July 25, 1961 C. K. WOODMAN 2,993,414

AMMUNITION FEED MECHANISM

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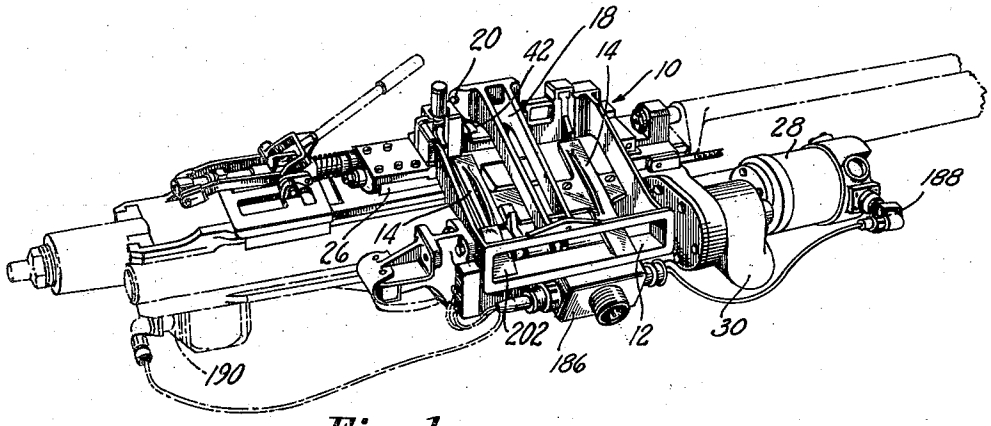


Fig. 1

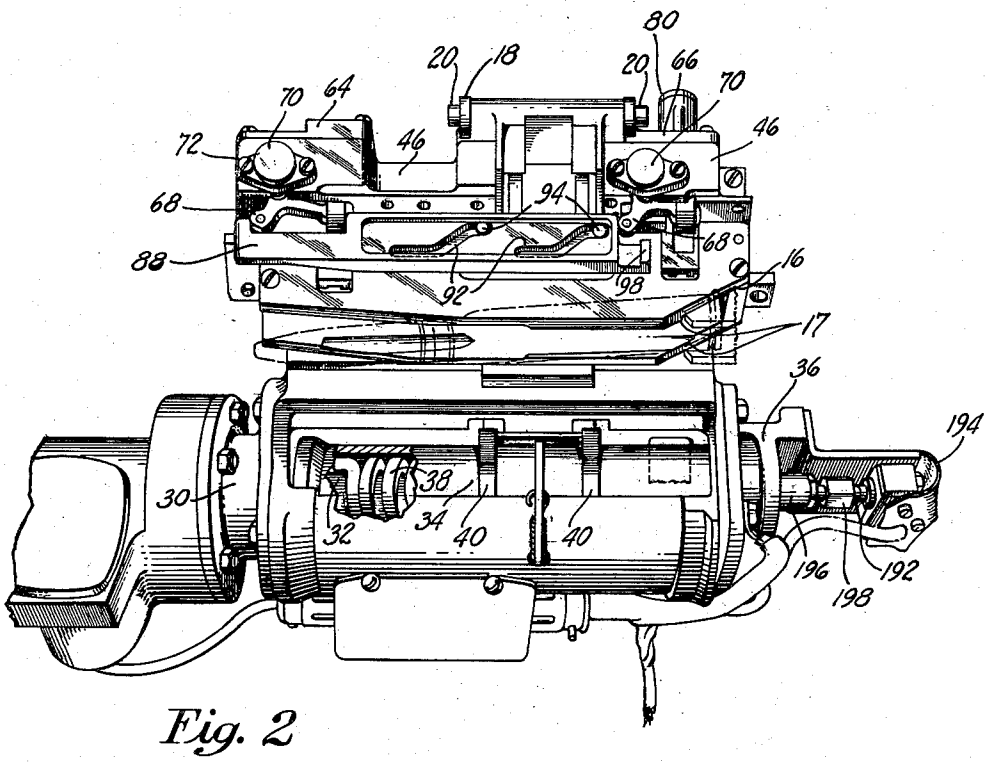


Fig. 2

Inventor:
Charles K. Woodman
By his Attorney

July 25, 1961

C. K. WOODMAN

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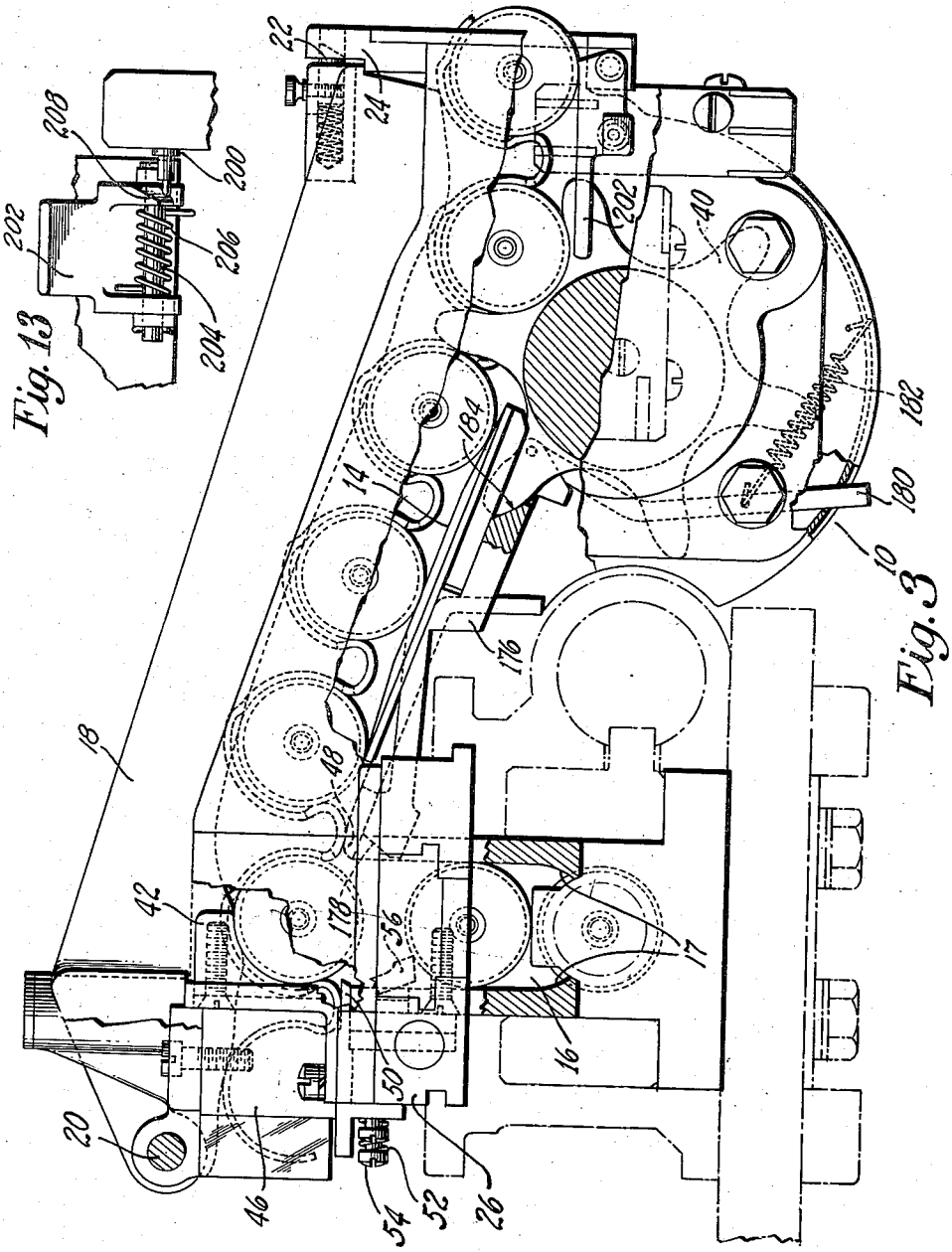


Fig. 13

Fig. 3

Inventor:

Charles K. Woodman

By his Attorney

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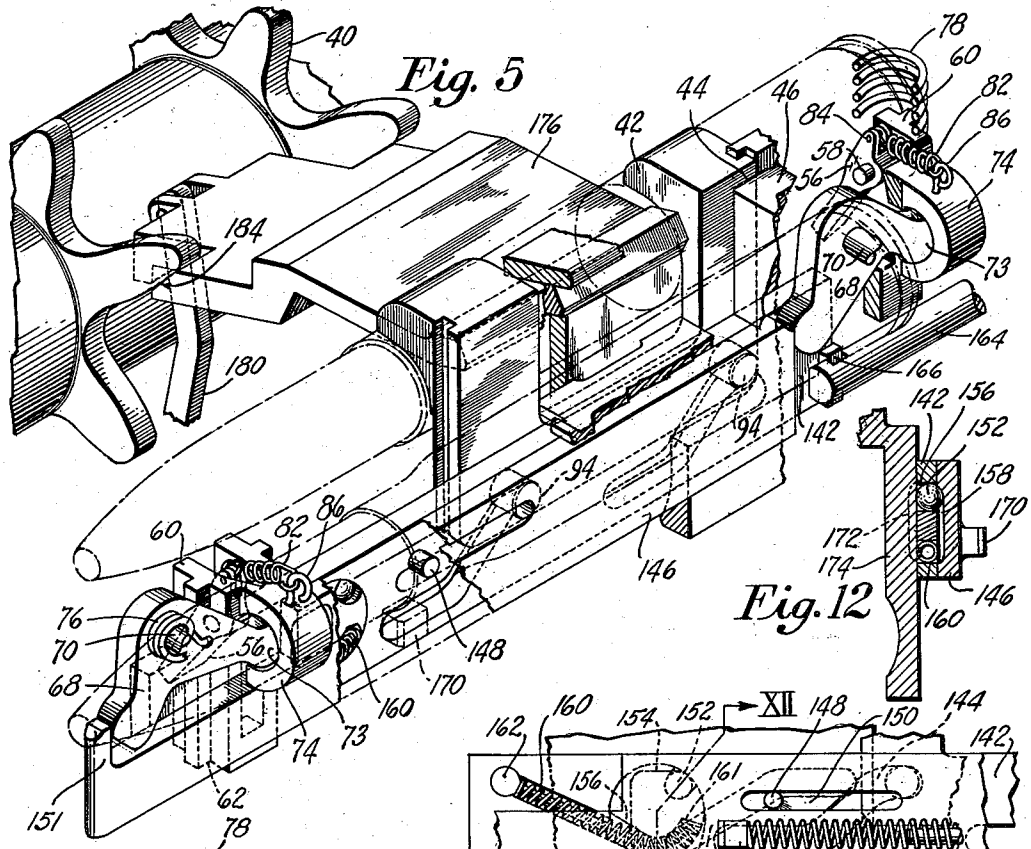


Fig. 5

Fig. 12

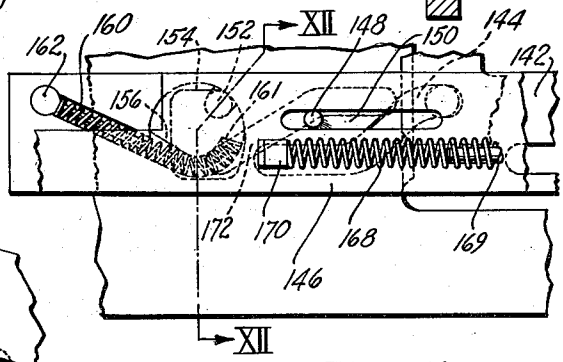


Fig. 11

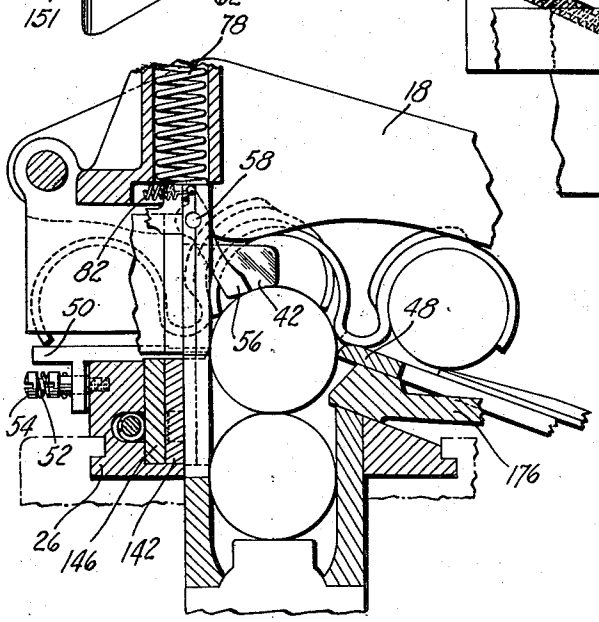


Fig. 4

Inventor:
Charles K. Woodman
By his Attorney

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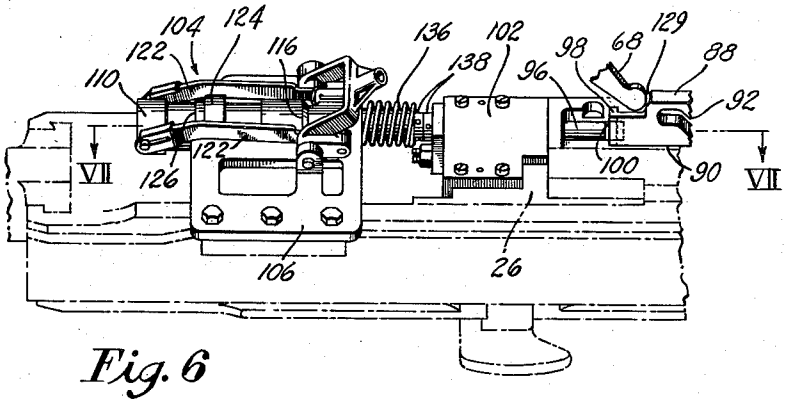


Fig. 6

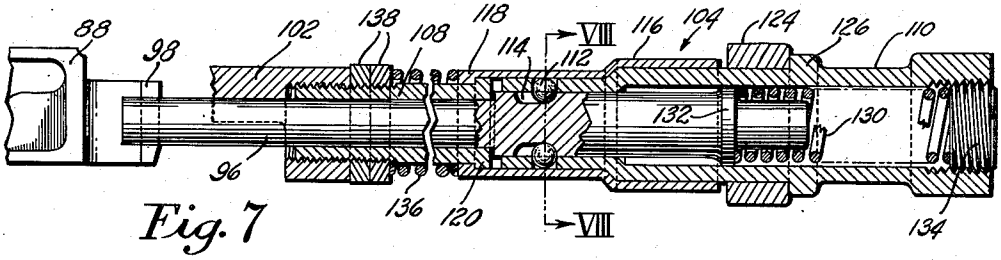


Fig. 7

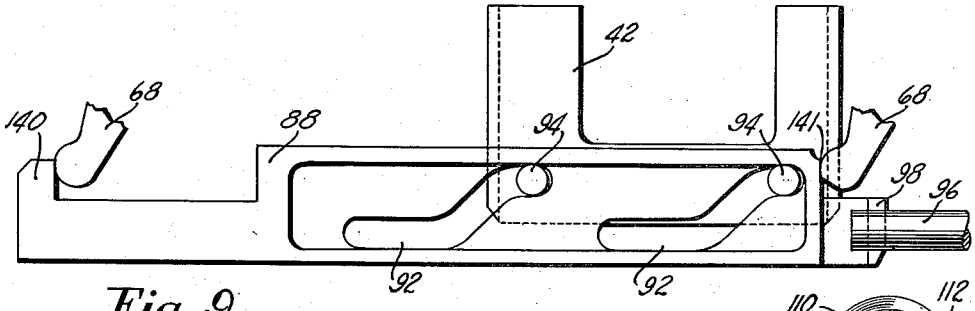


Fig. 9

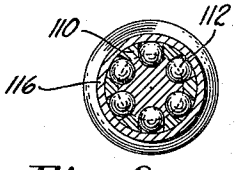


Fig. 8

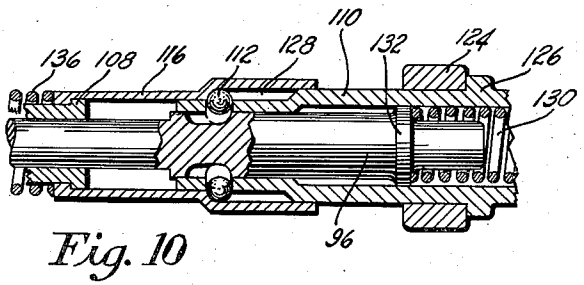


Fig. 10

Inventor:
Charles K. Woodman
By his Attorney

United States Patent Office 2,993,414 Patented July 25, 1961

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AMMUNITION FEED MECHANISM

Charles K. Woodman, Beverly, Mass., assignor to United Shoe Machinery Corporation, Flemington, N.J., a corporation of New Jersey

Filed June 5, 1946, Ser. No. 674,542
8 Claims. (Cl. 89—33)

This invention relates to means for supplying ammunition to automatic guns, such as those used in aircraft, from a linked belt and is particularly concerned with an automatic feed mechanism mounted on a gun.

An object of the invention is to increase the belt pulling capacity of such feed mechanisms, particularly their ability to lift a long belt, and to insure simultaneously a delivery of successive cartridges from the belt to the breech mechanism without reducing the firing rate of the gun. Another object of the invention is to reduce the overall dimensions of such feed mechanisms so that they can be used readily and effectively within a confined space such as in the wings of aircraft.

The links forming an ammunition belt have a ring portion which embraces slightly more than half the circumference of the large case portion of a cartridge. It has been customary, heretofore, in feed mechanisms for 20 mm. guns, to move the cartridges axially until their reduced portions reach the rings and then to effect removal of the links. The released cartridges drop into the path of the breech bolt. The feed mechanism of the present invention removes the cartridges from the links diametrically, feeds them into the breech mechanism, and holds them firmly in position to be picked up by the breech bolt. This eliminates the space consuming mechanism for axial displacement of the cartridges and insures control over each cartridge until it is chambered.

Accordingly, one feature of the invention provides an ammunition feed mechanism in which the leading cartridges fed into the mechanism in a belt are engaged above the feeder mouth of the mechanism and stripped from the belt by a vertically movable member. Another feature of the invention provides vertical feed members which assume control of the stripped cartridge and hold it in position to be picked up by the breech bolt of the gun.

The invention also provides novel means for actuating the stripping and vertical feed members as well as a control for terminating the horizontal feed when the last cartridge in the belt passes beyond the horizontal feed means.

In the accompanying drawings,

FIG. 1 is an angular front view of a right hand feed mechanism mounted on a gun;

FIG. 2 shows the feed mechanism opened up to reveal features of its internal structure;

FIG. 3 is a left hand side view of the feed mechanism, partly in section, showing the leading round in the belt in position to be stripped from the belt;

FIG. 4 is a fragmentary view showing the leading round stripped from the belt;

FIG. 5 is an angular view of the stripper and the vertical feed units, seen from the back of the feed mechanism;

FIG. 6 is an angular view of a release mechanism on the gun;

FIG. 7 is a view of the release mechanism, partly in section, on line VII—VII of FIG. 6;

FIG. 8 is a section on line VII—VII of FIG. 7;

FIG. 9 is a rear view of a cam bar cooperating with the release mechanism shown in FIGS. 6 and 7;

FIG. 10 is a partial view, similar to FIG. 7, showing the parts of the release mechanism in a different position;

FIG. 11 is a rear view of a modified form of release mechanism;

FIG. 12 is a section on line XII—XII of FIG. 11; and

FIG. 13 is a detail view of a safety switch for controlling the feed motor, with the switch operating plate in raised position.

General

The feed mechanism for providing a gun with ammunition comprises a small, compact frame **10** (FIG. 1) containing a horizontal feed unit, a stripper unit, and a vertical feed unit which cooperate to bring successive rounds or cartridges from an ammunition belt, by means of which the rounds are supplied to the feed mechanism, into the path of the reciprocating gun breech bolt in a manner to be described. The gun, as illustrated, is a 20 mm. aircraft gun. The belt, i.e., the linked rounds, enters the frame through an ammunition mouth **12** at the front of the frame and moves along a slightly upward inclined path over a guard **14** to the upper end of a feeder mouth **16** (FIGS. 2 and 3) formed by downward projecting walls of the frame. The feeder mouth engages in the breech bolt passageway of the gun and has lips **17** for supporting rounds in the path of the breech bolt.

As the rounds move through the feed mechanism in their substantially horizontal path, upward displacement of the rounds is prevented by a cover **18** (FIG. 3) which is pivoted to the back of the frame **10** by pins **20**. The cover is held in closed position by a spring pressed latch **22** engaging a projection **24** on the frame portion surrounding the ammunition mouth **12**.

The feed mechanism is secured to a magazine slide **26** (FIGS. 1 and 3) by means of screws. This slide is similar to the slides ordinarily mounted in the receiver bodies of guns of the present type and remains stationary during the firing of the gun, permitting movement of the gun relatively thereto during recoil and counterrecoil.

Horizontal feed unit

A motor **28** (FIG. 1) furnishes the force for lifting the belt and moving it horizontally through the feed mechanism into position above the feeder mouth. The motor is secured to a gear box **30** attached to the frame **10** and containing a non-reversing reduction gear mechanism (not shown). The input of the motor into the reduction gear mechanism is at 2000 r.p.m.; the output speed of the reduction gear mechanism is 130 r.p.m. The reduction gear mechanism rotates a feed shaft **32** (FIG. 2) mounted in the frame **10**. Surrounding the feed shaft is a sprocket tube **34**, one end of which rotates about a collar (not shown) on the feed shaft **32** and the other end of which rotates in bearings in a sprocket tube housing **36** secured to the frame **10**. Mounted within the sprocket tube and surrounding the feed shaft is a torsion spring **38**, one end of which is joined to the shaft collar referred to above and the other end of which is secured in an opening in the breech end of the sprocket tube. The spring **38** is wound by the motor to impart rotation to the sprocket tube and thus to feed the ammunition belt horizontally by means of two sprockets **40** which are formed on the tube and engage successive rounds in the belt (see FIG. 3).

Stripper unit

As successive rounds are moved into position above the feeder mouth **16**, they engage a stripper **42** (FIG. 5) mounted for vertical movement in guideways **44** of a member **46** forming the rear wall of the feed mechanism. The stripper **42**, as shown in FIG. 5, has two projections, which are spaced apart approximately the width of a link and the inner faces of which are rounded to conform to the curvature of the rounds so that each round is firmly

engaged by the stripper as it reaches its position above the feeder mouth. At this time the links engaging a round above the feeder mouth rest on ledges **48** (FIG. 3) formed at the inner ends of the guard **14** and on a link plate **50** mounted in an opening of the wall **46** thus supporting the round in position to be stripped. When the stripper **42** is actuated to strip a round from the links, as will be described below, the link plate **50** may yield outward from its link supporting position against the pressure of a spring **52** to permit downward movement of the round. The pressure of the spring **52** may be adjusted by means of a screw **54**.

Vertical feed unit

Two feed fingers **56** (FIG. 5) serve to move the stripped rounds downward in the feeder mouth into position to be picked up by the breech bolt. The fingers **56** are pivotally secured to slides **60** by pins **58**. The slides **60** are vertically movable in guideways **62** formed in the wall **46**. Means for imparting upward and downward movement to the slides are mounted in housings formed in the wall **46** back of the guideways **62**, the tops of the housings being closed by a front cover **64** (FIG. 2) and a rear cover **66** secured to the wall **46**.

The means for moving the slides **60** include bell crank levers **68** mounted to swing about pins **70** (FIGS. 2 and 5) secured to the wall **46** by screws **72** (FIG. 2). An arm **73** (FIG. 5) of each bell crank lever **68** fits into an opening formed in a curved projection **74** on the back of each slide **60**. Counterclockwise movement of the bell crank levers **68**, as seen in FIG. 5, by means to be described below, raises the slides **60** and fingers **56**.

Downward movement is imparted to the slides in the following manner. A torsion spring **76** surrounds the pin **70** of the front bell crank lever **68**, one end of the spring **76** being connected to the bell crank lever and the other to the pin. Acting on the rear slide **60** is a compression spring **78** which is mounted in a housing **80** (FIG. 2) integral with the rear cover **66** and which engages the upper face of the rear slide **60**. The springs **76, 78** are energized by the counterclockwise movement (FIG. 5) of the bell crank levers **68** and upon release of the bell crank levers assume control of the slides **60** to impart downfeed movement to the slides.

The forward ends of the feed fingers **56** are normally held in position to engage the top of a round, as shown in FIGS. 3 and 4, by means of springs **82** connected to pins **84** in the fingers **56** and to hooks **86** on the projections **74** of the slides **60**. The springs **82** permit the fingers to yield inward and downward as a round passes the fingers during its downward movement out of engagement with the belt, at which time the slides **60** are moving upward. When the round has passed the fingers, the springs **82** immediately move the ends of the fingers outward into round engaging position in preparation for the downward feed.

The stripping and vertical feed units may be actuated by either of two alternative forms of actuating means, the first, and preferred form, being shown in FIGS. 2, 6, 7, 8, 9 and 10 and the second, alternative, form being shown in FIGS. 4, 5, 11 and 12. These two forms of actuating means will now be described separately.

Actuating means (modification 1) for stripping and vertical feed units

The stripper **42** is moved up and down by means of a cam bar **88** (FIG. 2) mounted in ways **90** (FIG. 6) of the magazine slide **26**. The cam bar has formed therein two cam tracks **92** (FIG. 9) in which pins **94** projecting from the back face of the stripper **42** engage.

The cam bar **88** is moved longitudinally, widthwise of the feed mechanism, by means of a rod **96**, a hook **98** on the rear portion of the cam bar **88** engaging in a notch **100** (FIG. 6) formed in the forward end of the rod **96**. The forward end of the rod **96** is mounted in an extension plate **102** of the frame **10**. The rod portion extending rearward beyond the plate **102** is joined to a release mechanism **104** (FIGS. 6 and 7) carried by a bracket **106** secured to the gun. Thus, the rod participates in the recoil movement of the gun.

In order more clearly to understand the actuation of the stripper and the vertical feed units, the release mechanism will first be described. The rod **96** extends through a rod guide **108**, the forward end of which is threaded into a socket provided in the plate **102** (FIG. 7). Adjacent to the rod guide **108** the rear end of the rod **96** is surrounded by a cage **110** containing six balls **112** (FIGS. 7 and 8). The diameters of the balls exceed the thickness of the cage in which they are mounted so that the balls engage in a depression **114** (FIG. 7) of the rod **96** thus coupling the rod to the cage. Mounted on the forward end of the cage **110** is a sleeve **116** which maintains the balls **112** in the cage. An inward extending radial projection on the front end of the sleeve **116** engages an outward extending radial projection on the rear end of the rod guide **108**. The cage is joined to the bracket **106** by links **122** each secured at one end to the bracket **106** and at its other end to the cage **110** (FIG. 6). In addition, an annular portion **124** formed on the bracket **106** and surrounding the cage **110** abuts a projection **126** on the cage. The cage will thus participate in the movements of the bracket **106**, and the gun to which it is secured during recoil and counterrecoil.

During the recoil movement of the gun parts, the annular portion **124** of the bracket **106** will force the cage **110** rearward. The balls **112** at first move along the inner face of the sleeve **116** held against movement by the rod guide **108**. After five-eighths of an inch of recoil the balls are moved into a position opposite a space **128** (FIG. 10) formed by an enlarged portion at the rear end of the sleeve and opened by the recoil movement of the cage. At this time a preloaded spring **130**, the forward end of which abuts an annular portion **132** on the rod **96** and the rear end of which abuts a plug **134** threaded into the end of the cage, forces the balls out of the depression **114** in the rod **96** and upward into the space **128**, as shown in FIG. 10, thereby releasing the rod **96** which is then moved forward by the spring **130**. The cage **110** continues its rearward movement with the recoiling gun, the balls now moving along the inner face of the enlarged portion of the sleeve **116**.

During the counterrecoil movement of the gun the cage is moved forward with the gun parts by the links **122**. The rod **96** is stationary at this time, having completed its forward or return movement to its initial position. Thus the counterrecoil movement of the cage **110** relatively to the rod **96** will load the spring **130** in preparation for imparting forward movement to the rod during the next recoil movement of the gun. When the balls **112** reach their position of engagement with the inclined face formed by the inner end of the sleeve enlargement (FIG. 10) they move the sleeve **116** forward relatively to the rod guide **108**. This movement of the sleeve compresses a spring **136** which surrounds the rod guide **108** between the sleeve and the plate **102**. As the balls **112** again reach their position above the depression **114** of the rod **96** the spring **136** has been compressed sufficiently to prevent continued forward movement of the sleeve **116** and the balls are forced downward back into the depression **114**, again coupling the rod **96** and the cage **110**. The spring **136** then moves the sleeve **116** rearward to its initial position shown in FIG. 7. The force of the spring **136** may be varied by two collars **138** threaded onto the rod guide **108**.

The stripper and vertical feed units are actuated in the following manner. The recoiling cage **110**, through the balls **112**, moves the rod **96** accordingly, the rod carrying the cam bar **88** with it. During the rearward movement of the cam bar **88** the pins **94** of the stripper **42** will move downward in the cam tracks **92** of the bar

88 and the stripper 42 will be moved downward, moving a round out of engagement with the belt. While moving rearward with the rod 96, the cam bar 88 simultaneously rotates the bell crank levers 68 in counterclockwise direction as seen in FIG. 5, a projection 140 (FIG. 9) on the front end of the cam bar 88 engaging one arm of the front bell crank lever 68 and the rear edge 141 of the bar engaging one arm of the rear bell crank. Counterclockwise movement of the bell crank levers 68 moves the slides 60 upward in preparation for their feed movement, and simultaneously compresses the spring 78 and winds the spring 76. Forward or reverse movement of the rod 96, occurring after five-eighths of an inch of recoil, release the bell cranks 68, permitting the springs 76, 78 to impart downward feed movement to the feed fingers 56. At the same time the stripper 42 will be moved upward by the upward movement of the stripper pins 94 in the cam tracks 92.

Actuating means (modification 2) for stripping and vertical feed units

A modified type of actuating means for the stripper and the slides 60 may be used in place of that described above. In includes a stripper cam bar 142 (FIG. 5) similar to the bar 88 and mounted for movement widthwise of the feed mechanism in guideways of the magazine slide 26. The stripper cam bar 142 is also provided with two cam tracks 144, like the cam tracks 92, in which the pins 94 on the stripper 42 engage. In accordance with the modification, a separate finger operating slide 146 is provided for moving the feed slides 60 upward and for energizing the springs 76, 78. The finger operating slide 146 is mounted for movement in the magazine slide 26 back of the stripper cam bar 142, the rear edge of the slide engaging the left arm (FIG. 5) of the rear bell crank lever 68 and a projection 151 on the front end of the slide engaging the left arm of the front bell crank 66. To guide the finger operating slide 146 during its movement with, as well as during its movement relatively to, the stripper cam bar 142, a dowel 148 on the stripper cam bar moves in a longitudinal slot 150 (FIG. 11) of the finger operating slide. The bar 142 and slide 146 may be adjusted relatively to each other by a screw (not shown).

The cam bar 142 and the slide 146 are coupled for movement as a unit by means of a ball 152 (FIG. 11) seated in a cage 154 mounted for rotation in an opening of the stripper cam bar. The diameter of the ball 152 is greater than the width of the stripper cam bar opening and projects beyond said opening into a socket or depression 158 (FIG. 12) of the finger operating slide 146. The ball 152 is normally held in its upper position shown in FIG. 11 by means of a spring 160 which engages a face 161 on the cage 154. The spring 160 is partially mounted on a pin 162 positioned in a slot extending from the cage opening, the free end of the spring projecting into the opening to engage the cage.

The stripper cam bar 142 is reciprocated by a rod 164, a projection 166 (FIG. 5) on the rear end of the bar 142 engaging in a notch in the rod 164. The rod 164 is mounted for movement in the frame 10 and projects beyond the frame where it is secured to the recoiling gun parts (not shown). As the rod 164 moves rearward during recoil it moves the stripper cam bar 142 accordingly. The pins 94 move along the tracks 144 to lower the stripper 42, disengaging a round from the belt. Since the finger operating slide 146 is coupled to the bar 142, it also participates in the movement of the rod 164, swinging the bell crank levers 68 in counterclockwise direction, as seen in FIG. 5, to move the slides 60 upward and energize the springs 76, 78.

Mounted in a longitudinal slot in the magazine slide 26, back of the finger operating slide 146 is a compression spring 168 the rear portion of which is supported by a guide pin 169 also seated in the slot. The front end of the spring 168 abuts a projection 170 on the slide 146, the projection compressing the spring 168 during its recoil movement. After five-eighths of an inch of recoil, the spring 168 has acquired sufficient force to counteract the rearward movement of the finger operating slide 146 and thus to force the ball 152 out of the depression 158 and into the upper path of a track 172 (FIGS. 11 and 12) formed in a guide piece 174 which is secured to the wall 46 adjacent to the stripper cam bar 142. This disengages the slide 146 from the stripper cam bar 142. The spring 168 then moves the released finger operating slide 146 in reverse direction back to its initial position permitting the springs 76, 78 to impart downward feed movement to the slides 60 and thus to the feed fingers 56. In this form of the invention, the stripper cam bar 142 and the rod 164 continue their rearward movement with the recoiling gun parts, the ball 152 now moving in the upper path of the track 172.

During the counterrecoil the rod 164 moves the stripper cam bar 142 in reverse direction, again raising the stripper 42. As the ball 152 moves along the downward inclined path of the track 172, it rotates the cage 154 clockwise (FIG. 11) compressing the spring 160. When the ball reaches its position in the lower path of the track 172, the stripper cam bar has again reached its initial position relatively to the finger operating slide 146 and the ball is opposite the depression 158. The spring 160, sufficiently compressed by the ball 152, then forces the ball 152 out of the track 172 and back into the depression 158, simultaneously rotating the cage 154 counterclockwise (FIG. 11) so that the ball resumes its position shown in FIG. 11 in the upper end of the depression 158, again coupling the bar 142 and slide 146.

Sprocket locking slide

In both modifications the horizontal feed of the ammunition belt by the sprockets 40 is periodically limited by an escapement slide 176 (FIGS. 3 and 5) mounted to reciprocate in the frame 10, the inner end 178 of the slide projecting into the feeder mouth upon inward movement of the slide. Joined to the outer end of the slide 176 adjacent to the sprocket tube 34 is a lever 180 which fulcrums about the edge of an opening in the frame 10, the lower end of the lever 180 passing through the opening. A spring 182 (FIG. 3) one end of which is attached to the lever 180 and the other end of which is joined to the frame 10 tends to draw the escapement slide toward the sprocket tube. When the sprockets 40 are rotated to feed the belt, they engage cam faces 184 formed on the outer end of the escapement slide 176 and move the slide inward against the action of the spring so that the sprockets can pass the slide. The inner end 178 of the escapement slide extends into the feeder mouth, i.e., into a vacancy in the path of the cartridges, at this time. However, when the breech bolt is recoiling, the loose rounds in the feeder mouth are in the path of movement of the escapement slide 176 and thus prevent movement of the slide toward the feeder mouth by the sprockets 40, locking the sprockets temporarily against rotation until the loose rounds have been fed downward. The horizontal component of the sprocket force at this time is exerted against the side of the round in the path of the escapement slide and the vertical component of the sprocket force is exerted against the escapement slide itself. Since the direction of the sprocket force is substantially downward, most of the force is taken up by the escapement slide and not transmitted to lips 17 of the feeder mouth, thereby safeguarding the lips and permitting the breech bolt to recoil without too much resistance. When the breech bolt has passed to the rear of the loose rounds and while it is moving forward in counterrecoil, the vertical feed fingers 56 move the loose rounds downward out of the path of the escapement slide. The sprockets 40 are then released and resume the cross-feed of the belt.

Motor control

Power is supplied to the gun and to the motor **28** from a remote station from which connections are made to a junction box **186** (FIG. 1) attached to the front of the feed mechanism. Wires run from the junction box to the motor switch **188** and to a firing solenoid **190**. The motor circuit is opened periodically during operation of the feed mechanism in the manner now to be described.

A spring-torsion microswitch **192** carried by a bracket **194** (FIG. 2) secured to the housing **36** acts to open the motor circuit when the spring **38** has been wound. The switch is controlled by a nut **196**. The nut **196** is threaded onto a screw (not shown) forming the end of the feed shaft **32** and is keyed in the sprocket tube **34**. Threaded into the nut is a switch engaging stud **198** which may be adjusted relatively to the nut and which is held in adjusted position by a locknut. As the spring **38** is wound, the nut **196** travels outward on the rotating shaft **32**. When the spring **38** has been fully wound, the stud **198** has reached its position in which it contacts the switch **192** thus opening the motor circuit and terminating the movement of the feed shaft **32**. As soon as the energy of the spring has been depleted by imparting feed movement to the sprocket tube, the stud **198** is moved out of engagement with the switch by reverse movement of the nut, permitting the motor circuit to be closed again so that the spring **38** can be rewound.

When the last round in the belt has passed beyond the control of the sprockets **40**, the sprockets can no longer exert force to bring the rounds remaining in the belt into position above the feeder mouth. This might lead to a jamming of the gun. Hence, a safety or last round microswitch **200** (FIG. 13) is provided which opens the firing solenoid circuit and the motor circuit when the last round is engaged by the sprockets **40**. The switch **200** is secured in the frame **10** adjacent to the ammunition mouth **12** and is controlled by a trip plate **202** (FIGS. 1 and 13) which is mounted to swing about a pin **204** (FIG. 13) in the frame **10** and is normally held in raised position by a spring **206** surrounding the pin. As the belt passes into the feed mechanism through the ammunition mouth **12**, the trip plate **202** is depressed by the belt, a cam face **208** on the plate acting to close the switch **200** and thus to close the motor and firing solenoid circuits. The spring **206** raises the plate **202** when the last round from the belt has passed beyond the plate permitting the switch to be opened and to interrupt the motor circuit and the firing circuit.

Operation

The horizontal feed, the stripper, and the vertical feed units cooperate effectively in the manner described to provide the gun with ammunition at the rate required by the gun from a belt of considerable length and weight, i.e. containing 100 rounds.

In order to facilitate an understanding of the operation of the feed mechanism, it may be assumed that an ammunition belt is passing through the feed mechanism, that the first or leading round in the belt is in a position of engagement with the stripper, that a loose round rests on the closed breech bolt, and that a round is in the chamber and about to be fired (see FIG. 3). Upon firing the gun, the recoil moves the cam bar **88** or **142**, **146** rearward longitudinally of the gun, causing the stripper **42** to move downward to strip the leading round from the belt. Simultaneously, the vertical feed fingers **56** are moved upward into position to assume control of the round for the vertical feed, the fingers yielding inward as they pass the round. After five-eighths of an inch of recoil the fingers **56** are released for downward movement under the action of their springs **76**, **78** and now press the round just released from the belt and the loose round thereunder downward against the rearward moving breech bolt as shown in FIG. 4.

The empty case is ejected in known manner during the recoil movement of the gun. When the bolt has reached a position in which it has passed to the rear of the two loose rounds, the feed fingers **56** move the two rounds downward, the lower round being brought into its position on the lips **17** of the feeder mouth, from where it can be picked up by the forward moving breech bolt during the counterrecoil of the gun. As soon as the upper round has been moved downward vertically out of the path of the escapement slide, the spring **38** is free to rotate the sprockets **40** to impart a horizontal feed movement to the belt in order to bring the next round into position under the stripper. The freed link is ejected through a link chute formed in the cover **66**, by the pressure of the belt. Upon completion of the counterrecoil movement the lowermost round has been chambered, the cam bar has been returned to its initial position in preparation for the next cycle, and the parts assume the position first described.

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

1. In an ammunition feed mechanism adapted to be mounted on a longitudinally reciprocable automatic gun to feed cartridges from a linked belt to the gun, a feeder mouth, a stripper for engaging a cartridge above the feeder mouth, a cam bar movable with the recoiling gun for positively moving the stripper in a vertical direction to strip the cartridge from the belt, a link plate for supporting the cartridge in preparation for the stripping action, and a spring normally holding said plate in cartridge supporting position and permitting it to yield during the stripping movement of the stripper.

2. In an ammunition feed mechanism adapted to be mounted on an automatic gun to feed cartridges from a linked belt to the gun, the combination of a feeder mouth, a stripper for engaging a cartridge above the feeder mouth and adapted to move in a vertical direction to strip the cartridge from the belt, feed fingers moving in a vertical direction into feed position above the stripped cartridge and thereafter moving in reverse direction to feed the cartridge into the feeder mouth, and a cam bar for positively moving the stripper in vertical directions and for moving the feed fingers into their feed position.

3. In an ammunition feed mechanism adapted to be mounted on a longitudinally reciprocable automatic gun to feed cartridges from a linked belt to the gun, a feeder mouth, means for stripping the leading cartridge from the belt above the feeder mouth, means for feeding the stripped cartridge into the feeder mouth, a cam bar for actuating said means for stripping and feeding the cartridge, means moving with the recoiling gun parts to actuate the cam bar, mechanism for releasing the cam bar before completion of the recoil movement, and means for returning the released cam bar to its initial position.

4. In an ammunition feed mechanism adapted to be mounted on a longitudinally reciprocable automatic gun to feed cartridges from a linked belt to the gun, a feeder mouth, a stripper for stripping the leading cartridge from the belt above the feeder mouth, feed fingers for moving the stripped cartridge downward in the feeder mouth, a cam bar for actuating the stripper and the feed fingers, a reciprocating rod for operating the cam bar, and a release mechanism for moving the rod with the recoiling gun parts and releasing the cam bar from the rod before completion of the recoil, for return movement of the cam bar to its initial position.

5. In an ammunition feed mechanism adapted to be mounted on a longitudinally reciprocable automatic gun to feed cartridges from a linked belt to the gun, a feeder mouth, a stripper for stripping from the belt the leading cartridge located above the feeder mouth, feed fingers movable vertically into feed position above the stripped cartridge, feed springs for moving the fingers in reverse direction, a stripper cam bar for actuating the stripper, a

finger operating slide for moving the feed fingers into feed position and energizing the finger springs, a rod movable with the recoiling gun parts to actuate the stripper cam bar, means for coupling the stripper cam bar to the finger operating slide, and a return spring energized by the recoil movement of the gun and adapted to release the finger operating slide before completion of the recoil movement, said return spring moving the released finger operating slide in reverse direction to permit the finger springs to move the fingers downward to feed the stripped cartridge into the feeder mouth.

6. In an ammunition feed mechanism adapted to be mounted on an automatic, reciprocating breech bolt gun to feed cartridges from a linked belt to the gun, lips for supporting a cartridge in front of the breech bolt, sprockets for feeding cartridges in succession to the gun, feed fingers for then feeding the cartridges to the supporting lips, a slide movable between the gun and the sprockets, and a spring for drawing the slide into engagement with the sprockets, the slide being capable of yielding away from the sprockets, under the pressure of the sprockets, into a vacancy in the path of the cartridges moving from the sprockets to the lips to permit rotation of the sprockets or of locking the sprockets against rotation when no vacancy exists.

7. In an ammunition feed mechanism adapted to be mounted on an automatic gun to feed cartridges from a linked belt to the gun, sprockets for feeding cartridges in succession to the gun, a torsion spring for rotating the sprockets, a motor for loading said spring, a torsion switch for opening the motor circuit when the sprocket spring is loaded, and a safety switch for opening the motor circuit when the last cartridge in the belt passes over the sprockets.

8. In an ammunition feed mechanism adapted to be mounted on an automatic gun to feed cartridges from a linked belt to the gun, sprockets for feeding cartridges in succession to the gun, a spring for rotating the sprockets, a motor for loading the spring, a switch for opening the motor circuit when the spring is loaded, a trip plate pivoted in the feed mechanism in the path of the belt to the sprockets, a safety switch engaged by the trip plate under the pressure of the belt to close the motor circuit, and a spring for raising the trip plate out of engagement with the safety switch to open the motor circuit when the last cartridge passes over the sprockets.

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