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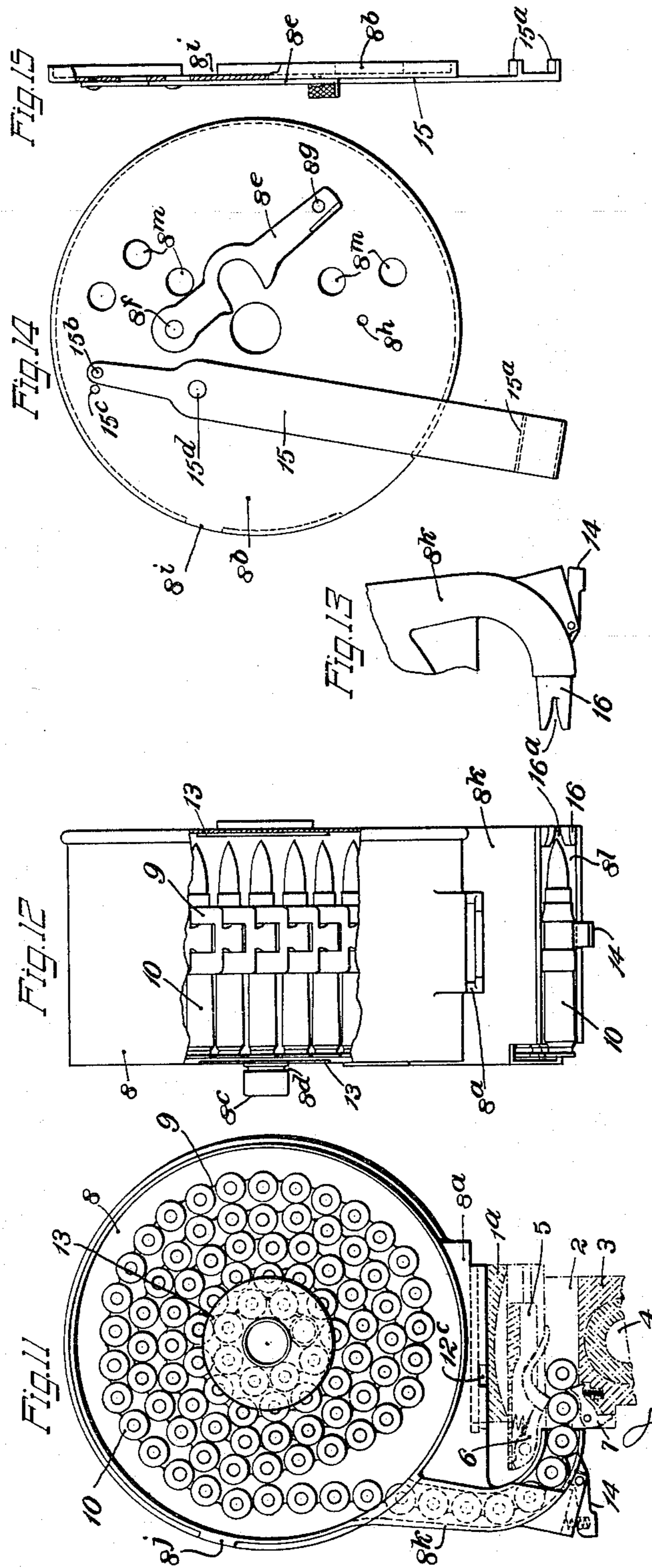
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CARTRIDGE FEEDING MECHANISM

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CARTRIDGE-FEEDING MECHANISM

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The invention relates generally to a cartridge feeding mechanism, and more particularly to a cartridge magazine for use with firearms of the class having a belt feed and a feed channel through which the cartridge belt is adapted to be fed, such as is shown, for example, in the Letters Patent of the United States to John M. Browning, No. 1,293,021, dated February 4, 1919, for Automatic machine guns.

Heretofore, in arms of this class, considerable time was lost in applying a filled cartridge belt to the arm to replace an empty belt, because after the box or magazine containing the filled cartridge belt had been brought into its proper operative relation to the arm or, in cases where a box fixed with relation to the arm was used, after the filled belt had been placed therein, the end of the feed belt was then brought into the feed channel of the arm into operative relation with the means for moving the belt through said channel, in some cases, by threading said end through the feed channel and in other cases where the arm was provided, as in the patent hereinbefore referred to, with a hinged top cover closing the feed channel, by lifting said cover and placing the end of the belt in the channel, and then closing the cover down. Such loss of time in bringing a fresh cartridge supply to the arm is obviously objectionable where continuous operation of the arm is necessary or desirable. The number of manual operations heretofore necessary to bring a new cartridge supply into operative relation to the arm is also objectionable, especially in the use of such arm on aircraft, such as combat planes, where the pilot has to attend to the control of his plane as well as to the operation of the arm.

It is an object of the invention to overcome these objections by providing a novel improved construction whereby a cartridge belt can be easily brought into operative relation with the arm with which it is adapted to be used with a minimum of manual handling and with the utmost dispatch.

This object is attained by providing a magazine for said cartridge belt, readily assembled on and locked to the arm and having

means whereby the end of the flexible cartridge belt which extends some distance outside the exit opening of said magazine, is supported and automatically brought into operative relation with the feed mechanism of the arm in the act of assembling said magazine on the arm.

With this and other objects in view, as will appear from the following disclosure, the invention resides in the combination of parts set forth in the specification and covered by the claims appended thereto.

In the accompanying drawings:

Fig. 1 is a front view of a machine gun with a magazine embodying the invention applied thereto.

Fig. 2 is a left-hand side view of a portion of the gun with a magazine embodying the invention applied thereto.

Fig. 3 is a rear view of the gun with a magazine embodying the invention applied thereto.

Fig. 4 is a top view of a portion of the hinged top cover of the gun casing with parts for securing the magazine mounted thereon.

Fig. 5 is a right-hand side view of the top cover, and a portion of the magazine showing the connection between said members.

Fig. 6 is a rear end view of the spool carrying the cartridge belt, detached; the last cartridge in the belt is shown in dotted lines.

Fig. 7 is a right-hand view of said spool, detached, with the last cartridge in the belt indicated in dotted lines.

Fig. 8 is a rear view of the retaining pawl, detached.

Fig. 9 is a right-hand view of said pawl, detached.

Fig. 10 is a rear view of the gun and the magazine, showing them in the relative position they occupy in the act of assembling the magazine on the gun.

Fig. 11 is a vertical transverse section, on an enlarged scale and as seen from the rear, through the transverse feed channel of the gun with the detachable magazine in place thereon; the rear closing disk or cover of the magazine has been removed to show the arrangement of the cartridge belt within the magazine.

Fig. 12 is a right-hand side view of the magazine, detached, with the rear closing cover removed, a portion of the casing being broken away.

Fig. 13 is a front view of a portion of the magazine adjacent the exit opening thereof.

Fig. 14 is a rear view of the rear closing cover of the magazine, detached, and with the parts carried thereby.

Fig. 15 is a right-hand view of said cover, detached, and with the parts carried thereby; a portion of the cover has been broken away to more clearly show certain features of construction.

Figs. 12 to 15 inclusive, are shown on the same scale as Fig. 11.

In the drawings, the parts of the gun to which the invention has been shown applied are shown more or less diagrammatically in dot and dash lines, while the novel features are shown in full lines.

The gun shown comprises the usual breech casing 1 having the hinged top cover 1^a which closes the transverse feed channel 2 provided through the front block 3 of the casing above the barrel 4.

The feed slide 5 carrying the spring-actuated depending feed pawl 6 is mounted, as usual, for transverse reciprocating movement in the under side of the laterally-widened portion of the top cover 1^a for advancing the cartridge belt with a step-by-step movement through the feed channel from left to right to bring the cartridges successively into the central longitudinal plane of the gun, where they are withdrawn from the belt and transferred to the barrel chamber by the usual mechanism (not shown).

The usual stop pawl 7 engages the cartridges successively to prevent retrograde movement of the cartridge belt after the same has been operatively connected with the gun.

To provide for the rapid and convenient bringing of a full cartridge belt into position with its end in the transverse feed channel 2 in position to be actuated by the feeding mechanism of the gun, such as the feed slide 5 and the feed pawl 6, a magazine 8 is provided for carrying the cartridge feed belt 9 and connected to the gun so as to substantially maintain the lateral balance of the gun even when the magazine is full of cartridges, the center of gravity of the cartridges and magazine being substantially in the vertical longitudinal plane of the gun.

The cartridge feed belt 9 is shown in the drawings as comprising a metal disintegrating belt in which the cartridges 10 form the pivotal connection between the belt links, but it is to be understood that other types of belt are equally adapted for use in connection with the invention.

The magazine 8 is detachably secured to the casing 1, in the form of the invention selected for illustration, by a connection which

permits the same to be quickly connected to the gun by simply moving it laterally relative to the gun from the position shown in Fig. 10 to the position shown in Fig. 3.

Such connection may comprise a member 11, T-shaped in cross section, see Figs. 4 and 5, secured transversely to the top cover 1^a of the casing, as by the screws 11^a; said member cooperates with a corresponding groove, see Figs. 5 and 12, in the downward projection 8^a at the side of the magazine 8.

The magazine is in this way locked against vertical and longitudinal movement. To lock it also against transverse movement when in its assembled position, a spring-actuated latch 12 is provided, said latch being pivoted on a pivot stud 12^a secured in the top cover, and having a forwardly projecting nose 12^b adapted to enter a notch 12^c in the downward projection 8^a of the magazine, see Fig. 11. As clearly shown in Figs. 4 and 5, the latch 12 is actuated to its operative position by the spring 12^d seated in a recess in the latch and acting at its outer end through a plunger against the abutment pin 12^e. A pin 12^f limits the movement of the latch under the tension of its spring.

To guide the groove in the downward projection 8^a of the magazine, in assembling said magazine on the gun, over the T-shaped member 11, said member is formed with forward and rearward inclined surfaces at its left-hand end, see Fig. 4. The nose 12^b of the latch 12 is also formed with an inclined surface to allow it to be automatically cammed back against the tension of the spring 12^d when the magazine is being assembled on the gun until, when said magazine is in its assembled position, the nose of the latch has come opposite the notch 12^c, into which it is moved by its spring 12^d, thereby locking the magazine in place.

The latch 12 is provided with a rearwardly extending arm having at its end an upward projection 12^g, see Figs. 4 and 5, which is adapted to be engaged by the hand of the operator to press the latch to its inoperative position, thereby releasing the magazine for removal.

The magazine 8 may be of any suitable shape, but as shown in the drawings, it comprises a casing of generally cylindrical form. To permit easy insertion of the cartridge belt within the same, the magazine has a flanged removable cover 8^b closing its rear end.

The body portion of the magazine casing has connected with it parts 8^k forming a belt passage having its exit opening 8^l so located that it is adapted to connect with the transverse feed channel 2 of the firearm when the magazine is in assembled relation thereto.

Secured centrally to the forward end of the cylindrical magazine casing is a stud 8^c on which is rotatably mounted the spool 13, shown detached in Figs. 6 and 7, upon which

the cartridge belt 9 is wound. The stud 8^c extends rearwardly through and projects some distance beyond the closing cover 8^b of the magazine, see Figs. 2, 3 and 10, and is
 5 formed just outside said cover with an annular locking groove 8^d, see Fig. 12.

This groove is adapted to cooperate with the sides and rounded inner end of an arcuate slot formed in one side of a thin spring
 10 latch 8^e pivoted at 8^f to the outside of the cover 8^b, said latch being shown in its operative position in Figs. 3 and 10, where it keeps the closing cover locked in assembled position; and in its inoperative position, in
 15 Fig. 14. It is yieldingly held by its spring tension in either of said positions by having a low rounded inward projection 8^g adjacent its free end engage alternately in corresponding holes 8^h in the cover 8^b. See Figs. 14
 20 and 15.

The flanged closing cover 8^b is held against rotation, as shown, by having a short portion of its flange cut away to form a recess 8ⁱ, see Figs. 14 and 15, which is adapted to
 25 fit a corresponding projection 8^j extending outwardly from the cylindrical surface of the magazine casing, see Fig. 11. The flange of the cover 8^b is also cut away to provide clearance for the curved passage way 8^k leading from the cylindrical chamber of the
 30 magazine to the magazine exit opening 8^l.

The flanged closing cover 8^b of the magazine is provided with a plurality of peep openings 8^m arranged at varying distances
 35 from the center of the cover to enable the operator to readily ascertain the approximate number of cartridges still remaining in the magazine without removing said closing cover.

40 The spool 13 is provided, as clearly shown in Figs. 6 and 7, with curved projections 13^a on its hub, which are adapted to co-operate with the first cartridge in the belt to keep the belt from sliding off the spool when winding
 45 it on the same. The hub of the spool 13 is also provided with suitable means for frictionally opposing the rotary movement of the spool on the stud 8^c. Such means may comprise the means shown in Figs. 6 and 7,
 50 which is formed by longitudinally slitting the hub of the spool at slightly spaced longitudinal lines and pressing the metal of the hub between said slits inwardly to form an indentation 13^b which does not appreciably
 55 interfere with the placing of the spool on the hub, but exerts a sufficient drag on the rotation of the spool to prevent a too rapid unwinding of the belt during the operation of the gun.

60 It is necessary that the end of the belt leaving the exit opening of the magazine extend some distance from said exit opening in order that when the magazine is applied to the gun, the belt with the cartridges therein may
 65 enter a sufficient distance into the transverse

feed channel 2 to be operated upon by the feed mechanism of the gun. In the gun to which this invention is shown applied, this means that the first two cartridges in the cartridge belt will be outside the exit opening of the magazine, and, if unsupported, would hang down and consequently interfere with the expeditious assembling of the magazine on the gun.

It has been found necessary and desirable
 75 therefore, in the practice of the invention, to provide supporting and guiding means for the portion of the belt and cartridges so arranged outside the exit opening of the magazine, and the provision of such means forms
 80 an important feature of the invention, as, by such provision, the attachment of the magazine to the gun with the cartridge belt in operative relation with the feeding mechanism of said gun, is greatly facilitated.
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In accordance with the invention I provide means carried by the magazine adjacent the passage 8^k and adapted to engage the belt therein at a position separated from the forward end of the belt. The said means
 90 is transversely movable relatively to the firearm for the purpose of moving the forward end portion of the belt into the feed channel 2. The magazine is also provided with means for engaging the said forward end
 95 portion of the belt between the belt moving means and the entrance to the feed channel in order to support it prior to its movement into the said channel. The details of construction can be widely varied, but I prefer
 100 and have shown a pawl 14 which is pivoted to the magazine and which is movable relatively to the firearm for the purpose stated when the magazine is as an entirety moved
 105 relatively to the firearm during assembly therewith. The supporting and guiding means will presently be described in detail, but it will be understood that the purpose or function of the supporting and guiding means
 110 is to so hold the forward end portion of the belt that it can be moved into the feed channel by the said pawl when the pawl is bodily moved relatively to the firearm as already described.

The said pawl has its inner end projecting
 115 into the passage way 8^k for the cartridge belt for cooperation with the said cartridge belt, and its outer end is in position to be actuated by the operator against the tension of the
 120 pawl spring 14^a to remove the inner end of the pawl from its engagement with the cartridge belt when desired.

The supporting and guiding means for the cartridge belt preferably comprises two separate members. One of these members is a
 125 fixed guide which supports the bullet end of the cartridges and is adapted to project into the feed channel of the firearm. The other of the members engages the head ends of the cartridges and is preferably movable with
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respect to the magazine. The last said member is so constructed and arranged that it is automatically moved to an inoperative position as the magazine is assembled on the
5 firearm.

To support and guide the head ends of the two cartridges in the belt outside the exit opening while the magazine is separated from the gun and during the act of assembling said magazine on the gun, movable
10 means, such as a lever 15, is provided, said lever being pivoted at 15^d on the rear closing cover 8^b of the magazine 8, as shown in Figs. 3, 10 and 14. The said lever has at the
15 end of its lower arm two forwardly extending transverse guide flanges 15^a to properly guide and support the head ends of the two cartridges outside the exit opening of the curved passage-way 8^k leading from the in-
20 side of the magazine, as shown in Fig. 10.

To support and guide the forward or bullet ends of said two cartridges, the horizontal guiding extension 16, see Figs. 12 and 13, is provided at the forward end of exit opening
25 of the magazine. This guiding extension is of a vertical height such as to permit its entry into the transverse feed channel of the gun and has a V-shaped guide groove 16^b into which the bullet ends of the car-
30 tridges project. This groove is flaring at its outer end to facilitate entry of the cartridges thereinto if, for any reason, the cartridge belt is manually moved in reverse direction.

While the guiding flanges 15^a on the lever
35 15 for the head ends of the cartridges have been shown, Fig. 15, extending forwardly a relatively short distance, it is to be understood that they may be extended forwardly to the rear edge of the belt 9, if desired, and
40 thus form a channel of sufficient depth to support and guide the entire length of the cartridges, in which case, the forward guiding extension 16 may be dispensed with.

Means are provided to hold the lever 15
45 in its operative position when the magazine is not assembled on the gun but to permit said lever to be automatically released and moved to inoperative position when the magazine is assembled on the gun. Such
50 means may comprise a short arm of the lever 15 extending above its pivot 15^d, which arm is of spring temper and has near its end a low rounded inward projection 15^b adapted to co-operate to alternately hold the lever
55 yieldingly in either its operative position, shown in Fig. 10, or in its inoperative position shown in Fig. 3, with either of two corresponding holes 15^c in the closing disk 8^b, see Figs. 14 and 15.

With the parts in the position shown in Fig. 10, the filled magazine can be readily assembled on the gun by simply moving it toward the right to cause the T-shaped
60 groove on the downward projection 8^a on the bottom of the magazine to engage with

the corresponding member 11 on the top cover 1^a, as hereinbefore described. In this position the end of the belt and the first two cartridges therein are supported and guided
70 in the horizontal plane of the transverse feed channel 2 of the gun and with the continued assembling movement, they will be caused to enter said channel, since retrograde movement is prevented by the retaining pawl 14. At the beginning of the entering movement
75 of the first cartridge, the lower end of the guide lever 15 strikes the side of the gun and in the further entering movement, it is automatically swung from its operative position shown in Fig. 10, to its inoperative position,
80 shown in Fig. 3. To provide clearance for such movement of the lever 15, the rear portion of the passage way 8^k is cut away for some distance back from the exit opening 8ⁱ, see Figs. 11 and 12.
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From this construction and arrangement of parts it results that, when the magazine is locked fully home in its assembled position on the gun, the first cartridge in the feed belt will have been automatically entered into the transverse feed channel of the
90 gun a distance sufficient to bring it into operative relation with the feed slide 5 and feed pawl 6 of the gun, so that, if the mechanism of the gun is now actuated in the usual manner, the cartridge belt will be withdrawn from the magazine and moved through the feed channel of the gun with a step by step movement until the operation of the gun is
95 stopped or the supply of cartridges in the magazine is exhausted.
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It will be seen that, when the magazine is in position on the gun both the usual stop pawl 7 on the gun and the retaining pawl 14 on the magazine operate to prevent retro-
105 grade movement of the feed belt. It is thus made possible by the invention, to dispense with the regular stop pawl 7 on the gun if desired, and rely only on the retaining pawl 14 for preventing retrograde movement of
110 the belt.

While I have shown the invention as applied to a machine gun, such as shown and described in my prior patent above referred to, the invention is not limited to use with
115 this particular type of gun, for it will be evident to those skilled in the art that with minor changes and alterations it may be adapted to other types of firearms. Also, while the magazine is being shown mounted
120 on top of the gun, it will be understood that it could, if desired, be readily adapted for mounting in other positions on the gun without departing from the spirit and scope of the appended claims.
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What I claim and desire to secure by Letters Patent is:

1. The combination with a firearm having a breech casing provided with a channel for the passage of a cartridge belt and means for
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feeding said belt through said channel, of a magazine for said belt detachably mounted on said casing, and an element carried by said magazine for guiding and supporting the outer end of the cartridge belt in position to cause it to automatically enter said channel when the magazine is assembled on the casing, said element being movable from its operative to its inoperative position in such assembling of the magazine.

2. The combination with a firearm having a transverse feed channel for allowing a cartridge belt to be fed therethrough, of a detachable magazine for said belt having a passage communicating with the entrance to said feed channel, and a member movable either to an operative or to an inoperative position and forming, when in its operative position, an extension of said passage, said member being adapted to support and guide the outer end of the belt when the magazine is detached, whereby said end with the cartridges therein is caused to enter said channel and the member itself is moved to its inoperative position as the magazine is attached to the arm.

3. The combination with a firearm having a breech casing provided with a transverse feed channel and means for feeding a cartridge belt through said channel, of a magazine for said belt detachably secured to said casing, and means whereby the foremost portion of said cartridge belt is automatically caused to enter said channel in the act of assembling the magazine, said means comprising a pawl for preventing rearward movement of said belt and a movable member for supporting and guiding said foremost portion of the belt.

4. In a firearm having a belt feed, the combination of a breech casing having a channel for the passage of a cartridge belt, means for feeding said belt through said channel, a magazine for said belt detachably mounted on said casing, said magazine having an exit opening in position to communicate with the entrance to said channel, and means whereby the outer portion of said belt may project from said exit opening and be automatically guided into said channel in the act of assembling the magazine on the casing, said means comprising a lever pivotally carried by said magazine and movable from its operative to its inoperative position in assembling the magazine, and means for normally holding said lever against such movement.

5. The combination with a firearm having a transverse channel for a flexible cartridge belt and means for feeding a belt through the said channel, of a detachable magazine for the said belt adapted to be supported on the firearm and having a passage communicating with the entrance to the feed channel when the magazine is in operative position,

the said magazine being transversely movable relatively to the firearm while being assembled thereon or removed therefrom, a member pivotally mounted on the magazine and arranged adjacent the exit opening of the said passage for supporting and guiding the forward end portion of the cartridge belt outside of the exit opening in order to automatically bring it into operative relation with said feeding means while the magazine is being assembled on the firearm, the said member being moved from an operative position to an inoperative position during such assembling movement, and a releasable detent means normally tending to hold the said member in its operative position.

6. The combination with a firearm having a transverse channel for a flexible cartridge belt and means for feeding a belt through the said channel, of a detachable magazine for the said belt adapted to be supported on the firearm and having a passage communicating with the entrance to the feed channel when the magazine is in operative position, the said magazine being transversely movable relatively to the firearm while being assembled thereon or removed therefrom, and a member pivotally mounted on the magazine and arranged adjacent the exit opening of the said passage for supporting and guiding the forward end portion of the cartridge belt outside of the exit opening in order to automatically bring it into operative relation with said feeding means while the magazine is being assembled on the firearm, the said member being moved from an operative position to an inoperative position during such assembling movement and a portion of the said member being resilient and formed to cooperate with complementary portions of the magazine in order to tend to hold the member in either of the said positions.

7. The combination with a firearm having a transverse channel for a flexible cartridge belt and means for feeding a belt through the said channel, of a detachable magazine for the said belt adapted to be supported on the firearm and having a passage communicating with the entrance to the feed channel when the magazine is in operative position, the said magazine being transversely movable relatively to the firearm while being assembled thereon or removed therefrom and the said magazine comprising a cover adapted to be removed in order to permit a cartridge belt to be put in place, and a member movably mounted on the cover so as to be adjacent the exit opening of the said passage when the cover is in closed position, the said member serving to support and guide the forward end portion of the cartridge belt outside of the exit opening in order to automatically bring it into operative relation with said feeding means while

the magazine is being assembled on the firearm.

8. The combination with a firearm having a transverse channel for a flexible cartridge belt and means for feeding a belt through the said channel, of a detachable substantially cylindrical magazine for the said belt adapted to be supported on the firearm and having a passage extending from the cylindrical portion thereof and communicating with the entrance to the feed channel when the magazine is in operative position, the said magazine being transversely movable relatively to the firearm while being assembled thereon or removed therefrom and the said magazine including a flat end cover adapted to be removed in order to permit a cartridge belt to be put in place, a member movably mounted on the cover so as to be adjacent the exit opening of the said passage when the cover is in closed position, the said member serving to support and guide the forward end portion of the cartridge belt outside of the exit opening in order to automatically bring it into operative relation with said feeding means while the magazine is being assembled on the firearm, and interengaging parts on the body portion of the magazine and on the cover for holding the cover and the said supporting and guiding member against relative rotative movement out of proper relationship with the body portion.

9. In a firearm having a belt feed, the combination of a breech casing having a transverse feed channel, means for feeding a cartridge belt through said channel, a magazine for said belt detachably secured to said casing, and means whereby the foremost portion of said belt is automatically caused to enter said transverse channel in the act of assembling the magazine, said means comprising a fixed guide for the bullet ends of the cartridges and a guiding and supporting member for the head ends of the cartridges.

10. In a firearm having a belt feed, the combination of a breech casing having a transverse feed channel, means for feeding a cartridge belt through said channel, a magazine for said belt detachably secured to said casing, and means whereby the foremost portion of said belt is automatically caused to enter said transverse channel in the act of assembling the magazine, said means comprising a fixed guide for the bullet ends of the cartridges and a movable guiding and supporting member for the head ends of the cartridges, said movable member being automatically moved to its inoperative position in the act of assembling the magazine.

11. In a cartridge belt magazine adapted to be detachably assembled with a firearm having a transverse belt feed, the combination of a casing having a passage with an exit opening for the belt, and means arranged adjacent

cent the said exit opening for supporting the forward end portion of the belt outside of the exit opening and guiding it in a transverse direction, whereby the belt is automatically brought into operative relation with the feeding mechanism of the gun when the magazine is moved transversely of the firearm during assembly therewith.

12. In a cartridge belt magazine adapted to be detachably assembled with a firearm having a transverse belt feed, the combination of a casing having a passage with an exit opening for the belt, and a relatively movable member adjacent the said exit opening for supporting the forward end portion of the belt outside of the exit opening and guiding it in a transverse direction, whereby the belt is automatically brought into operative relation with the feeding mechanism of the gun when the magazine is moved transversely of the firearm during assembly therewith, the said member being automatically movable from its operative position to an inoperative position during the transverse assembly movement.

13. In a cartridge belt magazine adapted to be detachably assembled with a firearm having a transverse belt feed, the combination of a casing having a passage with an exit opening for the belt, and a member pivotally mounted on the casing and arranged adjacent the said exit opening for supporting the forward end portion of the belt outside of the exit opening and guiding it in a transverse direction, whereby the belt is automatically brought into operative relation with the feeding mechanism of the gun when the magazine is moved transversely of the firearm during assembly therewith, the said member being automatically movable from its operative position to an inoperative position during the transverse assembly movement.

14. A detachable magazine for cartridge belts comprising a casing having an exit opening for the belt, means for guiding and supporting the end of the belt adjacent said opening, said means comprising a member movable from operative to inoperative position and means to normally hold said member in its operative position, said holding means being automatically releasable, when the magazine is assembled on a firearm with which it is adapted to be used, to permit movement of said member to its inoperative position.

15. In a cartridge belt magazine adapted to be detachably assembled with a firearm having a transverse belt feed, the combination of a casing including a body portion and a removable cover therefor, the said body portion of the casing having a passage with an exit opening for the belt, and a member relatively movably mounted on the cover and arranged adjacent the said exit opening for

supporting the forward end portion of the belt outside of the exit opening and guiding it in a transverse direction, whereby the belt is automatically brought into operative relation with the feeding mechanism of the gun when the magazine is moved transversely of the firearm during assembly therewith.

16. In a cartridge belt magazine adapted to be detachably assembled with a firearm having a transverse belt feed, the combination of a casing having a passage with an exit opening for the belt, and means arranged adjacent the said exit opening for supporting the forward end portion of the belt outside of the exit opening and guiding it in a transverse direction, whereby the belt is automatically brought into operative relation with the feeding mechanism of the gun when the magazine is moved transversely of the firearm during assembly therewith, the said means comprising a guide for the bullet ends of the cartridges in fixed relation with the casing and also comprising a guiding and supporting member for the head ends of the cartridges.

This specification signed and witnessed this 10th day of October, A. D. 1923.

JOHN M. BROWNING.