

(No Model.)

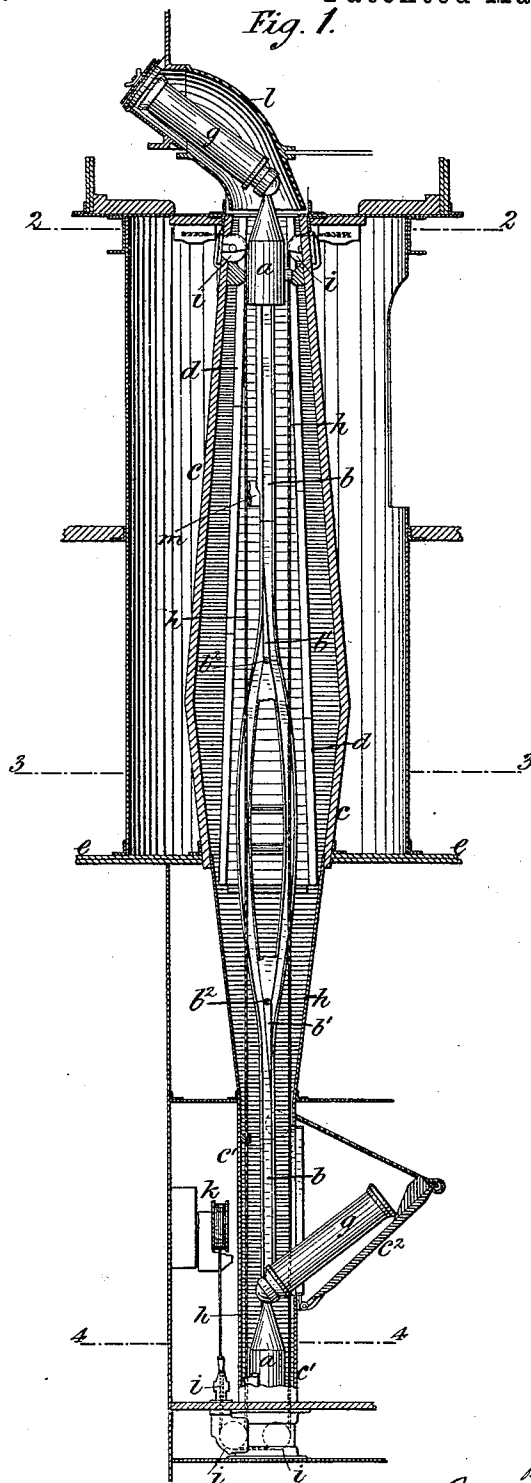
5 Sheets—Sheet 1.

A. NOBLE & R. T. BRANKSTON.
AMMUNITION HOIST.

No. 536,154.

Patented Mar. 19, 1895.

Fig. 1.



Witnesses.
C. H. Miller
C. M. Brooke.

Inventors.
Andrew Noble
and
Ralph T. Brankston
By their Attys.
Baldwin, Davidson & Hyatt

(No Model.)

5 Sheets—Sheet 2.

A. NOBLE & R. T. BRANKSTON.
AMMUNITION HOIST.

No. 536,154.

Patented Mar. 19, 1895.

Fig. 2.

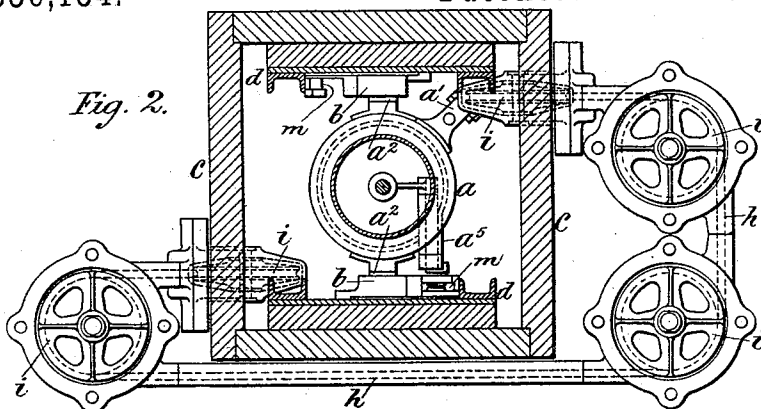


Fig. 3.

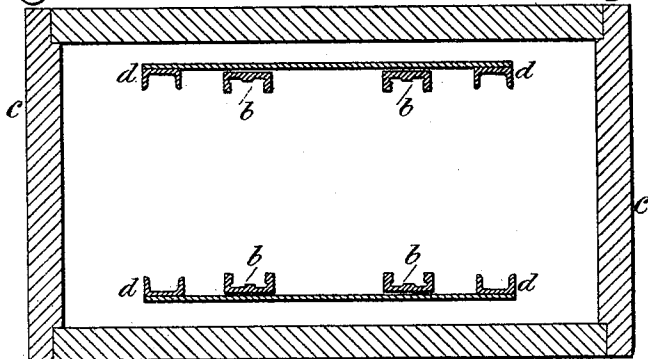
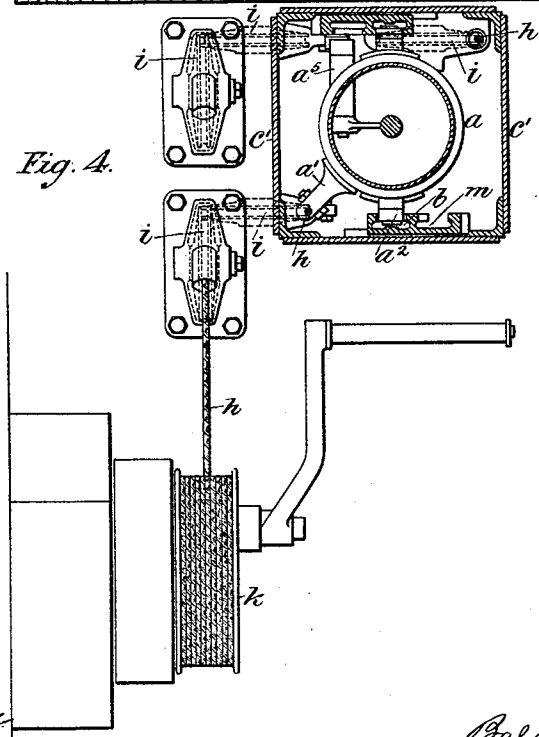


Fig. 4.



Witnesses.
B. H. Miller.
C. M. Brooke.

Inventors
Andrew Noble
and
Ralph T. Brankston.
By John S. Wright
Baldron, Davidson & Wright.

(No Model.)

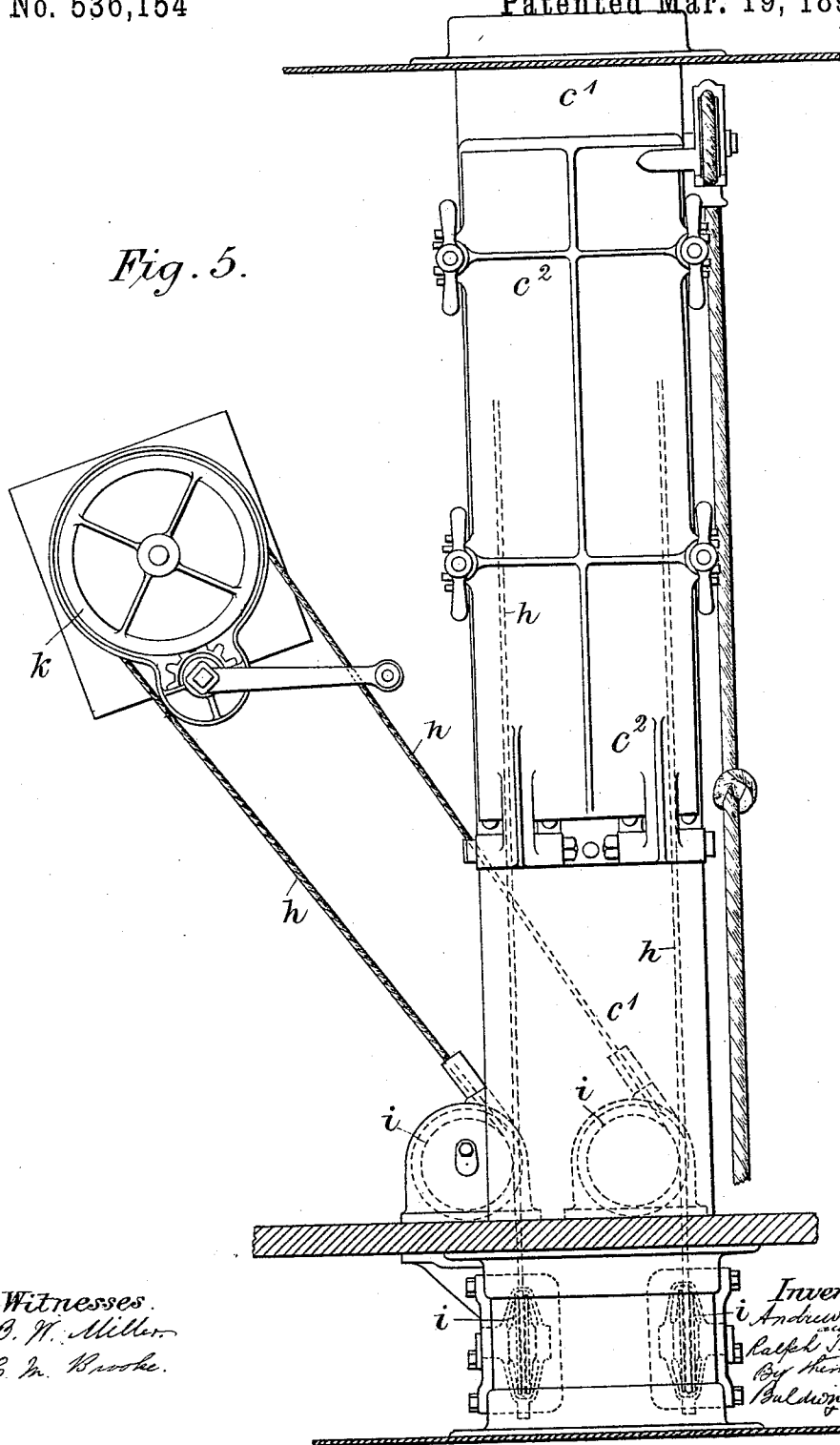
5 Sheets—Sheet 3.

A. NOBLE & R. T. BRANKSTON.
AMMUNITION HOIST.

No. 536,154

Patented Mar. 19, 1895.

Fig. 5.



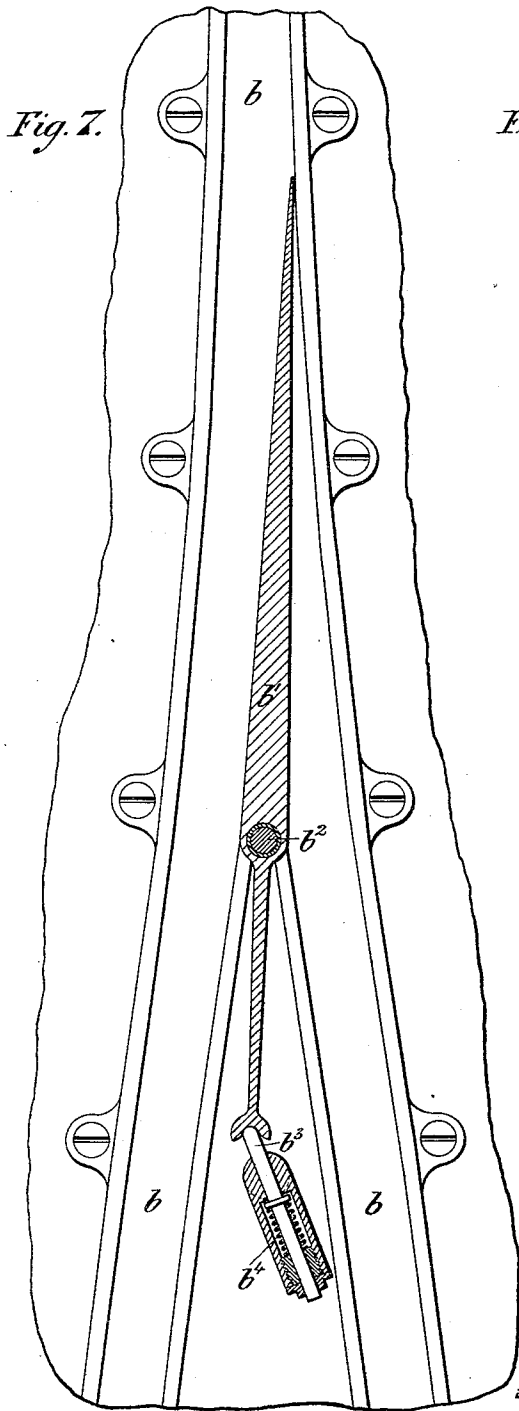
Witnesses.
B. W. Miller.
C. M. Brooke.

Inventors.
Andrew Noble.
Ralph T. Brankston.
By their attys.
Baldwin, Davidson
& Mott.

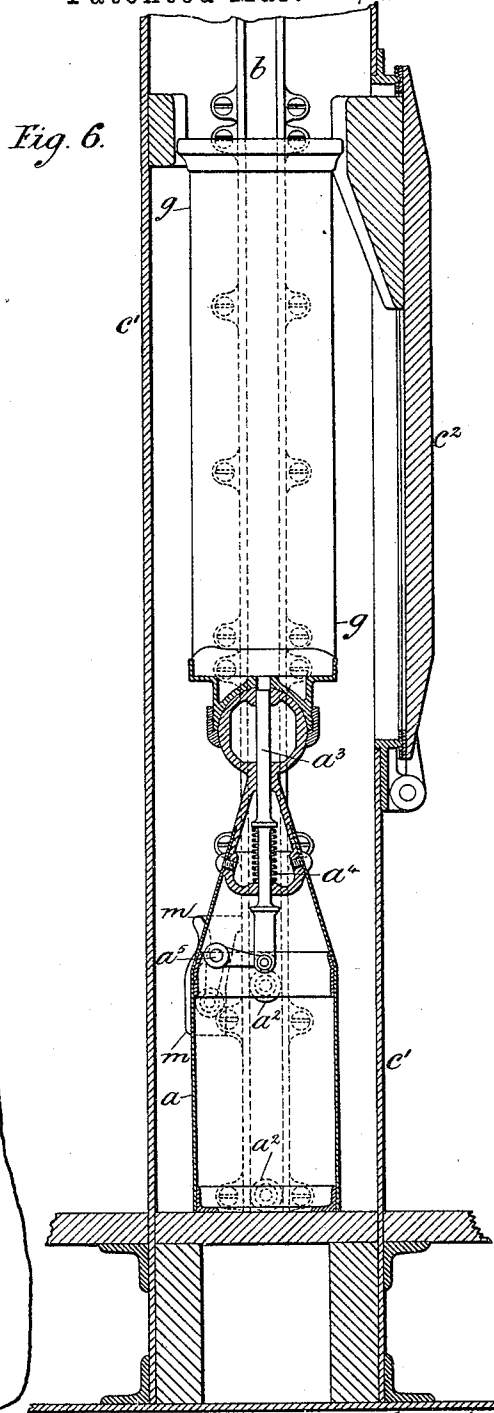
A. NOBLE & R. T. BRANKSTON.
AMMUNITION HOIST.

No. 536,154.

Patented Mar. 19, 1895.



Witnesses.
R. W. Miller.
E. W. Brooke.



Inventors.
Andrew Noble.
Ralph T. Brankston.
By M. S. Wright.
Baldwin Danderson Wright.

(No Model.)

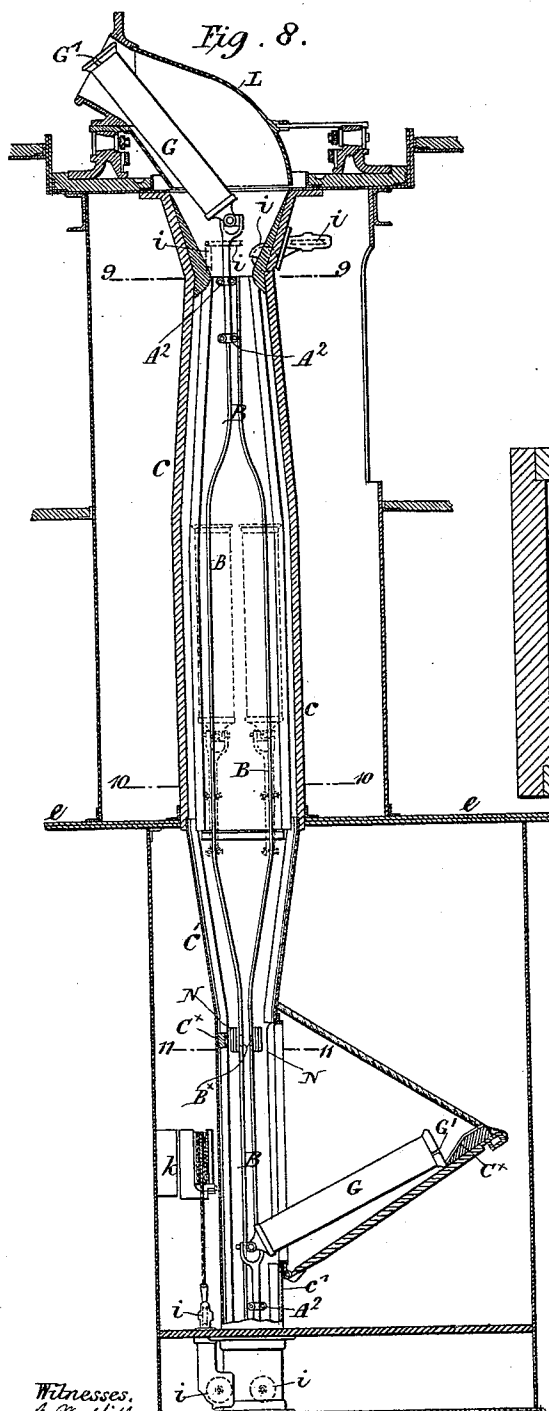
5 Sheets—Sheet 5.

A. NOBLE & R. T. BRANKSTON.
AMMUNITION HOIST.

No. 536,154.

Patented Mar. 19, 1895.

Fig. 9.



Witnesses,
B. H. Mills,
C. M. Brooke.

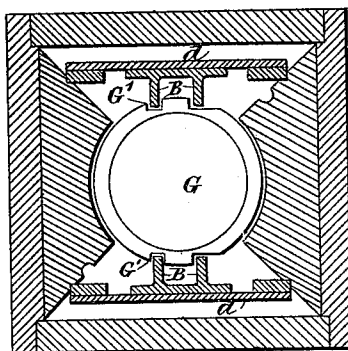


Fig. 10.

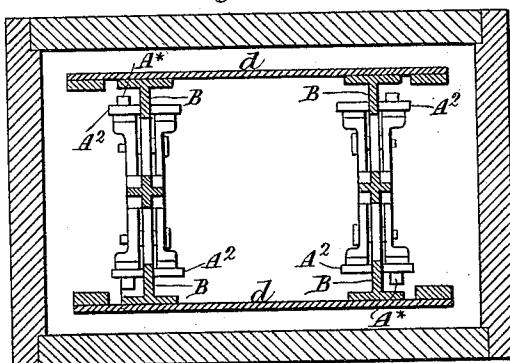
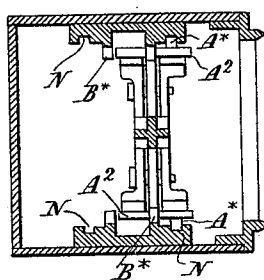


Fig. 11.



Inventors,
Andrew Noble,
and
Ralph T. Brankston
By *Wm. A. Davidson*
Baldwin Davidson Wright

UNITED STATES PATENT OFFICE.

ANDREW NOBLE AND RALPH THEW BRANKSTON, OF NEWCASTLE-ON-TYNE, ENGLAND, ASSIGNORS TO THE SIR W. G. ARMSTRONG, MITCHELL & COMPANY, LIMITED, OF SAME PLACE.

AMMUNITION-HOIST.

SPECIFICATION forming part of Letters Patent No. 536,154, dated March 19, 1895.

Application filed August 8, 1894. Serial No. 519,779. (No model.)

To all whom it may concern:

Be it known that we, ANDREW NOBLE, H. C. B., F. R. S., residing at Jesmond Dene House, and RALPH THEW BRANKSTON, engineer, residing at Elswick Works, Newcastle-on-Tyne, England, subjects of the Queen of Great Britain, have invented certain new and useful Improvements in Ammunition-Hoists, of which the following is a specification.

10 The principal objects of our invention are to minimize the space occupied by the ammunition hoist and the armor required for its protection; to lessen the liability to derangement in action; to cause the ammunition carriers to be presented so as most conveniently to receive and deliver the charge and to attain simplicity in structure and manipulation.

According to our invention, a trunk is provided extending upward from the place where 20 the ammunition is supplied to that at which it is delivered to the gun. So much of this trunk as is exposed to the enemy's fire is of armor plate. The trunk contains within it a frame on which guide rails are fixed. The 25 frame for the greater part of its length is without attachment to the trunk so that the trunk may be a good deal knocked about without deranging the guide rails. There are two carriers which ascend and descend 30 within the trunk. They are drawn up and down by a rope passing around pulleys as it is wound upon and unwound from a drum. Only in the middle part of the trunk is it large enough for the carriers to pass. To 35 save weight and space it is reduced in size at the ends leaving room for one carrier only. Each carrier consists of two parts, a lower part or cage which simply travels up and down in the trunk and a powder case jointed at its 40 lower end to the top of the cage and so able to drop into an inclined position. At the top of the trunk there is a cowl or curved passage which moves round with the gun. The powder case as it comes to the top of the trunk 45 enters this cowl, the joint permitting it to do so and thus the charge is presented in the most convenient position for the service of the gun in every position to which the gun may be trained. A door is provided at the 50 bottom of the trunk. When the door is

opened the powder case which is at the bottom of the trunk drops to an inclined position convenient to receive the charge. The same guide rails may for part of the length of the trunk serve for both the carriers and 55 automatic switches may be provided at the passing places where double guide rails are necessary; or separate guide rails may be provided throughout. A bolt controlled automatically by inclines may be employed to 60 lock the cage and the powder case fast together except in the positions in which the powder case should be permitted to incline; or, the guide rails may be adapted to keep the powder case in position without the aid 65 of a bolt.

In the drawings annexed, Figure 1 is a vertical section of a powder hoist in accordance with our invention. Figs. 2, 3 and 4 show to 70 a larger scale sections taken respectively on the lines 2, 2, 3, 3, and 4, 4, in Fig. 1. In Fig. 4 the winch barrel which is above the line of section also appears. Fig. 5 is a front elevation, and Fig. 6 is a vertical section of the lower part of the ammunition hoist. Fig. 7 75 shows a detail to a larger scale than any of the other figures. Fig. 8 is a vertical section and shows a modification. Figs. 9, 10 and 11 show to a larger scale sections taken respectively on the lines 9, 9, 10, 10 and 11, 11 in Fig. 8. 80

We will first describe the ammunition hoist shown by Figs. 1 to 7. This ammunition hoist consists of two carriers or cages *a a* which work in guides *b b* in the powder trunk. The upper part *c* of the powder trunk is made of 85 armor plate. The lower part of the trunk is marked *c'*. The guides for the cage are carried upon an independent frame *d* which is not attached to the armor *c* except at the top, and the attachment at the bottom is not 90 made until the frame is below the protected deck *e*. In this manner the risk from damage by shock, should the armor be struck is much reduced. The trunk is bulged in the center to allow the cages to pass each other. 95 On the top of each cage *a* is a powder case *g* to contain the powder charge. This case is pivoted to the cage, at its base, by means of a ball and socket joint. The cages are suspended in the trunk by means of a wire rope 100

h, the ends of the rope being conveyed by means of conveyance sheaves *i* to a winch *k* for hoisting up the powder. The cages are so suspended to the rope, that when one cage is at the top, the other is at the bottom of the trunk, and the rope is laid on opposite sides of the drum of the hoisting winch. The ends of the rope are made fast to the drum by means of an adjusting screw, so that the rope may be tightened, or the position of the cages be adjusted. The rope is made fast to the drum on one side, and leads to conveyance sheaves at the base of the trunk, and passes up the inside of the trunk. It is made fast to one of the cages in passing at the side by means of a clamp *a'* and passes on over conveyance sheaves at the top of the trunk, and then down the trunk at the opposite side. The rope is clamped to the other cage at *a'* at its side in passing down. It then goes on to the bottom of the trunk, and is conveyed by means of conveyance sheaves to the opposite side of the drum from where it started. By this means when the drum is worked one cage goes up and the other comes down. A cowl *l* is provided on the gun mounting having its center co-incident with the center of the trunk. The other end of this cowl comes out at the side of the gun mounted. The powder case being pivoted at its base on a ball and socket joint, as it enters the cowl falls over into position as seen in Fig. 1 so that the powder can be removed, no matter in what position the mounting may be.

The cages are provided with rollers *a*² on each side which fit into the rails *b* carried on the frame *d* in the inside of the trunk. The rails are divided at the center part of the trunk so as to allow the cages *a* and the powder cases *g* to pass each other. The rails *b* are provided with switches *b'* *b'* at the points of division, and the switches are arranged to work automatically, so that each cage in going up or coming down will pass into the proper rail and insure being clear of the other cage. The switch is pivoted at *b*² near one end to the rails *b* and a plunger *b*³ forced outward by a spring *b*⁴ in a pivoted box acts upon it so that whichever side the switch may be thrown the spring holds it in that position.

After the charge is placed in the powder case *g* the door *c*² of the trunk is closed which brings the case into the vertical position, so that its axis is in line with the axis of the cage, and in this position it is held by means of a locking bolt, which will be described hereinafter. As the cage ascends it passes into the guide rails on one side of the lower switch, and as it approaches the upper switch it pushes it over to the opposite side where it is held automatically by its spring. In the meantime the descending cage pushes over the lower switch in the same manner. The switches are thus always left in the correct position for the cages to ascend and descend and keep clear of each other, each keeping to its own side. The powder case being pivoted

on a ball and socket joint at its base is free to fall over in any direction. In order to prevent this happening during the ascent and descent of the cages an automatic locking bolt *a*³ is provided on each cage which holds the case rigidly attached to the cage during the ascent and descent, but frees it at the top and bottom to allow it to fall over at the top and bottom to receive the powder. The locking bolt is forced upward by a spring *a*⁴ and its lower end is pivoted to one arm of a bell crank lever *a*⁵ whose other arm carries a roller which at the proper time enters cam grooves *m* *m* fixed near the top and bottom of the trunk.

When the cage reaches the bottom of its course the bolt is withdrawn from the powder case by the lower cam *m* and the case is free to fall over when the door *c*² of the trunk is opened. When the cage begins to rise the lower cam *m* acts upon the roller at the end of the bell crank lever *a*⁵ and pushes the bell crank over, and forces the bolt up into a hole in the socket of the powder case. The spring then holds the bolt in position during the ascent of the cage, and when it gets near the top the upper cam *m* acts on the bell-crank lever and withdraws the bolt. The case is then free to fall over in the cowl *l* at the top into position for the charge to be removed. On the descent of the cage the reverse action takes place and the case *g* is again locked to the cage in descending, and it is freed again at the bottom by means of the lower cam.

The automatic switches *b'* may be dispensed with by providing separate guide rails for each carrier. Such an arrangement is shown by Figs. 8 to 11. Many of the parts it will be seen are the same as in the hoist already described and to these the same reference letters are applied. The guide rails which now are separate throughout are marked B B. This modification also renders the automatic bolts unnecessary, grooves *G'* being made in the rim at the top of the powder case *G* into which the guide rails B fit and which serve to guide the case during its ascent and descent, a gap being cut in the rail at *B*^x to allow the case to fall out at the door at the bottom of the trunk to get charged.

In order that the gap in the rail may not interfere with the guide rollers *A*² on the carrier a bridge guide *N* is provided at the gap, and the roller pins are extended at *A*^x so as to enter the bridge guide during the interval that the rollers are passing the gap in the rail.

When the powder case has been charged, the door of the trunk is then closed, blocks *C*^x on the trunk and door holding the case in position so that the groove *G'* in the rim of the case is in line with the guide rail B. The case is then hoisted up and is guided by means of the rail, and passes the descending case in the enlarged part of the trunk as is indicated by dotted lines in Fig. 8.

At the top, the case leaves the guide rail and is then free to fall over into the cowl *L*

no matter in what position the cowl may be. On lowering again, the groove engages the guide rail and is guided in the same manner to the bottom.

5 What we claim is—

1. The combination with a gun mounting, of the cages or carriers, tackle for operating them, guide rails on which the cages travel, a trunk inclosing the rails and having a bulged
10 portion around that portion of the rails where the cages pass, and a cowl at the top of the trunk carried by the gun mounting, and arranged concentrically with the axis of the trunk, substantially as described.

15 2. The combination with an ammunition hoist of a cage and a powder case flexibly connected to the cage, for the purpose specified.

3. The combination of the guide rails, a cage, tackle for operating it, and a powder case flexibly
20 bly connected to the cage.

4. The combination of the guide rails, a cage, tackle for operating it, and a powder case having a universal joint connection with the top
of the cage.

25 5. The combination of the guide rails, a cage, tackle for operating it, a trunk inclosing the rails, a cowl at the top of the trunk, and a powder case flexibly connected with the case.

6. The combination of the guide rails, the
30 cages or carriers, tackle for operating them, the trunk, the door C^2 at the bottom of the trunk, and the powder case jointed or flexibly connected with the cages, substantially as described.

7. The combination of a cage or carrier, 35 tackle for raising and lowering it, a powder case, flexibly jointed to the carrier, and a bolt a^3 for locking the carrier to the cage, and means for automatically withdrawing the bolt to permit the powder case to be tilted, sub- 40 stantially as described.

8. The combination with a gun mounting, of the upright guide rails extending from the mounting to an ammunition magazine, a stationary armored trunk or casing inclosing 45 the upper part of the rails, a cowl secured to the gun mounting and moving therewith, registering with the trunk, the cages or carriers traveling on the guide rails and having laterally projecting arms, a raising and low- 50 ering rope connected with said laterally projecting arms, a winch for operating the rope and powder cases jointed to the cages or carriers.

9. The combination with the gun mounting 55 of the upright guide rails extending therefrom to an ammunition magazine, cages or carriers adapted to travel on the rails, automatic switches controlling the course of the cages a rope connected with the cages, a 60 winch, and an adjustable connection between the winch and the rope for regulating the relative position of the carriers.

A. NOBLE.

RALPH THEW BRANKSTON.

Witnesses:

T. PURVIS,

LEO. W. WOODS.