March 9, 1948. W. V. GOODHUE ET AL 2,437,425

AMMUNITION CONTAINER

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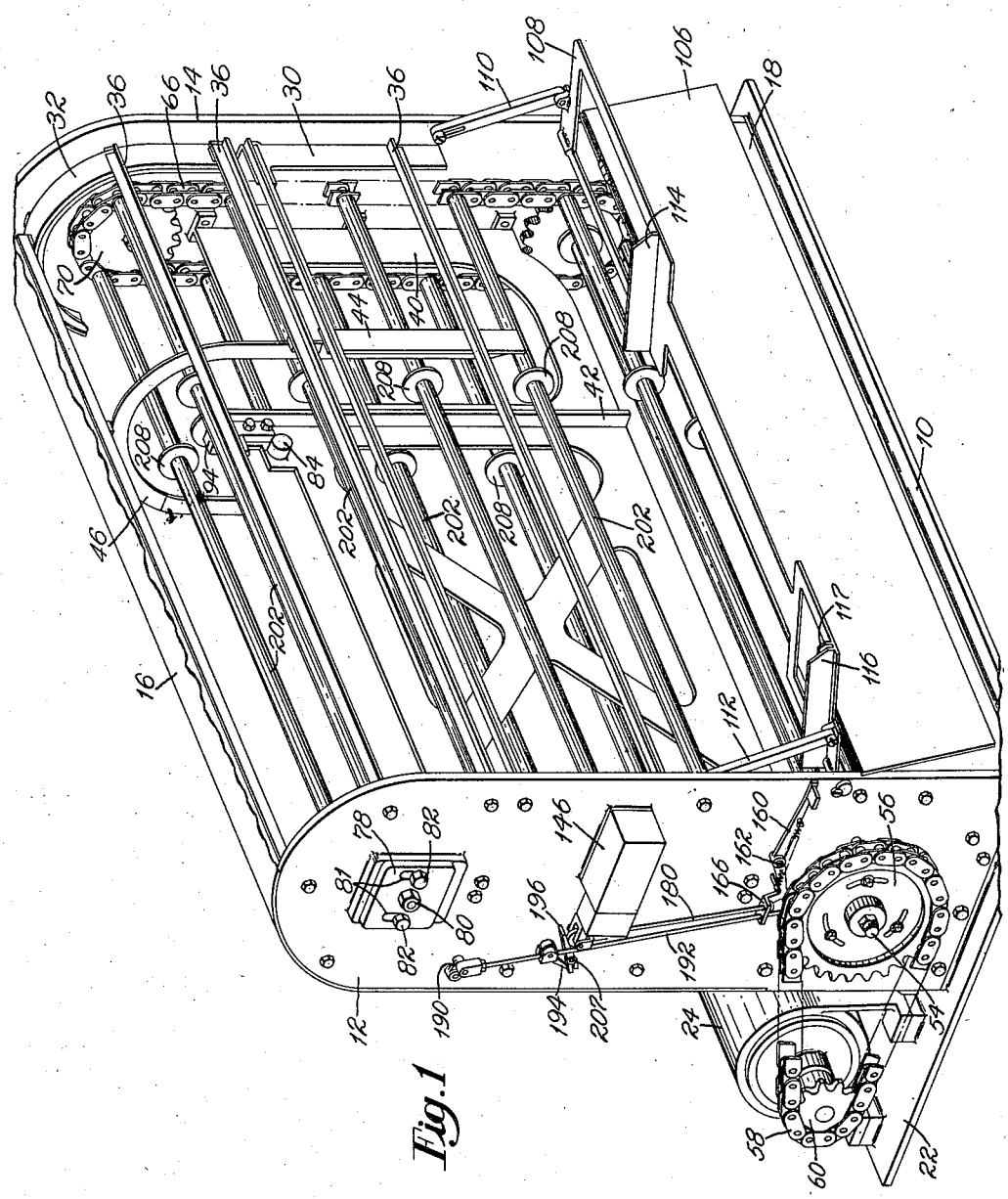


Fig. 1

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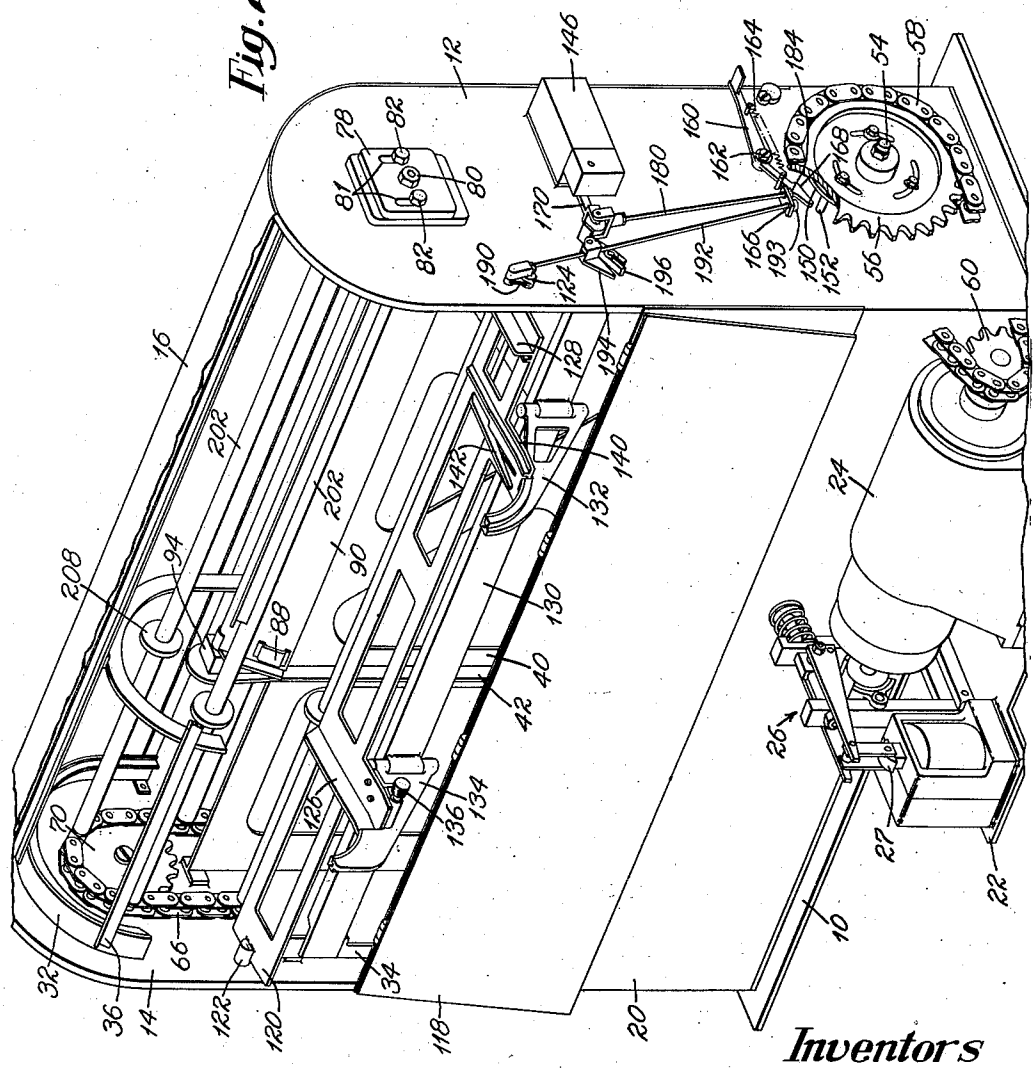
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AMMUNITION CONTAINER

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Fig. 2



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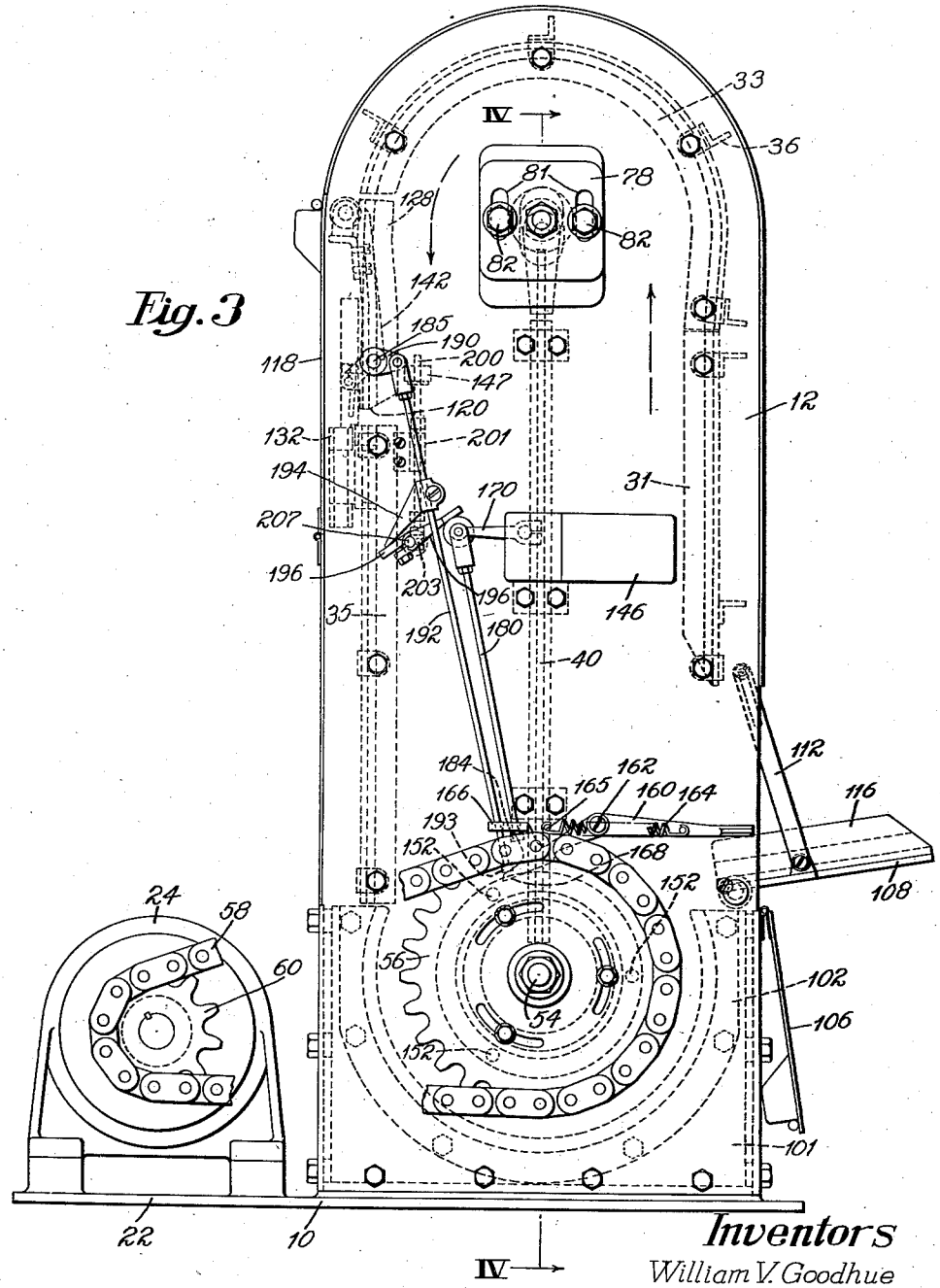
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AMMUNITION CONTAINER

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Fig. 3



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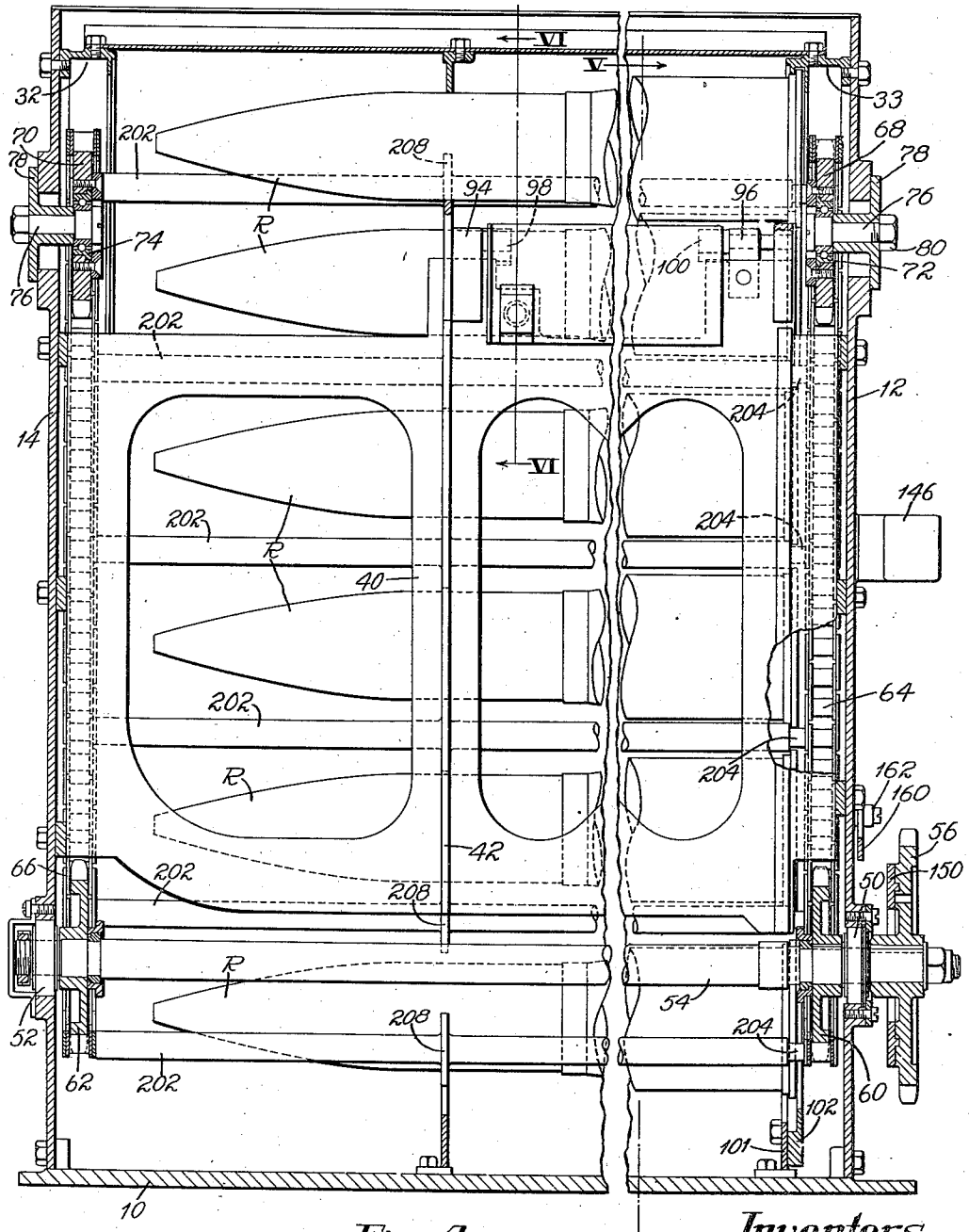


Fig. 4

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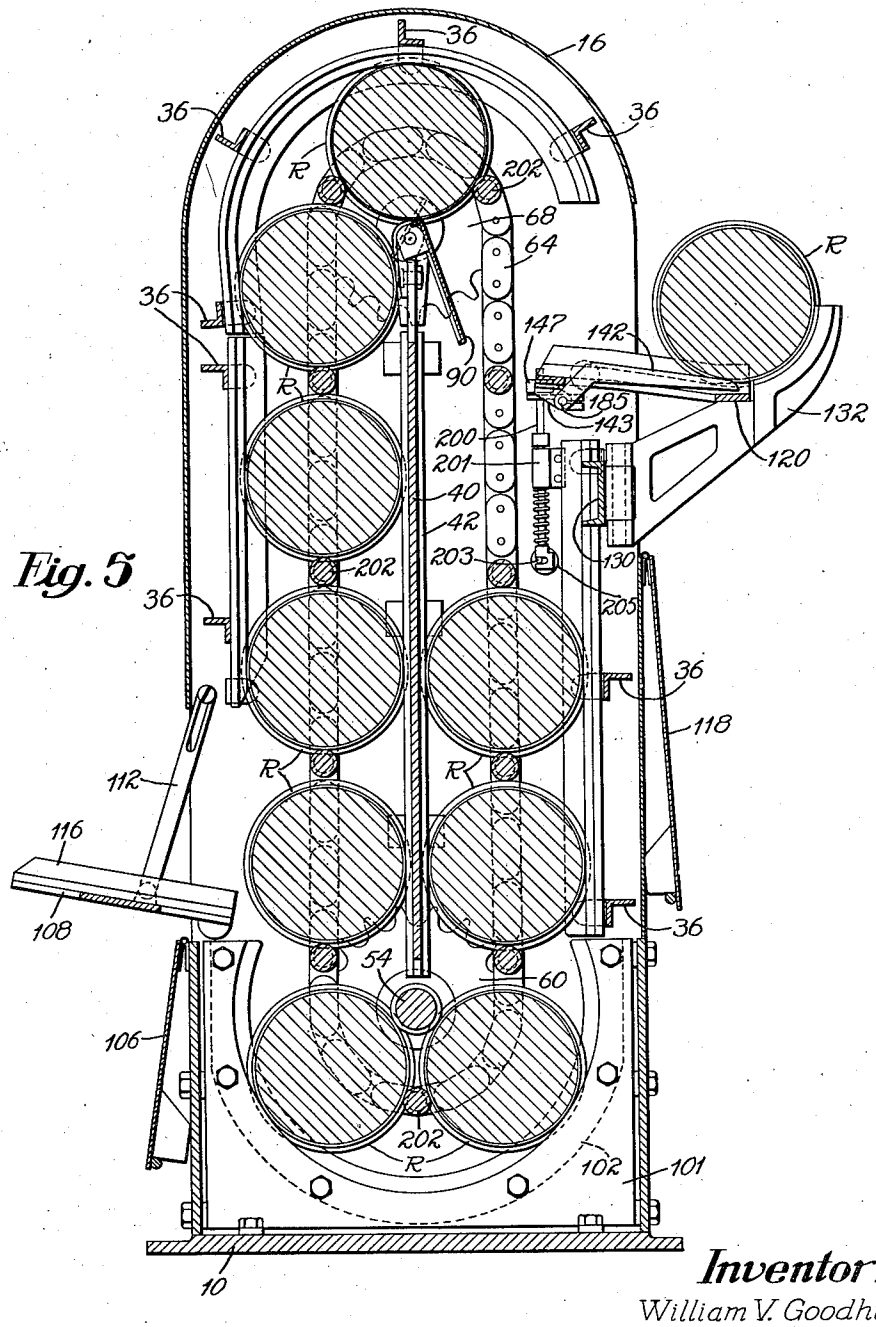


Fig. 5

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Fig. 6

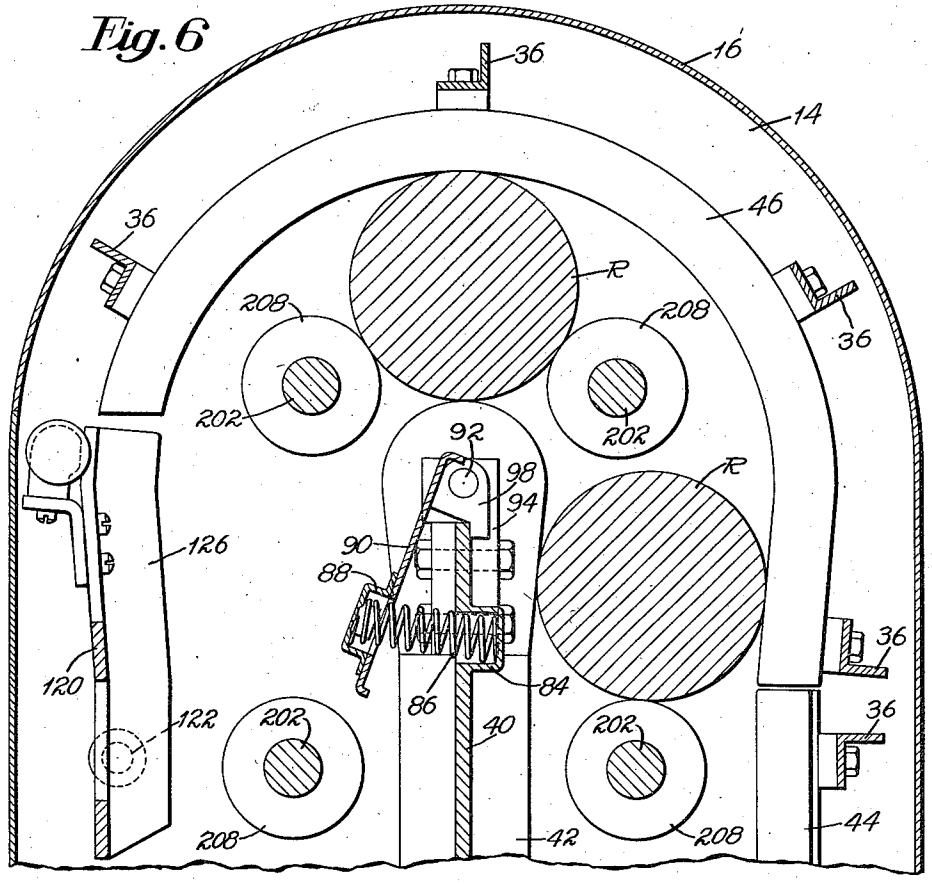
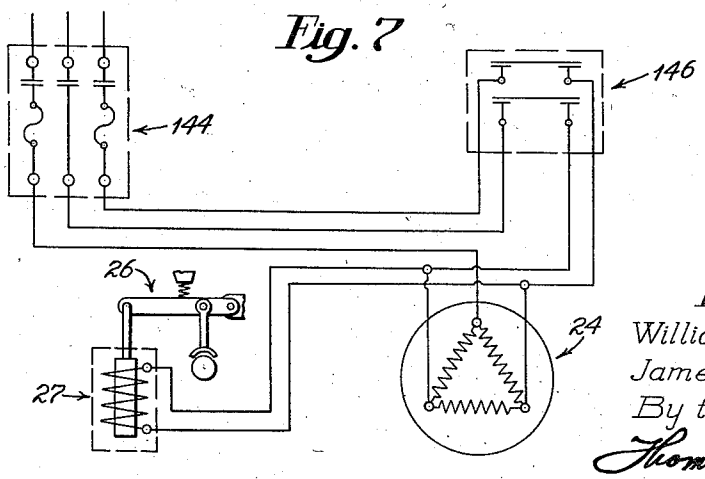


Fig. 7



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UNITED STATES PATENT OFFICE

2,437,425

AMMUNITION CONTAINER

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Application December 19, 1945, Serial No. 635,867

3 Claims. (Cl. 312—96)

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This invention relates to an ammunition container for a number of rounds of ammunition and more particularly to a container transportable as a unit and suitable for storing readily accessible ammunition near the guns to be supplied.

The invention is herein illustrated as embodied in a container suitable for mounting on the platform of a large caliber gun and arranged to store eleven rounds of ammunition, the container having an opening through which manual loading may be accomplished and a second opening from which successive rounds may be delivered with the aid of a power driven endless conveyor to a delivery apron or tray easily accessible to a gunner.

One object of the invention is to provide a transportable and unitary ammunition container including power means for successively delivering one at a time, rounds stored and protected within the container to an open and exposed position within the reach of a gunner, with means for automatically initiating the delivery of each round after the preceding round has been manually removed from the exposed position by the gunner. Another object of the invention is to provide an ammunition container which may be manually loaded with the aid of a motor driven conveyor and which will automatically and successively deliver rounds therefrom with the use of the same motor, the arrangement being such that the manual loading operation cannot interfere with the automatic delivery operation.

A feature of the invention is a novel ammunition container which is a complete unitary device for storing rounds of ammunition, the container holding a motor driven endless conveyor the power operation of which is initiated manually for the loading of each round as it is received from an inclined apron upon which it is introduced, and is controlled automatically for the delivery of each round as a preceding round is removed by the gunner for use. Another feature is an ammunition container having an endless conveyor arranged to be driven by an electric motor for the purpose of either loading the container or delivering rounds from the container with a lock or stop mechanism for preventing interference with an automatic delivery operation by untimely or inadvertent attempts simultaneously and independently to operate the conveyor for loading.

The above and other features of the invention, including novel details of construction and combinations of parts, will now be more particularly described in connection with the accompanying drawings and pointed out in the claims.

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In the drawings,

Fig. 1 is a perspective view of a container in which the present invention is embodied, the container being shown opened to receive rounds to be loaded therein and with a portion of the casing broken away more clearly to show the interior construction;

Fig. 2 is a perspective view of the delivery side of the container with the parts in positions for delivering rounds and with parts broken away for ease of illustration;

Fig. 3 is a view in elevation of the end of the container at which power is applied;

Fig. 4 is a vertical sectional view along the line IV—IV of Fig. 3 with rounds of ammunition in place on the conveyor;

Fig. 5 is a sectional view along the line V—V of Fig. 4 with nine rounds in position on the conveyor and one round delivered to a position which may be convenient for a gunner;

Fig. 6 is a partial sectional view taken along the line VI—VI of Fig. 4 and showing two rounds positioned on the conveyor; and

Fig. 7 is a diagrammatic representation of the electrical circuits controlling the conveyor.

In Figs. 1 and 2 the container is shown as embodying a base plate 10 and two vertical end plates 12 and 14, these plates being joined by a top curved casing plate 16 and bottom side plates 18 and 20. The base plate 10 is extended to one side at 22 forming a support for a motor 24 the shaft of which is provided with a conventional spring operated friction brake of the block type generally indicated at 26 (Fig. 2). A solenoid 27 is operatively connected to the brake in such a manner that energization thereof will compress the brake spring and release the brake as will be understood. End brackets 30, 32 (Fig. 1) and 34 (Fig. 2) are bolted to the end plate 14. Guide brackets 31, 33 and 35 (Fig. 3) are bolted to the end plate 12 and the plates 12 and 14 are spaced by eight stiffening bars 36 (Fig. 5) which serve to lend rigidity to the entire container. A thin plate 40 extends the length of the container interior and is vertically positioned and bolted to the end plates 12 and 14. At a position somewhat removed from one end of the container, a guide flange 42 is provided extending over the top and down both sides of the plate 40. The central flange of a T bar 44 (Fig. 1) supported by two stiffening rods 36, on the loading side of the container, is placed in the same vertical plane as is the flange 42 to serve as a guide for the rounds, as will be subsequently described. The

four uppermost horizontal stiffening bars 36 are joined by an arcuate strip 46 which is located in the same vertical plane as the flange 42 and serves also as a guiding means with the flanges 42, 44.

The bottom portions of the end plates 12 and 14 are provided with roller bearings 50 and 52 (Fig. 4) supporting a shaft 54 to which a driving sprocket 56 is keyed, which sprocket carries a chain 58 leading to a sprocket 60 on the shaft of the motor 24. Also keyed to the shaft 54 but within the rack casing are the two sprockets 60 and 62 (Fig. 4) meshing with endless chains 64 and 66 respectively. The straight runs of the chains 64 and 66 are vertical and engage sprockets 68 and 70 running in bearings 72, 74 adjustably located in the upper portion of the casing. The bearings 72 and 74 are similarly mounted, that is, each is carried on a stub shaft 76 mounted within a bracket 78 firmly held thereto by means of a nut 80. The tension of the chains 64 and 66 is suitably regulated by adjusting the vertical positions of the two brackets 78. Each bracket 78 is provided with slots 81 and bolts 82 by means of which the adjustment may be maintained.

The upper portion of the plate 40 is provided with a cup 84 (Fig. 6) containing one end of a coil spring 86, the other end of the spring 86 being retained within a cup 88 fastened to a deflector plate 90 which, in turn, is pivoted at 92 on brackets 94 and 96 (Fig. 4) bolted to the plate 40 thereby forming a buffer the operation of which will be subsequently described. The suspension of the plate 90 is by means of pivoting bosses 98 and 100 which bosses are provided with shoulders for contacting the upper end of the plate 40 and for limiting the outward swinging movement of the deflector plate or buffer 90. Near one end of the casing the bottom of the container is provided with an arcuate plate 101 (Fig. 4) to which is bolted an arcuate guiding track 102.

At the back or loading side the container (Fig. 1) is provided with a door 106 which may be lowered to uncover a loading apron 108 pivoted for downward swinging movement upon short shafts extending from and held in the two end plates 12 and 14. Slotted links 110 and 112 limit the extent of downward movement of the apron and hold it when in its lowered position at an inclination such as to cause a round placed on the apron to roll gently into place on the conveyor. The loading apron 108 is provided with shell guiding flanges 114 and 116. As each round introduced should roll properly, flange 114 is of a height to allow for the smaller diameter of the shell itself as compared with the cartridge casing. Flange 116 has a parallel smaller flange 117 and these two flanges cooperate in guiding the rim of the cartridge casing. At the front or delivery side of the container a door 118 (Fig. 2) is hinged to the top edge of the casing plate 20 and in Fig. 2 is shown in its lowered position, disclosing a delivery apron 120 which is pivoted at 122 and 124 upon the casing end plates 14 and 12 to swing outwardly. The delivery apron 120 bears shell guiding flanges 126 and 128 similar to the flanges 114 and 116 of the loading apron. Beneath the delivery apron is a channel bar 130 (Figs. 2 and 5) extending from one end of the container to the other and bearing swinging brackets 132 and 134. The bracket 134 has a locking pin 136 (although not essential) for holding it with relation to the apron in its outermost position as shown in Fig. 2 and the bracket 132 may be provided with a similar pin (not shown) for locking it in its outermost position. An arm 140 extends outwardly from the delivery apron 120 and a trigger mechanism or pivoted trigger finger 142 is mounted closely adjacent thereto to perform a function as is described hereinafter.

The operation of the motor 24 is controlled by a master switch 144 only diagrammatically illustrated in Fig. 7 and also by an indexing control switch 146 mounted on one end of the container. The exterior sprocket 56 driven by the motor is provided with a circular plate 150 which is adjustably affixed thereto by means of three bolts extending through three arcuate slots in the sprocket 56 as shown in Figs. 2 and 3. The plate 150 is provided with three pins 152 (Fig. 3) extending toward the end plate 12. Fig. 2 shows one of the pins 152 more clearly. A manual control lever 160 is pivoted to the casing at 162 and one end of a spring 164 extending from a pin 165 on the container plate 12 is attached thereto for swinging the lever 160 either up or down beyond a dead center position. The lever 160 is bent to form a flange 166 and is also formed to provide a toe section 168. The operation of indexing the conveyor control switch 146 is primarily performed by an arm 170 pivoted to a rod 180 which, at its lower end, passes loosely through an enlarged opening in the flange 166. Rod 180 carries a knob 184 adapted to be engaged by the flange 166. The trigger mechanism or finger 142 extending over the delivery apron 120 has a rearwardly extending fork 143 (Fig. 5) adapted to engage the under side of a head or collar 147 formed at the upper end of a vertically actuable rod 200.

The delivery tray or apron 120 is pivoted on the same center 185 (Fig. 5) as the trigger finger 142, and the arrangement is such that a swinging of the apron 120 rotates a lever 190 on the exterior of the casing, to which lever is pivoted the upper end of a rod 192. Clamped to the rod 192 is an arm 194 which serves to hold a switch operating lever 196 out of engagement with a roller on the arm 170 of the indexing control switch 146 when the apron 120 is in its closed or inner position and the operation of the conveyor is to be controlled for the purpose of loading the container, as will be further described. The vertical rod 200 (Fig. 5) is spring-loaded inside the casing in relation to a supporting bracket 201 and tends to hold the lever 196 (Fig. 3) against the roller of the switch control lever 170 through an eccentric arrangement. For this purpose, the lower end of the rod 200 is provided with a horizontal slot engaging a pin 203 (Fig. 5) eccentrically mounted on a disk 205 which serves as a crank to turn a shaft 207 (Fig. 3). This latter shaft passes through and outside the end plate 12 of the rack casing. The lever 196 is suitably affixed to the shaft 207 so that they rotate together when actuated by a vertical movement of the rod 200. The lower end of the rod 192 extends loosely through an enlarged opening in the flange 166 of the control lever 160 and the rod 192 has a knob 193 on its lower end which is adapted to engage the toe 168 of the lever 160 during delivery of rounds to the tray 120.

The conveyor chains 64 and 66 support eleven parallel rods 202 suitably spaced to hold the rounds R (Figs. 4, 5 and 6) in their proper positions for storage and handling. Each rod 202 is provided with a groove 204 (Fig. 4) for receiving the ridge or rim at the end of a cartridge casing.

The operation of the container may be described as follows: When the main power switch 144 is "on," the starting and stopping of the con-

veyor is controlled by the indexing control switch 146. This switch is operated manually during the loading of the container and automatically during round delivery. With both switches 144 and 146 on, the electric motor 24 will rotate the sprockets through the chain drive and cause operation of the conveyor. With both aprons 108 and 118 closed, the guiding flanges on those aprons retain the rounds in place on the conveyor and the rounds are moved around smoothly, their guidance being aided by guide disks 208 mounted on the bars 202. As the shell of each round is smaller in diameter than the cartridge casing the disks 208 serve to keep the shells properly spaced and each round in a horizontal position.

When loading the conveyor, the loading door 106 is first opened and then the loading apron 108 is lowered into the position shown in Figs. 1 and 3. The main power switch 144 is closed and the first round is then placed on the apron 108, the end or rim of the cartridge casing being guided by the flanges 116 and 117. The round is then rolled onto a rod 202 of the shell carrier with a slot 204 of the rod receiving the flange on the cartridge casing and holding the round against endwise movement. The lever 160 is then tripped upwardly (in a counterclockwise direction) beyond dead center, thereby closing the contacts of the control switch 146 by pulling down on rod 180 and lever 170. This energizes the motor brake solenoid 27 and driving motor 24, as can be seen in the diagram of Fig. 7, causing the brake 26 to be released and the motor shaft to rotate, with the consequent rotation of the conveyor in the direction of the arrows as shown in Fig. 3. The conveyor continues to move until one of the sprocket ring pins 152 contacts the under side or cam surface of the toe 168 of lever 160. This cam surface was moved into the path of the pins 152 when the opposite end of lever 160 was tripped upwardly. Contact of a pin 152 with the cam surface with the aid of the spring 164 causes the control lever 160 to return to its original position (as in Fig. 3) and the switch operating rod 180 to open the contacts of the indexing control switch 146 deenergizing the driving motor and brake solenoid. The switch 146 is so constructed that lever 170, when released, is biased by a spring (not shown) into the "open" position. The motor and conveyor will therefore come to rest with the next round carrier rod 202 at the loading station to receive the next round from the loading apron 108. The pins 152 are held in angular adjustment about the shaft 54 by means of the bolts attaching the plate 150 to the sprocket 56. This adjustment is provided so that the pins 152 may be set to stop the conveyor in the proper position relative to the loading station. After eleven rounds have been placed on the conveyor the apron 108 should be closed. If the ammunition container is not to be used immediately the cover 106 should also be closed.

The round delivery station is located in the upper front section of the container and is shown in the open or delivery position in Figs. 2 and 5. When not in use the delivery station is closed, as shown in Fig. 3. If rounds are to be delivered to the delivery apron 120, door 118 is lowered, as shown in Figs. 2 and 5. After making sure that the main switch 144 is open (as it should be when the container is not being used except for storage), brackets 132 and 134 are first swung outwardly, and the delivery apron 120 is then lowered to a slightly inclined position, as in Fig. 5. The main switch 144 must be open when the

delivery apron 120 is lowered, as the conveyor would otherwise start because of the trigger finger 142 being in its raised position. Lowering or opening the apron 120 serves to lift the rod 192 by means of the lever 190. This brings the collar or knob 193 on the lower end of the rod 192 up against the flange 166, thereby preventing the manual control lever 160 from being tripped accidentally. It is clear that the automatic delivery operation should not be interfered with by a simultaneous actuation of the switch 146 through the lever 160. The lifting of the rod 192 also lifts the arm 194, permitting the lever 196 to close the switch 146, when required to do so, by the finger 142 acting through the fork 143, rod 200, pin 203, disk 205 and pin 207. The deflector or buffer 90 is adapted to yield as the rounds pass down over it during the loading operation with the apron 120 in the closed position, but when the delivery apron is open, the rounds are successively deflected out onto the delivery apron guides 126 and 128 as needed and as the conveyor is operated. The presence of a round at the delivery station and on the delivery apron 120 causes a depression of the finger 142, thereby raising the spring-loaded rod 200 by means of the fork 143 on the rear end of the finger 142 engaging the collar or head 147 on the rod 200. The pin 203 extending horizontally from the slot in the bottom end of the rod 200 is thereby lifted, and the lever 196 will rotate in a counterclockwise direction as viewed in Fig. 3. It can be seen, therefore, that, as each round of ammunition rolls onto the delivery apron 120, the finger 142 is depressed, this action permitting the lever 170 to swing upwardly and thereby open the contacts of the switch 146 and stopping the conveyor. When a round is removed from the apron 120, the finger 142 will rise because of the spring on the rod 200, and the rod 200 will lower slightly and, by means of the pin 203, will rotate lever 196 to close the switch 146, thereby starting the conveyor and causing another round to be deflected out upon apron 120.

When the delivery apron 120 is in its closed position (as it is in Fig. 3), the lever 190 holds the rod 192 in its lowest position. At the same time, the arm 194 (which is attached to the rod 192) holds the lever 196 from rotating in a clockwise direction as viewed in Fig. 3 and prevents the finger 142 and the spring-loaded rod 200 from closing the switch 146.

The entire device is compact and so constructed that it may be provided with porter bars (not shown) or other means facilitating its being transported as a complete unit.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent of the United States is:

1. An ammunition container comprising a casing having a delivery opening, means for supporting a round outside said opening and accessible to a gunner, power means for conveying successive rounds within said casing and through said opening, and a trigger mechanism operated by the weight of a round on said supporting means for terminating the operation of said power means, the said container forming a transportable and protective ammunition storage unit.

2. An ammunition container for mounting upon a gun platform, said container comprising a vertical casing with sprockets at each end supporting an endless chain conveyor for moving rounds in a circuit within said casing and extending vertically by a loading opening and a delivery open-

ing, an apron pivoted to extend into and from each of said openings, power means for operating said conveyor, buffer means located adjacent to said delivery opening and arranged to yield upon passage of the rounds in said circuit when passage of the rounds through the delivery opening is closed by one of said aprons and to discharge the rounds when the delivery opening is open, means for manually controlling said power means during the loading of rounds on the other of said aprons and through said loading opening, automatic means for controlling said power driven means to deliver one round at a time for delivery by said buffer means, said automatic means comprising a trigger mechanism located in position to be operated by contact with successively delivered rounds, and covers for said openings.

3. An ammunition container comprising a casing having a loading opening and a delivery opening, power driven parallel spaced means arranged to support and convey successive rounds from a position adjacent one opening to a position adjacent the other, means for manually controlling

said power driven means during the loading of rounds through said loading opening, automatic means for controlling said power driven means to deliver one round at a time through said delivery opening, said automatic means comprising a trigger mechanism located in position to be operated by contact with successively delivered rounds, and means for locking said manual control means when said automatic control means is in operation.

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