May 20 , 1924. 1,494,591

A. T. DAWSON ET AL

AMMUNITION HOISTING AND LOADING APPARATUS FOR ORDNANCE

Filed Nov. 13 , 1923 4 Sheets-Sheet 1

Fig.1.

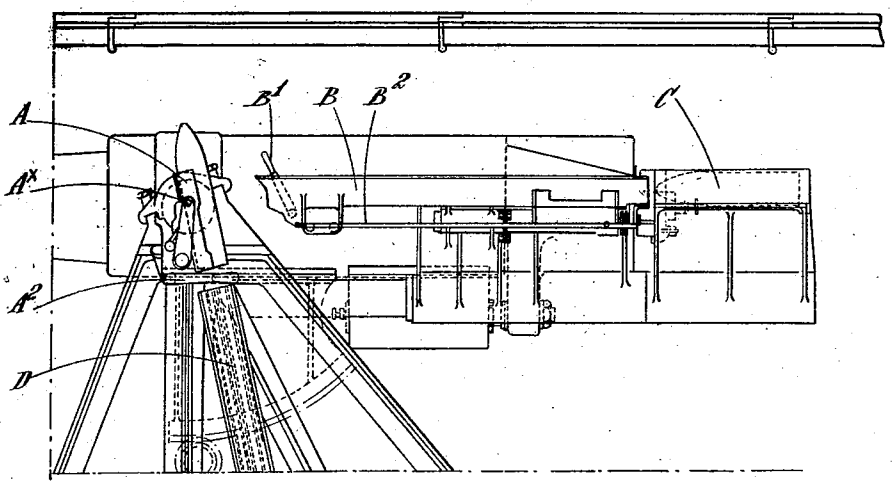
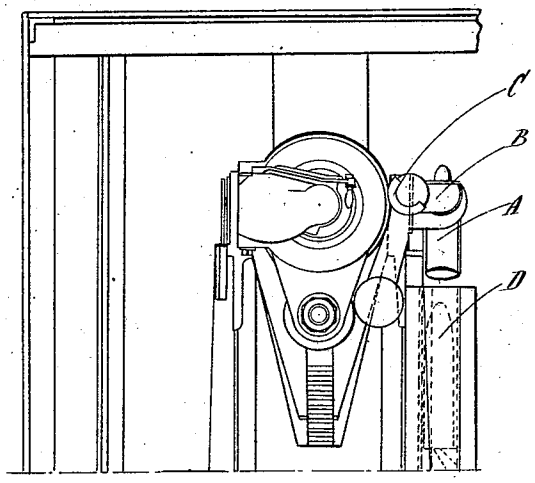


Fig.2.



Inventors
Arthur Trevor Dawson
and
George Thomas Burkham
By
Dennis, Davis Mann & Edwards
Attorneys

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Filed Nov. 13, 1923 4 Sheets-Sheet 2

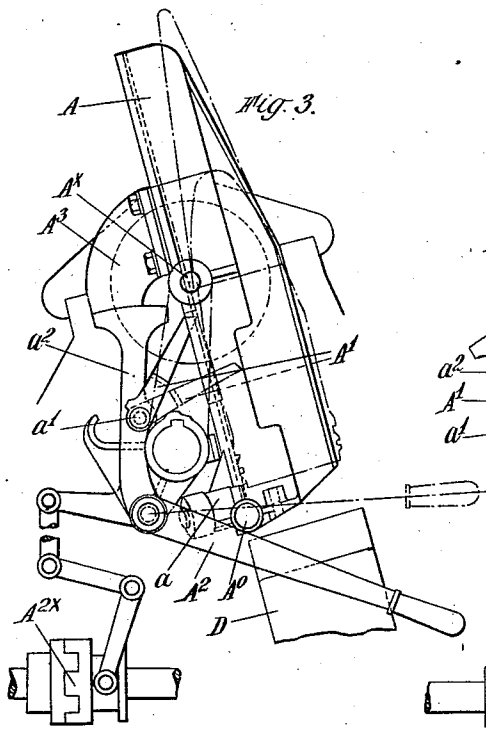

Fig. 3.

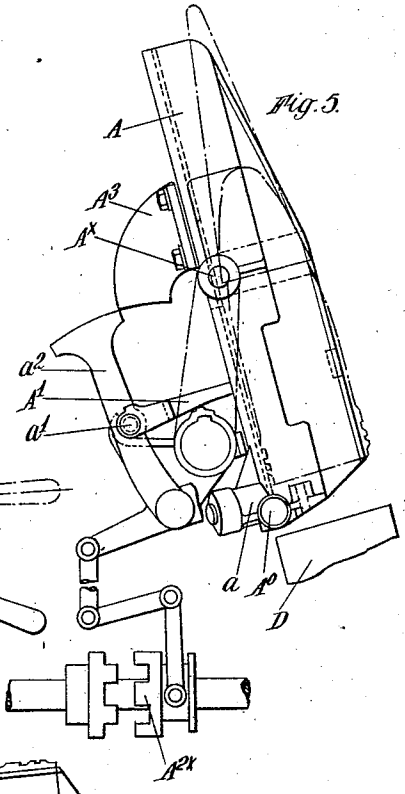

Fig. 5.

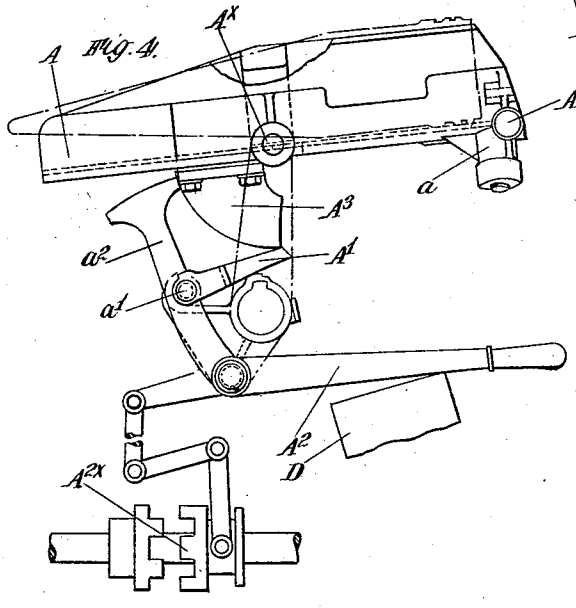

Fig. 4.

Inventors
Arthur Trevor Dawson
and
George Thomas Buckham
By Pennie, Davis, Marvin & Edmonds
Attorneys

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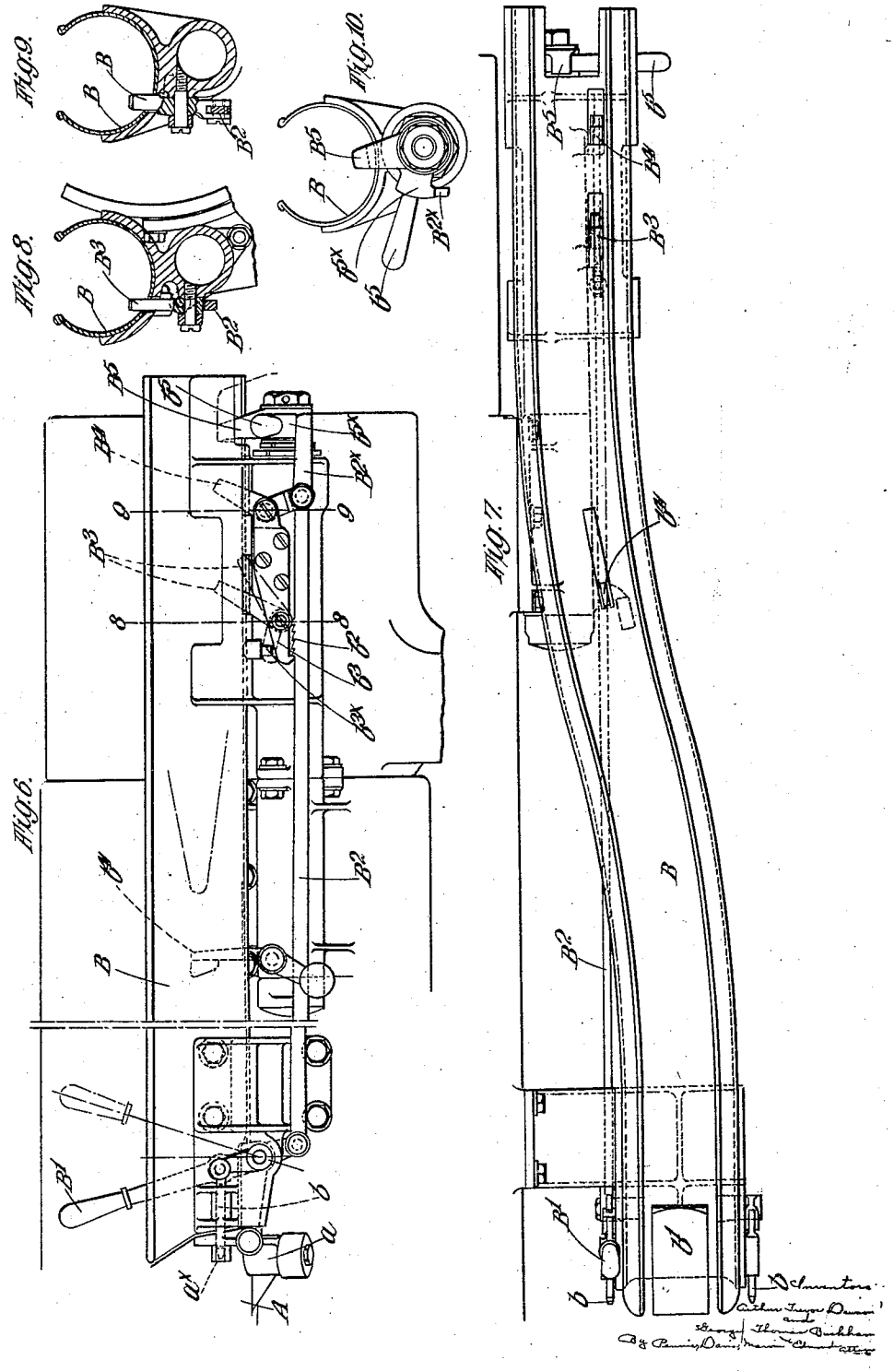
Filed Nov. 13, 1923 4 Sheets-Sheet 3



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AMMUNITION HOISTING AND LOADING APPARATUS FOR ORDNANCE

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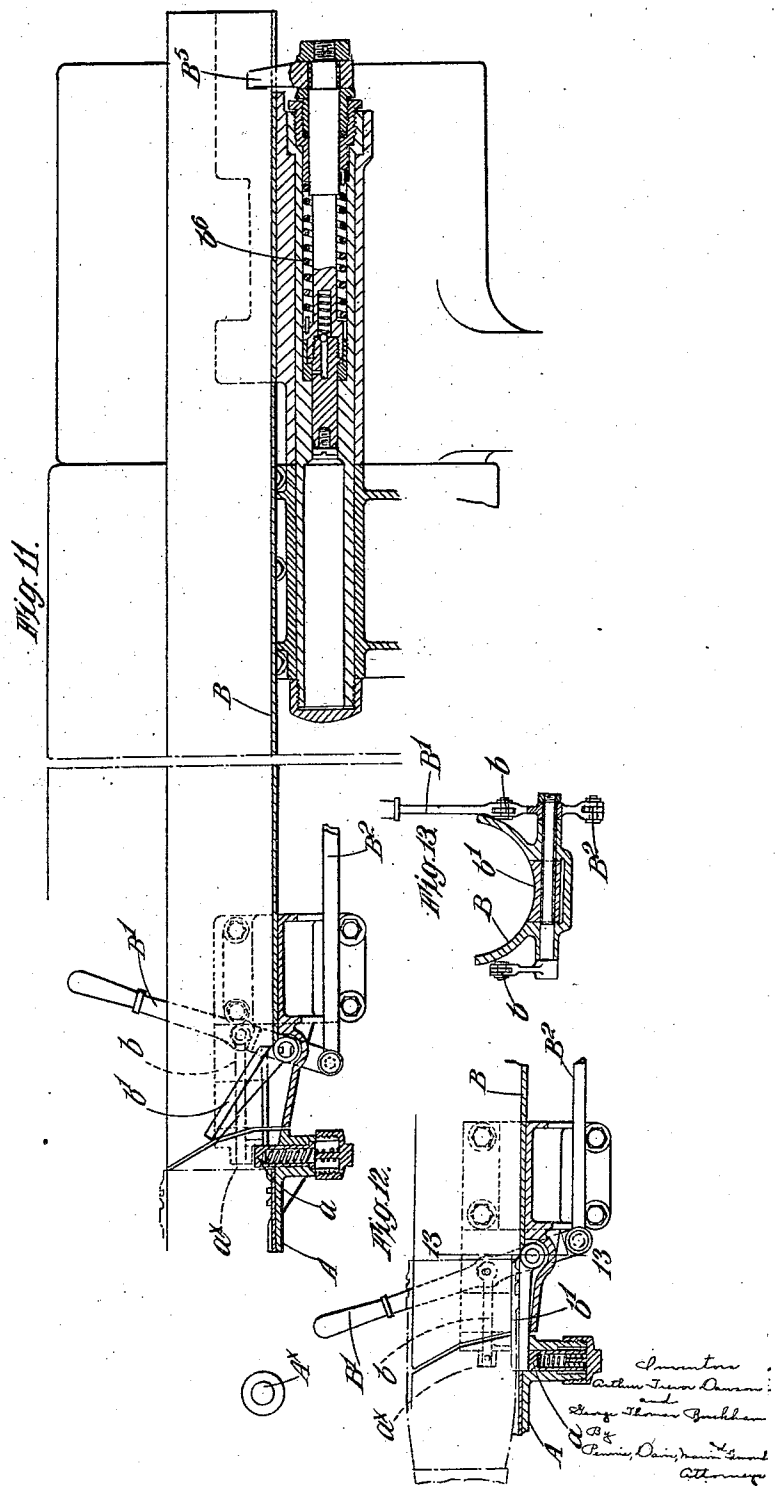

Patented May 20, 1924. 1,494,591

UNITED STATES PATENT OFFICE.

ARTHUR TREVOR DAWSON AND GEORGE THOMAS BUCKHAM, OF WESTMINSTER, LONDON, ENGLAND, ASSIGNORS TO VICKERS LIMITED, OF WESTMINSTER, LONDON, ENGLAND.

AMMUNITION HOISTING AND LOADING APPARATUS FOR ORDNANCE.

Application filed November 13, 1923. Serial No. 674,448.

To all whom it may concern:

Be it known that we, ARTHUR TREVOR DAWSON and GEORGE THOMAS BUCKHAM, both subjects of the King of Great Britain, and both of Vickers House, Broadway, Westminster, in the county of London, England, have invented certain new and useful Improvements in or Relating to Ammunition Hoisting and Loading Apparatus for Ordnance, of which the following is a specification.

This invention relates to ammunition hoisting and loading apparatus for ordnance.

According to the invention the apparatus for conveying the projectiles from the hoist to the breech end of the gun for ramming therein, comprises a lifting tray mounted to rock at the side of the gun cradle about an axis coincident or substantially so with the axis of the gun trunnions, a waiting tray fixed to the side of the gun cradle in line with the lifting tray when the latter occupies its raised or transferring position and a loading tray mounted to move transversely to the axis of the gun from a receiving position in which it is in line with the waiting tray into the loading position behind the gun. By this arrangement of trays the projectile can be transferred from the said lifting tray along the waiting tray to the loading tray by a sliding movement without any independent bodily movement of the projectile transversely to its axis as is necessary in an arrangement heretofore proposed in which the lifting tray when raised occupies a position to one side of an auxiliary tray carried by the gun and arranged in line with the loading tray, the projectile having to be conveyed bodily from the lifting tray to the auxiliary tray.

The said lifting tray, instead of being mounted at the end of a long arm pivoted coaxially with the gun trunnions as is described in the specification of our earlier English Patent No. 175307, is preferably so pivoted to the gun trunnions that its pivotal axis is not far removed from the centre of gravity of the projectile when the latter is in position in the said tray. When the latter occupies its receiving position it is preferably not quite vertical and is fed by a slightly inclined hoist of any suitable description. Improved safety devices are provided for preventing the controlling lever of the hoist from being operated to place another projectile in the lifting tray until the latter is empty and occupies the receiving position and for preventing a projectile from moving into the waiting tray from the lifting tray unless the said waiting tray is empty. Any suitable or known safety device may be provided for preventing movement of a projectile from the waiting tray unless the loading tray is in line with the waiting tray and is empty. Three projectiles are thus permitted to be in position contiguous to the gun, one in each tray.

In order that the said invention may be clearly understood and readily carried into effect, the same will now be described more fully with reference to the accompanying drawings, in which:—

Figure 1 is a general side elevation showing a constructional form of our improvements,

Figure 2 is a rear elevation, the lifting tray and the parts associated with it being situated at the right hand side of the gun instead of at the left hand side as in Figure 1,

Figures 3, 4 and 5 are side elevations showing in different positions the safety device associated with the lifting tray and the hoist.

Figure 6 is a general side elevation of the waiting tray and the safety devices associated therewith.

Figure 7 is a plan of Figure 6.

Figures 8 and 9 are sections taken approximately on the lines 8—8 and 9—9 respectively of Figure 6,

Figure 10 is a rear elevation of the waiting tray,

Figure 11 is a vertical longitudinal section of the front and rear portions of the waiting tray,

Figure 12 is a view similar to the left hand portion of Figure 11 but showing the parts in a different position, and

Figure 13 is a section taken approximately on the line 13—13 of Figure 12.

A is the aforesaid lifting tray pivotally mounted at A^x on one of the gun trunnions with its pivotal axis not far removed from the centre of gravity of the projectile when the latter is in position in the said tray and provided with a laterally extending handle A^0 (Figures 3 to 5) by which the said tray can be moved about its pivotal axis. B is the waiting tray fixed to the side of the gun trunnions and C (Figures 1 and 2) is the manually operated loading tray.

The projectile is passed into the lifting tray A by a hoist shown diagrammatically at D in Figures 1, 2, 3, 4 and 5 and is retained in place by the engagement with the base of one or more spring plungers a carried by the tray. As the projectile enters the tray A its nose engages with an arm A′ (Figures 3 to 5) pivoted at a' to an extension a^2 of a hand lever A^2 controlling the hoist and displaces this arm into the position shown in full lines in Figure 3 from the position shewn in chain lines. Another projectile cannot be raised until the lifting tray is emptied and brought back into the receiving position as the hoist is stopped, immediately the shell enters the lifting tray as in Figure 3, by the manual movement of the hand lever A^2 into the position shewn in Figure 4, this movement declutching a clutch A^{2x} on the driving shaft of the hoist. The extension a^2 co-operates with a stop-member A^3 on the tray A to hold the latter in the position shown in Figure 3 until the hand lever A^2 is moved into the position shown in Figures 4 and 5. The said stop-member A^3 has a curved front surface which co-operates with the extension a^2 to prevent the hand lever A^2 from being moved from the position shown in Figures 4 and 5 until the tray resumes its receiving position. During the said movement of the hand lever A^2 the arm A′ falls into the position shown in Figure 5 with its end bearing against the projectile in the tray A. The arrangement is therefore such that the hand lever A^2 cannot be moved into the position shown in full lines in Figure 3 to permit the hoist to be operated, until the lifting tray A is empty and is in the receiving position. It will also be observed by reference to Figure 3 that the extension a^2 co-operates with the stop-member A^3 to lock the lifting tray in the receiving position.

The lifting tray A is locked to the waiting tray B by locking pins b which are carried by the waiting tray and engage in holes a^x in the lifting tray. The said pins are moved to and from their locking position by a hand lever B′ on the waiting tray which hand lever is connected to a plate b' operating to depress the spring plungers a when the hand lever B′ is moved into the position shown in Figure 12 in which the lifting tray is locked to the waiting tray by the pins b. In this condition of affairs the projectile can be slid rearwards from the lifting tray into the waiting tray, the plate b' being flush with the bottom of the trays so as not to impede this movement of the projectile. The hand lever B′ is connected to a longitudinal rod B^2 provided with teeth b^2 (Figure 6) engaging with a nose-piece b^3 of a lever B^3 which is adapted to lie in the path of travel of the projectile along the waiting tray B. The said lever is held in the position in which the nose-piece b^3 engages with the teeth b^2, by a spring plunger b^{3x}, thereby locking the hand lever B′ in the position shown by full lines in Figure 6. The engagement of the projectile with the said lever B^3 displaces the latter into the position shown by chain lines and thereby liberates the nose-piece b^3 from the teeth b^2. The projectile during its continued rearward movement, engages with a lever B^4 connected to the rod B^2 and thereby displaces the latter in a forward direction, thus moving the hand lever B′ into the position shown by Figure 11 to unlock the lifting tray A from the waiting tray B as aforesaid and allow the lifting tray to move into the receiving position. The hand lever B′ cannot be moved from the position shown in Figure 11 to that shown in Figure 12 so long as there is a projectile in the waiting tray B, owing to the co-operation of the projectile with the lever B^4; in this manner security is obtained against another projectile entering the waiting tray while one is in position therein. During the passage of the projectile along the tray B it displaces a weighted lever b^4 which, after the projectile has passed it, resumes its original position shown in Figure 6 and thereby prevents the projectile from running forward to any material extent if the waiting tray B should become depressed as a result of the rolling or the pitching and tossing movements of the ship.

The rear end of the waiting tray B is provided with a stop B^5 for the projectile, which stop can conveniently form part of a buffer device as shown in Figure 11 so as to absorb shocks due to the shell falling down the waiting tray rapidly when the gun is at elevation. The said stop (together with the piston rod of the buffer device) can be angularly displaced by a handle b^5 to the inoperative position allowing the projectile to pass into the loading tray C, this displacement of the stop being permitted only after the projectile has reached the lever B^4 and has actuated the rod B^2, owing to the fact that at other times a rearward extension B^{2x} of the rod B^2 engages with part b^{5x} of the stop and obstructs such displacement of the stop as will be seen from Figures 6 and 10. A torsion spring b^6 (Fig-

ure 11) within the buffer device operates to return the stop B^5 to its operative position, but in the event of the said spring failing to act safety is insured by reason of the fact that the part b^{5x} of the stop lies behind the extension B^{2x} of the rod B^2 and thus prevents the hand lever B′ being moved into the position shown by Figure 12 permitting a projectile to enter the waiting tray B. It will be observed from Figure 7 that the waiting tray is somewhat curved, as in the construction shown the loading tray C, when in the receiving position, is nearer to the axis of the gun than is the lifting tray A. The loading tray C is carried by an arm which is pivoted to the gun cradle about a longitudinal axis situated below the axis of the gun and preferably as shown in Figure 2 in such a position that the said tray, when in the receiving position, is at a somewhat higher level than when it is in the loading position behind the gun.

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

1. Ammunition hoisting and loading apparatus for ordnance, comprising in combination a lifting tray pivotally mounted upon an axis approximately coincident with the axis of the gun trunnions, a waiting tray fixed to the side of the gun cradle in line with said lifting tray when the latter occupies its raised or transferring position and a loading tray mounted to move transversely to the axis of the gun from a receiving position in which it is in line with the waiting tray into the loadng position behind the gun.

2. Ammunition hoisting and loading apparatus for ordnance, comprising in combination a lifting tray mounted to rock at the side of the gun cradle about an axis which is approximately coincident with the axis of the gun trunnions and which is close to the centre of gravity of the projectile when the latter is in position in said tray, a waiting tray fixed to the side of the gun cradle in line with said lifting tray when the latter occupies its raised or transferring position and a loading tray mounted to move transversely to the axis of the gun from a receiving position in which it is in line with the waiting tray into the loading position behind the gun.

3. Ammunition hoisting and loading apparatus for ordnance, comprising in combination a lifting tray mounted to rock at the side of the gun cradle about an axis approximately coincident with the axis of the gun trunnions, a waiting tray fixed to the side of the gun cradle in line with said lifting tray when the latter occupies its raised or transferring position, a loading tray mounted to move transversely to the axis of the gun from a receiving position in which it is in line with the waiting tray into the loading position behind the gun, mechanism for placing a projectile in said lifting tray, a lever controlling said mechanism, an extension of said lever, a co-acting member on said lifting tray and a pivoted arm which is carried by the said extension and co-operates with the projectile in said lifting tray.

4. Ammunition hoisting and loading apparatus for ordnance, comprising in combination a lifting tray mounted to rock at the side of the gun cradle about an axis approximately coincident with the axis of the gun trunnions, a waiting tray fixed to the side of the gun cradle in line with said lifting tray when the latter occupies its raised or transferring position, a loading tray mounted to move transversely to the axis of the gun from a receiving position in which it is in line with the waiting tray into the loading position behind the gun, a lifting tray locking contrivance on said waiting tray, a projectile retaining device on the lifting tray, a member on said waiting tray for releasing said retaining device and means for displacing and holding said contrivance and said member in the inoperative position by the passage of a projectile into said waiting tray.

5. Ammunition hoisting and loading apparatus for ordnance, comprising in combination a lifting tray mounted to rock at the side of the gun cradle about an axis approximately coincident with the axis of the gun trunnions, a waiting tray fixed to the side of the gun cradle in line with said lifting tray when the latter occupies its raised or transferring position, a loading tray mounted to move transversely to the axis of the gun from a receiving position in which it is in line with the waiting tray into the loading position behind the gun, a lifting tray locking contrivance on said waiting tray, a projectile retaining device on said lifting tray, a member on said waiting tray for releasing said retaining device, means for displacing and holding said contrivance and said member in the inoperative position by the passage of a projectile into said waiting tray and a device for locking said contrivance and said member in their operative position, which device is released by the passage of a projectile along said waiting tray.

6. Ammunition hoisting and loading apparatus for ordnance, comprising in combination a lifting tray mounted to rock at the side of the gun cradle about an axis approximately coincident with the axis of the gun trunnions, a waiting tray fixed to the side of the gun cradle in line with said lifting tray when the latter occupies its raised or transferring position, a loading tray mounted to move transversely to the axis of the gun from a receiving position in which it is in line with the waiting tray into the loading position behind the gun, a lifting

tray locking contrivance on said waiting tray, a projectile retaining device on the lifting tray, a member on said waiting tray for releasing said retaining device, means for displacing and holding said contrivance and said member in the inoperative position by the passage of a projectile into said waiting tray and a projectile stop device on said waiting tray co-operating with said means to prevent improper movement of the last-mentioned device to its inoperative position.

ARTHUR TREVOR DAWSON.
GEORGE THOMAS BUCKHAM.