

No. 729,342.

PATENTED MAY 26, 1903.

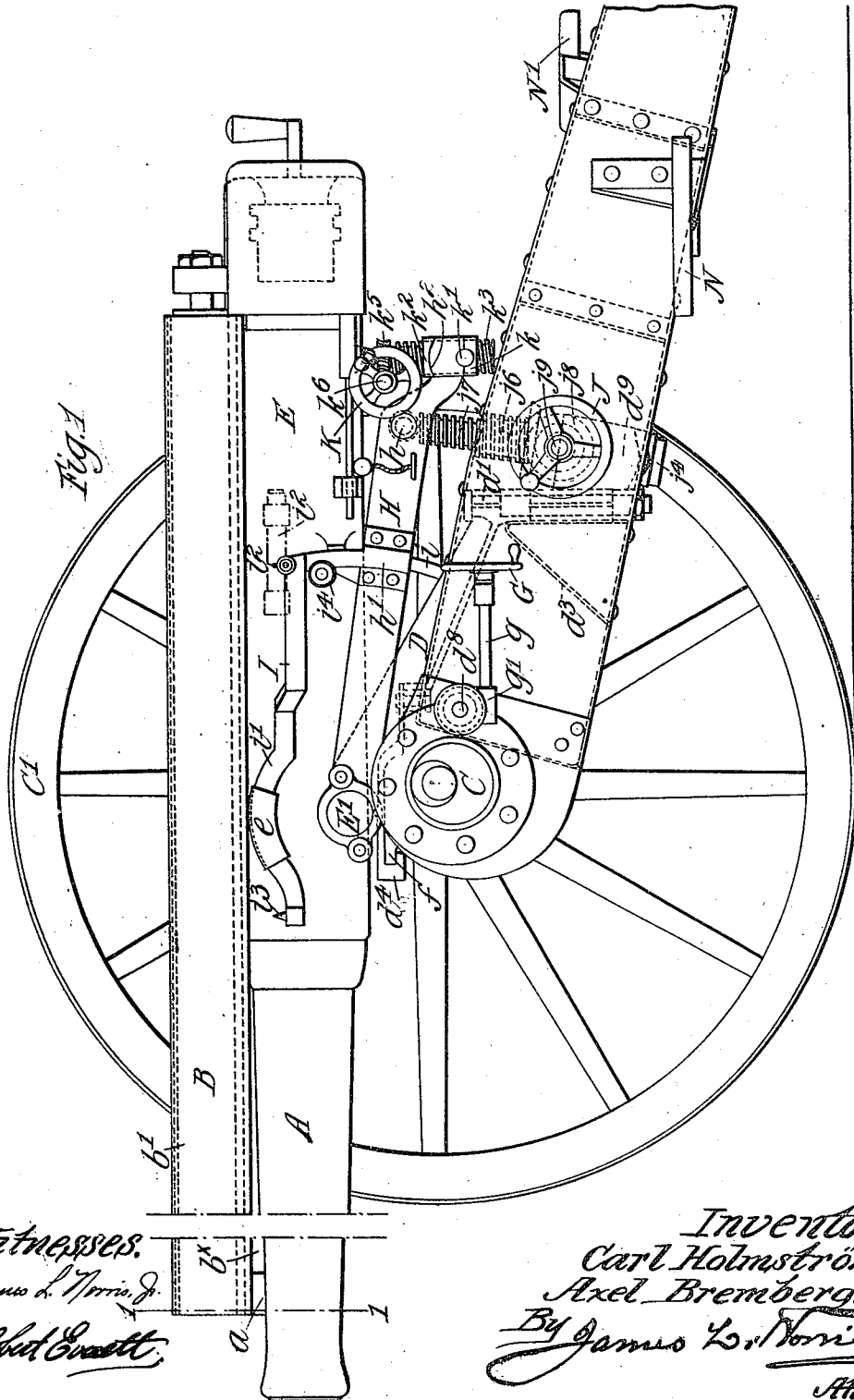
C. HOLMSTRÖM & A. BREMBERG.

GUN MOUNTING OR CARRIAGE

APPLICATION FILED JULY 28, 1902.

NO MODEL.

4 SHEETS—SHEET 1.



Witnesses.

James L. Norris, Jr.

Robert Emmett

Inventors
Carl Holmström
Axel Bremberg.
By James L. Norris.
Att'y

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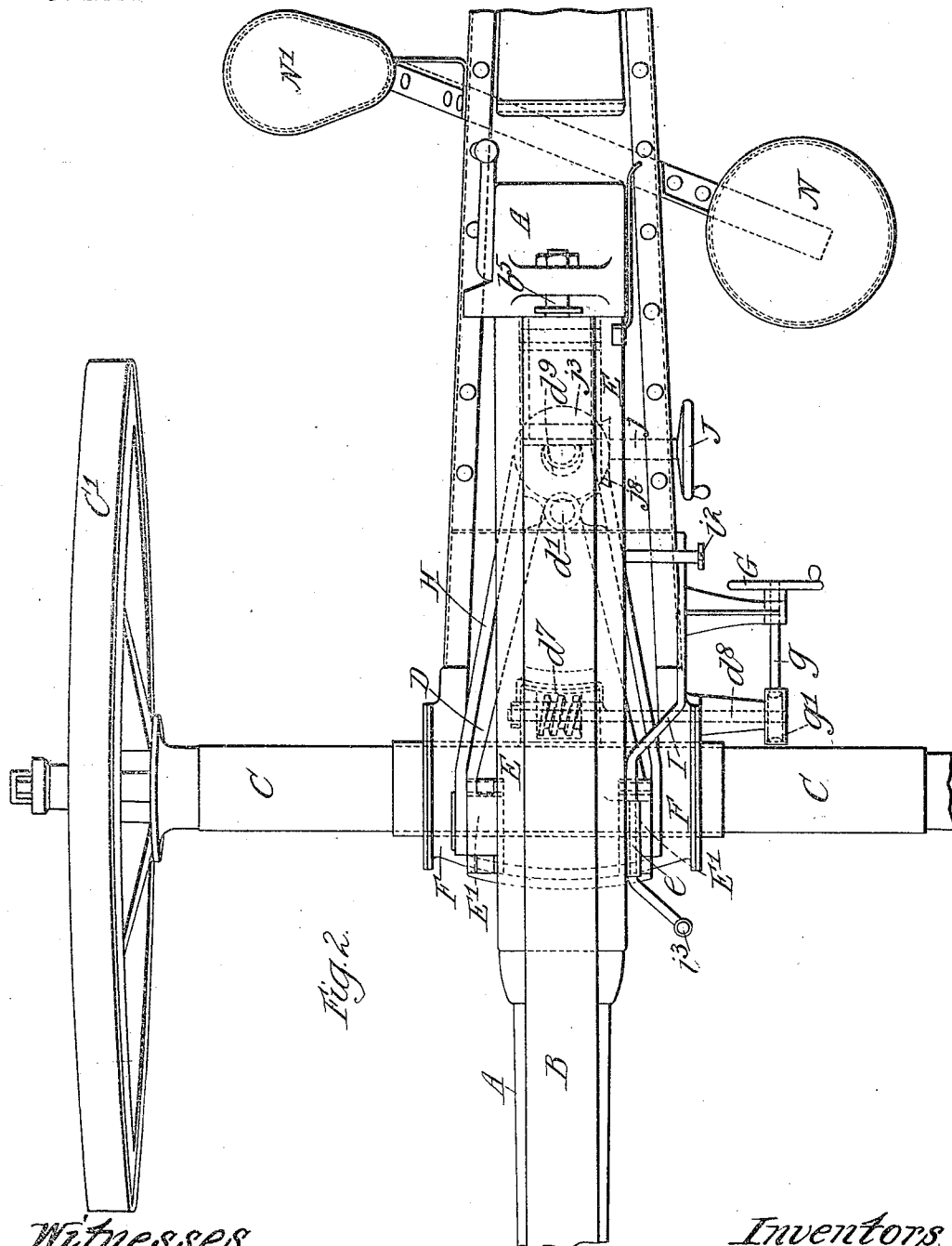
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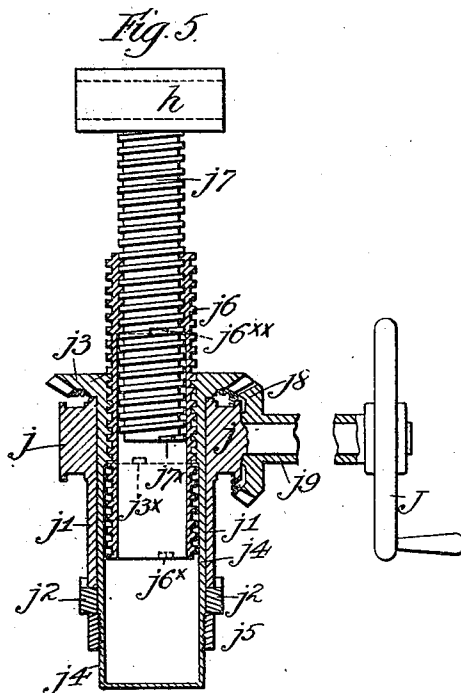
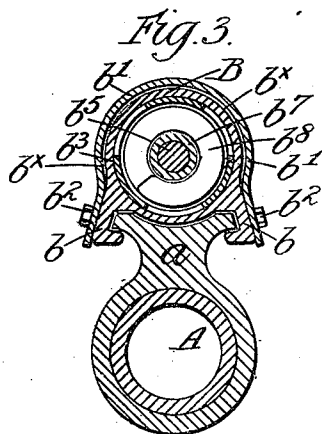
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NO MODEL.

4 SHEETS—SHEET 3.



Witnesses:
James L. Morris, Jr.
Robert Everett.

Inventors:
Carl Holmström
Axel Bremberg.
By James L. Morris.
Att'y

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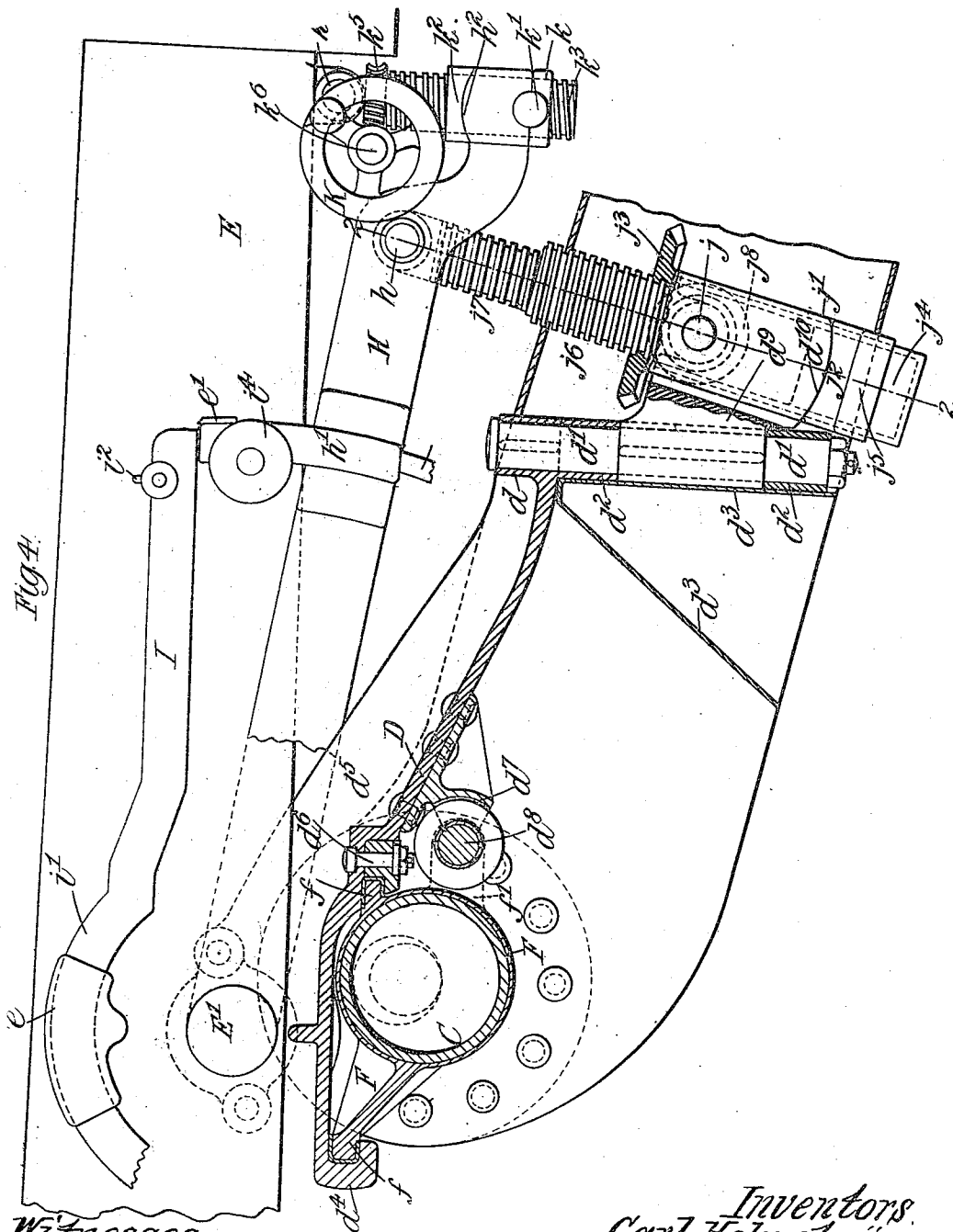
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MODEL.

4 SHEETS—SHEET 4.



Witnesses:
James L. Norris, Jr.
Robert Everett

Inventors.
Carl Holmström
Axel Bremberg.
By James L. Norris.
Atty.

UNITED STATES PATENT OFFICE.

CARL HOLMSTRÖM AND AXEL BREMBERG, OF GLASGOW, SCOTLAND; S. BREMBERG ASSIGNOR TO SAID HOLMSTRÖM.

GUN MOUNTING OR CARRIAGE.

SPECIFICATION forming part of Letters Patent No. 729,342, dated May 26, 1900.

Application filed July 28, 1902. Serial No. 117,404. (No model)

To all whom it may concern:

Be it known that we, CARL HOLMSTRÖM and AXEL BREMBERG, engineers, subjects of the King of Sweden and Norway, residing at Parkhead Forge, Rolling Mills, and Steel Works, Glasgow, Scotland, have invented certain new and useful Improvements in Gun Mountings or Carriages, of which the following is a specification.

This invention relates particularly to field-gun carriages or mountings.

According to our invention the gun is arranged to recoil axially in a cradle, which is provided with a hydraulic buffer or recoil cylinder situated, preferably, above the gun, although said buffer may in some cases be situated at one side of or below said gun. The said buffer is provided with longitudinal guides for the reception of a corresponding lug or lugs or bracket or brackets on the gun. These guides are located in a position to be protected from blows to which the gun is subject in traveling or while in action. In order to protect the buffer, it may be provided with a casing of nickel-steel or other suitable material. The cross-head in which the cradle trunnion-bearings are formed is adapted to slide upon an axle-bracket about a vertical or approximately vertical pivot on a transom-bracket in the trail. The elevating-gear is so arranged that the gun and sighting apparatus can either be moved together in the ordinary way or the gun can be elevated or depressed to accurately alter the range without altering the line of sight. The said elevating-gear is connected to and moves laterally with the cross-head. The sight-bar, carried by the elevating-arm, slides in guides around the trunnions when the sight is raised or lowered, and a pointer fixed to the cradle shows the range on the graduated stem of the rear sight.

In order that our said invention may be clearly understood and readily carried into practice, we will now describe the same with reference to the accompanying drawings, in which—

Figure 1 is a side elevation of the gun and its carriage with one of the carriage-wheels removed. Fig. 2 is a plan of the said gun and carriage. Fig. 3 is a transverse section

taken approximately on the line 1 1 of Fig. 1 showing the arrangement of the brake or recoil cylinder relatively to the gun and the protective casing for said cylinder. Fig. 4 is a sectional elevation showing, on a larger scale, the elevating and traversing gear. Fig. 5 is a vertical section on the line 2 2 of Fig. 1 showing the elevating-gear.

A is the gun.

B is the buffer or recoil cylinder.

C is the carriage-wheel axle, and C' C' are the carriage-wheels.

D is the cross-head, carrying the cradle trunnion-bearings.

E is the cradle, and E' E' are the cradle trunnions.

F is the axle-bracket, on which the cradle head traverses or slides.

G is a hand-wheel for actuating the traversing gear.

H is the elevating-arm.

I is the sight-bar.

J is a hand-wheel for operating the gun sighting apparatus simultaneously.

K is a hand-wheel for operating the cradle independently of the sighting apparatus.

The aforesaid buffer or recoil cylinder is provided with longitudinal guides *b b*, Fig. 4, on its upper side, and the gun has on its upper side the muzzle a T-shaped lug or bracket *a*, which engages with and slides in the said longitudinal guides on the recoil-cylinder.

b' is the casing for protecting the buffer-cylinder and guides against rifle-fire and shrapnel, said casing being made of hard nickel-steel or other suitable metal. The casing is preferably situated a short distance from the buffer-cylinder, as represented in Fig. 4, so as to leave space for possible rotation of the casing without damage to the buffer-cylinder. The casing is secured in place on the buffer-cylinder by means of screw-bolts *b''* or other suitable fasteners. The space *b'''*, Fig. 1, existing between the gun and the buffer-cylinder may be closed in any appropriate manner to avoid the entrance of dirt or other foreign matter which would interfere with the proper movement of the lug or bracket *a* in its guides *b* as the gun reciprocates. The buffer-cylinder is preferably formed of steel and forged

e with the cradle. By making the afore-guides on the buffer-cylinder and the socket on the gun we are able to provide any desired length of recoil movement of gun by increasing the length of the buffer-ender.

The aforesaid cross-head D is formed at its end with an eye or socket d' , which fits the end of a bolt d'' , that passes vertically through bearings d^2 d^3 , carried by the transverse bracket d^4 , the said bolt occupying a position in proximity to the screw of the elevating-gear. The said cross-head has grooved gears or clip-pieces d^1 d^5 to engage with clip-pieces f' on the axle-bracket F. The grooved flange d^5 is composed of a bar welded to the under side of the cross-head by web-bolts d^6 , so as to permit of the cross-head being conveniently attached to or released from the axle-bracket. The guide-eyes f' are arcs of circles concentric with center of the pivot-bolt d' , so that the cross-head can freely turn about the axis of bolt to traverse the gun and cradle. In order to actuate said cross-head, it is provided with a segmental rack d^7 , riveted or otherwise welded to the under side of the cross-head.

Teeth of the rack gear with a worm-spindle d^8 , which is mounted horizontally in bearings f' on the axle-bracket and which is intended to be revolved by the hand-wheel G, mounted on an axle g , having a worm g' , geared with a worm-wheel on the spindle d^8 . The aforesaid pivot-bolt d' also carries a set d^9 , which at its upper part is formed to receive trunnions j , provided on a cylindrical casing j' , which has curved guide-pieces situated near its lower end and arranged concentric with the said trunnions j , these guide-pieces being adapted to bear against the underside of correspondingly-curved surfaces d^{10} of the socket d' .

There is a bevel-pinion having an extension j^1 , which fits into the aforesaid casing j' , so as to rotate therein without moving longitudinally with respect thereto, for which purpose it has an upper portion provided with a screw-nut j^2 . The interior of said extension is formed with a series of threads and constitutes a nut that is in conjunction with a screw j^3 . This screw j^3 is made hollow and is internally threaded to receive a second or smaller screw j^4 , which is pivotally connected at h to the elevating-arm II. The two screws j^3 and j^4 together form a telescopic screw device for actuating the said elevating-arm. Gearing the bevel-pinion j^1 is a bevel-wheel j^5 , which is fixed on a hollow shaft j^6 , carrying a hand-wheel J. The two screws j^3 and j^4 have the same pitch, and both of them may be either left-handed or right-handed. The screw j^3 has a stop j^{6+} at its lower end, the inner threads of the screw j^4 have a stop j^{6++} . These stops when they meet together limit the movement of the two screws relatively to each other, so that they cannot become detached. The outer

screw j^4 has a stop j^{6+} , and the threads in the bevel-wheel j^5 have a stop j^{6+} . These stops when they meet together limit the movement of the screw j^4 relatively to the bevel-wheel, so that said screw j^4 cannot screw out of the said bevel-wheel. When the wheel j^5 is revolved, the screw j^4 can either fully or partly participate in the revolution of the wheel j^5 or can remain stationary, there being only slight friction between them; but in any case the gun will be moved by said elevating-gear a distance equal to the pitch of the screws, as they have exactly the same pitch. Not until the stops j^{6+} and j^{6++} meet is the screw j^4 compelled to participate in the revolution of the wheel j^5 , and then the gun is moved exactly the same distance as before by the revolution of the screw j^4 on the screw j^3 . It is immaterial whether the screw j^4 completely or partially revolves or remains stationary, as in any case the gun will move precisely the same amount when the wheel j^5 is revolved in either direction. The aforesaid elevating-arm II has a socket or guide k' to receive the arc-shaped member i of the sight-bar I. The curvature of this arc-shaped member is concentric with the gun-trunnions, and the forward portion of said sight-bar is curved at i' to engage with a correspondingly-curved socket or guide e on the cradle E, the curvature of said guide and curved portion being concentric with the gun-trunnions. The aforesaid trunnions j permit the elevating-gearing to move freely in a vertical plane, and the connection of the socket d^9 to the pivot-bolt d' permits said gearing to move freely horizontally with the gun and cradle and the cross-head when the training is being effected. A pointer e' is provided on the cradle adjacent to the said curved portion i' of the sight-bar for indicating the range. The said sight-bar is furnished with a rear sight i^2 and a fore sight i^3 and is capable of being actuated independently of the elevating-arm II by a pinion having an operating-handle i^1 and engaging with teeth on the said arc-shaped member i . The rear end of the said elevating-arm II is socketed to receive a screw-nut k , having trunnions k' to engage with recessed bearings on the lower portion of said socketed portion. The said nut is formed with curved cheeks k^2 at its upper portion to engage with correspondingly-curved portions h^2 on the arm II, the said curved portions being concentric with the trunnions k' . Fitting the said nut k is a screw k^3 , which is pivotally connected at k^4 to the gun-cradle. This screw k^3 has a worm-wheel k^5 , which gears with a worm mounted on the spindle k^6 , that carries the hand-wheel K.

When it is desired to traverse the gun, the hand-wheel G is operated, whereby, through the aforesaid gearing d^7 d^8 , the gun will be shifted to the right or the left in accordance with the direction in which said hand-wheel is turned, the said cross-head D moving bodily on the axle-bracket F about the axis of

the pivot-bolt *d'* and carrying with it the gun, the cradle, the sighting apparatus, and the elevating-gear, while the trail and carriage-wheels remain stationary. When the gun and sighting apparatus are to be operated simultaneously, the hand-wheel J is actuated in the required direction to elevate or depress the gun, whereby the screws *j⁶* *j⁷* are actuated as aforesaid and the elevating-arm H raised or lowered together with the sight-bar and the gearing *k k³*, which latter moves vertically without revolving. If, however, the elevation of the gun is to be changed without altering the line of sight, the hand-wheel K is operated in the required direction, whereby the gun is elevated or depressed without affecting the gearing J and without actuating the elevating-arm H or the sight-bar I.

What we claim, and desire to secure by Letters Patent of the United States, is—

1. In a field-gun carriage, the combination with the recoiling gun and its cradle, of longitudinal guides on the side of the buffer next the gun, a bracket on the gun adapted to slide in said guides when the gun reciprocates, and means for protecting the said guides and buffer from rifle-fire and splinters, substantially as described.

2. In a field-gun carriage, the combination with the recoiling gun and its cradle, of a buffer or recoil cylinder formed in one with the cradle and situated above the gun, longitudinal guides on the side of the buffer next the gun, a bracket on the gun adapted to slide in said guides when the gun reciprocates, and means for protecting the said guides and buffer from rifle-fire and splinters substantially as described.

3. In a field-gun carriage, the combination with the recoiling gun and its cradle, of a buffer-recoil cylinder formed in one with the cradle and situated above the gun, longitudinal guides on the side of the buffer next the gun, a bracket on the gun adapted to slide in said guides when the gun reciprocates, and a metal casing inclosing the exposed portions of said buffer, said guides and said brackets substantially as and for the purpose specified.

4. In a field-gun carriage, the combination with the recoiling gun and its cradle, of a buffer or recoil cylinder formed in one with the cradle and situated above the gun, longitudinal guides on the side of the buffer next the gun, a T-shaped bracket on the upper part of the gun near its muzzle adapted to slide in said guides when the gun reciprocates, a metal casing of larger diameter than the buffer and adapted to inclose the exposed portions of said buffer said guides and said bracket, and of means for affixing said casing to the buffer substantially as and for the purpose specified.

5. In a field-gun carriage, the combination with the axle-bracket, of a transversely-sliding cross-head carrying the trunnion-bearings of the gun-cradle, a vertical or approximately vertical pivot situated in proximity to the

screw of the elevating-gear and about the axis of which pivot the cross-head swivels, a transverse bracket having bearings for said pivot, a toothed arc on said cross-head concentric with said pivot, a worm gearing with said toothed arc, bearings on the axle-bracket for said worm, and means for revolving said worm substantially as described.

6. In a field-gun carriage, the combination with the axle-bracket, of a transversely-sliding cross-head carrying the trunnion-bearings of the gun-cradle, a vertical or approximately vertical pivot situated in proximity to the screw of the elevating-gear and about the axis of which pivot the cross-head swivels, curved guides on said axle-bracket concentric with said pivot, curved and grooved flanges on said cross-head concentric with said pivot and adapted to slide on said curved guides, a transom-bracket having bearings for said pivot, a toothed arc on said cross-head concentric with said pivot, a worm gearing with said toothed arc, bearings on the axle-bracket for said worm, and means for revolving said worm, substantially as described.

7. In a field-gun carriage, the combination with the axle-bracket, of a transversely-sliding cross-head carrying the trunnion-bearings of the gun-cradle, a vertical or approximately vertical pivot about the axis of which the cross-head swivels, means for actuating said cross-head, a socket carried by said pivot and participating in the movements of said cross-head, an elevating-arm movable about the gun-cradle trunnions, a sight-bar movable about said gun-cradle trunnions and adjustable with respect to said elevating-arm, adjustable means connecting said elevating-arm to said socket, and adjustable means connecting said elevating-arm to the gun-cradle substantially as and for the purposes specified.

8. In a field-gun carriage, the combination with the axle-bracket, of a transversely-sliding cross-head carrying the trunnion-bearings of the gun-cradle, a vertical or approximately vertical pivot about the axis of which the cross-head swivels, means for actuating said cross-head, a socket carried by said pivot and participating in the movements of said cross-head, an elevating-arm movable about the gun-cradle trunnions, a sight-bar movable about said gun-cradle trunnions and adjustable with respect to said elevating-arm, a bevel-pinion having an elongated portion, a cylindrical casing into which said elongated portion rotatably fits, transverse trunnions in said cylindrical casing, bearings on the socket for the reception of said trunnions, curved cheeks on said cylindrical casing concentric with said casing-trunnions and working on correspondingly-curved portions on the socket, means for retaining said casing in said socket for enabling it to revolve without sliding in said socket, a screw engaging with screw-threads in the interior of said elongated portion of the bevel-pinion, a stop on the lower part of the said screw to engage with a corre-

sponding stop on the interior of the bevel-wheel, -another screw pivotally connected with the elevating-arm and engaging with internal threads in the first-mentioned screw and having a stop on the lower part to engage with a corresponding stop on the first-mentioned screw, means for actuating said bevel-pinion, a screw pivotally connected with the gun-cradle, a nut with which said screw engages, trunnions in said nut engaging with bearings in said elevating-arm, curved cheeks on said nut concentric with said nut-trun-

nions and sliding in correspondingly-curved portions on said elevating-arm, and means for revolving said screw, substantially as and for the purposes specified. 15

In testimony whereof we have hereunto set our hands, in presence of two subscribing witnesses, this 16th day of July, 1902.

CARL HOLMSTRÖM.
AXEL BREMBERG.

Witnesses:

MARY R. KELLY,
ROBER THOMSON.