No. 813,106. PATENTED FEB. 20, 1906.

S. N. McCLEAN.

GUN CARRIAGE.

APPLICATION FILED OCT. 12, 1901.

Fig. 1.

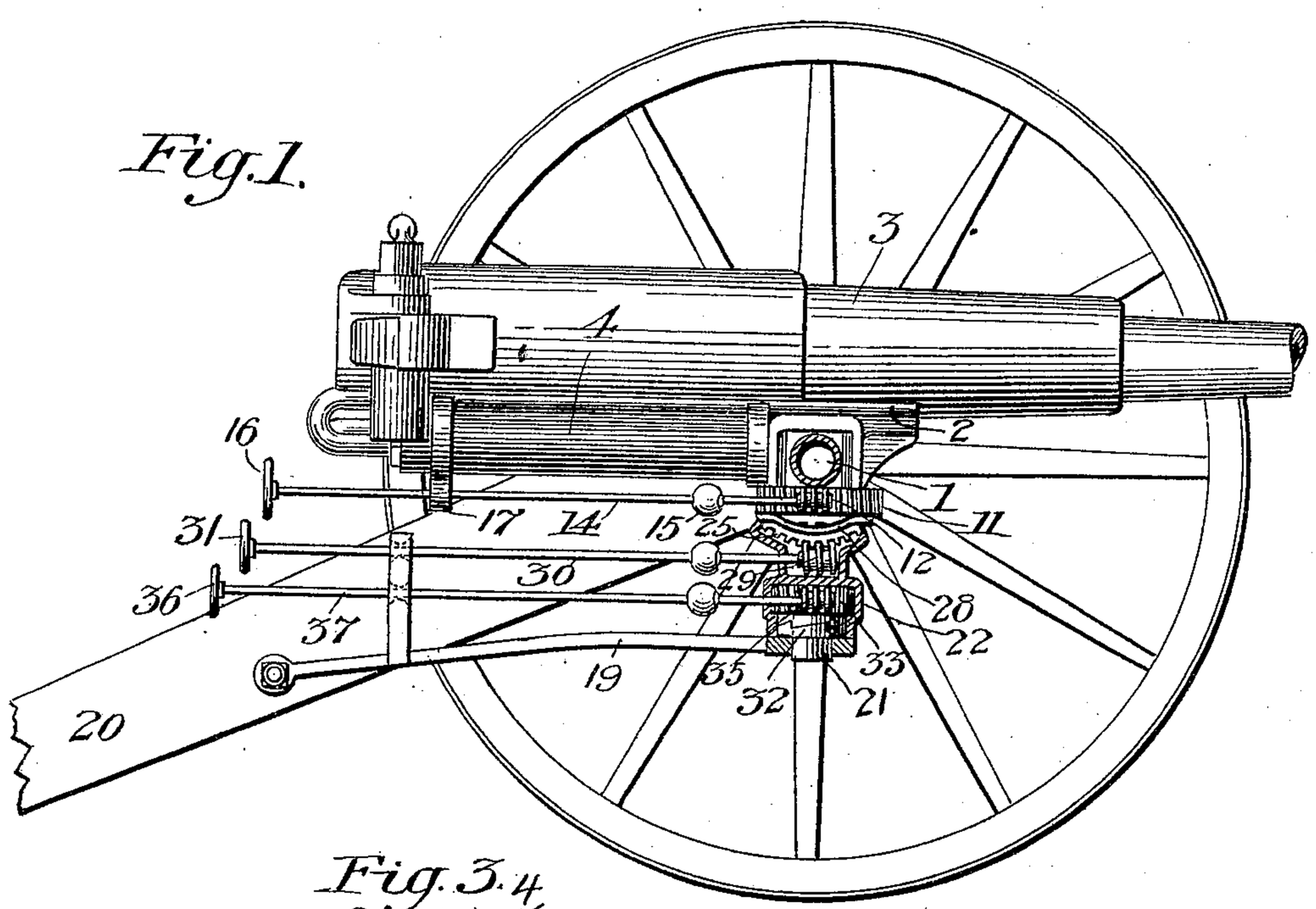

Fig. 3.

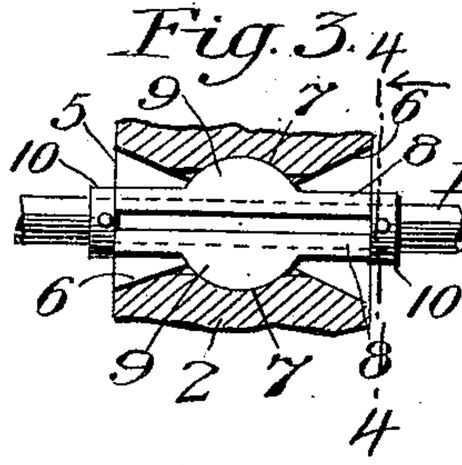

Fig. 4.

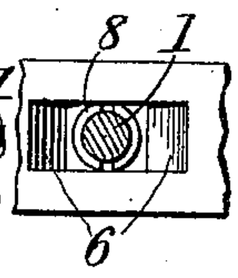

Fig. 5.

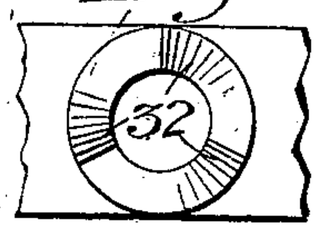

Fig. 2.

Witnesses:
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UNITED STATES PATENT OFFICE.

SAMUEL N. McCLEAN, OF CLEVELAND, OHIO.

GUN-CARRIAGE.

No. 813,106. Specification of Letters Patent. Patented Feb. 20, 1906.

Application filed October 12, 1901. Serial No. 78,479.

To all whom it may concern:

Be it known that I, SAMUEL N. McCLEAN, a resident of Cleveland, Ohio, have invented a new and useful Improvement in Gun-Carriages, which invention is fully set forth in the following specification.

My invention relates to gun-mounts, and more particularly to field-carriages, and has for its object to provide a carriage having means to control the recoil, devices for quickly and accurately traversing, elevating, and depressing the gun, and means for securely locking the gun in any position in which it may be laid by such devices.

With these objects in view the invention consists in a gun-carriage having the usual wheels and axle, with a cradle on which the gun is supported, which cradle is mounted to turn around the axle of the carriage in a vertical plane to elevate and depress the gun and to turn in a plane within which the axle lies and around a vertical axis passing through said axle to traverse the gun, combined with means for imparting said movements to the cradle, which means preferably consist of suitable worm-gearing.

Furthermore, the invention consists in locking devices whereby the gun-cradle is securely locked in any position to which it may be turned by the training, elevating, and depressing devices.

While the inventive idea involved in my improved carriage may be expressed in various mechanical forms, I prefer to construct it in the form illustrated in the accompanying drawings, which drawings, however, are designed for purposes of illustration only and not as defining the patentable limits of the invention, reference being had to the claims for this purpose.

In said drawings, Figure 1 is a broken side elevation, parts being removed to more clearly illustrate the construction. Fig. 2 is a front elevation with parts in section. Fig. 3 is a plan with the cradle in horizontal section, showing the manner of mounting the cradle on the axle. Fig. 4 is a section on the line 4 4, Fig. 3, looking in the direction of the arrow; and Fig. 5 is a detail view of the locking-cam.

Referring to the drawings, 1 is the axle.

2 is a cradle, within which the gun 3 is permitted to recoil under the control of a suitable recoil-check, here shown as a cylinder 4, mounted on the under side of the cradle and having a suitable piston therein, the piston-rod thereof being secured to the gun. The cradle 2 is mortised, as at 5, Figs. 3 and 4, the mortise being flared, as at 6 6, at the ends and having a partially-spherical portion 7 7 at its center. Two similarly-shaped boxes 8 8 are inserted in the mortise and are provided with partially-spherical portions 9 9, which seat in the parts 7 7 in the mortise, so that when the axle 1 is slipped through the boxes, as shown in Figs 3 and 4, the boxes are securely held in position in the mortise and fit snugly around the axle, on which they are prevented from slipping by collars 10 10, secured to the axle. This construction connects the cradle by a universal joint to the axle.

For the purpose of elevating or depressing the gun-muzzle the cradle 2 is free to swing around the axle—*i. e.*, in a substantially vertical plane transverse to the axle—the cradle 2 and the boxes 8 8 turning together on the axle as an axis. For lateral adjustment to traverse the gun the cradle 2 turns around the spherical portions 9 9 of the boxes 8 8, which do not turn. By inspecting Figs. 3 and 4 it will be seen that this lateral or traversing movement of the cradle takes place in a plane within which the axle lies, no matter what may be the adjustment of the cradle in the plane transverse to the axle. To give the cradle this traversing movement, the following means are employed, viz: Attached to the side of the cradle 2 is an arc 11, having worm-teeth thereon which are engaged by a worm 12, mounted to turn on a bracket 13, hung loosely to the axle 1, as shown in Fig. 2, the worm being operated by a shaft 14, provided with a flexible joint 15 and a hand-wheel 16, and bearing in a bracket 17, depending from the rear end of the cradle. (See Fig. 1.) A bracket 18 is mounted fixedly on the axle and is preferably braced by bars 19 19, secured to the trail-cheeks 20 20. Centrally under the cradle this bracket 18 is provided with a bearing for a pivot 21, rigidly secured to a casting 22, which has two cheeks 23 24, embracing a depending arc-shaped worm-rack 25 on the cradle, the cheeks 23 and 24 having arc-shaped grooves 26 27, engaging similarly-shaped flanges or ribs 28 on the sides of the rack. Mounted in bearings in the casting 22 is a worm 29, engaging the rack 25 and serving when operated by a flexible shaft 30 and hand-wheel 31 to turn the rack 25, and with it the cradle 2, in a vertical plane to elevate or depress the

gun. It will be noted that when the cradle is turned by worm 12 to traverse the gun the casting 22 turns on its pivot 21, thereby maintaining the worm 29 and rack 25 in their relative positions, the flexibility of the rod 30 permitting all the traversing movement required. On the other hand, when the gun is elevated or depressed the bracket 13 turns on the axle as an axis, and hence maintains the rack 11 and worm 12 in operative relation to traverse the gun.

For the purpose of securely locking or fixing the cradle in any position to which it may have been adjusted a cam-surface 32 is fixedly secured to the bracket 18 at a point in proximity to the pivot 21, and a worm-wheel 33 is loosely mounted to turn on said pivot at a point immediately above the cam-surface 32 and is provided on its under side with a reversely-inclined cam 34. Preferably there are a plurality of such cams distributed, as shown in Fig. 5. A worm 35 is mounted in the casting 22 and engaging the worm-wheel 33, and upon turning the worm the cams 32 and 34 operate to force upward the casting 22, with which it engages on its upper surface, and by reason of the flange-and-groove connection between the cradle and casting the former is likewise forced upward. This wedging action therefore serves to cause the cradle to bind so firmly on its bearing around the universal joint formed of the boxes 9 and bearings 7 as to effectually lock the cradle in its adjusted position and prevent any turning movement thereof until released by the movements of the wedge or cam-wheel 33. The worm 35 is operated by a flexible shaft 37 and hand-wheel 36.

What is claimed is—

1. In a gun-carriage, a cradle jointed to the axle to turn in a plane within which the axle lies and in a plane transverse to the axle, and means imparting said movements to the cradle.

2. In a gun-carriage, a cradle connected to the axle by a universal joint around the axle, and means imparting movements to the cradle in a plane within which the axle lies and in a plane transverse to the axle.

3. In a gun-carriage, a cradle in which the gun recoils, a recoil-check on the cradle, a universal joint around the axle and connecting the cradle thereto, and means imparting movements to the cradle in a plane within which the axle lies and in a plane transverse to the axle.

4. In a gun-carriage, a cradle in which the gun recoils, a recoil-cylinder on the cradle, a piston in the cylinder connected to the gun, a universal joint around the axle and connecting the cradle thereto, and means imparting movements to the cradle in a plane within which the axle lies and in a plane transverse to the axle.

5. In a gun-carriage, a cradle jointed to the axle to move in a plane within which the axle lies and in a plane transverse thereto, means imparting said movements to the cradle, and a locking device securing the cradle in any adjusted position.

6. In a gun-carriage, a cradle connected to the axle by a universal joint around the axle, means imparting movements to the cradle in a plane within which the axle lies and in a plane transverse to the axle, and a device locking the cradle in any adjusted position.

7. In a gun-carriage, a cradle in which the gun recoils, a recoil-check on the cradle, a universal joint around the axle and connecting the cradle thereto, means imparting movements to the cradle in a plane within which the axle lies and in a plane transverse to the axle, and a device locking the cradle in any adjusted position.

8. In a gun-carriage, a cradle jointed to the axle to move in a plane within which the axle lies and in a plane transverse to the axle, and worm-gearing imparting said movements to the cradle.

9. In a gun-carriage, a cradle jointed to the axle to turn in a plane within which the axle lies, a segmental worm-rack on the cradle, and a worm turning in bearings attached to the axle and engaging said rack to impart said movement to the cradle.

10. In a gun-carriage a cradle jointed to the axle to turn in a plane within which the axle lies, a segmental worm-rack on the cradle, a worm turning in bearings attached to the axle and engaging said rack to impart said movement to the cradle, and a locking device securing the cradle in any adjusted position.

11. In a gun-carriage, a cradle hung to turn around the axle of the carriage as an axis, a segmental worm-rack depending from the cradle below the axle, a worm engaging said rack and turning in bearings attached to the axle and means turning the cradle, in a plane within which the axle lies.

12. In a gun-carriage, a cradle hung to turn around the axle of the carriage as an axis and also in a plane within which the axle of the carriage lies, a segmental worm-rack depending from the cradle in a substantially vertical plane, a worm turning in bearings attached to the axle and engaging said rack, a second segmental worm-rack on the cradle in a substantially horizontal plane, and a worm hung in bearings turning on the axle, and engaging the said horizontal rack.

13. In a gun-carriage, a cradle hung to the axle by a universal joint, two worm-racks attached to the cradle one of which is in a substantially horizontal plane and the other of which is in a substantially vertical plane, a worm engaging the horizontal rack and turning in bearings attached to the axle so as to move in a plane transverse thereto, and a second worm engaging the vertical rack and

mounted in bearings turning on a vertical axis.

14. In a gun-carriage, a cradle hung to turn around the axle of the carriage as an axis and also in a plane within which the axle of the carriage lies, a segmental worm-rack depending from the cradle in a substantially vertical plane, a worm turning in bearings attached to the axle and engaging said rack, a second segmental worm-rack on the cradle in a substantially horizontal plane, a worm hung in bearings turning on the axle, and engaging the said horizontal rack and a locking device securing the cradle in any adjusted position.

15. In a gun-carriage, a cradle hung to the axle by a universal joint, two worm-racks attached to the cradle one of which is in a substantially horizontal plane and the other of which is in a substantially vertical plane, a worm engaging the horizontal rack and turning in bearings attached to the axle so as to move in a plane transverse thereto, a second worm engaging the vertical rack and mounted in bearings turning on a vertical axis, and a locking device securing the cradle in any adjusted position.

16. In a gun-carriage, a cradle hung to turn on the axle in a substantially vertical plane and to turn on the axle in a substantially horizontal plane, means imparting said movements to the cradle, and a locking-wedge adjustable into position to secure the cradle against movement on the axle.

17. In a gun-carriage, a cradle hung to turn on the axle in a substantially vertical plane and to turn on the axle in a substantially horizontal plane, means imparting said movements to the cradle, a locking-wedge supported by the axle and adjustable into and out of position to secure the cradle against movement on the axle.

18. In a gun-carriage, a cradle hung to turn on the axle in a substantially vertical plane, a depending segmental worm-rack on the cradle, a worm operatively engaging said rack, a bracket depending from the axle, bearings for said worm on said bracket, a wheel engaging the worm-bearings and having a cam or wedge surface engaging a corresponding cam or wedge surface on the bracket, and means for turning said wheel, whereby the cradle is locked in adjusted position.

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

SAMUEL N. McCLEAN.

Witnesses:
E. G. Babcock,
Arthur Turnbull.