E. A. L. BOURDELLES.

GUN CARRIAGE OF A WIDE FIRING ANGLE.

APPLICATION FILED APR. 14, 1915.

1,223,931.

Patented Apr. 24, 1917.

2 SHEETS—SHEET 1.

Fig. 1.

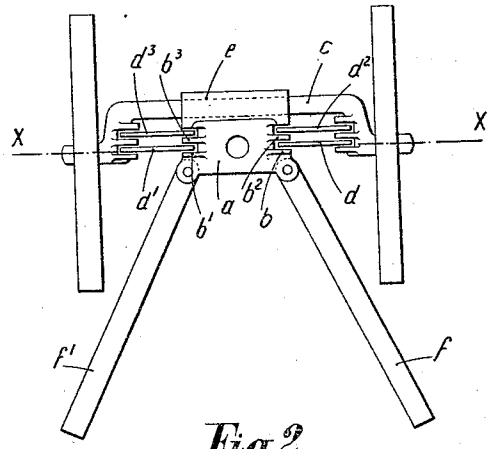

Fig. 2.

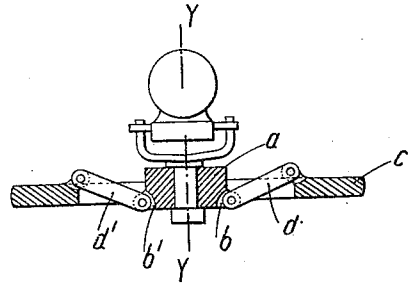

Fig. 3.

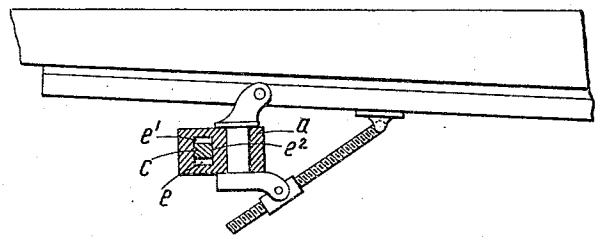

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Fig. 4.

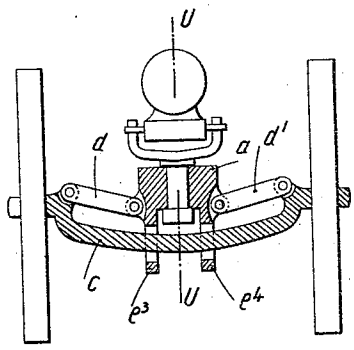


Fig. 5

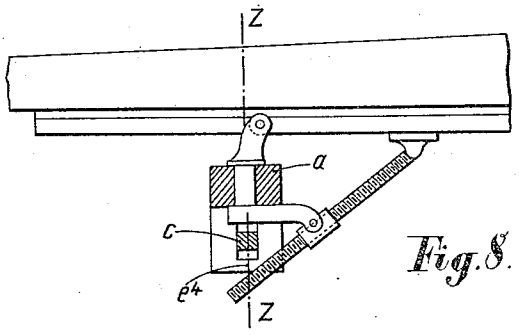


Fig. 6.

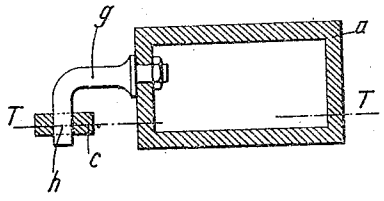


Fig. 7.

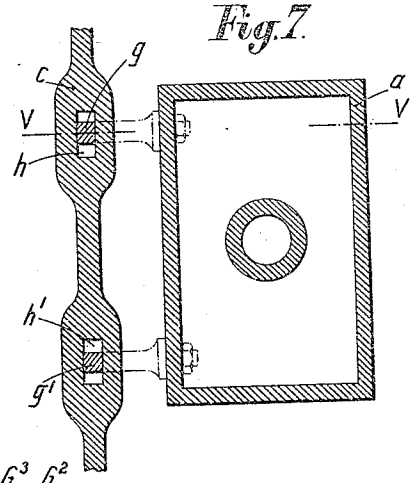
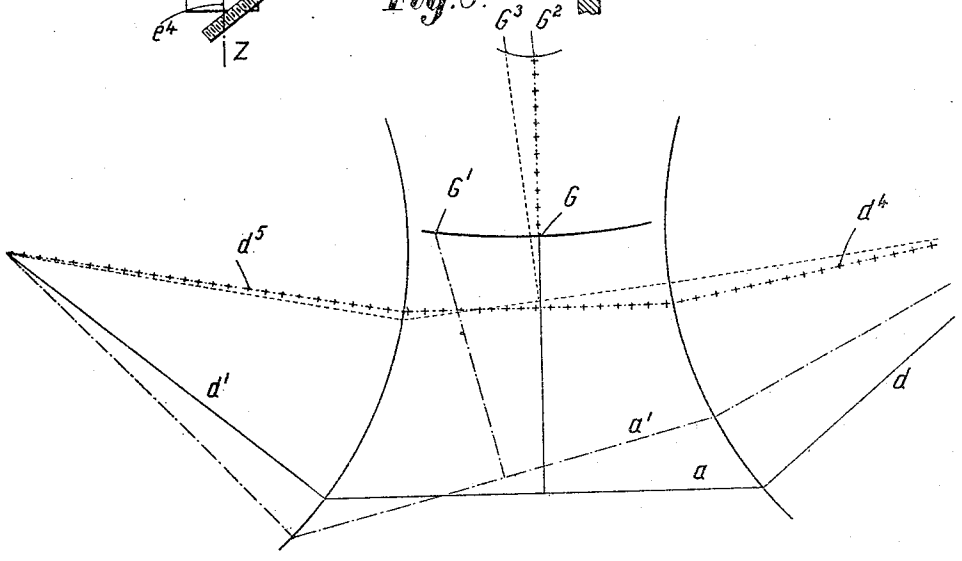


Fig. 8.



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UNITED STATES PATENT OFFICE.

EMILE ALEXANDRE LOUIS BOURDELLES, OF ST.-DENIS, FRANCE, ASSIGNOR TO THE SOCIETE ANONYME DES ETABLISSEMENTS DELAUNAY-BELLEVILLE, OF ST.-DENIS, FRANCE, A CORPORATION OF FRANCE.

GUN-CARRIAGE OF A WIDE FIRING-ANGLE.

1,223,931. Specification of Letters Patent. Patented Apr. 24, 1917.

Application filed April 14, 1915. Serial No. 21,419.

To all whom it may concern:

Be it known that I, EMILE ALEXANDRE LOUIS BOURDELLES, citizen of the French Republic, residing at St.-Denis, Department of the Seine, in France, have invented certain new and useful Improvements in Gun-Carriages of a Wide Firing-Angle; 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.

Gun carriages with a wide firing angle are known, comprising either spherical, geared or the like pivotal joints or having more solid arrangements such as frames pivotally connected to the axle about a horizontal axis. The latter system possesses such objections as instability, interfering with the placing of the guns in firing position owing to the position of the center of gravity around the axis of articulation. In certain cases other disadvantages such as a considerable reduction in the angle of elevation are created, if, in order to obviate the first mentioned disadvantages the pivot supporting the gun is placed upon the axle, leaving at the rear of the axle the small apex of the frame.

The present invention relates to a novel connection between the gun carriage and the axle for guns having a wide firing angle, which will permit of a deformation of the quadrilateral support of the gun carriage upon the ground, in accordance with the nature of the latter or with the unequal penetration of the trails due to the effects of firing.

For this purpose, the gun carriage consists of a body provided with one or more opening or folding trails, provided at its head with lugs connected on each side by rods with corresponding lugs placed on the axle which, if desired, may be bent. The head of the gun carriage may, moreover, be provided with a cage or stirrup members longitudinally imprisoning the axle for the purpose of imparting movement to the axle during firing and transmitting motion from the cage to the axle during transportation, but leaving a certain clearness in height thus enabling the said axle to oscillate slightly about the main axis of the gun carriage. The operation of the axle may also be effected by means of connecting rods or fingers carried by the gun carriage or axle, penetrating into recesses formed in the axle or gun carriage. These devices for operating the axle, however, are not indispensable and may be dispensed with if the head of the gun carriage is connected on either side to the axle through the medium of a rod having a great length in a direction parallel to the gun barrel.

The accompanying drawings illustrate, by way of example, various constructional forms embodying the principles set forth.

Figure 1 is a plan of a gun carriage with an axle bent horizontally.

Fig. 2 is a vertical section of the axle taken on line x—x of Fig. 1, through a plane passing through the axes of the axle spindles.

Fig. 3 is a vertical section through a plane parallel to the wheels taken on line y—y of Fig. 2.

Fig. 4 is a vertical section taken on line z—z of Fig. 5, of an axle bent in the vertical plane, with operating stirrup members.

Fig. 5 is a vertical section taken on line U—U of Fig. 4, showing an arrangement for operating the axle through the medium of fingers.

Fig. 6 is a horizontal section taken on line V—V of Fig. 7.

Fig. 7 is a vertical section taken on line T—T of Fig 6.

Fig. 8 is a diagrammatic view illustrating the stability of the device.

Referring to Figs. 1 and 2, the head a of the gun carriage supporting the cradle and the barrel, carries on each side, lugs b, b', b^2, b^3 connected to the axle C through the medium of two or more rods d, d', d^2, d^3 which are pivotally connected to the axle.

The head of the gun carriage also carries a cage e (see Fig. 3); the axle C, which is guided and operated by the cheeks e', e^2 of the cage, has a certain amount of vertical play therein, enabling it to assume positions at various angles to the ground with respect to the plane of the trails f, f'.

Figs. 4 and 5 illustrate another constructional form in which the axle G, bent in a

vertical plane, is operated by two stirrup members e^3, e^4 allowing the same a certain amount of vertical play.

The operation of the axle by the gun carriage may also be carried into effect in the manner illustrated in Figs. 6 and 7, by means of the fingers g, g' engaging in recesses h, h' formed in the axle and having a certain amount of lateral play.

The diagram of stability (Fig. 8) shows, for the horizontal position of the gun carriage a and an inclined position a', the positions G, G′ of the centers of gravity of the structure, gun carriage, cradle and barrel. This center of gravity follows a curve G G′ with a downwardly directed convexity. The mean position is therefore substantially stable and with less inclined connecting rods such as d^4 and d^5 a curve G^2 G^3 having a more pronounced curvature is obtained, affording a better transverse stability.

The margin of stability may also be varied by varying the width of the head of the gun carriage with respect to the length of the connecting rods.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. The combination of a gun carriage having an axle, a gun carriage head, and a link at each side of said head for pivotally supporting the same from the axle for movement substantially parallel to the axle.

2. The combination of a gun carriage having an axle, a gun carriage head, and a link at each side of said head pivoted to the head and to the carriage on pivots extending substantially at right angles to the axle for pivotally supporting the same from the carriage.

3. The combination of a gun carriage, a gun carriage head, means associated with each side of said head to pivotally support the same from the carriage for movement substantially parallel to the axle of the carriage, and means to prevent relative movement between the carriage and said head longitudinally of the carriage.

4. The combination with a gun carriage, a gun carriage head, trails pivoted thereto, and a link at each side of said head to pivotally support the same from the carriage for movement substantially parallel to the axle of the carriage.

5. The combination with a gun carriage, a gun carriage head, trails pivoted thereto, a link at each side of said head to pivotally support the same from the carriage for movement substantially parallel to the axle of the carriage, and means to prevent relative movement between said head and the carriage longitudinally of the latter.

6. The combination with a gun carriage having an axle, of a gun carriage head, and a link pivoted to each side of the head, extending in a plane parallel to a plane of the axle and pivoted to the axle to support the head free of the latter.

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

EMILE ALEXANDRE LOUIS BOURDELLES.

Witnesses:
HENRI COHEN,
CHAS. P. PRESSLY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."