A. T. DAWSON & J. HORNE.

ELEVATING MECHANISM OF HEAVY GUNS.

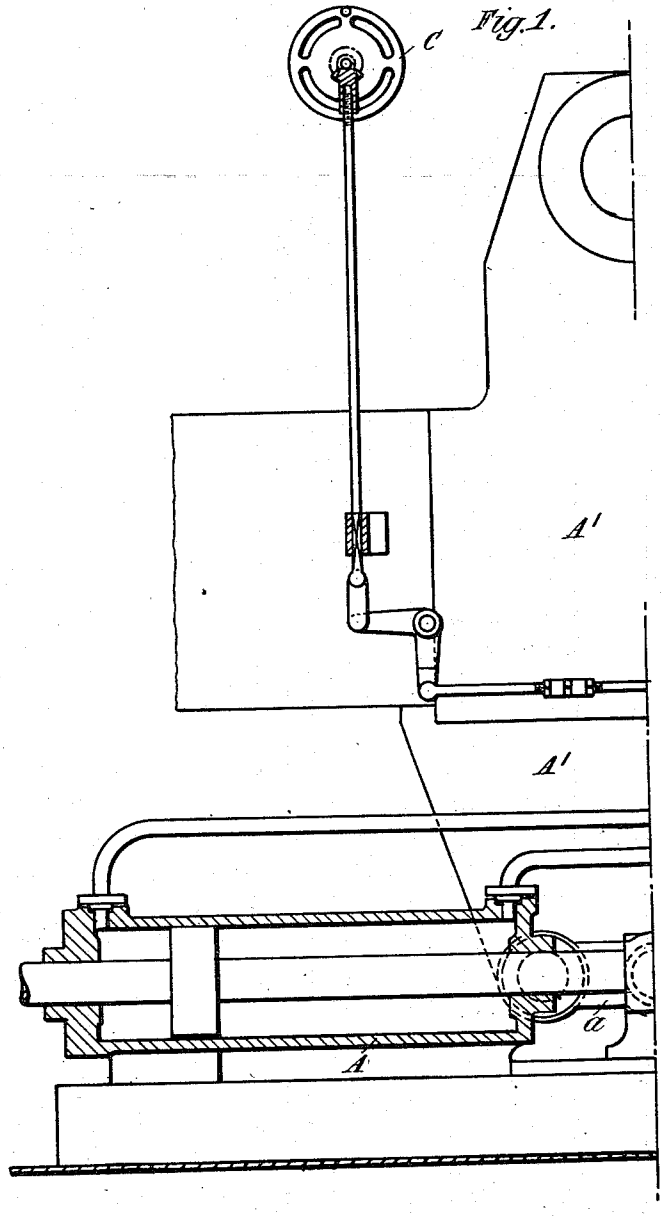
APPLICATION FILED MAY 15, 1915.

1,289,692.

Patented Dec. 31, 1918.

2 SHEETS—SHEET 1.

Fig. 1.



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2 SHEETS—SHEET 2.

Fig. 1.
(Continuation)

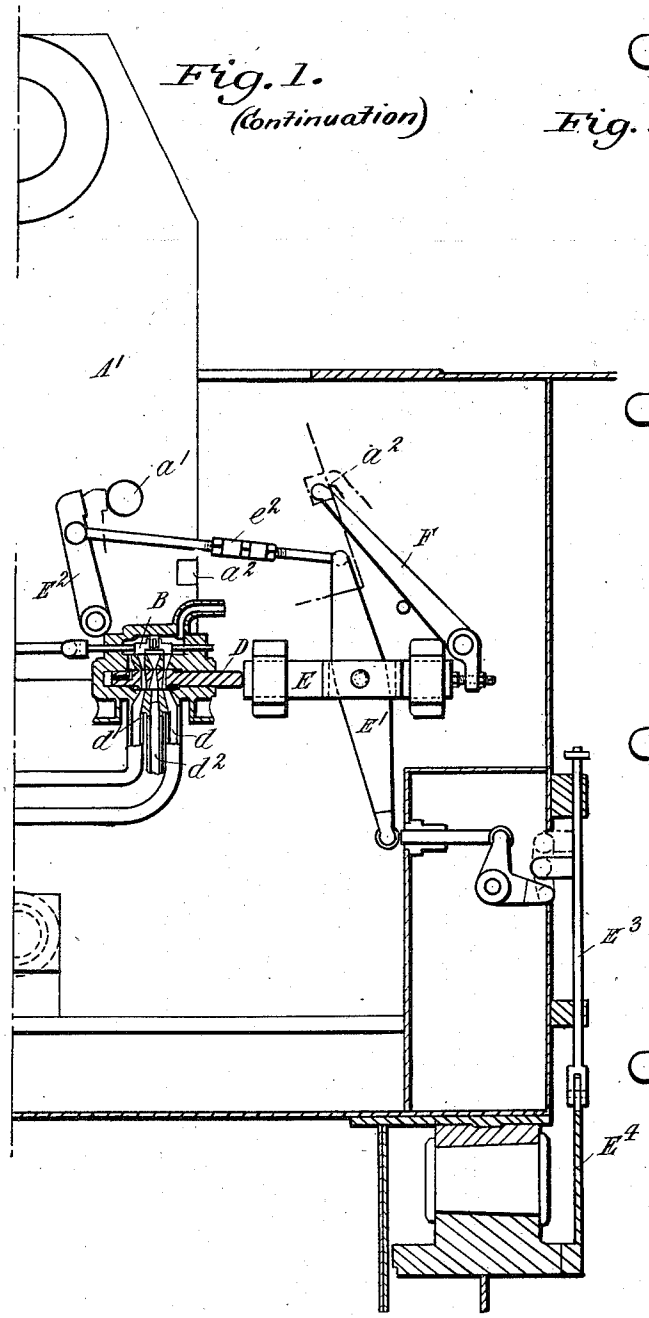


Fig. 2.

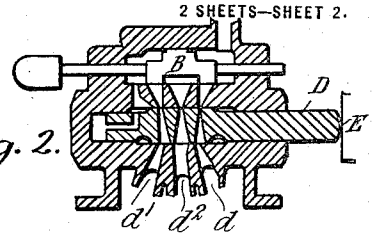


Fig. 3.

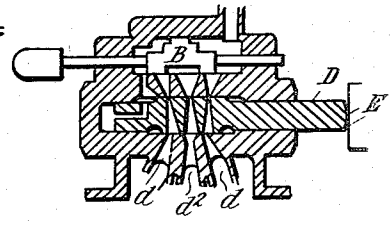


Fig. 4.

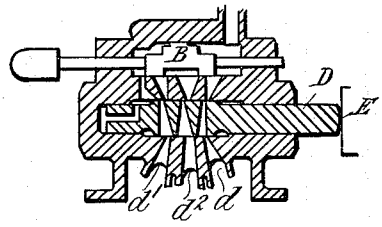
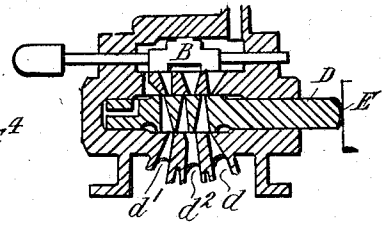


Fig. 5.



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UNITED STATES PATENT OFFICE.

ARTHUR TREVOR DAWSON, OF WESTMINSTER, LONDON, AND JAMES HORNE, OF BARROW-IN-FURNESS, ENGLAND, ASSIGNORS TO VICKERS LIMITED, OF WESTMINSTER, LONDON, ENGLAND.

ELEVATING MECHANISM OF HEAVY GUNS.

1,289,692. Specification of Letters Patent. Patented Dec. 31, 1918.

Application filed May 15, 1915. Serial No. 28,493.

To all whom it may concern:

Be it known that we, Sir ARTHUR TREVOR DAWSON, knight, and JAMES HORNE, both subjects of the King of Great Britain, residing, respectively, at Vickers House, Broadway, Westminster, in the county of London, England, and Naval Construction Works, Barrow-in-Furness, in the county of Lancaster, England, have invented certain new and useful Improvements in or Relating to the Elevating Mechanism of Heavy Guns, of which the following is a specification.

This invention relates to elevating mechanism for heavy guns of the kind that are elevated and depressed by a hydraulic motor such as a press controlled by a valve operated by the elevating handwheel or the like.

The chief object of the invention is to provide improved safety mechanism for preventing the gun from being depressed into a position such that if fired it would cause damage to any part of the ship within the training arc of the turret and, in certain circumstances, for automatically elevating the gun from the danger zone.

According to this invention we employ in addition to the said control valve, an auxiliary valve which is in fluid pressure communication with the elevating motor and is so arranged in relation to the control valve and to the safety depression gear that in the event of the control valve being moved to depress the gun into the danger zone, the auxiliary valve will be automatically displaced to cut off the supply of pressure fluid to the elevating motor, while if the gun is trained (with the gun at any given angle of depression) to bring the gun into the danger zone, the said auxiliary valve will be automatically shifted to admit pressure fluid to the elevating motor and thereby cause the gun to be elevated out of the danger zone. The said auxiliary valve also serves to bring the gun to rest when it reaches its full angles of depression and elevation.

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

Figure 1 is a side elevation showing in a more or less diagrammatic manner a constructional form of the invention.

Fig. 2 is an enlarged view of the valves of Fig. 1.

Figs. 3, 4 and 5 are views similar to Fig. 2 but showing the valves in different positions hereinafter referred to.

A is the elevating press the ram of which is connected through a link a to the trunnion arm A′ of the gun. B is the control valve of the press A and C is the elevating hand-wheel for operating the said valve. D represents the aforesaid auxiliary valve.

In the example shown the control valve B is superposed on, but is preferably not in contact with, the auxiliary valve D these two valves being arranged in the same valve body. The stem of the auxiliary valve is in contact with a member E (herein referred to as the plunger block) which pivotally carries a floating lever E′ connected at one end through a link e^2 to a pivoted arm E^2 under the influence—when the gun is being depressed—of a tappet a' carried by the trunnion arm A′ or by any other suitable part moving with the gun. The other end of the floating lever is under the influence of a vertically slidable member E^3 (herein referred to as the roller bar) carried by the turret and the lower end of this roller bar bears upon a stationary cam E^4 arranged vertically around the turret and having a contour conforming to the deck fittings or the like which are situated within the training arc of the turret and which constitutes the danger zone.

In the event of the control valve B being moved toward the left (Fig. 3) by its hand-wheel C to depress the gun when such depression would bring the gun into the danger zone as aforesaid, the tappet a' strikes the pivoted arm E^2 and the consequent movement of the floating lever E′ about the end of its lower arm causes the plunger block E to displace the auxiliary valve D to the left into a position shown by Fig. 4 to cut off the supply of pressure fluid through the depression port d of the valve casing, thereby bringing the gun to rest. If the turret is then trained it may happen that the roller bar E^3 is moved on to a higher portion of the cam rail, in which event the upward displacement of the roller bar causes the floating lever E′ to be rocked about the

point of connection of its upper arm with the aforesaid link e^2 and the auxiliary valve D to be shifted farther toward the left into the position shown by Fig. 5 so that pressure fluid will be admitted through the elevating port d' and exhaust will take place through the depression port d to the exhaust port d^2; the gun is thereby elevated until it is no longer in the danger zone, in which condition the valve D will have returned to the position shown by Fig. 4 owing to the constant pressure fluid on the left hand face of the valve, this movement being possible as the tappet a' moves away from the arm E^2.

The plunger block E is in the example shown connected to a pivoted lever F the free end of which is arranged in the path of a stop a^2 carried by the trunnion arm A' or by any other suitable part moving with the gun in elevation. When the gun approaches its maximum angle of elevation, this stop assumes the position shown by chain lines and displaces the said lever and the plunger block to cause the auxiliary valve D to move into the cut off position, thereby bringing the gun gradually to rest at its maximum elevation. Similarly the aforesaid tappet a', by coöperating with the pivoted arm E^2 connected to the floating lever E', brings the gun to rest at its maximum angle of depression.

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

1. In the elevating mechanism of ordnance, the combination with the pressure fluid elevating motor, its control valve and the actuating handle for said control valve, of an auxiliary control valve in fluid communication with said motor and safety depression gear for automatically displacing said auxiliary control valve to cut off the supply of pressure fluid to the elevating motor and bring the gun to rest in the event of the first mentioned valve being moved to depress the gun into the danger zone.

2. In the elevating mechanism of ordnance, the combination with the pressure fluid elevating motor, its control valve and the actuating handle for said control valve, of an auxiliary control valve in fluid communication with said motor, a cam having a contour adapted to the deck fittings or other obstructions within the training arc of the gun, and means interposed between said cam and the gun for automatically displacing said auxiliary control valve to cut off the supply of pressure fluid to the elevating motor and bring the gun to rest in the event of the first mentioned valve being moved to depress the gun into the danger zone.

3. In the elevating mechanism of ordnance, the combination with the pressure fluid elevating motor, its control valve and the actuating handle for said control valve, of an auxiliary control valve in fluid communication with said motor, a cam having a contour adapted to the deck fittings or other obstructions within the training arc of the gun, a tappet moving with the gun in elevation and depression and means interposed between said tappet and the cam for automatically displacing said auxiliary control valve to cut off the supply of pressure fluid to the elevating motor and bring the gun to rest in the event of the first mentioned valve being moved to depress the gun into the danger zone.

4. In the elevating mechanism of ordnance, the combination with the pressure fluid elevating motor, its control valve and the actuating handle for said control valve, of an auxiliary control valve in fluid communication with said motor, a cam having a contour adapted to the deck fittings or other obstructions within the training arc of the gun, a tappet moving with the gun in elevation and depression and means interposed between said tappet and the cam for automatically displacing said auxiliary control valve to cut off the supply of pressure fluid to the elevating motor and bring the gun to rest in the event of the first mentioned valve being moved to depress the gun into the danger zone and to cause the pressure fluid elevating motor to elevate the gun if the gun is trained, with the gun at a given angle of depression, to bring it into a dangerous position relatively to any of the obstructions.

5. In the elevating mechanism of ordnance, the combination with the pressure fluid elevating motor, its control valve and the actuating handle for said control valve, of an auxiliary control valve in fluid communication with said motor, means for automatically displacing said auxiliary control valve to cut off the supply of pressure fluid to the elevating motor and bring the gun to rest in the event of the first mentioned valve being moved to depress the gun into the danger zone, and means for automatically displacing said auxiliary control valve to stop the pressure fluid elevating motor when the gun reaches its full angle of elevation.

In testimony whereof we affix our signatures.

ARTHUR TREVOR DAWSON.
JAMES HORNE.