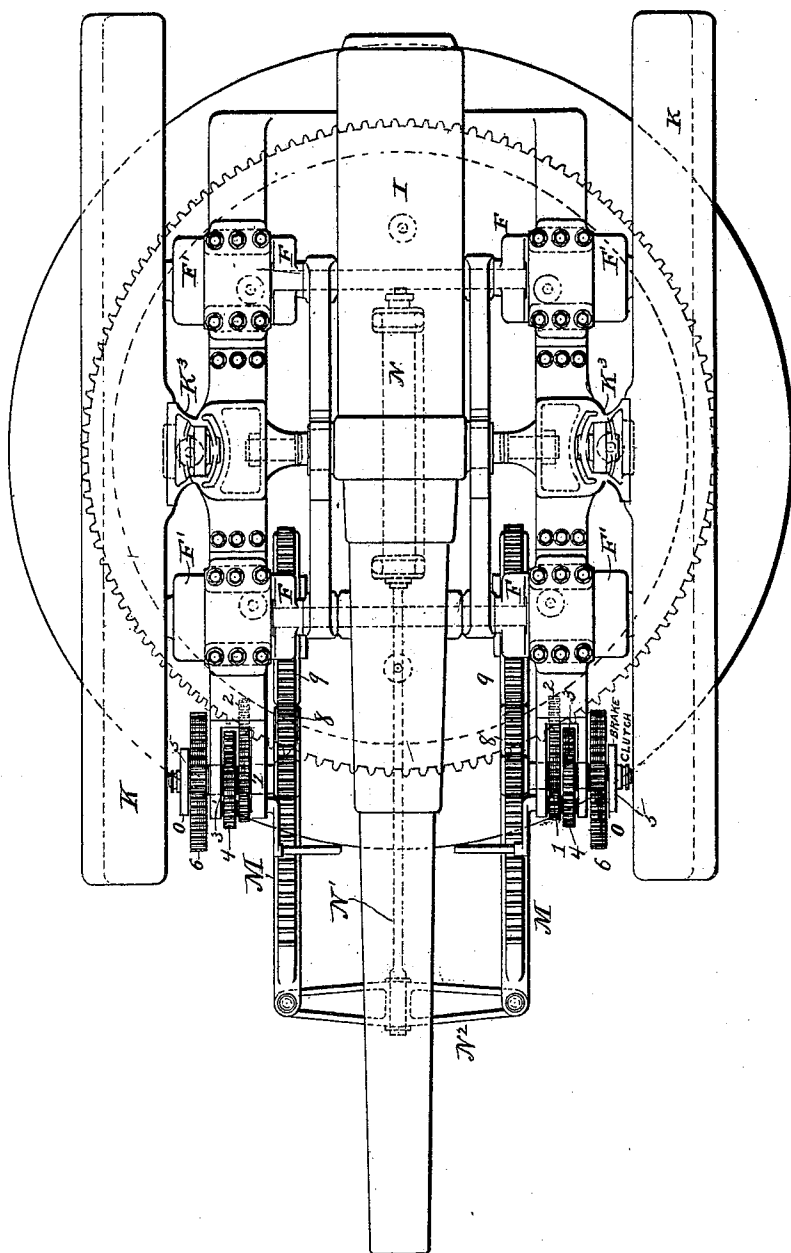
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UNITED STATES PATENT OFFICE.

WILLIAM HENRY MORGAN, OF ALLIANCE, OHIO.

COUNTERPOISE DISAPPEARING-GUN CARRIAGE.

SPECIFICATION forming part of Letters Patent No. 569,222, dated October 13, 1896.

Application filed January 22, 1896. Serial No. 576,445. (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 is designed more particularly as an improvement on the carriage disclosed in United States Patent No. 497,977, granted May 23, 1893.

In the patented carriage above referred to the gun is mounted on a top carriage journaled on the upper ends of two pairs of pivoted arms or double cranks and is counterbalanced by weights carried by the lower ends of said pivoted arms or double cranks, the construction disclosed in the drawings being such that as the gun moves rearwardly and downwardly during recoil the counterweights move forwardly and upwardly. With such a construction the counterweights must move at the same speed as the gun during recoil, and as the gun is fired the resistance of the counterweights to the instantaneous movement of the gun subjects the parts to severe strains and tends to tip or upset it.

The object of the present invention is to overcome the tendency to tipping or upsetting by connecting counterweights to the crank-arms, so that the former move gradually in starting and the speed is accelerated as the gun descends.

My invention consists in the combination of two pairs of pivoted arms, a top carriage supported on the upper ends of said arms, and vertically-movable counterweights carried by the opposite ends of 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 in 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 showing the latter in its elevated position, and Fig. 4 is a plan view.

A represents a base or bed plate constructed in any desired manner and located over and secured to, if necessary, 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, thus permitting the carriage to rest on the traverse-circle C'. This traverse-circle C' is mounted on rollers moving on the foundation-plate D', and can be used for traversing without the aid of the hydraulic devices just described.

The side frames E of the carriage are integral with or 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 G, 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 a trunnion of the gun I. The shafts G pass through the top carriage from side to side and are journaled thereon, one in front and one in the rear, and are rigidly fastened at their outer ends to the parallel arms F of the crank-arms. 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, while the outer cranks F' rest on the outside of the side frames and support the weights K, which throughout this specification and claims I have termed "counterweights," but which are combined slightly greater in weight than the gun, and hence slightly overbalance it.

The four parallel crank-arms are, as before stated, journaled in the side frames E of the lower carriage, and as they are connected at their upper ends to the upper or top carriage and at their lower ends to the counterweights it follows that when the upper carriage with the gun thereon is rising the counterweights are descending, and vice versa.

In the patented device previously referred to the counterweights are mounted on wrist-pins carried by the cranks F', the counterweights having cylindrical bearings for the reception of the wrist-pins.

With the patented construction the counterweights move forwardly and upwardly at the same rate of speed that the gun moves rearwardly and downwardly during recoil, and as the gun begins to move simultaneously with the firing of the shot it will be seen that the stress on the parts in starting is considerable. With the present construction I have succeeded in relieving the parts of this abnormal stress, and have accomplished this end by so connecting the counterweights to the cranks that at the beginning of the recoil the counterweights are started gradually, the speed being accelerated as they rise. The construction by which this end is accomplished consists in providing the counterweights with longitudinal grooves or guideways I², starting from near the front ends of the counterweights and terminating at a point just behind the rear cranks. The counterweights are preferably thickened near their upper edges to prevent a material weakening of the parts by the presence of the grooves.

Journaled on the wrist-pins of the lower cranks F are the trucks J, mounted on the rollers J', which latter bear against the upper wall of the grooves or guideways in the counterweights and sustain the weights in position. The two trucks J of each counterweight are connected by a distance-piece J², which operates to hold the trucks a predetermined distance apart under any and all conditions. Thus it will be seen that as the top carriage with the gun moves rearwardly and downwardly from the effect of the recoil the trucks J move lengthwise in the guideways in the counterweights and toward the front ends thereof and thus elevate the counterweights.

In order to prevent the counterweights from moving forwardly with the cranks, I have provided the side frames E with the vertical guides K³, which latter extend from the lower edge of the lower carriage to a point in close proximity to the lower edge of the top carriage. These guides can each be in the form of a groove, as shown in the drawings, or it can be in the form of a flange. If it be in the form of a groove each counterweight should be provided with two rollers L, mounted on bearings L', carried by the counterweights and moving in the grooves, whereas if the guide be in the form of a flange the rollers should be arranged in pairs, so as to engage

the opposite sides of said flange. The means employed, however, for holding the counterweights against longitudinal movement, but permitting free vertical movement, are immaterial, as my invention comprehends, broadly, two pairs of pivoted arms or cranks, a top carriage supported on the upper ends of said arms, and counterweights guided to move vertically and connected to the lower ends of said arms.

From the foregoing it will be seen that as the shot is fired the gun begins to move rearwardly and downwardly, carrying with it the top carriage and turning the cranks. As the cranks begin to turn the trucks J move lengthwise the groove; but as the crank moves in the arc of a circle it follows that the counterweights are moved vertically. This vertical movement of the counterweights is slow at first, but is gradually accelerated as the gun continues to descend. Hence the great stress on the parts, which resulted from throwing the entire energy of recoil onto counterweights connected to the crank-arms so as to move simultaneously with and at the same rate of speed as the gun, as in the patented construction, is entirely overcome.

As before stated, the counterweights are somewhat heavier than the gun and as a matter of fact overbalance the gun. Notwithstanding this excess of weight in the counterweights the energy of recoil is sufficient to move the counterweights to the plane of the gun when the latter is in its depressed position, Fig. 2, which is its position for loading, and to prevent the possibility of a further upward movement, and to check the movements of the parts as they approach the position shown in Fig. 2, I have provided the hydraulic brake N, which latter can be of any approved form. This brake consists simply of a cylinder containing water or other liquid and provided with openings or other equivalent means so arranged that at the commencement of movement of the gun and counterweights the liquid can pass freely from behind the piston as the latter moves rearwardly, but as the movement continues this escape of the fluid is gradually lessened or restricted, thus operating as a brake which gradually retards and finally checks the movements of the parts. The piston of this hydraulic brake is connected by the piston-rod N' to the cross-head N², which latter is connected at its ends to the rack-bars M. These rack-bars are located adjacent to the side frames, and each is engaged by a toothed wheel 8, suitably journaled on a bearing carried by the side frame E of the main carriage. Each toothed wheel 8 meshes with a segment-gear 9, integral with or secured to and concentric with the front cranks F. Thus it will be seen that as the gun begins its rearward and downward movement segments 9 turn wheels 8, and the latter, meshing with the rack-bars M, move the latter rearwardly, thus forcing the piston toward the

rear of the cylinder, and the fluid therein, acting as before described, operates to gradually bring the moving parts to a state of rest.

It is sometimes necessary to bring the gun from its firing position (shown in Fig. 1) to its position for loading. (Shown in Fig. 2.) The act of firing always carries the gun to the loading position, but to accomplish this end without firing a shot I have provided gearing adapted to be actuated by a motor or by hand - cranks, as shown in the drawings. Through these wheels 1, 2, 3, 4, 5, 6, 7, and 8 and segment 9 I can conveniently and within a short space of time elevate the counterweights, and consequently lower the gun, until the latter is in a position for firing. This gearing is provided with a differential brake O, (shown in Fig. 4,) adapted to regulate the descent of the counterweights, and the toothed wheel 7 of the train is preferably locked to its shaft by a spring-actuated clutch, so that normally it is loose on its shaft, and hence does not transmit motion to the wheels 6 5 4, &c., while the gun is in motion from the effect of the recoil.

I would have it understood that I do not confine myself to the details of construction herein shown and described, but consider myself at liberty to make such changes and alterations as fairly fall within the spirit and 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 pivoted arms, of a top carriage supported on the upper ends of said arms and counterweights guided to move vertically and connected to the lower ends of said arms.

2. The combination with two pairs of crank-arms journaled at points between their ends, of a top carriage for a gun, the said carriage mounted on the upper ends of said arms, counterweights loosely carried by the lower ends of said arms and means for guiding the counterweights vertically, substantially as set forth.

3. The combination with side frames and two pairs of crank-arms journaled at points between their ends, of a top carriage for a gun, the said carriage mounted on the upper ends of said arms, counterweights carried by the lower ends of said arms and means for preventing longitudinal movement of the counterweights, but permitting free vertical movement thereof, substantially as set forth.

4. The combination with two pairs of pivoted arms, of a top carriage supported on the upper ends of said arms counterweights guided to move vertically and connected to the lower ends of said arms, a hydraulic brake or checking device, and means connecting the moving parts with said hydraulic brake or checking device, substantially as set forth.

5. The combination with two pairs of pivoted arms, of a top carriage supported on the

upper ends of said arms counterweights guided to move vertically and connected to the lower ends of said arms, a checking-cylinder, piston therein, and gearing connecting one pair of pivoted arms, and the piston, substantially as set forth.

6. The combination with two pairs of pivoted arms, of a top carriage supported on the upper ends of said arms, counterweights guided to move vertically, and provided each with a longitudinal bearing, and trucks carried by the lower ends of the pivoted arms, the rollers or wheels of the truck resting under the longitudinal bearings of the counterweights and supporting the latter.

7. The combination with two pairs of pivoted arms, of a top carriage supported on the upper ends of said arms, counterweights guided to move vertically and provided, each, with a longitudinal bearing, trucks carried by the lower ends of the pivoted arms, the rollers or wheels of the truck resting under the longitudinal bearings of the counterweights, and supporting the latter and distance-pieces connecting the two trucks of each counterweight.

8. The combination with two pairs of pivoted arms, of a top carriage supported on the upper ends of said arms, counterweights, each provided with a longitudinal slot, and trucks carried by the pivoted arms, and resting within the slots in the counterweights and supporting the latter, substantially as set forth.

9. The combination with two pairs of pivoted arms, of a top carriage supported on the upper ends of said arms, counterweights, each provided with a longitudinal slot, trucks carried by the pivoted arms and resting within the grooves in the counterweights and supporting the latter and distance-pieces connecting the trucks, substantially as set forth.

10. The combination with two pairs of pivoted arms, of a top carriage for a gun, the said carriage supported by the upper ends of said arms, devices connecting the lower ends of said pivoted arms and counterweights supported by said devices.

11. 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, and counterweights guided to move vertically, supported by said devices.

12. The combination with two pairs of arms pivoted at points between their ends, of a gun supported by devices carried by the upper sections of said arms, devices connecting the lower sections of said arms, and counterweights suspended from said latter devices.

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

14. The combination with two pairs of arms

pivoted at points between their ends, of a gun supported by devices carried by the upper sections of said arms, devices connecting the lower section of said arms, counterweights
5 supported by said latter devices, and a hydraulic brake for checking the movement of the parts during recoil.

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

WILLIAM HENRY MORGAN.

Witnesses:

W. C. LLOYD,
A. F. MORRIS.