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J. M. DESLIERRES ET AL

2,810,325

GUN CHARGER

Filed Feb. 14, 1955

4 Sheets-Sheet 1

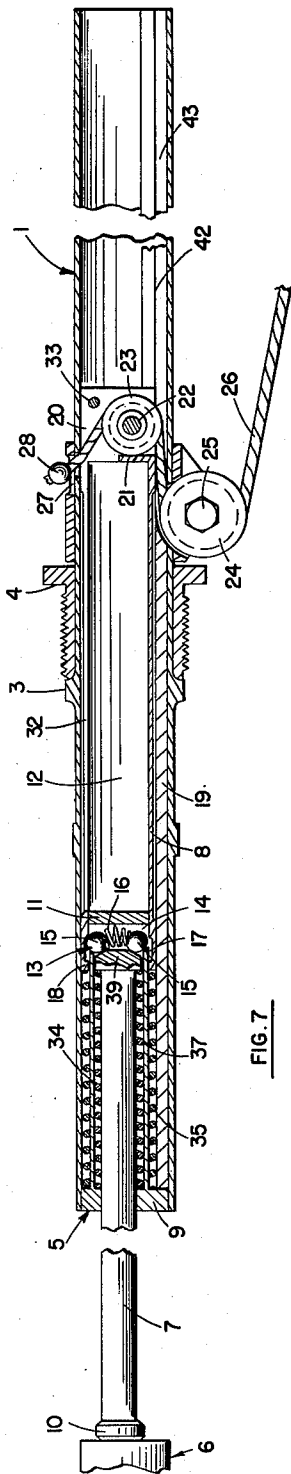


FIG. 7

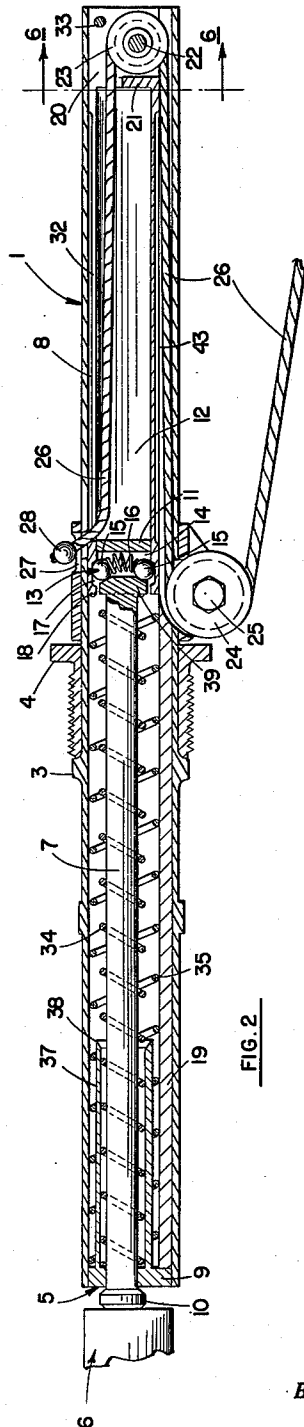


FIG. 2

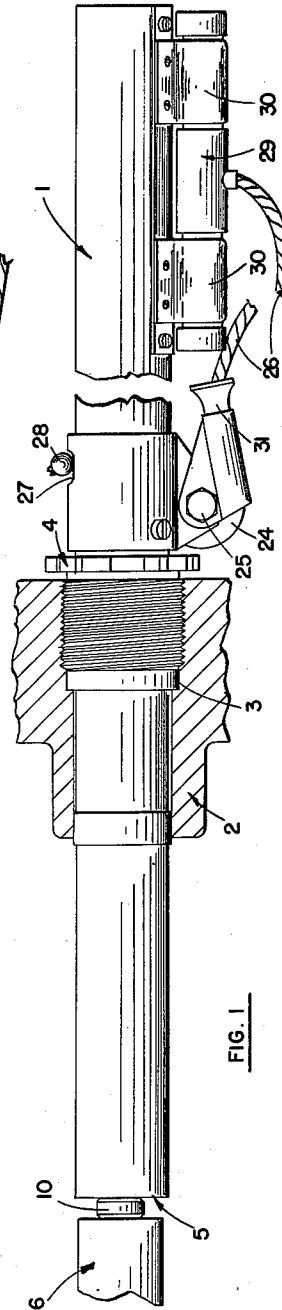


FIG. 1

INVENTORS
JOHN M. DESLIERRES
PAUL F. PETERSON
BY
William R. Lane
ATTORNEY

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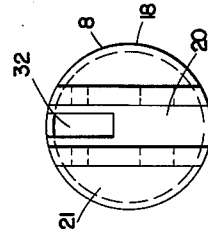
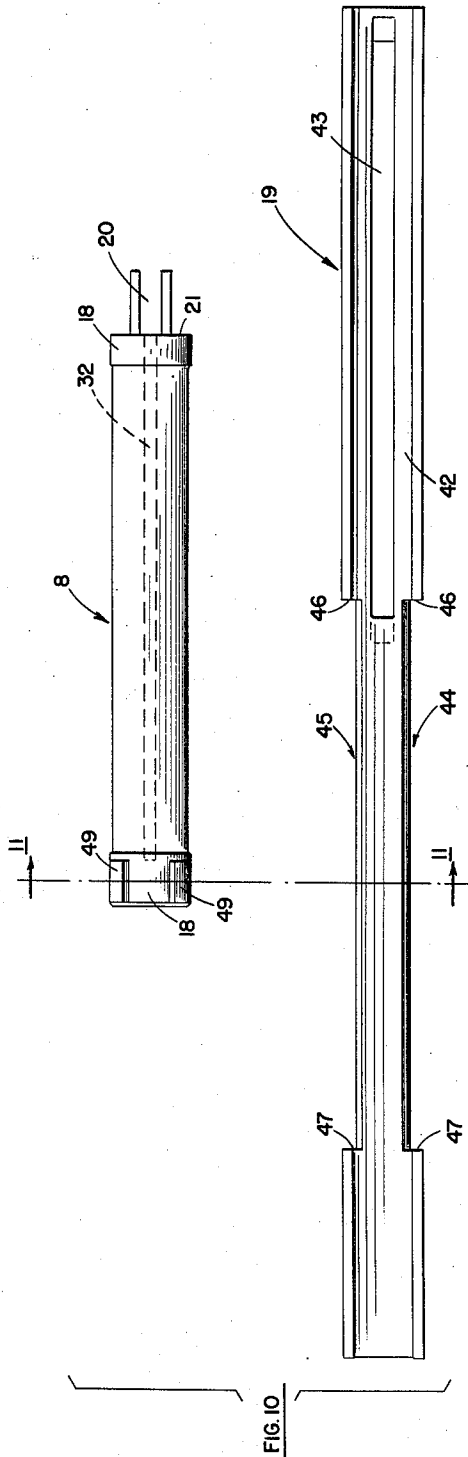


FIG. 5

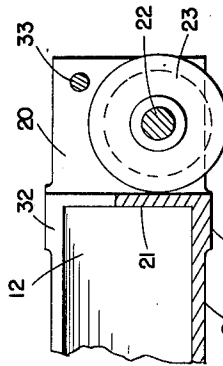


FIG. 4

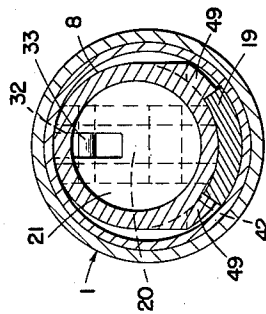


FIG. 11

BY

INVENTORS
JOHN M. DESLIERRES
PAUL F. PETERSON

William R. Lane
ATTORNEY

Oct. 22, 1957

J. M. DESLIERRES ET AL

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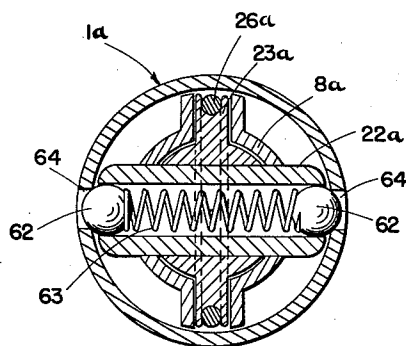


FIG. 14

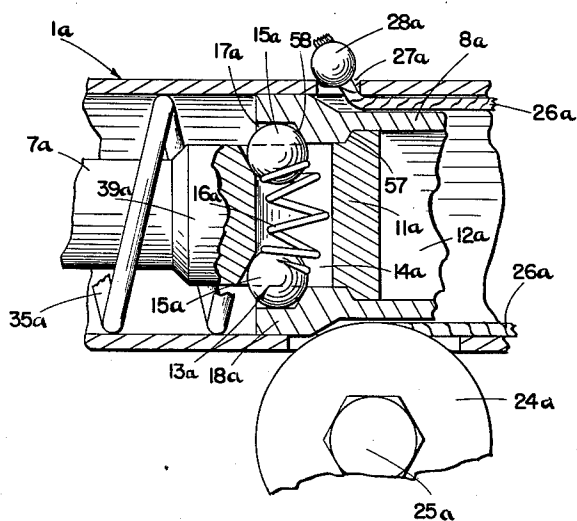


FIG. 13

INVENTORS
JOHN M. DESLIERRES
PAUL F. PETERSON

BY

William R. Lane

ATTORNEY

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2,810,325

GUN CHARGER

John M. Deslierres, Rolling Hills, and Paul F. Peterson, Palos Verdes Estates, Calif., assignors to North American Aviation, Inc.

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9 Claims. (Cl. 89—1)

This invention pertains to a gun charger and more particularly to a manually operable device for forcing a gun slide through a charging operation.

For certain automatic guns, particularly those of more recent design, the charging of the gun is a rather difficult operation requiring the exercise of considerable skill and effort. The problem is that the stroke of the gun slide must be sufficient to force the gun mechanism through the initial portion of the charging cycle by pushing the gun slide in one direction, but the slide must then be released at exactly the right moment so that the slide may move back to its initial position and the charging operation be completed. If the slide is held at the end of its stroke by the charger the slide cannot then return and the charging of the gun cannot take place. The stroke and release of the charger are therefore very critical. It is also true that the charging of these modern guns requires a great deal of force which makes it even more difficult to move the slide to its exact position and then release it at the proper instant.

The charger of this invention is particularly adapted for such guns by providing an exact length of stroke, release of the gun slide at the proper time, and gives the operator sufficient mechanical advantage so that the charger may be easily manipulated. This is accomplished by the provision of two plungers reciprocally carried within a housing, the first plunger being driven by the second, and a detent connection being provided between the two plungers. The first plunger engages the gun slide and will project from the housing when the plunger is driven to its extended position. At the extreme limit of this position a trigger releases the detent which frees the first plunger from the second, thus assuring that the gun slide is given a full stroke but is released when this stroke is completed.

Therefore it is an object of this invention to provide a gun charger having an exact length of stroke and position of release.

Another object of this invention is to provide a gun charger which is adapted to manual operation and is completely dependable in its usage.

A still further object of this invention is to provide a gun charger which is of simplified, rugged and economical construction.

These and other objects will become apparent from the following detailed description taken in connection with the accompanying drawings in which

Fig. 1 is a side elevational view of the gun charger of this invention mounted on a gun with the plungers retracted;

Fig. 2 is a side sectional view of the arrangement of Fig. 1;

Fig. 3 is an enlarged detail view of the detent arrangement;

Fig. 4 is an enlarged detail view of the slotted end of the second plunger;

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Fig. 5 is an enlarged end elevational view of the slotted end of the second plunger;

Fig. 6 is a sectional view taken along line 6—6 of Fig. 2;

Fig. 7 is a side sectional view of the charger near the end of the charging stroke;

Fig. 8 is an enlarged detail view illustrating the trigger release of the detent;

Fig. 9 is a side sectional view of the charger after the first plunger has been released;

Fig. 10 is an exploded view of the guide member and second plunger assembly, the former being shown in the top plan and the latter in the bottom plan;

Fig. 11 is a sectional view taken along line 11—11 of Fig. 10, but with the plunger and guide in assembled relationship;

Fig. 12 is a side sectional view of a modified form of the invention;

Fig. 13 is an enlarged detail sectional view of the detent arrangement of the modification of Fig. 12; and

Fig. 14 is a sectional view taken along line 14—14 of Fig. 12.

The charger of this invention includes a housing 1 which is received in and secured to fixed portions 2 of an automatic gun. Shoulder portion 3 of the housing engages a corresponding portion of the fixed part of the gun, while nut 4 is threadably received in this portion of the gun and serves to secure the charger housing to the gun. By this type of mounting and with proper dimensioning end 5 of the housing will be disposed adjacent slide 6 of the gun. The purpose of the gun charger is to move this slide laterally through a stroke to the left as shown in the drawing, and release the slide at exactly the instant it reaches the end of this stroke.

For this purpose, as may be seen in Fig. 2, housing 1 is of hollow cylindrical configuration mounting two plungers 7 and 8 on the inside thereof. These plungers are axially reciprocal relative to the charger housing. The first plunger 7 extends through end wall 9 of the housing and is provided with an enlarged end portion 10 which is adapted to engage the gun slide 6. The opposite end 11 of plunger 7 is also enlarged, this end of plunger 7 being received within plunger 8 which has a hollow interior portion 12. As illustrated in Fig. 2 and in the enlarged detail showing of Fig. 3, the two plungers are in a retracted position, interconnected by a detent 13. End 11 of plunger 7 is provided with an aperture 14, inclined at its outer surfaces as shown, which receives a pair of ball elements 15 of the detent. The balls 15 are pressed outwardly by a spring 16 so as to engage recess 17 in end portion 18 of plunger 8. This provides a driving connection so that if plunger 8 is moved axially to the left of the position illustrated in Fig. 2 of the drawing the force of this movement will be transmitted through balls 15 to plunger 7 so that the latter plunger will also be moved to the left. Plunger 8 slides within the housing on an elongated guide member 19 which is fixedly mounted in the housing and extends the length thereof.

In order to effect movement of the plungers through a stroke from the retracted position of Fig. 2 to an extended position, a cable drive means is provided for plunger 8. As a part of this driving arrangement, a slotted portion 20 is provided beyond end wall 21 of plunger 8 and by means of shaft 22 rotatably mounts a pulley 23 (see Figs. 4 and 5). A second pulley 24 is rotatably mounted on shaft 25 exteriorly of the housing and at the approximate location of the other end of plunger 8. A cable 26 engages the two pulleys with one end thereof passing through a slot 27 in the housing and being provided with an enlarged ball end 28 which serves to anchor the end of the cable. This end of the cable is located approximately above pulley 24. The other end of the cable

terminates in a T-handle 29 (see Fig. 1) which may be conveniently held to the exterior of the housing by clips 30 when the cable is not in use. A movable guide 31 covers a portion of pulley 24 and maintains the cable in proper alignment therewith as seen in Fig. 1 (this element has been removed from the other figures for purpose of clarity). Passage of the cable from pulley 23 to slot 27 is permitted by a slot 32 formed in the upper surface of plunger 8 for the entire length thereof and extending through end wall 21. Pin 33 through portion 20 of plunger 8 acts as a keeper to maintain cable 26 in engagement with pulley 23. It is apparent thus far that if cable 26 is pulled by means of handle 29, the force on the cable will cause plunger 8 to slide within the housing axially thereof to the left of the position illustrated in Fig. 2. This will cause simultaneous movement of plunger 7 by reason of the detent 13 which interconnects the two plungers.

Movement of the two plungers to the left is opposed by springs 34 and 35 which bear against end wall 9 of the housing, and against end portions 11 and 18 of plungers 7 and 8 respectively. These two springs serve to retain the plungers in their retracted position until the force has been exerted on cable 26. As the plungers are moved to the left there is no interference between the two springs 34 and 35 because one is a left-hand spring and the other right-hand.

Movement of the plungers to the left is also resisted by gun slide 6 which the plungers thereby cause to begin its stroke through the charging cycle. It can be seen that by reason of the use of two pulleys, and extending the cable to the end of plunger 8 and back to the location of slot 27 in the housing, a mechanical advantage of two to one is obtained whereby the effort in moving the cable is greatly reduced.

Continued force on cable 26 will move the two plungers to the left extending plunger 7 and bringing the two plungers to the position of Fig. 7 which is at very nearly the end of the stroke of the two plungers, and of the stroke of the gun slide. It is of course necessary to release the gun slide at this time so that the slide will be permitted to return and the charging operation can be completed. Therefore, in order to release plunger 7 from plunger 8 so as to free the gun slide, a trigger member 37 is provided in the housing. This member may comprise a tubular projection from the end wall 9 having a beveled end portion 38. As may best be seen in the enlarged detail of Fig. 8, trigger member 37 is of a dimension which may receive the forward portion 39 of end 11 of plunger 7, and will be received within end 18 of plunger 8 without any interference therefrom. Beveled end 38 of the trigger 37 therefore engages the two balls 15 and forces them inwardly away from recess 17 in plunger 8 in opposition to the force exerted by spring 16. Therefore, when the plungers have passed a position very slightly beyond that shown in Fig. 7 and moved to the position shown in Fig. 8, trigger 37 will have forced the balls inwardly into aperture 14 sufficiently to release the balls from recess 17 and free plunger 7 from plunger 8. Spring 34 will thereupon immediately return plunger 7 to its retracted position as may be seen in Fig. 9, even though the cable is held so that plunger 8 remains extended. Plunger 7 slides freely within hollow portion 12 of plunger 8. Thus it can be seen that at the precise location shown in Fig. 8, and as determined by the position of the trigger 37, the stroke of the plunger 7 is terminated and the gun slide is released so that it is free to return as the charging operation is completed. Subsequently, when handle 29 is released, spring 35 will return plunger 8 to its initial retracted position, ball elements 15 will be forced outwardly by spring 16 into recess 17 and the charger will be in the initial position of Fig. 2.

The stops which limit the travel of plunger 8 can best be seen by reference to Figs. 10 and 11. The guide member 19, which may be seen in top elevation in Fig. 10,

rests on the bottom of housing 1 and is integrally attached thereto. This guide includes an arcuate upper surface 42 which receives plunger 8 and provides a supporting surface therefor. An elongated slot 43 is provided in guide 19 at one end portion thereof to provide a clearance for cable 26. Beyond this portion of the guide member it is cut away laterally as indicated at 44 and 45 to provide shoulders 46 at one end and 47 at the other end of the cut away portion. As may be seen in the bottom plan view of plunger 8, as well as in the assembled sectional view of Fig. 11, the bottom of one end of the plunger is provided with a pair of projecting tabs 49. These are spaced so that when the plunger 8 is disposed on guide 19 tabs 49 straddle the guide member between shoulders 46 and 47. Therefore tabs 49 and shoulders 46 and 47 cooperate to provide the stops for plunger 8. When the plunger is at its retracted position tabs 49 will be in engagement with shoulders 46 preventing the spring 35 from forcing the plunger further to the right. When plunger 8 has been moved by the cable to its extended position tabs 49 will then be brought into engagement with shoulders 47 which will limit the travel of the plunger to the left.

The stops for plunger 7 may comprise the enlarged end portion 10 thereof bearing against end wall 9 of the housing for limiting the travel in one direction, and end portion 11 thereof which will not pass beyond the trigger member 37 as the plunger is moved to the extended position.

A modified form of the invention is illustrated in Fig. 12, and in detail in Figs. 13 and 14 which are sectional views thereof, this being a simplified arrangement which eliminates one of the springs and certain other parts. The basic design remains the same, however, so parts corresponding to those of the previously described arrangement have been given the same numbers with the suffix "a" added. According to the design of Fig. 13 there is no spring for maintaining plunger 7a in its right-hand retracted position, but end portion 11a thereof is provided with a flange 57 which engages an inwardly extending flange 58 of plunger 8a. These two flanges maintain plunger 7a in its retracted position when plunger 8a is retracted, providing an interfering means which will prevent the plunger 7a from moving to the left. As before, end 10a of plunger 7a will engage end wall 9a of the housing to limit the travel of the plunger in the other direction. The single spring 35a, therefore, by engaging plunger 8a will maintain the unit in its retracted position. Initial return of plunger 7a when plunger 8a is still extended by reason of the force on the cable 26a is effected by the gun slide itself which drives plunger 7a back to the retracted position.

Trigger 37a of the modification of Fig. 12 also serves as a stop means for the plunger 8a. For this reason, the trigger not only includes surface 38a which engages the balls of the detent, but there is a second shoulder 59 which is adapted to engage end 18a of plunger 8a thereby to limit the travel of the plunger to the left. The movement of plunger 8a to the right toward the retracted position is limited by reason of the flange 57 of plunger 7a engaging flange 58 of plunger 8a, the inner plunger having been in turn stopped in this direction by end wall 9a of the housing.

As may be seen in the sectional showing of Fig. 14, a means is provided for retaining the plungers in their retracted position in the modified form of the invention. This positions the plungers in their right-hand location and of course may be readily overcome by the cable when it is desired to operate the charger. Accordingly, shaft 22a which carries pulley 23a has a hollow interior. This receives balls 62 which are pressed outwardly against housing 1a by means of spring 63. These balls are adapted to engage circular apertures 64 in the side of the housing for providing a retaining means for the plungers. Force on cable 25a will unseat balls 62 from aperture 64 in op-

position to spring 63 and allow the plungers to be extended. This retaining arrangement assures that the plungers will not be extended slightly due to vibration from firing of the gun thereby preventing damage thereto from the gun slide.

It is apparent from the foregoing that this invention provides a manually operable gun charger which is of simple operation but always provides an exact stroke and release of the gun slide so that the gun will always be properly charged. The unique use of two plungers interconnected by a detent which is triggered at the end of the stroke of the charger so as to release the gun slide enables these results to be obtained. The cable drive arrangement furthermore affords a two to one mechanical advantage, thus assisting in the ease of operation of the charger.

The foregoing detailed description is to be understood as given by way of illustration only, the spirit and scope of this invention being limited only by the appended claims.

We claim:

1. A gun charger comprising a housing; a first plunger means, said first plunger means having a portion projecting from said housing for engaging a gun slide, said first plunger means being movable relative to said housing to an extended position for thereby moving a gun slide in a charging operation; a second plunger means in said housing and movable relative thereto to an extended position; detent means interconnecting said first and second plunger means whereby movement of said second plunger means relative to said housing drives said first plunger means by said detent means; trigger means in said housing engageable by said detent means when said first and second plunger means are in said extended positions for releasing said detent means and freeing said first plunger means from said second plunger means; and means for returning said second plunger means to a retracted position independently of said first plunger means.

2. A device as recited in claim 1 including in addition a resilient releasable retaining means for normally retaining said second plunger in its retracted position.

3. A gun charger comprising a housing; a first plunger therein, said first plunger having a portion adapted to project from said housing for engaging a gun slide, said first plunger being reciprocal through a stroke from a retracted position to an extended position for moving a gun slide engaged thereby in a charging operation; a second plunger in said housing and reciprocal through a stroke from a retracted position to an extended position; detent means interconnecting said plungers so that movement of said second plunger effects movement of said first plunger; means for releasing said detent when said first and second plungers are in an extended position for freeing said first plunger from said second plunger, said plungers being independently operable when so freed by said detent; and resilient means for urging said second plunger to a retracted position.

4. A gun charger comprising a housing; a first and a second plunger in said housing, said plungers being reciprocal from a retracted to an extended position, said first plunger having a portion adapted to engage a gun slide and move said slide through a charging operation when said first plunger is moved from a retracted to an extended position, said first plunger being received in and movable relative to said second plunger and being withdrawn a maximum amount therefrom when said plungers are in said retracted position; a spring-pressed detent interconnecting said plungers for permitting said second plunger to drive said first plunger from a retracted position to an extended position; manually operable means for moving said second plunger from a retracted to an extended position; a trigger member in said housing positioned to engage said detent when said plungers are in said extended position and operable to release said detent thereby to free said first plunger from said second plunger; and

resilient means for urging said second plunger to a retracted position.

5. A gun charger comprising a substantially tubular housing, a first plunger means in said housing and reciprocal relative thereto through a stroke from a retracted to an extended position, said first plunger means having one end portion projecting from said housing for engagement with a gun slide for moving such a slide through a charging operation during movement of said first plunger means from said retracted to a said extended position; a second plunger means in said housing and reciprocal relative thereto, said second plunger means including a hollow portion adapted to slidably receive said first plunger means; detent means interconnecting said plunger means for permitting said second plunger means to drive said first plunger means to said extended position; exteriorly operable cable means engaging said second plunger means for moving said second plunger means from a retracted to an extended position; trigger means constructed and arranged to engage said detent means when said first plunger means is in said extended position for releasing said detent means thereby to free said first plunger means from said second plunger means; spring means for returning said second plunger means to said retracted position; and stop means for limiting the travel of said second plunger means in either direction.

6. A device as recited in claim 5 in which the end of said first plunger means remote from said gun slide is provided with an aperture therein, the portion of said second plunger means adjacent thereto being provided with a shoulder, said detent comprising spring-pressed ball elements in said aperture adapted to engage said shoulder to thereby provide a driving connection means between said plungers, and said trigger means comprising an element fixed to said housing projecting around said first plunger means and including an abutment to engage said ball elements at the end of the stroke of said first plunger means to said extended position for forcing said ball elements into said aperture away from said shoulder, thereby to free said first plunger means from said second plunger means.

7. A gun charger comprising an elongated housing; a first plunger in said housing reciprocal relative thereto through a stroke from a retracted to an extended position, said housing having an end wall through which said plunger projects when so extended so that said plunger is adapted to force a gun slide through a charging operation; a second plunger in said housing reciprocal relative thereto through a stroke from a retracted to an extended position, said second plunger having an open tubular portion receiving said first plunger; a detent at the end of said first plunger remote from said gun slide engageable with the end of said open portion of said second plunger for providing a releasable driving connection between said plungers; exteriorly operable cable means engaging said second plunger for driving the same through its stroke from a retracted to an extended position; a trigger in said housing near said end wall thereof for engaging said detent to release the same thereby freeing said first plunger from said second plunger; and a spring interposed between said end wall and said second plunger for urging said second plunger to a retracted position.

8. A gun charger comprising a housing; a first plunger reciprocal therein through a stroke from a retracted to an extended position, said first plunger having an end adapted to engage a gun slide for moving the same through a charging operation when said first plunger is moved from a retracted to an extended position; a second plunger in said housing reciprocal through a stroke from a retracted to an extended position, said second plunger including a tubular portion one end of which is open and receives said first plunger therein; a detent at said open end for releasably interconnecting said plungers; pulley means on the opposite end of said second plunger; a cable anchored to said housing near said open end, extending therefrom

to said second pulley, and extending from said second pulley to an opening in said housing near said open end, whereby tension on said cable is effective to drive said plungers through a stroke from a retracted position to an extended position; a trigger in said housing for engaging said detent when said first plunger has been extended thereby to release said detent and free said first plunger from said second plunger; and resilient means for returning said second plunger to said retracted position.

9. A gun charger comprising a housing; a first reciprocal means therein, said first reciprocal means having a portion adapted to engage a gun slide, said first reciprocal means being movable relative to said housing to an extended position projecting from said housing for thereby moving such a gun slide in a charging operation; a second reciprocal means in said housing movable relative thereto to an extended position; detent means interconnecting said first and second reciprocal means so that movement of said second reciprocal means to said extended position thereof

causes movement of said first reciprocal means to the extended position thereof; externally operable means engaging said second reciprocal means for causing such movement of said second reciprocal means to its extended position; and trigger means in said housing engageable by said detent means when said reciprocal means are in said extended positions for releasing said detent means and freeing said first reciprocal means from said second reciprocal means.

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