Feb. 14, 1939. H. L. CROCKETT 2,146,941

TUBULAR MAGAZINE REPEATING FIREARM

Filed July 19, 1937 4 Sheets-Sheet 1

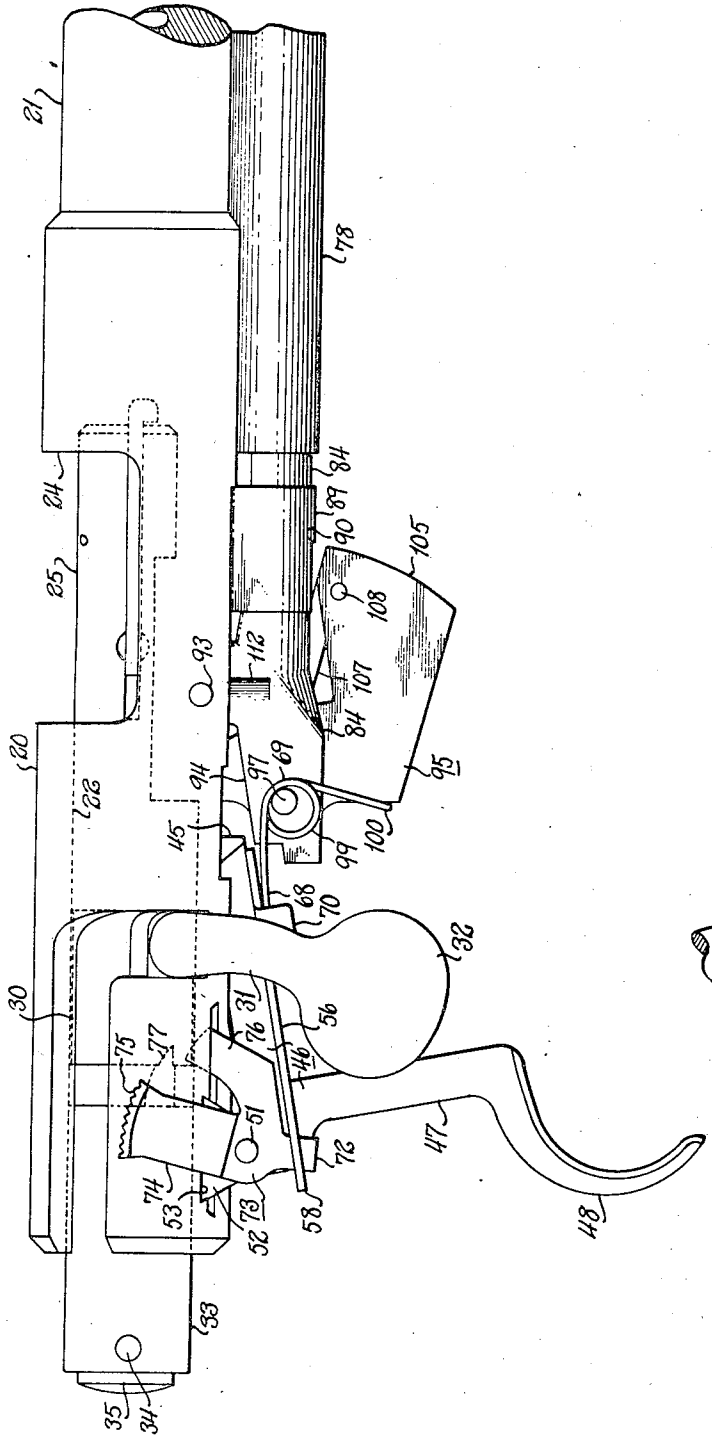


Fig. 1.

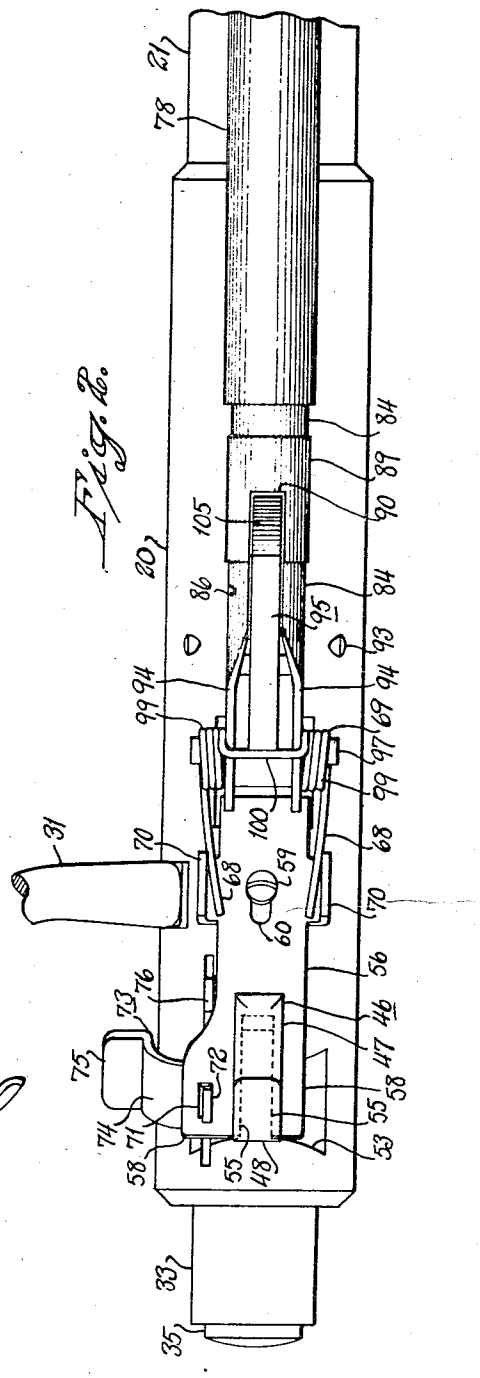


Fig. 2.

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TUBULAR MAGAZINE REPEATING FIREARM

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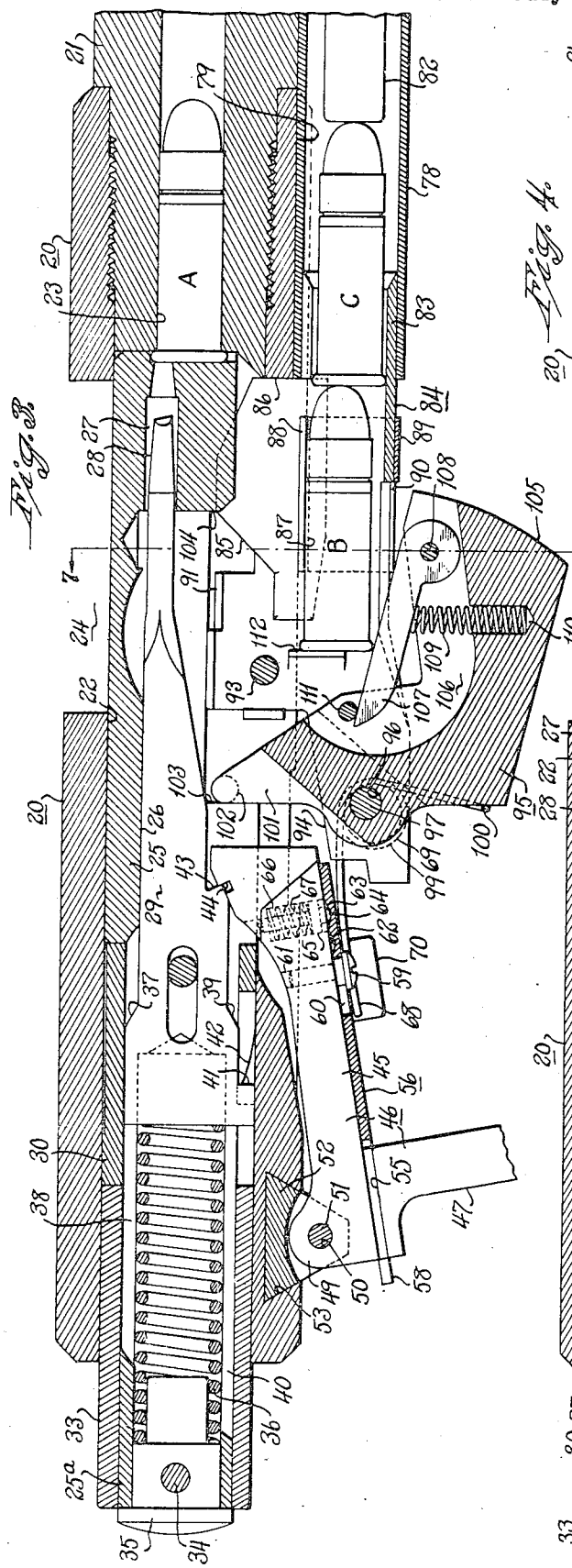


Fig. 3.

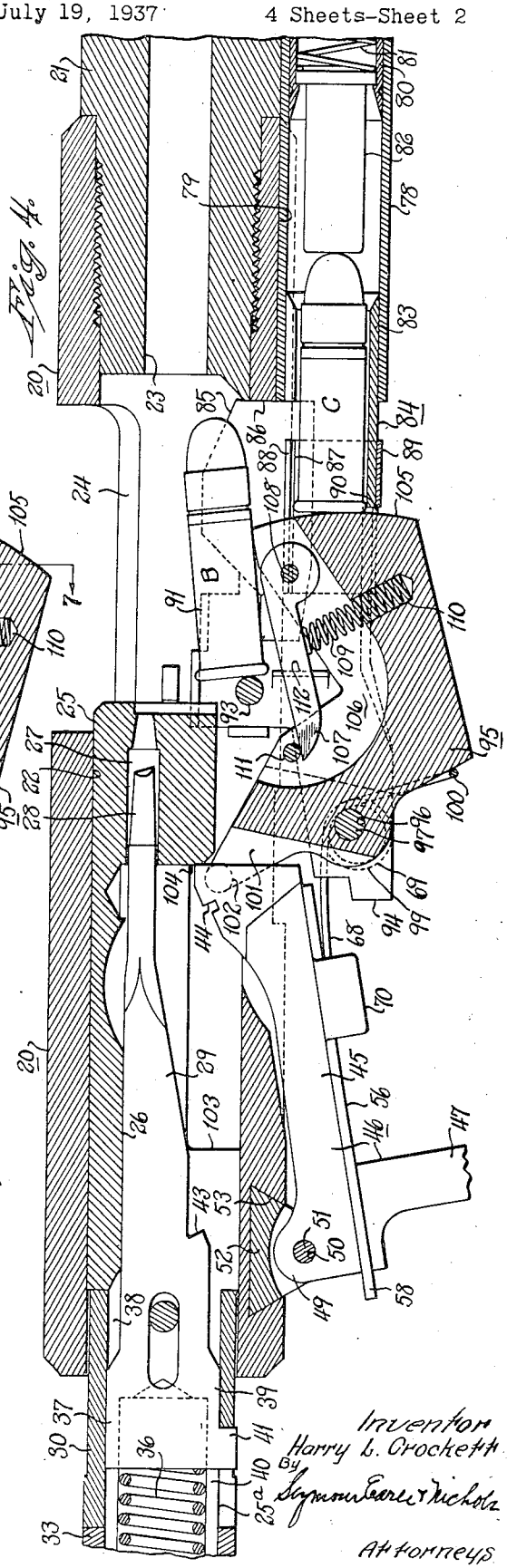


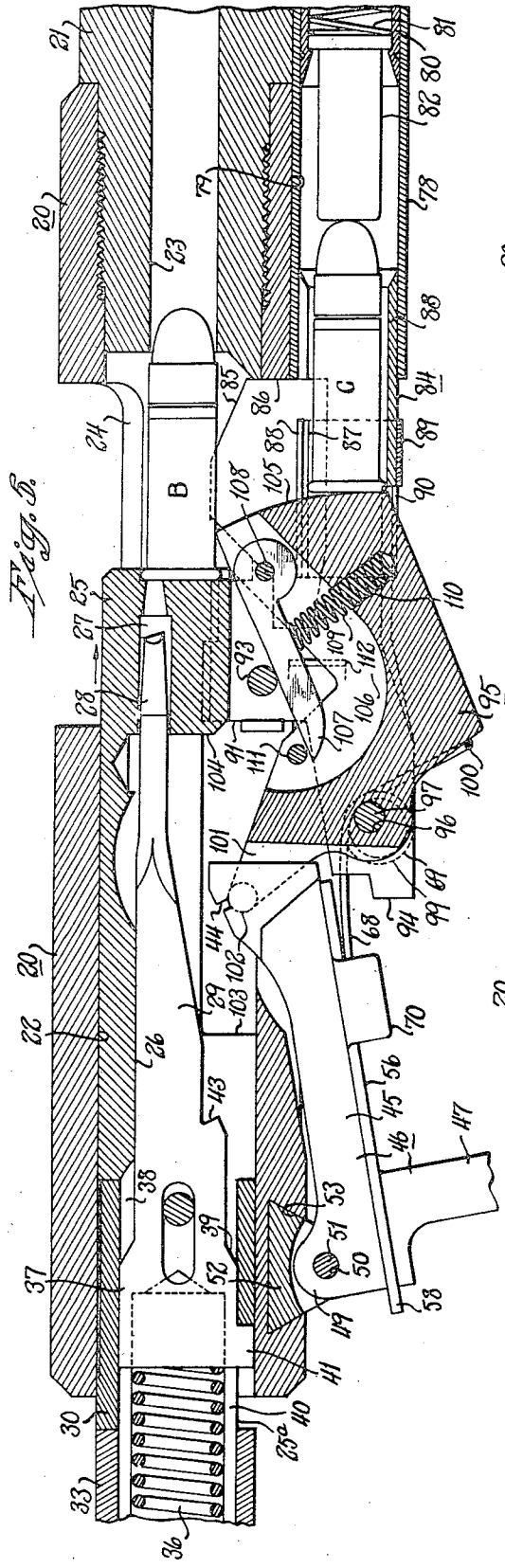
Fig. 4.

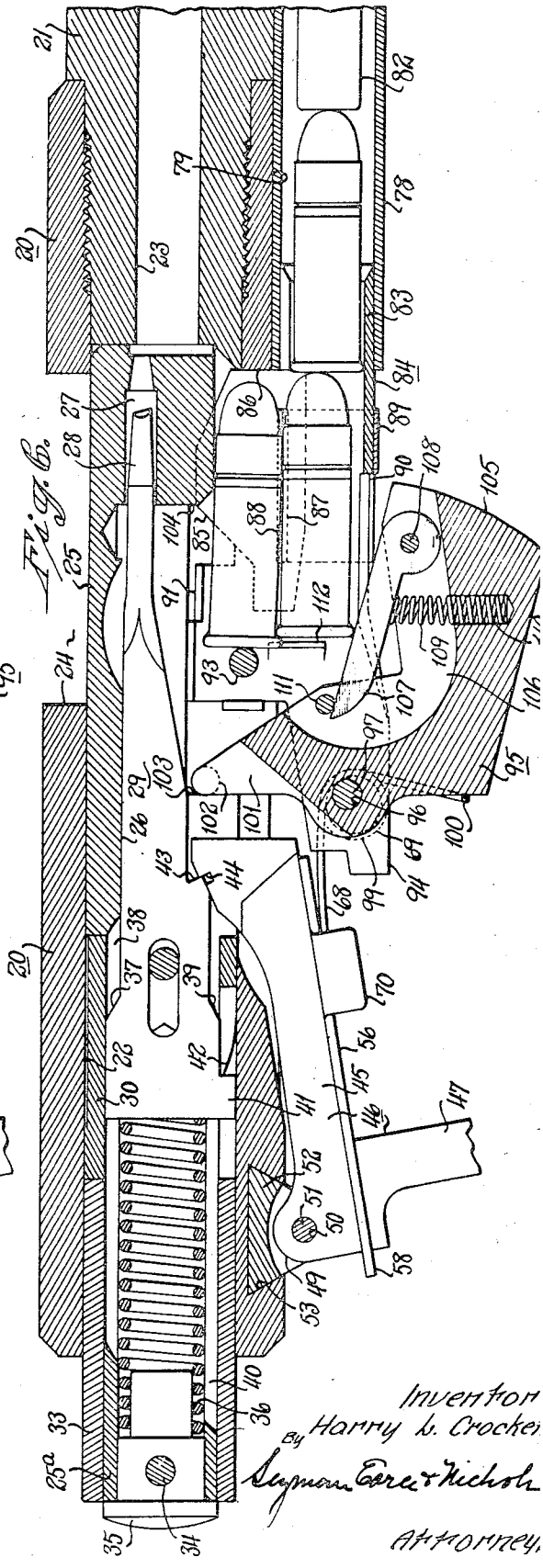
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TUBULAR MAGAZINE REPEATING FIREARM

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TUBULAR MAGAZINE REPEATING FIREARM

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Fig. 7.

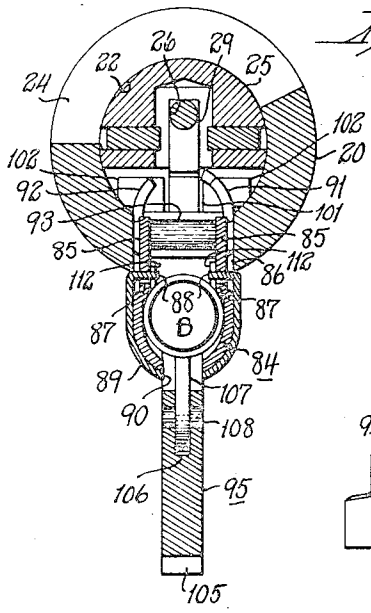
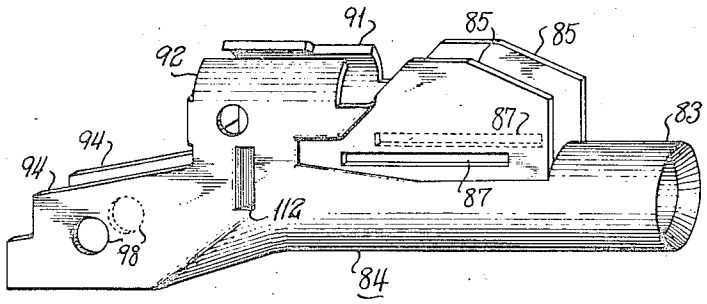


Fig. 8.



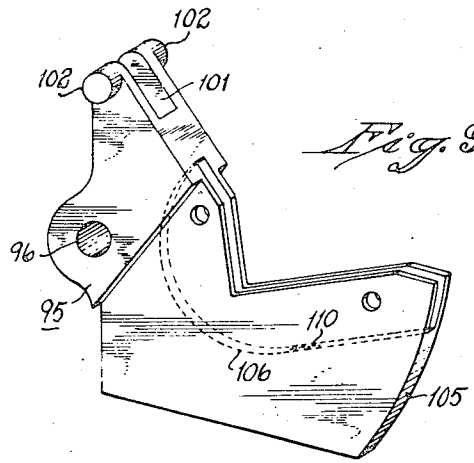


Fig. 9.

Fig. 10.

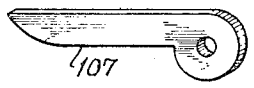
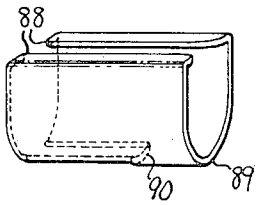


Fig. 11.



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Patented Feb. 14, 1939 2,146,941

UNITED STATES PATENT OFFICE

2,146,941

TUBULAR-MAGAZINE REPEATING FIREARM

Harry L. Crockett, New Haven, Conn., assignor, by mesne assignments, to Western Cartridge Company, a corporation of Delaware

Application July 19, 1937, Serial No. 154,447

3 Claims. (Cl. 42—17)

This invention relates to an improvement in repeating firearms, and particularly to repeating firearms of the tubular-magazine type.

One of the objects of the present invention is to provide a tubular-magazine repeating firearm having superior means for transferring cartridges from the tubular-magazine to a position for introduction into the cartridge-chamber of the firearm.

A further object is to provide a repeating firearms having superior means whereby cartridges may be transferred from the tubular-magazine to a position for introduction into the cartridge-chamber without causing such interference between succeeding cartridges as would cause a jam.

Another object of the present invention is to provide superior cartridge-elevating means whereby one cartridge may under-ride another cartridge without blocking the upper cartridge against being fed into the cartridge-chamber of the firearm.

With the above and other objects in view, as will appear to those skilled in the art from the present disclosure, this invention includes all features in the said disclosure which are novel over the prior art and which are not claimed by me in a separate application.

In the accompanying drawings, in which certain modes of carrying out the present invention are shown for illustrative purposes:

Fig. 1 is a broken view in side elevation of an upturn-and-pullback bolt-action firearm of the tubular-magazine type, in which the present invention is incorporated, the stock and associated parts being omitted;

Fig. 2 is a broken under-side view thereof;

Fig. 3 is a view thereof in vertical, central-longitudinal section, showing the positions which the parts assume when the breech-bolt is closed and the firing-plunger is cocked, preparatory to firing the arm;

Fig. 4 is a view corresponding to Fig. 3, but illustrating the positions which the parts assume after the firearm has been discharged and the breech-bolt has been fully retracted;

Fig. 5 is a view corresponding to Figs. 3 and 4, save that the parts are shown in the positions which they assume when the breech-bolt is about midway of its forward travel;

Fig. 6 is a view corresponding to Fig. 3, but showing two cartridges located in the magazine-throat;

Fig. 7 is a transverse sectional view taken on the line 7—7 of Fig. 3;

Fig. 8 is a perspective view of the magazine-throat, detached;

Fig. 9 is a similar view of the cartridge-elevator;

Fig. 10 is a perspective view of the tongue-member of the cartridge-elevator; and

Fig. 11 is a similar view of the U-shaped cartridge-retainer.

The cartridge-carrying or elevating mechanism of the present invention is suitable for use in various firearm structures, but the particular tubular-magazine firearm herein chosen for illustration is of the so-called "upturn-and-pullback bolt-action" type. The said firearm includes a receiver 20 of tubular form into the forward end of which the rear end of a barrel 21 is threaded. The receiver 20 is also provided with an axial bolt-receiving passage 22 which is also coaxial with the cartridge-chamber 23 in the rear portion of the barrel 21. The forward portion of the bolt-receiving passage 22, just referred to, is intersected laterally by a loading-and-ejection opening 24.

Mounted in the bolt-receiving passage 22 of the receiver 20, with capacity for reciprocation therein, is a cylindrical breech-bolt 25 formed in its interior with an axial firing-plunger passage 26. Intersecting the forward end of the passage 26 is a relatively-small eccentric firing-point passage 27 through which is projectable the firing-point 28 located at the forward end of a firing-plunger 29, which latter is located in the passage or guide-way 26 in the bolt 25, with capacity for reciprocation therein.

The rear portion 25*a* of the breech-bolt 25 is reduced in diameter to provide a smooth cylindrical exterior surface upon which turns a bolt-operating sleeve 30 having a laterally-offsetting handle 31 terminating in a ball-grip 32. To retain the bolt-operating sleeve 30 in place upon the reduced rear portion 25*a* of the bolt 25, a retaining-sleeve 33 is mounted upon the said portion 25*a* and in turn is secured in place by a retaining-pin 34 extending diametrically through the said retaining-sleeve 33, the portion 25*a*, and through an end-plug 35 installed in the open rear end of the said portion 25*a*, as is clearly shown in Figs. 3 and 6.

Fitted within the rear portion of the passage or guide-way 26 in the reduced rear portion 25*a* of the breech-bolt 25 and seated at its rear end against the end-plug 35 therein, is a helical firing-spring 36 which bears at its forward end against the rear end of the firing-plunger 29, before referred to. The main portion of the firing-plung-

er 29 is substantially plate-like in form and is provided at its rear end with an upwardly-extending guide-extension 37 riding in a longitudinal guide-groove 38 formed in the upper wall of the reduced portion 25a of the breech-bolt 25. The firing-plunger 29 is also formed at its rear end with a downwardly-extending guide-extension 39 projecting into a longitudinal guide-slot 40 formed in the bottom wall of the reduced portion 25a. The said guide-extension 39 has projecting from it in turn a downwardly-extending finger 41 which projects into engagement with a cam-slot 42 formed in the bolt-operating sleeve 30, before referred to.

The firing-plunger 29 is also formed in its under-portion with a forwardly-facing cocking-shoulder 43 which is adapted to be engaged by a rearwardly-facing cocking-shoulder 44 formed upon the substantially-horizontal sear-arm 45 of a sear-and-trigger unit generally designated by the reference character 46. The said sear-and-trigger unit 46 also includes, in addition to the said sear-arm 45, a substantially-vertical trigger-arm 47 terminating at its lower end in a curved trigger or finger-piece 48. The sear-arm 45 and the trigger-arm 47 of the sear-and-trigger unit 46, above referred to, together form a substantially L-shaped figure which is provided adjacent its apex with a mounting-ear 49 having a transverse bearing-opening 50 therethrough. The mounting-ear 49 of the sear-and-trigger unit 46 receives a pivot-pin 51 which is mounted in a bracket 52 which is of wedge-shaped form in end elevation and has its upper portion firmly driven into a transverse dovetail notch 53 formed in the under-side of the receiver 20 immediately adjacent the rear end thereof.

Formed in each of the respective opposite sides of the sear-and-trigger unit 46 is a guide-groove 55 extending parallel with the sear-arm 45 and having its upper wall in the same plane as the under-side or face of the said sear-arm 45. Arranged directly beneath the sear-arm 45 of the said unit 46 is a sheet-metal safety-slide, generally designated by the reference character 56. The rear end of the said safety-slide is notched to form two-guide-fingers 58—58, the inner edge portions of which ride in the guide-grooves 55—55 before described in the sear-and-trigger unit 46.

The forward portion of the safety-slide 56 is supported and guided for reciprocation beneath the sear-arm 45 by a guide-screw 59 which extends through a longitudinal slot 60 in the said safety-slide and into a threaded bore 61 in the sear-arm 45. Immediately forward of the slot 60, the safety-slide 56 is formed with two conical detent-pockets 62 and 63 which alternately register with and receive the conical detent-nose 64 of a detent-plunger 65. The said detent-plunger 65 is mounted for reciprocation in a downwardly-opening pocket 66 formed in the forward portion of the sear-arm 45 and opening through the under-side thereof. The said detent-plunger 65 is yieldingly urged downwardly into engagement with either one or the other of the two detent-pockets 62 or 63 by a helical spring 67 which is also located in the pocket 66 referred to.

The safety-slide 56, and hence the sear-arm 45, is urged upwardly by the tension of the rearwardly-extending complemental arms 68—68 of a spring, which is generally designated by the reference character 69, and which will be described more in detail hereinafter. To prevent the arms 68—68 of the spring 69 from spreading unduly, the safety-slide 56 is formed on each of its respective opposite sides, adjacent its forward end, with a retaining-finger 70.

The right rearwardly-projecting arm 58 of the safety-slide 56 is formed with a substantially-rectangular coupling-opening 71 which receives the depending coupling-finger 72 of a sheet-metal operating-lever, generally designated by the reference character 73 (Figs. 1 and 2). The operating-lever 73, just referred to, rocks upon the projecting right end of the pivot-pin 51 upon which the sear-and-trigger unit 46 is pivotally hung. The operating-lever 73 is also formed with an upwardly-extending and slightly outwardly-bowed operating-arm 74 which is bent outwardly at its upper end to provide a finger-piece 75 having a serrated upper surface. The operating-lever 73 is further formed, as is particularly well shown in Fig. 1, with an upwardly-projecting locking-finger 76 which is adapted on occasion to be swung upwardly into position to be engaged by a locking-abutment 77 (Fig. 1) formed in the exterior surface of the bolt-operating sleeve 30.

Extending beneath the barrel 21 in substantial parallelism therewith is an outer magazine-tube 78, the upper rear portion of which is accommodated in a longitudinal groove 79 formed in the under-face of the forward portion of the receiver 20.

The tubular-magazine of which the outer magazine-tube 78 forms a feature may be made of any approved construction common in the art, and as shown, includes an inner magazine-tube 80 in which is housed a spring 81 which rearwardly urges a follower 82. Projecting into the open rear end of the outer magazine-tube 78 is the tubular stem 83 of a magazine-throat formed of sheet-metal and designated as a whole by the reference character 84. The said magazine-throat is formed with a pair of laterally-spaced-apart upwardly-extending side-panels 85—85 which extend upwardly into the interior of the receiver 20 through a longitudinal passage 86 formed in the bottom wall of the said receiver. Each of the side-panels 85 is formed with a longitudinal slot 87 respectively receiving one of the opposed cartridge-checking fingers 88—88 of a substantially U-shaped cartridge-retainer formed of spring metal and generally designated by the reference character 89. The rear portion of the bottom wall of the elastic cartridge-retainer 89 is formed with a clearance-notch or passage 90 for the purpose as will hereinafter appear. Immediately to the rear of the side-panels 85—85, the magazine-throat 84 has its opposite walls curved inwardly to provide opposed cartridge-stop fingers 91 and 92.

The forward portion of the magazine-throat 84 is supported by having its tubular stem 83 extended within the rear end of the outer magazine-tube 78, before described, and its rear portion is rigidly supported in the firearm structure by a transverse pin 93 which extends through perforations in the respective cartridge-stop fingers 91 and 92 and is supported at its respective opposite ends in the receiver 20. The magazine-throat 84 is also formed with a pair of rearwardly-projecting laterally-spaced-apart arms 94—94 between which extends, for rocking movement, a cartridge-carrier or elevator which is of substantially L-shaped form and which is generally designated by the reference character 95.

About midway of its height, the cartridge-ele-

vator 95 is provided with a transverse bearing-opening 96 through which extends a pivot-pin 97 which also extends through perforations 98, one of which is formed in each of the two rearwardly-extending arms 94. The respective opposite ends of the pivot-pin 97 project laterally beyond the magazine-throat 84 to a degree sufficient to support the complemental coils or loops 99 which are formed in the spring 69, before referred to, so as to in effect constitute a trunnion for the said spring. The spring 69 is formed with a depending U-shaped arm 100 which joins its complemental coils or loops 99 and which engages with the rear face of the lower portion of the cartridge-elevator 95 to yieldingly urge the same in a counterclockwise direction around the pivot-pin 97. As thus constructed and arranged, the spring 69 discharges the dual function of turning the cartridge-elevator 95 and also lifting the sear-arm 45 of the sear-and-trigger unit 46.

The upper rear portion of the cartridge-elevator 95 is formed with a clearance-notch 101 designed to clear the forward portion of the sear-arm 45 when occasion requires, as is especially well shown in Figs. 4 and 5. Projecting laterally from each of the respective opposite sides of the upper terminal of the cartridge-elevator 95 is an operating-lug 102, both of which lugs 102—102 are adapted to be engaged for rocking said cartridge-elevator by a forwardly-facing depressing-shoulder 103 and a rearwardly-facing lifting-shoulder 104, both of which are formed in the breech-bolt 25.

The forward edge 105 of the substantially-horizontal leg of the cartridge-elevator 95 is curved concentrically with respect to the pivot-pin 97 and constitutes a check for the column of cartridges in the tubular-magazine, in a manner as will more fully hereinafter appear. The cartridge-elevator 95 is formed with a longitudinal upwardly-opening pocket 106 which receives a tongue 107 hung upon a pivot-pin 108 carried by the cartridge-elevator 95 at a point remote from its own pivot-pin 97.

The tongue 107 carried by the cartridge-elevator 95 is urged upwardly by a helical spring 109 bearing against its under-side about midway of its length and seated in a spring-pocket 110 which opens upwardly and intersects the bottom wall of the pocket 106 in the cartridge-elevator 95. To limit the upward swinging movement of the rear end of the tongue 107 with respect to the cartridge-elevator 95 by which it is carried, a pin-like stop-abutment 111 is mounted in the cartridge-elevator 95 and extends across the upper rear portion of the pocket 106 therein.

For the purpose of checking the rearward movement of cartridges as they emerge from the tubular-magazine when the forward upper corner of the cartridge-elevator is substantially fully depressed, the magazine-throat 84 is provided in each of its respective opposite side-walls with a bent-in cartridge-stop-abutment 112, which act as stops for the cartridges, in the manner illustrated in Figs. 3 and 6.

For the purpose of description, let it be assumed that the parts are in the positons in which they are illustrated in Figs. 1 to 3 inclusive, in which the firearm is cocked, a cartridge A is in place in the cartridge-chamber 23 and a cartridge B is located in the magazine-throat 84 and held against the cartridge-stop-abutments 112, by the rearward urge of a third cartridge C, which in turn is urged rearwardly by the spring-pressed follower 82.

Now, when the trigger 48 is pulled, the cartridge A will be fired, whereupon the next operation in the normal functioning of the firearm is for the operator to lift the bolt-handle 31 and retract the breech-bolt 25 into the position in which it is shown in Fig. 4. In this manner, the now-fired cartridge A will have been ejected.

Near the completion of the rearward travel of the breech-bolt, as just above described, the lifting-shoulder 104 of the said breech-bolt will engage with the operating-lugs 102 of the cartridge-elevator 95 and will effect the positive counterclockwise swinging movement of the said cartridge-elevator to positively force the cartridge B upwardly between the laterally-yielding cartridge-checking fingers 88—88 of the U-shaped cartridge-retainer 89. The cartridge-elevator, under the urge of the spring 69, will continue to turn until the cartridge B is elevated to the position in which it is shown in Fig. 4, in which position its further upward movement is checked temporarily by the cartridge stop-fingers 91 and 92.

The operator of the firearm now forces the breech-bolt 25 forwardly by means of the operating-handle 31, with the effect of engaging the lower portion of the front face of the said breech-bolt with the rear face of the cartridge B. The continued movement of the breech-bolt will in due course move the cartridge B out from under the cartridge stop-fingers 91 and 92, whereupon the tension of the spring 69 will serve to further elevate the said cartridge into substantial alignment with the cartridge-chamber 23, as shown in Fig. 5.

Ultimately, in the forward travel of the breech-bolt, as above described, the depressing-shoulder 103 thereof will come into engagement with the operating-lugs 102 of the cartridge-elevator 95 and will swing the same in a clockwise direction against the tension of the spring 69. As the cartridge-elevator 95 is swung as described, its forward upper corner will ultimately clear the lower edge of the cartridge C and thus permit the same to move rearwardly thereover into engagement with the cartridge-stop-abutments 112 of the magazine-throat 84. The cartridge C, as it moves rearwardly as described, as well as all other cartridges emerging from the tubular-magazine, will strike the sloping upper edge of the tongue 107 and will be yieldingly urged upwardly thereby. A cycle of operation will now have been completed, preparatory to firing and retracting and again closing the breech-bolt 25 to effect the insertion of the cartridge C into the cartridge-chamber 23.

It occasionally happens that a marksman, after partially retracting the breech-bolt, will decide that he wishes to close the said breech-bolt without leaving a cartridge in the cartridge-chamber 23. Under these conditions, the marksman will insert his finger through the loading-and-ejection opening 24 of the receiver 20 and depress the cartridge which is in the upper part of the magazine-throat 84, so that the breech-bolt may override the said cartridge. Now, when the breech-bolt is closed, no cartridge will be inserted into the cartridge-chamber 23, but the closing action of the said breech-bolt will, of course, operate the cartridge-elevator 95, as before described, and will permit another cartridge to move from the magazine into the lower portion of the magazine-throat 84, so that two cart-

ridges will now be therein as is illustrated in Fig. 6. The presence in the magazine-throat of prior firearms of two cartridges at one time is very apt to cause a jam when attempt is made to operate the breech-bolt in the ordinary manner. For instance, with two cartridges positioned as they are shown in Fig. 6 of the drawings, the rim of the lower cartridge is interporsed in the path of forward movement of the rim of the upper cartridge, and were it not for the provision of the yielding tongue 107, the upper cartridge would be forestalled from moving forwardly by the under cartridge when the breech-bolt was next operated. However, with the construction shown, when the breech-bolt is operated to insert the uppermost cartridge into the cartridge-chamber 23, the lower cartridge will be cammed downwardly by the rim of the upper cartridge, to permit the said upper cartridge to override the under cartridge. This camming action to free the upper cartridge for forward movement is permitted by the downwardly-yielding character of the tongue 107 which permits the lower cartridge to be depressed for the purpose just referred to.

Other conditions than that above described may also occasion a jam of cartridges in the magazine-throat, which conditions do not require detailed description herein other than to say that the yielding character of the tongue 107 serves to minimize if not entirely eliminate jams occasioned by the simultaneous presence of a plurality of cartridges in the magazine-throat or its equivalent.

The invention may be carried out in other specific ways than those herein set forth without departing from the spirit and essential characteristics of the invention, and the present embodiments are, therefore, to be considered in all respects as illustrative and not restrictive, and all changes coming within the meaning and equivalency range of the appended claims are intended to be embraced therein.

I claim:

1. A tabular-magazine repeating firearm including in combination: a barrel having a cartridge-chamber; a breech-bolt; a tubular-magazine located below the said barrel and the cartridge-chamber therein; a cartridge-elevator pivoted to the said firearm structure in position to elevate cartridges from the said tubular-magazine into position to be inserted into the cartridge-chamber of the said barrel by the said breech-bolt, the said elevator being provided with a stop-abutment and formed intermediate its respective opposite sides with a longitudinally-and-vertically-extending upwardly-opening cavity; a tongue pivoted to the said cartridge-elevator at a point remote from the pivot-point thereof and having its free end pointing in the general direction of the pivot-point of the said cartridge-elevator and engageable with the stop-abutment of the cartridge-elevator; and a spring carried by the said cartridge-elevator and pressing the free end of the said tongue toward the stop-abutment of the said cartridge-elevator.

2. A tubular-magazine repeating firearm including in combination: a barrel having a cartridge-chamber; a breech-bolt; a tubular magazine located below the said barrel and the cartridge-chamber therein; a frame or receiver connected to the said barrel and carrying the said breech-bolt and provided with a vertical cartridge-delivery passage extending between the said magazine and the cartridge-chamber in the said barrel and of sufficient length in a vertical direction to simultaneously accommodate two cartridges below the said breech-bolt; a cartridge-elevator pivoted to the said frame or receiver in position to elevate cartridges through the said cartridge-delivery passage from the said tubular magazine into position to be inserterd into the cartridge-chamber of the said barrel by the said breech-bolt; and a substantially-vertically-yielding spring-pressed cartridge-deflecting member carried by the said cartridge-elevator, the said cartridge-deflecting member being so positioned that when the said cartridge-elevator is in its retired position, the cartridge-deflecting member will yieldingly upwardly deflect a second cartridge entering the said vertical cartridge-delivery passage from the said magazine into engagement with an uppermost cartridge in the said cartridge-delivery passage and permit the downward yielding of the rim of the said lowermost cartridge in the said vertical cartridge-delivery passage to enable the rim of the uppermost of said cartridges in the said passage to ride over the rim of the said lowermost cartridge and thus prevent the malfunctioning of the firearm when two cartridges are simultaneously located in the aforesaid vertical cartridge-delivery passage.

3. A tubular-magazine repeating firearm including in combination: a barrel having a cartridge-chamber; a breech-bolt; a tubular magazine located below the said barrel and the cartridge-chamber therein; a frame or receiver connected to the said barrel and carrying the said breech-bolt and provided with a vertical cartridge-delivery passage extending between the said magazine and the cartridge-chamber in the said barrel and of sufficient length in a vertical direction to simultaneously accommodate two cartridges below the said breech-bolt; a cartridge-elevator pivoted to the said frame or receiver in position to elevate cartridges through the said cartridge-delivery passage from the said tubular magazine into position to be inserted into the cartridge-chamber of the said barrel by the said breech-bolt; a cartridge-deflecting tongue pivoted to the said cartridge-elevator at a point remote from the pivot-point thereof and having its free end pointing in the general direction of the pivot-point of the said pivotal elevator; and spring-means yieldingly urging the free end of the said cartridge-deflecting tongue upwardly; the said cartridge-deflecting tongue being so positioned on the said cartridge-elevator that when the latter is in its retired position, the said cartridge-deflecting tongue will yieldingly deflect a second cartridge entering the said vertical cartridge-delivery passage upwardly into engagement with an uppermost cartridge in the said cartridge-delivery passage and will retire against the tension of the said spring-means to permit the downward yielding of the rim of the said lowermost cartridge in the said cartridge-delivery passage to enable the rim of the uppermost of said cartridges in the said passage to ride over the rim of the said lowermost cartridge and thus prevent the malfunctioning of the firearm when two cartridges are simultaneously located in the aforesaid vertical cartridge-delivery passage.

HARRY L. CROCKETT