

No. 769,636.

PATENTED SEPT. 6, 1904.

F. RAUSENBERGER. CARRIAGE FOR DISAPPEARING GUNS.

APPLICATION FILED MAY 4, 1901.

NO MODEL.

3 SHEETS—SHEET 1.

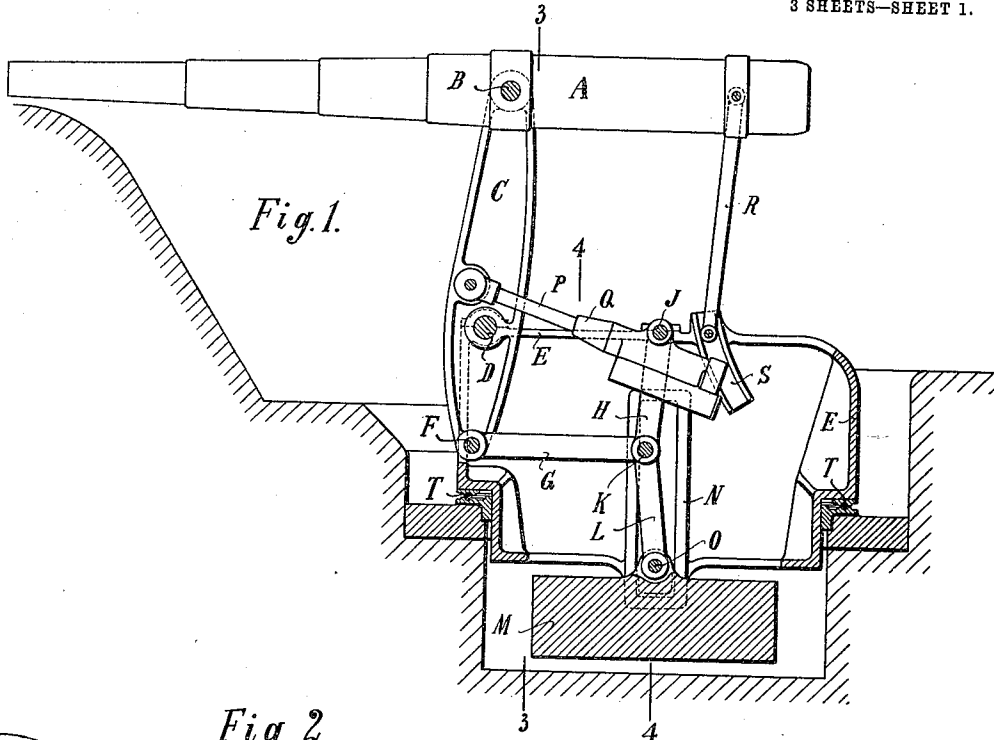


Fig. 1.

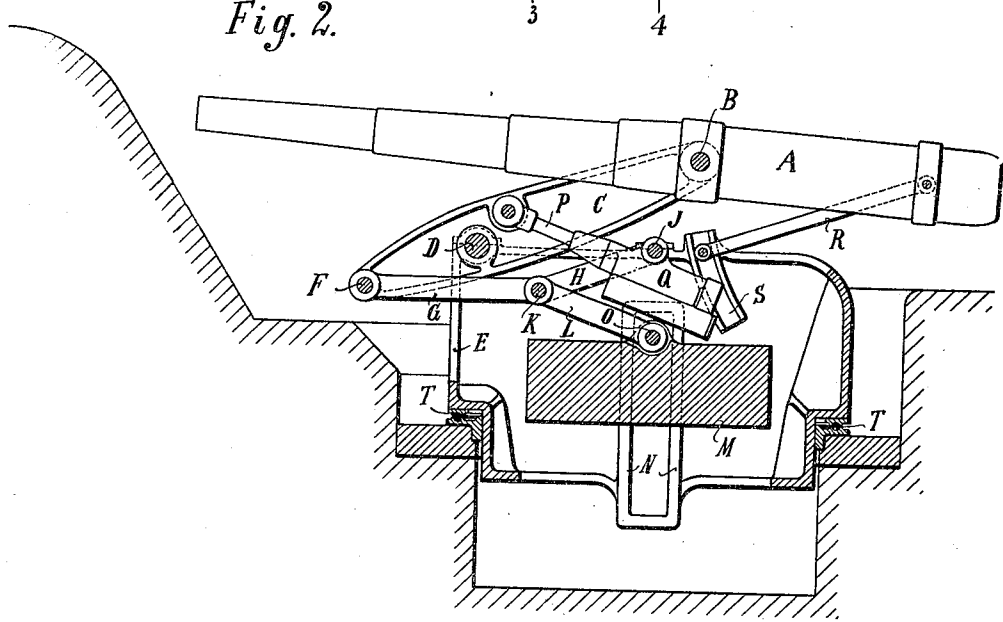


Fig. 2.

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3 SHEETS—SHEET 2.

Fig. 3.

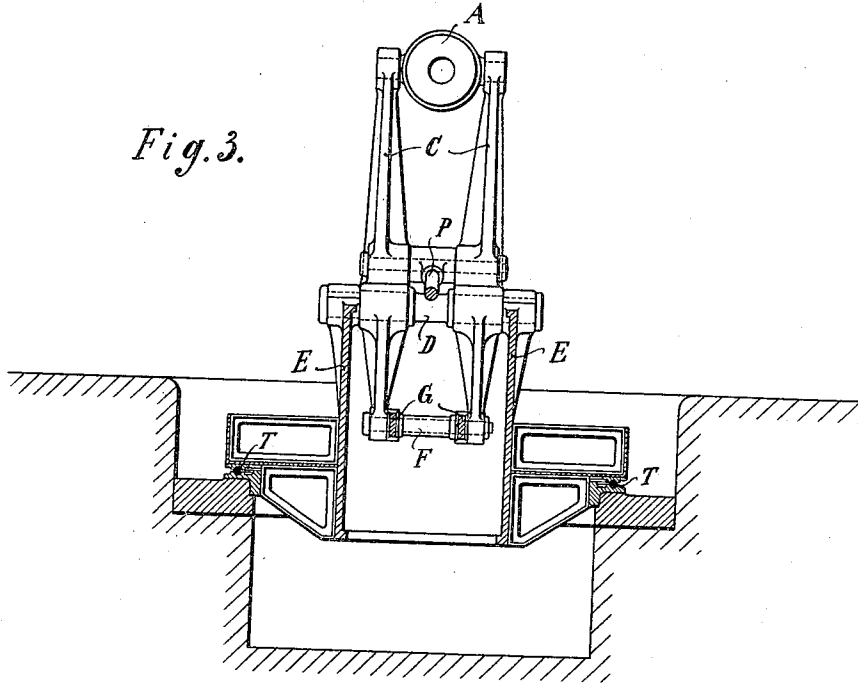
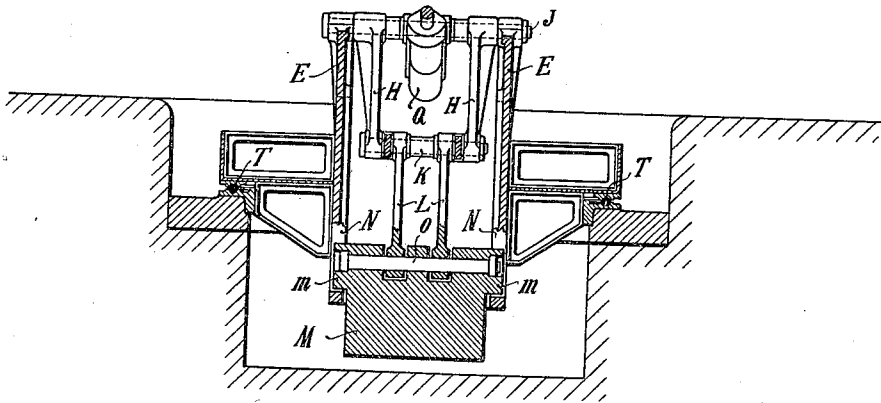


Fig. 4.



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3 SHEETS—SHEET 3.

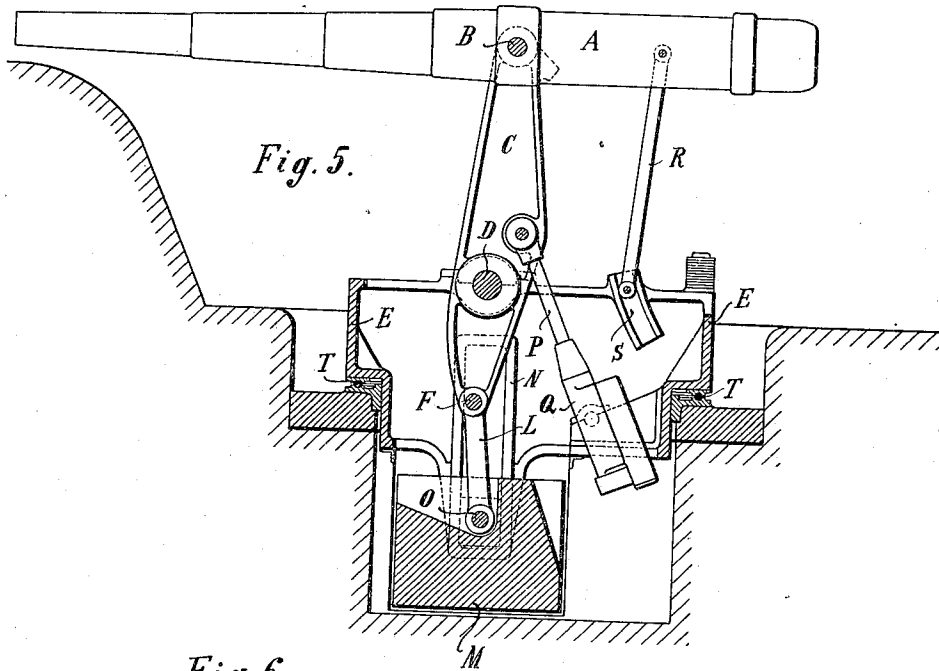


Fig. 5.

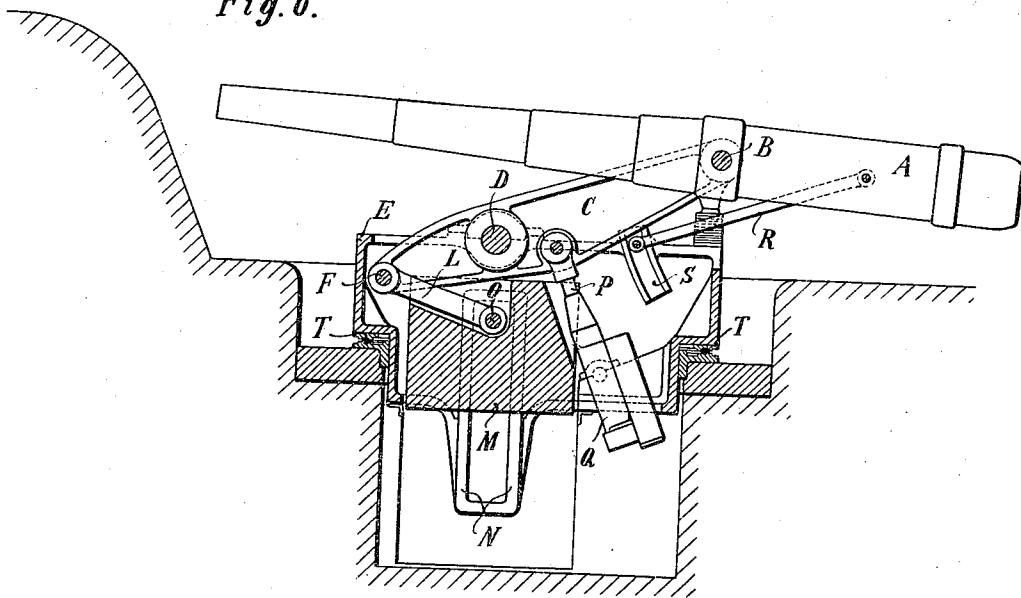


Fig. 6.

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UNITED STATES PATENT OFFICE.

FRITZ RAUSENBERGER, OF ESSEN-ON-THE-RUHR, GERMANY, ASSIGNOR TO
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CARRIAGE FOR DISAPPEARING GUNS.

SPECIFICATION forming part of Letters Patent No. 769,636, dated September 6, 1904.

Application filed May 4, 1901. Serial No. 58,739. (No model.)

To all whom it may concern:

Be it known that I, FRITZ RAUSENBERGER, engineer, a citizen of the German Empire, residing at 6 Alexstrasse, Essen-on-the-Ruhr, Germany, have invented certain new and useful Improvements in Carriages for Disappearing Guns, of which the following is a specification.

This invention has reference to improvements in carriages for disappearing guns of that class in which the gun-barrel is supported upon a two-armed lever which is automatically turned downwardly on firing and is returned to and retained in the firing position by a balance-weight.

The invention has for its particular object to so arrange the connection of the balance-weight and barrel-carrier as to insure the proper advancing of the barrel into the firing position and to obtain most favorable conditions for the forces of acceleration and for the equilibrium between the barrel and the balance-weight. This object is accomplished by suspending the balance-weight from the free end of a toggle guided in a straight line, the knuckle of the toggle being connected to the lower arm of the two-armed barrel-carrier in such a manner that when the gun is in its firing position the arms of the toggle are nearly in line.

The nature of the invention will best be understood when described in connection with the accompanying drawings, in which—

Figure 1 represents a vertical longitudinal section of a carriage embodying my invention and showing the gun in its firing position. Fig. 2 is a similar section showing the gun in its position for loading. Fig. 3 is a cross-section on the line 3 3, Fig. 1. Fig. 4 is a cross-section on the line 4 4, Fig. 1. Figs. 5 and 6 are views similar to Figs. 1 and 2, but illustrating a modified form for the carriage.

Similar letters of reference designate corresponding parts throughout the several views of the drawings.

Referring to the drawings, the letter A designates the gun-barrel, having its trunnions B supported in the upper end of the two-armed carrier-lever C, composed of two parallel

swings supported in bearings of the carriage-frame E by means of the shaft D. The lower arm of the lever C is half as long as the upper or supporting arm for the gun-barrel.

M is the balance-weight, which is guided in a straight line by means of lugs *m*, which enter vertical guideways N, formed in the carriage and is connected by a bolt O to the lower free end of the toggle. This toggle consists of two upper arms H, pivotally connected to the carriage-frame by a suitable bolt J, and of two lower arms L, pivotally connected with the lower ends of the arms H by a bolt K. The longitudinal axes of the bolts J and O, as well as the center lines of the ways N, lie in one and the same vertical plane, which said plane passes through the vertical axis about which the gun-carriage turns, while the center of gravity of the weight lies in the axis of rotation. In view of this construction and arrangement of the parts the turning movement of the carriage does not involve a lateral movement of the weight.

The knuckle-bolt K of the toggle H is connected, by means of two links G, with the lower end of the carrier-lever C, the connection being effected by means of the bolt F. The pivoting-bolts J, K, O, D, and F are parallel to the trunnions of the gun-barrel, so that the links, toggle-arms, and the barrel-carrier are free to swing in vertical planes. The length of the toggle-arms H is the same as that of the toggle-arms L and of the lower barrel-carrier arms, and the length of the links G corresponds to the distance between the axes of the pivot-bolts D and J, so that the upper toggle-arms H are parallel to the lower arms of the barrel-carrier. In the firing position of the gun-barrel the lower arms of the gun-barrel carrier C are not perfectly vertical, and consequently the toggle-arms are not entirely stretched out—that is to say, they do not lie in one and the same line—and therefore the weight M still exerts a turning movement adapted to vertically raise the gun. It will therefore be readily understood that the gun-barrel is raised with certainty to the firing position under all conditions.

Q designates the cylinder of the recoil-brake, which oscillates about the bolt J as a center of suspension. The piston-rod P of the recoil-brake is pivoted to the upper arm of the barrel-carrier C.

For adjusting the angular elevation of the gun rods R of the usual construction are used which are jointed at their upper ends to the breech end of the gun, while their lower ends are adjustably secured in a guide S of the carriage-frame. The carriage-frame is supported upon a usual turn-table having a ball-track T.

When upon firing the barrel-carrier is turned back, the links G actuate the toggle H to raise the weight M, and a part of the energy of recoil is thereby stored in the weight, while the remaining part is consumed in the recoil-brake Q.

From the above description of the arrangement of the gun-carriage it will readily be seen that the vertical travel of the weight is equal to the travel of the gun-barrel and is therefore very small at the commencement of the recoil. Consequently the accelerating forces are comparatively small during the action of the powder-gases. It will also be seen that equilibrium is established between the gun-barrel and the balance-weight in all positions of the barrel and lever-arms when the balance-weight is equal to the weight of the gun, provided that friction is not taken into consideration, and therefore the balance-weight need be but little in excess of the weight of the gun-barrel to insure certainty of return to the firing position after the shot.

When it is not considered very important that the center of gravity of the balance-weight should be in the vertical axis of the turn-table, then the above-described arrangement may be simplified by directly using the lower arm of the barrel-carrier in place of the upper arms H of the toggle. Such an arrangement is shown in Figs. 5 and 6. In this modification the balance-weight M is guided in a vertical line passing through the turning axis D of the barrel-carrier. The upper toggle-arms H, the link G, and the bolts J K are omitted, and the lower arms L are directly connected to the bolt F, so that the angle of the toggle is at the lower end of the barrel-carrier; otherwise the arrangement is the same as before described and operates in exactly the same manner.

What is claimed as new is—

1. A disappearing-gun mount comprising a barrel-carrier and a counterbalance-weight controlling the barrel-carrier through a toggle-joint; the weight being directed in a vertical straight guide and the fixed pivot of the toggle-joint being vertically above the connection of such toggle-joint with the weight.

2. In a mount for disappearing guns, the

combination of a barrel-carrier swinging upon a fixed pivot, a counterbalance-weight, a straight guide causing the weight to move in a vertical direction and a toggle-joint through which the weight is connected with the carrier; said toggle-joint having its ends pivoted in the same straight vertical line, one end to the weight and the other end to a fixed pivot.

3. In a mount for disappearing guns, the combination of a barrel-carrier swinging upon a fixed pivot, a counterbalance-weight, a straight guide causing the weight to move in a vertical direction and a toggle-joint through which the weight is connected with the carrier; said toggle-joint having its ends pivoted in the same straight vertical line, the one to the weight and the other to a fixed pivot, and in line with the straight vertical guide.

4. In a carriage of a disappearing gun, the combination of a two-armed barrel-carrier having a fixed pivot, a balance-weight for returning the barrel to the firing position, a straight-lined vertical guide on the frame of the carriage, a toggle-joint having one end pivoted to the frame of the carriage and the other to the balance-weight, and means establishing articulated connection between the lower end of the barrel-carrier and the knuckle of the toggle-joint.

5. In a carriage of a disappearing gun, the combination of a two-armed barrel-carrier, having a fixed pivot, a balance-weight for returning the gun to firing position, a straight-lined vertical guide on the frame of the carriage, a toggle-joint having one end pivoted to the frame of the carriage and the other to the balance-weight, and means establishing articulated connection between the lower end of the barrel-carrier and the knuckle of the toggle-joint, the longitudinal axis of the guide and the pivots of the toggle-joint lying in a single vertical plane.

6. In a carriage of a disappearing gun, the combination of a two-armed barrel-carrier, having a fixed pivot, a balance-weight for returning the barrel to firing position, a straight-lined vertical guide fixed to the frame of the carriage, a toggle-joint having one end pivoted to the frame of the carriage and the other to the balance-weight, and means establishing articulated connection between the lower end of the barrel-carrier and the knuckle of the toggle-joint, the arms of the toggle-joint and the lower arm of the barrel-carrier being half as long as the upper arm of the barrel-carrier.

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

FRITZ RAUSENBERGER.

Witnesses:

H. P. SMITH,
MICHEL W. HEGE.