

Sept. 26, 1967

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3,343,456

CONTROL DEVICE FOR A CARTRIDGE MAGAZINE OF A GUN

Filed May 10, 1965

2 Sheets-Sheet 1

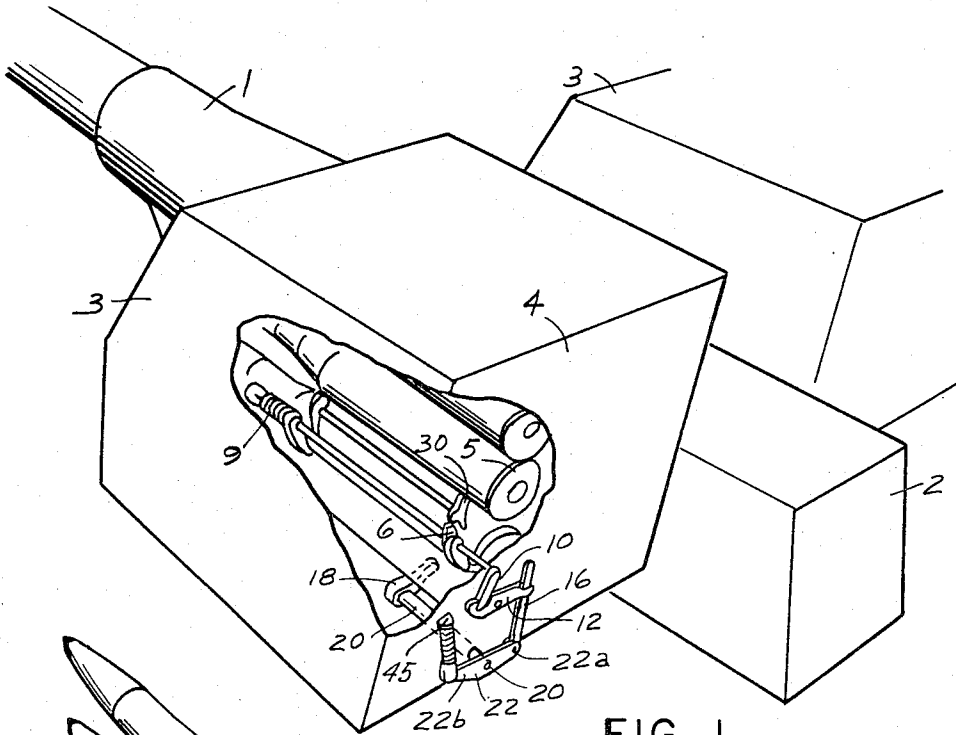


FIG. 1

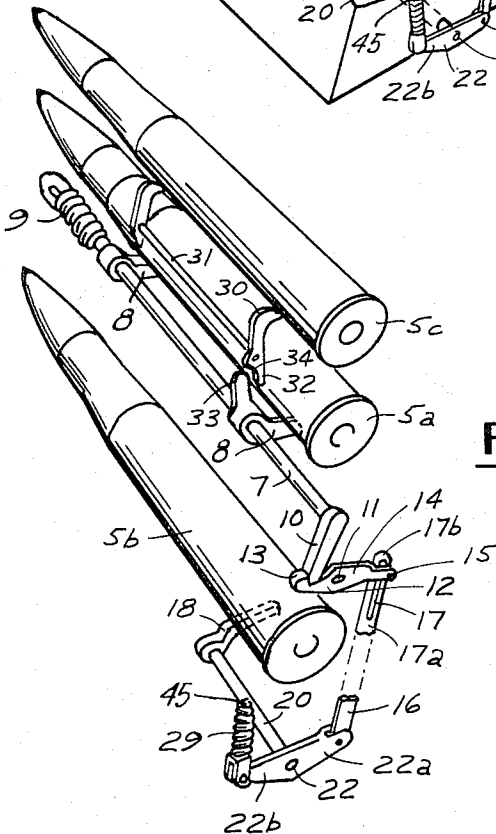


FIG. 2

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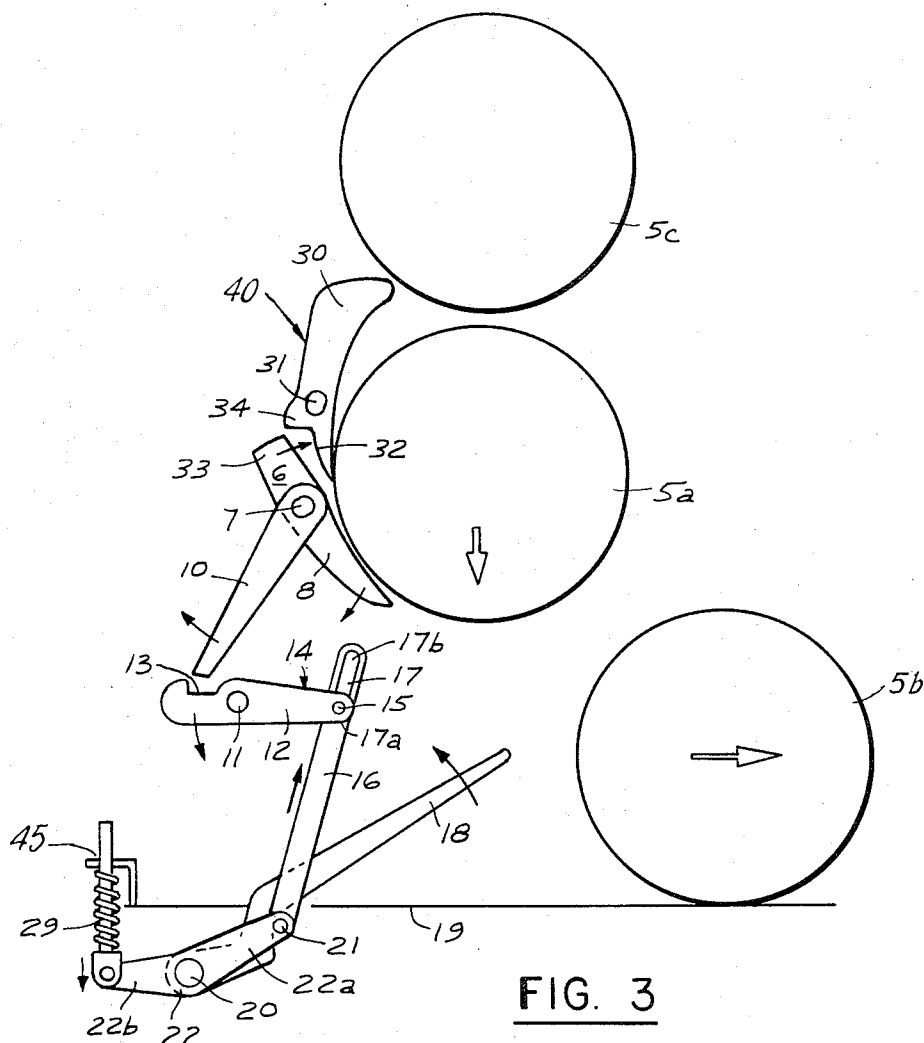


FIG. 3

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Filed May 10, 1965, Ser. No. 454,624

Claims priority, application Sweden, May 13, 1964,
5,881/64

3 Claims. (Cl. 89—33)

ABSTRACT OF THE DISCLOSURE

A cartridge magazine for a gun in which successive cartridges are discharged from vertical cartridge compartments upon a horizontal conveying path and release of a cartridge from one of the vertical compartments is blocked when and while a cartridge is located on the horizontal path below the compartment from which the cartridge is to be discharged.

The present invention relates to a device for a cartridge magazine of a gun, in particular for a cartridge magazine comprising one or more vertical cartridge compartments in each of which the cartridges are stacked in one vertical row with the longitudinal axis of each cartridge extending substantially horizontally, and in which the cartridges move downwardly as the cartridges, one by one, are fed out of the compartment at the bottom thereof.

In such cartridge magazines in which the cartridges are moving downwardly by action of gravity, the downward feed is, preferably, controlled by cartridge retaining means which successively actuate the cartridges while moving downwardly through the respective compartment so that they remain in substantially horizontal positions and a cartridge will not move from one cartridge position in the compartment into a lower one before such lower position is vacated.

As the cartridges are used, they leave the compartment at the bottom thereof by falling down upon a cartridge conveying path extending below the compartment in a substantially horizontal direction, and they are transported in a direction of the downward motion of the cartridges through the compartment, to be brought towards the ramming mechanism of the gun either in the longitudinal direction of the cartridge or perpendicularly thereto.

It is an object of the present invention to provide a novel and improved device, which prevents a cartridge located in a compartment above a cartridge lying in a horizontal cartridge conveying path along which the cartridges are to be fed out perpendicularly to the downward motion of the cartridge in the compartment, from being released for downward movement to this horizontal cartridge conveying path when and while a portion of a cartridge is still located in the horizontal path below a cartridge still located in the compartment.

When the cartridge magazine comprises several vertical and mutually parallel cartridge compartments situated side by side and the transport of the cartridges towards the discharge port of the magazine is perpendicular to the longitudinal direction of the cartridges and to the direction of movement of the cartridges through the compartments whereby cartridges from compartments located more remote than other compartments, as seen from the cartridge discharge port, must be conveyed below such closed other compartments, it is an object of the present invention to provide a device preventing cartridges from moving downwardly from one compartment upon said conveying path before the cartridge position in the con-

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veying path is fully vacated after an adjacent compartment located farther away from the discharge port has been emptied of cartridges.

The aforementioned objects and other objects which will be pointed out hereinafter are attained by a device comprising, in combination, a cartridge retaining means which is pivotal about an axis defined by a shaft constituting part of said retaining means and located beside the vertical path of the cartridges passing downwardly through a compartment of the magazine and extending parallel to the intended direction of the longitudinal axis of a cartridge in the compartment. The cartridge retaining means include cartridge support means which are pivotal between an active position extending into said vertical path to hold a cartridge and thus prevent it from moving downwardly through the cartridge compartment, and an inactive position out of the path of the cartridge in which the cartridge is free to pass downwardly out of the compartment due to its weight. The cartridge retaining means further include a first retaining member and a second retaining member of a releasable catch. The first retaining member coacts in a position in which the cartridge support means is located in the aforesaid active position with the second retaining member of the releasable catch. The second retaining member in an active position thereof engages said first retaining member of the catch thereby preventing movement of the cartridge support means out of the path of the cartridge in the compartment, and in an inactive position is located out of reach of the first retaining member thereby leaving the cartridge support means free to swing out of the path of a cartridge supported thereby. The second retaining member of the catch is connected to a feeler which is movable between a first position and a second position. In the first position the feeler extends into the horizontal cartridge conveying path below the cartridge compartment by action of a directional force means, the feeler in this position holding the second retaining member in its inactive position. In the second position, the feeler is swung out of said path by action of a cartridge located therein below the compartment and holds the second retaining member in the active position thereof.

When the magazine comprises several adjacent cartridge compartments located side by side and the transport of the cartridges towards the discharge port of the magazine proceeds perpendicularly to the longitudinal direction of the cartridges below the compartment, feelers for the several compartments as hereinbefore described are held in contact with a cartridge surface having a circular cross section in the direction of movement of the cartridges, each of said feelers thus being exposed to a pivotal movement during the forward transport of cartridges along the horizontal cartridge conveying path. Since the releasable catch of the cartridge support means should not be released until the cartridge position below the compartment in the cartridge conveying path is vacated, a limited play in the linkage between the feeler and the second retaining member of the releasable catch is preferably provided. Such play allows a limited movement of the feeler without the releasable catch being actuated for freeing a cartridge to move downwardly from the compartment and upon the horizontal conveying path.

The invention will be described more in detail in connection with a preferred embodiment thereof as shown in the accompanying drawings, in which:

FIG. 1 is a diagrammatic perspective view of parts of a gun having a cartridge magazine comprising a plurality of mutually parallel vertical cartridge compartments and a conveying path for the cartridges to be fed to a discharge port of the magazine, said path extending horizontally underneath the compartments, and of a device

according to the invention in the position for retaining a cartridge located in a compartment due to the presence of a cartridge in the horizontal cartridge conveying path;

FIG. 2 illustrates the device according to the invention on an enlarged scale; and

FIG. 3 is a side view of the device in the position thereof in which the retaining means for holding the lowermost cartridge in one of the compartments is released to free the cartridge for movement down into the underlying cartridge conveying path.

Turning now to FIG. 1, this figure shows a cartridge magazine in combination with an automatic gun, of which only the barrel 1 and a casing 2 enclosing the cartridge ramming means of the gun are illustrated. The cartridge magazine, as shown, comprises two parts 3 each including means for feeding cartridges along a horizontal cartridge conveying path 19 located at the bottom of the magazine towards the ramming means located within the casing 2. The ramming means and the cartridge feeding means located in the horizontal cartridge conveying path are not illustrated as they do not constitute part of the present invention. The forward feed of the cartridges may, for instance, be provided by means of a device as described in patent application Ser. No. 423,783 filed Jan. 6, 1965 now Patent No. 3,306,165. Each part of the cartridge magazine comprises a plurality of vertical cartridge compartments indicated at 4 for cartridges 5 stacked in vertical rows. The cartridges are each introduced into the magazine compartments through a conventional loading slot, not illustrated, located in the magazine walls in the top part of the respective compartment, and move downwardly through the compartment to be fed sideways to a discharge slot (also not shown) of the magazine.

To prevent a downward motion of a cartridge before the cartridge position in the horizontal cartridge conveying path below the respective compartment is vacated, the cartridge magazine comprises, at the lower end of each cartridge compartment, a device according to the invention, a preferred embodiment of which is described in the following.

In this embodiment each compartment comprises a cartridge retaining means 6, said cartridge retaining means including a cartridge support means having two arms 8 extending from and fixedly seated on a rotatable shaft 7, the arms 8 being pivotal into and out of the path of a cartridge moving downwardly through the compartment. A directional force means, such as a torsional spring 9, actuates the cartridge retaining means to bias the arms 8 thereof into the position best shown in FIG. 3 for one of the arms 8 in which position the arm extends into the compartment to prevent a cartridge from moving further downwardly. Said retaining means further include a first retaining member shown as a pawl 10 engageable with a recess 13 in a second retaining member 12 shown as an arm 14 pivotal about a stationary pivot 11. The second retaining member 12 may be pivoted into a position in which pawl 10 engages recess 13 and is held in the position, illustrated in FIG. 2, whereby the lowermost cartridge located in the compartment is prevented from moving downwardly, or into a position, illustrated in FIG. 3, in which the catch 10, 12 is released to free the arms 8 of the cartridge support means to move out of the way of the lowermost cartridge 5a in the compartment.

The second retaining member 12 of catch 10, 12 is linked to a feeler 18 by a linkage comprising a pin 15, a link 16 and a pivotal lever 22. Link 16 has a slot 17 which permits link 16 a limited movement in its longitudinal direction without actuating pin 15. The feeler 18 serves to probe for a cartridge located in the horizontal cartridge conveying path 19. The feeler 18 is pivotal about an axis defined by a shaft 20 carrying the feeler and an arm 22a of a two-arm lever 22 and located below the horizontal cartridge conveying path. A spring 29 biases feeler 18 into a position for cooperation with a cartridge 5b located in the conveying path below the cartridge compartment,

spring 29 being mounted between a stationary bracket indicated at 45 and an arm 22b of lever 22.

Unless a cartridge is located in the conveying path below a compartment, feeler 18 of the respective compartment occupies the position illustrated in FIG. 3. Link 16 by cooperation between the lower edge 17a of the slot 17 and the pin 15 of the retaining member 12 has pushed the second retaining member 12 of catch 10, 12 into the position illustrated in FIG. 3. The first retaining member 10 of the catch is thus free to pivot in the direction of the respective arrows in FIG. 3, and, consequently, arms 8 can swing out of the path of a cartridge 5a moving downwardly in its compartment. The cartridge will thus fall out of its compartment and upon the horizontal conveying path 19, the feeler 18 by action of the weight of the cartridge then being swung downwardly and out of the way of a cartridge moving along path 19. As a result, shaft 20 is turned in clockwise direction and with it lever 22 whereby the upper edge 17b of the slot 17 takes the pin 15 with it and thus pivots member 12 about pivot 11 to move recess 13 into a position for coacting with pawl 10. When the cartridge, while falling downwardly, has passed the arms 8, the entire cartridge support means by action of spring 9 returns into its position in which it prevents a cartridge from moving downwardly, the pawl 10 engaging recess 13. The device now occupies the position illustrated in FIG. 2, in which the feeler 18 is engageable with a cartridge located in the horizontal cartridge path such as cartridge 5b and the lowermost cartridge such as cartridge 52 is supported within the cartridge compartment by the cartridge support means.

To prevent a successive cartridge 5c in the compartment from following cartridge 5a when the same falls down, thereby permitting arms 8 to be swung back into position to retain a cartridge, and also to make possible an engagement of pawl 10 with recess 13, the device further comprises an additional cartridge support means, constituted by arms 30 and 32 of a two-arm lever 40 pivotal about a shaft 31 into and out of the way of a cartridge located in a cartridge position above the lowermost one in the compartment. Each arm 30 is retained in a position preventing a cartridge 5c resting thereupon from moving downwardly by the action of two separate means, namely, the second arm 32 of the two-arm lever 40, arm 32 constituting a probe member holding arm 30 of lever 40 in a pivotal position supporting the overlying cartridge 5c as long as a just lowered cartridge 5a is still present in the lowermost cartridge position in the compartment, and by a cam 33 secured on shaft 7 and engaging an abutment surface 34 on the arm 32 of two-arm lever 40 as long as arms 8 are swung out of the way of a lower downwardly moving cartridge 5a. However, when the retaining member or pawl 10 engages recess 13 and arms 8 are thus held in positions supporting a cartridge, cam 33 leaves abutment surface 34 and arms 30 are now free to swing out of the way of a following cartridge 5c, this cartridge thus falling onto the arms 8 to be held in the lowermost cartridge position in the compartment.

When, as stated before, the magazine comprises several mutually parallel vertical compartments and a cartridge falling out of one compartment passes below another compartment on its way towards the discharge port of the magazine, the feeler of said other compartment will not actuate and release the catch 10, 12 thereof as long as a cartridge located in the horizontal conveying path 19 is followed by a further cartridge moving along this path. To avoid the necessity of making the feeler in the longitudinal direction of the horizontal cartridge conveying path so long as to cause the feeler to remain substantially steady during the forward motion of the cartridge in spite of the circular cross section of the cartridges, the linkage between the feeler and the retaining member 12 includes, as mentioned above, the play provided by slot 17 which allows the feeler, when following

the circumference of a cartridge moving towards the discharge port, to swing within the limits of the play into the horizontal path without actuating the retaining member 12 to release the support means 7, 8 if a successive cartridge from an adjacent compartment follows in the horizontal conveying path. The feeler 18 before having moved so far into the path as to release the catch 10, 12, is again swung out of the path by being actuated by the following cartridge.

While the invention has been described in detail with respect to a certain now preferred example and embodiment of the invention, it will be understood by those skilled in the art, after understanding the invention, that various changes and modifications may be made without departing from the spirit and scope of the invention, and it is intended, therefore, to cover all such changes and modifications in the appended claims.

What is claimed is:

1. An assemblage comprising, in combination, a cartridge magazine of a gun, said magazine comprising at least one compartment for stacking therein a plurality of cartridges in lengthwise substantially horizontal and mutually parallel relationship, said cartridges being arranged to move downwardly one by one along a vertical path due to the weight thereof and to be discharged at the bottom of the magazine: a generally horizontal cartridge conveying path for feeding discharged cartridges to a point of utilization, said path extending underneath said compartment transversely of the cartridges and the path of the downward movement thereof; and a cartridge control device, said device comprising cartridge retaining means, a pivot shaft supporting the retaining means pivotal about an axis parallel to the cartridges in the compartment and laterally spaced apart of said downward path of the cartridges, said cartridge retaining means including a cartridge support means supported on said shaft pivotal between an active position protruding into said vertical cartridge path to block cartridges from moving downwardly in the same, and an inactive position withdrawn from said path thereby freeing said cartridges to move downwardly and out of the compartment into said path due to the weight of the cartridges, said cartridge retaining means further including a releasable catch means having a first and second movable retaining member, the first retaining member controlling the position of the cartridge support means and the second retaining member being movable between an active position engaged with the first retaining member and an inactive position disengaged from the first retaining member, said first retaining member when engaged by the second retaining member preventing a pivotal movement of the cartridge support means out of the path of cartridges in the compartment and when disengaged permitting such movement thereby freeing the cartridges for downward movement, and a movable feeler means connected to said second retaining member and movable between a

first position extending into said horizontal cartridge conveying path below the compartment and a second position withdrawn from said path, linkage means connecting said feeler means and said second retaining member, said linkage means including a slot and pin connection to provide a predetermined play allowing movement of the feeler means within the limits of said play while maintaining the second retaining member in its inactive position, and yieldable directional force means biasing said feeler means into said first position, said feeler means being moved into said second position by engagement with a cartridge discharged from the compartment upon a conveying path portion underneath said compartment, said feeler means controlling the second retaining member to hold the same when in the first position in the inactive position and when in the second position in the active position.

2. An assemblage according to claim 1 and comprising further cartridge support means, pivot means supporting said further support means and disposed laterally adjacent to a cartridge in said compartment located above the lowermost cartridge in the same, said further support means being pivotal into and out of a position for supporting said cartridge above said lowermost cartridge and including a probe member movable into engagement with the cartridge in the lowermost position in said compartment for detecting the presence and absence respectively of a cartridge in said position in the compartment, said probe member when detecting the presence of a cartridge locking said further cartridge support means in the position supporting the cartridge above the lowermost one in the compartment.

3. An assemblage according to claim 1 wherein said probe member has an abutment portion and said further cartridge support means a cam portion engageable with said abutment portion when said further support means is in the position withdrawn from said vertical path of the cartridges, engagement of said abutment portion and said cam portion with each other also locking said further support means in the cartridge supporting position.

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