

No. 679,632.

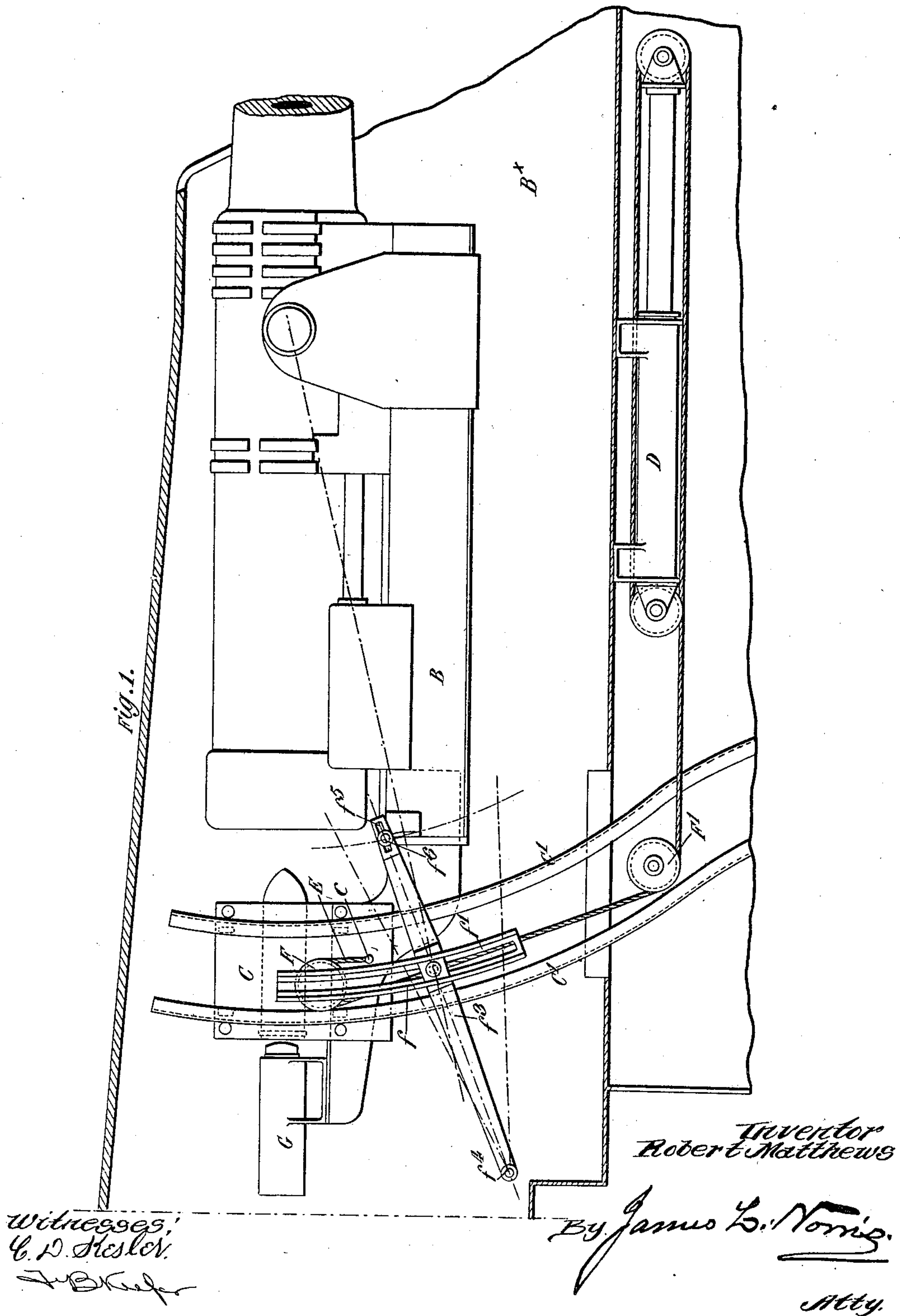
Patented July 30, 1901.

R. MATTHEWS.  
AMMUNITION HOIST.

(Application filed July 24, 1900.)

(No Model.)

3 Sheets—Sheet 1.



No. 679,632.

Patented July 30, 1901.

R. MATTHEWS.  
AMMUNITION HOIST.

(Application filed July 24, 1900.)

(No Model.)

3 Sheets—Sheet 2.

Fig. 3.

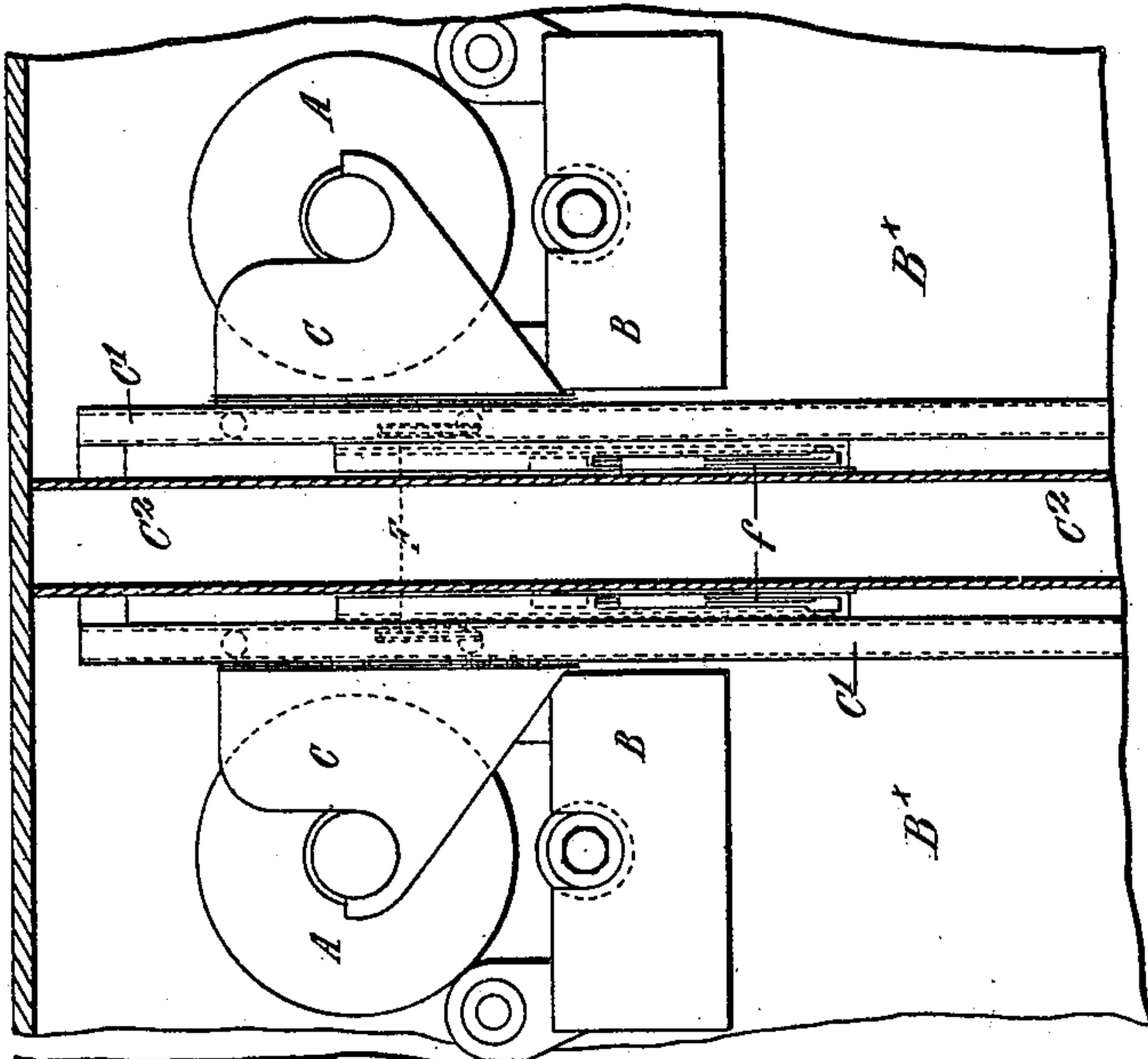
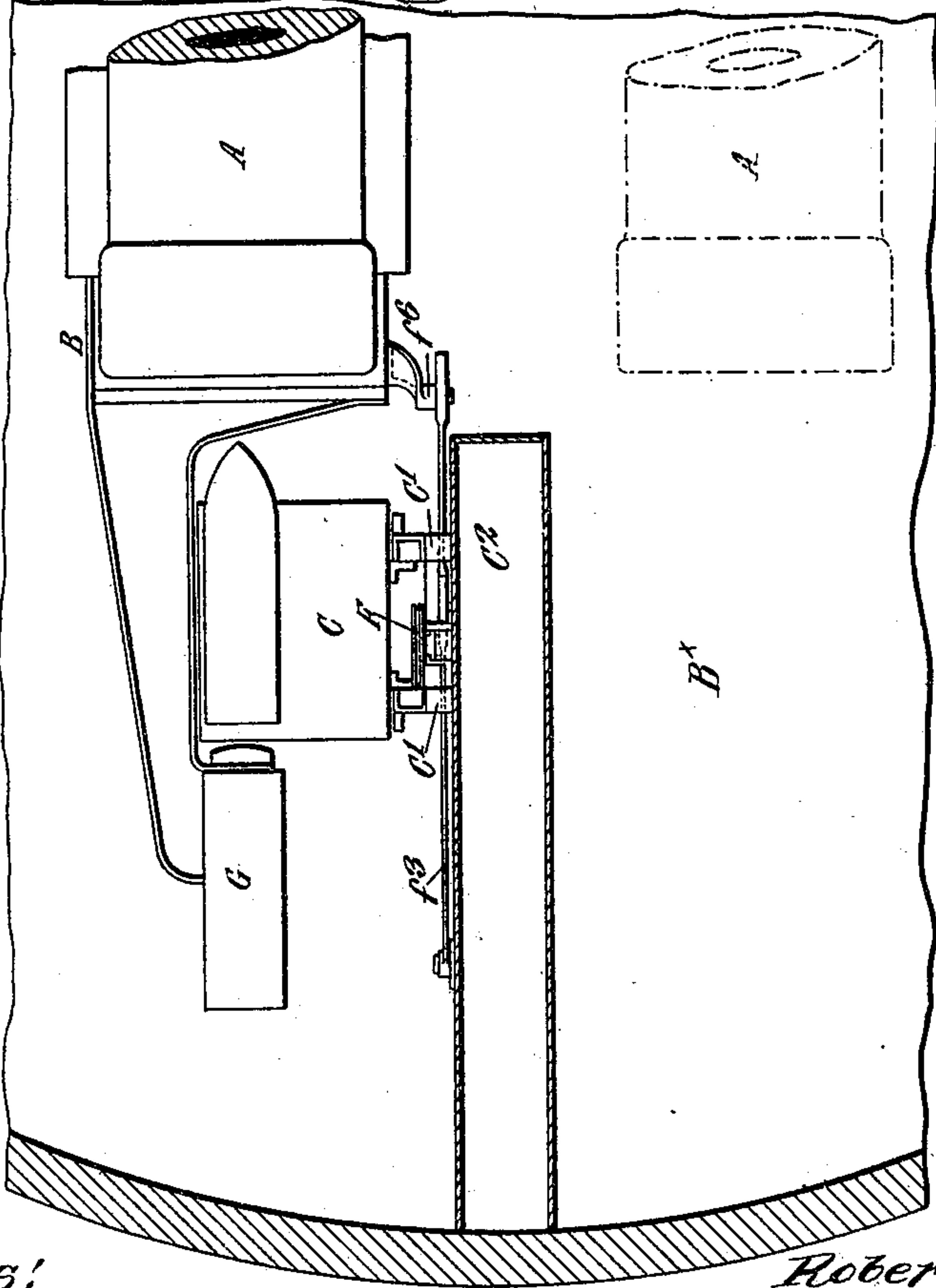


Fig. 2.



Witnesses:  
C. D. Hesler  
F. B. Keefe

Inventor  
Robert Matthews  
By James L. Norrie  
Atty

**No. 679,632.**

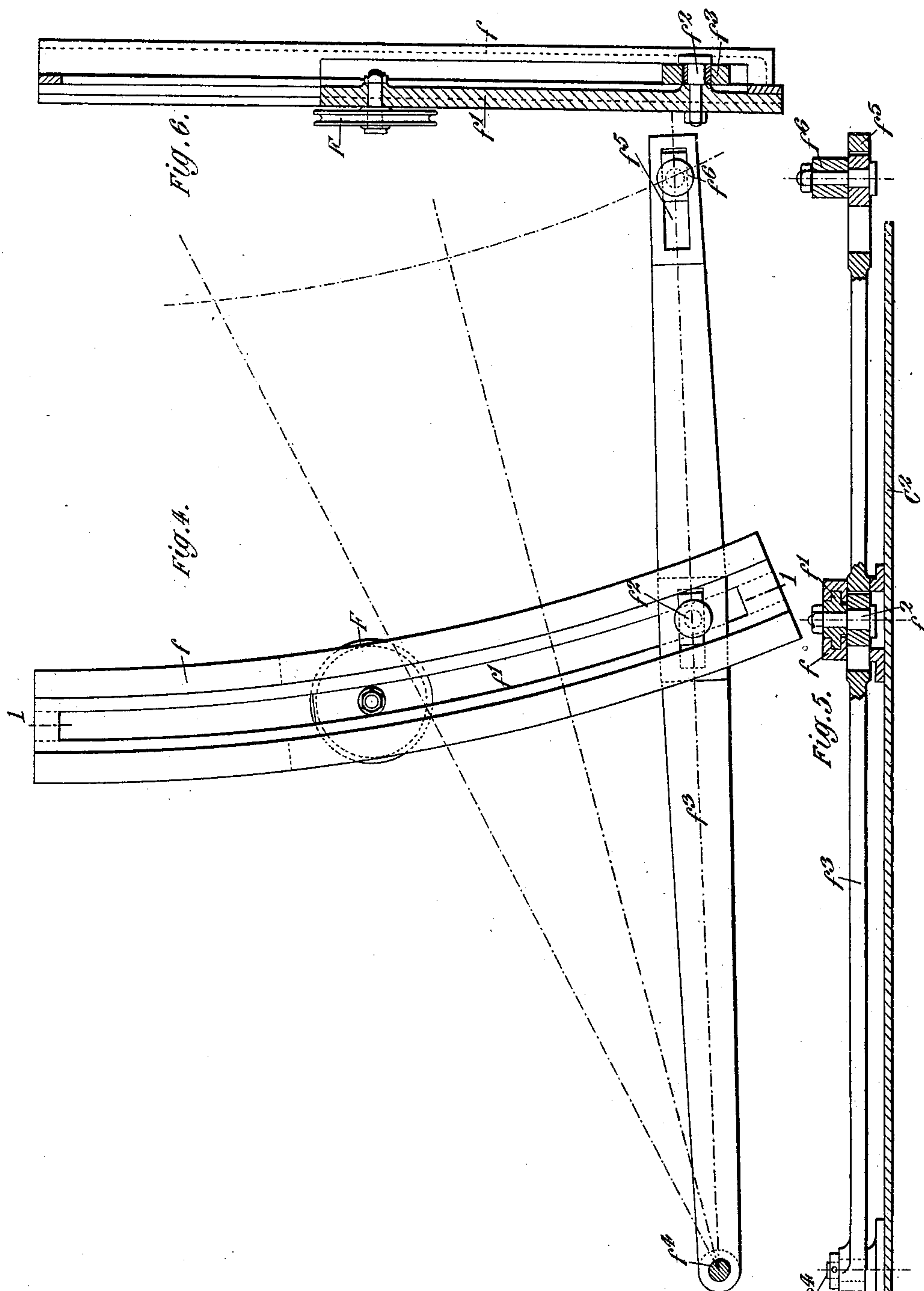
**Patented July 30, 1901.**

R. MATTHEWS.  
AMMUNITION HOIST.

(Application filed July 24, 1900.)

(No Model.)

**3 Sheets—Sheet 3.**



witnesses,  
C. W. Kessler  
J. B. Keeler

Inventor  
Robert Matthews

By James L. Norris.  
Atty.



# UNITED STATES PATENT OFFICE.

ROBERT MATTHEWS, OF MANCHESTER, ENGLAND.

## AMMUNITION-HOIST.

SPECIFICATION forming part of Letters Patent No. 679,632, dated July 30, 1901.

Application filed July 24, 1900. Serial No. 24,684. (No model.)

*To all whom it may concern:*

Be it known that I, ROBERT MATTHEWS, engineer, a subject of the Queen of Great Britain, residing at Openshaw, Manchester, in the county of Lancaster, England, have invented a certain new and useful Improvement in Ammunition-Hoists, of which the following is a specification.

This invention relates to apparatus for loading ordnance, and has reference particularly to the hoists by which the ammunition is conveyed to the gun from the magazine.

With some classes of ammunition-hoists the cage or carrier containing the ammunition is connected to one end of a chain or rope which passes over a pulley mounted on a fixed axle at the top of the hoist and extends down to another pulley mounted on the ram of a hydraulic cylinder. From this last-named pulley the rope is led and fixed to a part of the mounting which moves with the gun, so that whatever may be the angle of elevation of the gun the outward movement of the ram will act on the rope to raise the cage or carrier accurately to the loading position. When, however, the elevation of the gun is changed after the cage has been raised to the loading position, the said cage in varying its position to accord with that of the gun has to shift the entire length of the rope, and consequently considerable friction has to be overcome by the working of the rope upon the pulleys. Chiefly for this reason it has been found that in some instances the cage does not promptly follow the movement of the gun when its elevation is altered after the cage has been elevated and does not always come truly into alinement with the axis of the gun.

It is one of the objects of my invention to overcome this disadvantage by making the bearing of the pulley at the top of the hoist movable and by so connecting it to the gun-mounting or some other suitable part that the alteration in the position of the cage which takes place when the elevation of the gun is altered after the cage has been raised will only affect the comparatively short portion of the rope adjacent to the said pulley instead of affecting the entire length of the rope, as in the previous construction above referred to. In this case one end of the rope

is connected to the cage and the other end to a part that does not move with the gun in its elevation or depression.

In order that my said invention may be clearly understood and readily carried into practice, I will describe the same more fully with reference to the accompanying drawings, in which—

Figures 1, 2, and 3 are respectively a side elevation, a plan, and a rear elevation of a pair of guns mounted in a rotating turret and provided with my improved ammunition-hoisting apparatus, only so much of the guns and their mountings being shown as is required for the proper understanding of my apparatus. Fig. 4 is an elevation, Fig. 5 a sectional plan, and Fig. 6 a vertical section on the line 1 1 of Fig. 4, showing the improved apparatus separately and on a larger scale.

Like letters of reference indicate similar parts in all the figures.

A A are the guns, and B B the frames in which they recoil.

B<sup>x</sup> is the rotary turret.

C is one of the ammunition-hoisting cages or carriers, and C' C' are the rails along which such carrier travels. D is one of the hydraulic cylinders for actuating said cage or carrier, and E is the chain or rope which is acted upon by the ram of the cylinder and connected with the cage or carrier at c after passing around guide-pulleys F F'. The opposite end of said chain or rope is connected to the cylinder D.

G is the rammer, which in the arrangement illustrated is represented by an ordinary hydraulic rammer.

Referring more particularly to Figs. 1 to 6, and especially to Figs. 4, 5, and 6, *f* is a segmental slotted guide carried by the vertical framing C<sup>2</sup>, to which the aforesaid rails C' are connected. *f'* is a bearing-block which is capable of sliding in said segmental slotted guide and is provided with a lateral axle or stud, upon which the uppermost pulley F is rotatably mounted. The said block is connected by a bolt *f*<sup>2</sup> to a lever *f*<sup>3</sup>, which is slotted at the part where said bolt passes through it. The outer end of said lever is pivotally connected by a pin *f*<sup>4</sup> to the aforesaid framing C<sup>2</sup>, said pin forming the fulcrum



about which the lever can turn. The opposite or inner end of the said lever is slotted at  $f^5$  and is connected to a pin or other projection  $f^6$  on the frame B of the gun. The said bolt  $f^2$  and projection  $f^6$  are furnished with bearing-blocks which are capable of sliding in the aforesaid slots formed for their reception in the lever  $f^3$ . Thus when the elevation of the gun is changed by the vertical movement of the frame B about the axis of the gun-trunnions, as is well understood, the projection  $f^6$  shifts the inner end of lever  $f^3$ , thereby turning the lever about its fulcrum  $f^4$  and raising or lowering the bearing-block  $f^7$  in the segmental slotted guide  $f$ . The position of the axle of the said pulley F is therefore raised or lowered to the requisite extent to cause the cage to vary its position in accordance with the change in the elevation of the gun, this movement of the cage being effected with very little friction and very little wear or stress upon the rope and other parts of the apparatus, because at such times only that portion of the rope which is in proximity to the upper pulley F moves. In the drawings I have represented the aforesaid slotted guide approximately concentrically disposed with respect to the gun-trunnions, and the bearing-block is represented as being connected with the lever  $f^3$  about midway between its fulcrum and its inner or forward end, so that the lever is one of the second kind. Such arrangement is necessary because the extent to which the block and its pulley axle must move in order to enable the cage to keep in alinement with the gun, in the event of the elevation of the gun being changed after the cage has been elevated, is only about one-half of the extent of movement of the projection  $f^6$ , because a movable pulley being employed the amount of rope which is taken up or paid out when the said pulley is shifted is, as is well understood, about twice as much as the distance which the axis of said pulley travels. I do not wish to confine myself to this form of leverage, as other means can be employed to raise or lower the cage to the requisite extent to keep it in alinement with the gun when the latter changes its position after the cage has been elevated.

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

1. In an ammunition-hoist, the combination with an ammunition cage or carrier, a chain or rope passing around guide-pulleys and connected at one end with the cage or carrier and at the other end to a fixed point, and a motor for actuating the chain or rope, of means for connecting the axle of the uppermost pulley to the gun-mounting, so that the movement thereof will be substantially one-half that of the breech when the elevation of the gun is altered after the cage has been elevated and only the portion of the rope adjacent to the said pulley will be affected, for the purpose specified.

2. In an ammunition-hoist, the combination with an ammunition cage or carrier, a chain or rope passing around guide-pulleys and connected at one end with the cage or carrier and at the other end to a fixed point, and a motor for actuating the chain or rope; of a sliding block to which the axle of the uppermost pulley is connected, of a guide for said block, and of means for connecting the sliding block to the gun-mounting so that the movement of the said block will be substantially one-half of the breech when the elevation of the gun is changed, substantially as and for the purpose specified.

3. In an ammunition-hoist, the combination with an ammunition cage or carrier, a chain or rope passing around guide-pulleys and connected at one end with the cage or carrier, and at the other end to a fixed point and a hydraulic cylinder and ram for actuating the chain or rope; of a sliding block to which the axle of the uppermost pulley is connected, of a segmental slotted guide disposed approximately concentric with relation to the gun-trunnions and carried by a part which does not participate in the movement of elevation or depression of the gun, of means for connecting the said block to the gun-mounting so that when an alteration in the elevation of the gun takes place after the cage has been raised, the said block moves through an angle of approximately only one-half of the angle of elevation of the gun for the purpose specified.

4. In an ammunition-hoist, the combination with the ammunition cage or carrier, a chain or rope passing around guide-pulleys and connected at one end with the cage or carrier and at the other end to a fixed point, and a hydraulic cylinder and ram for actuating the chain or rope; of a sliding block to which the axle of the uppermost pulley is connected, of a segmental slotted guide concentrically disposed relatively to the gun-trunnions and carried by a part which does not participate in the movement of elevation or depression of the gun, of lever mechanism for connecting said block to the gun-mounting so that the movement of said block will be substantially one-half that of the breech when the elevation of the gun is changed substantially as and for the purpose specified.

5. In an ammunition-hoist, the combination with an ammunition cage or carrier, a chain or rope passing around guide-pulleys and connected at one end with the cage or carrier, and at the other end to a fixed point and a hydraulic cylinder and ram for actuating the chain or rope; of a sliding block to which the axle of the uppermost pulley is connected, of a segmental slotted guide disposed approximately concentric with relation to the gun-trunnions and carried by a part which does not participate in the movement of elevation or depression of the gun, of a lever to which the said block is connected at a point between the ends of said lever, the said lever



being fulcrumed near one end to the turret of the gun and connected at the other end to the gun-mounting so that the movement of the block will be substantially one-half that  
5 of the breech of the gun when the elevation of the latter is changed substantially as and for the purpose specified.

In testimony whereof I have hereunto set my hand, in presence of two subscribing witnesses, this 11th day of July, 1900.

ROBERT MATTHEWS.

Witnesses:

ALBERT EDW. KAY,  
JAMES CUMMING.