Jan. 6, 1953 J. L. HILL 2,624,241

GUN ACTION

Filed Nov. 4, 1949 3 Sheets-Sheet 1

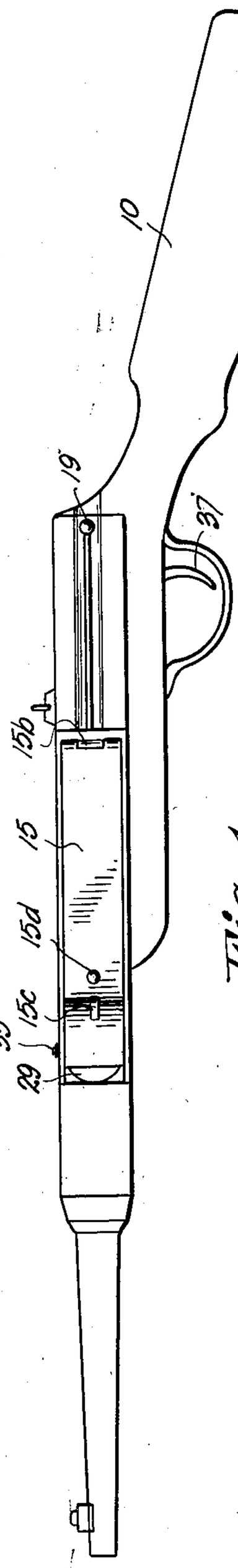

Fig. 1.

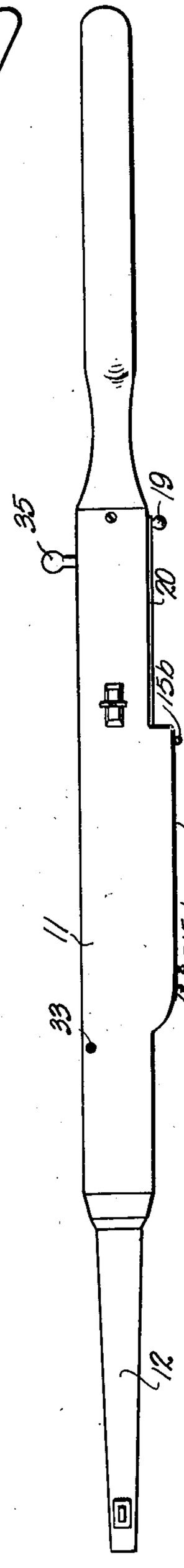

Fig. 2.

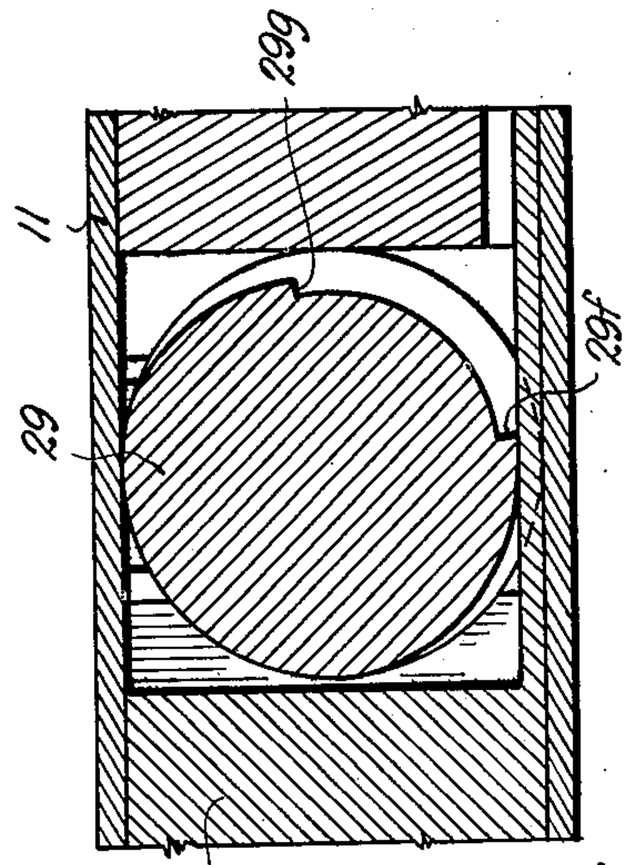

Fig. 6.

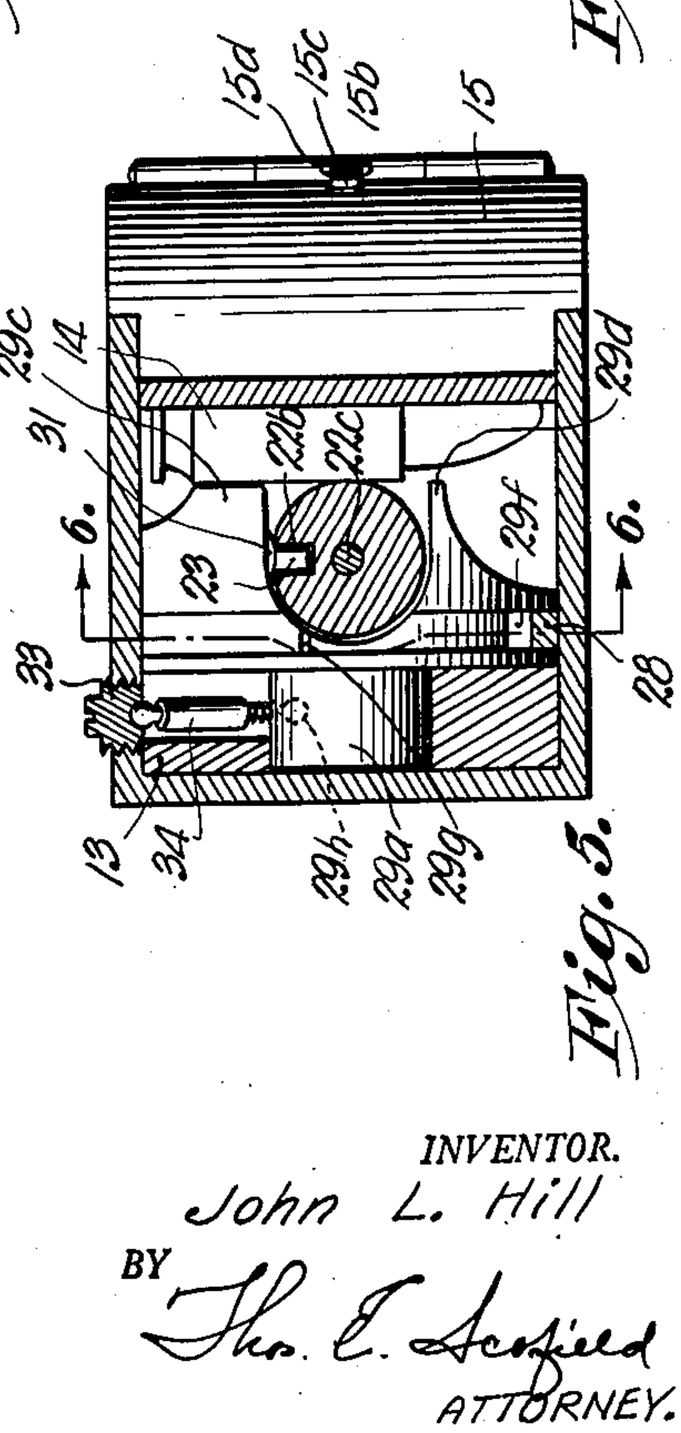

Fig. 5.

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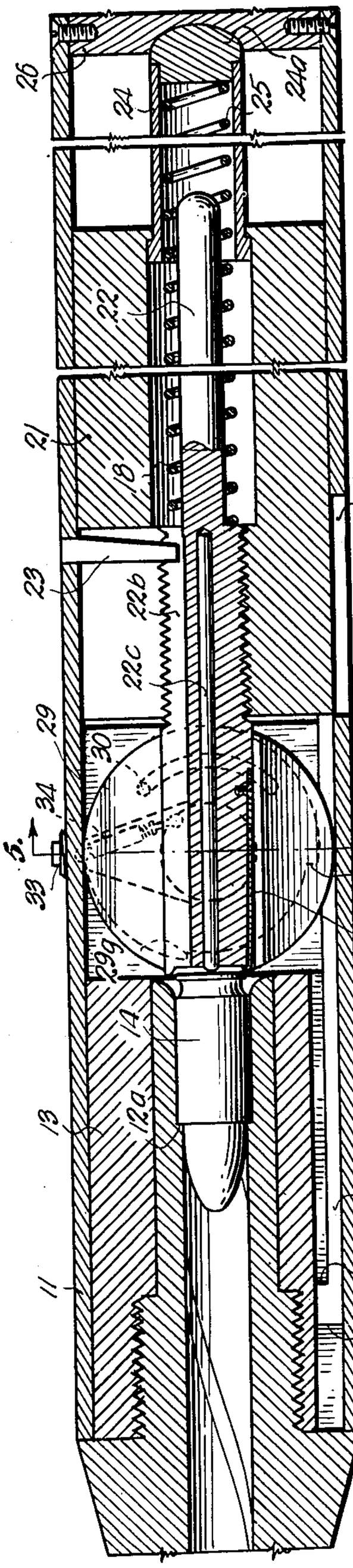

Fig. 3.

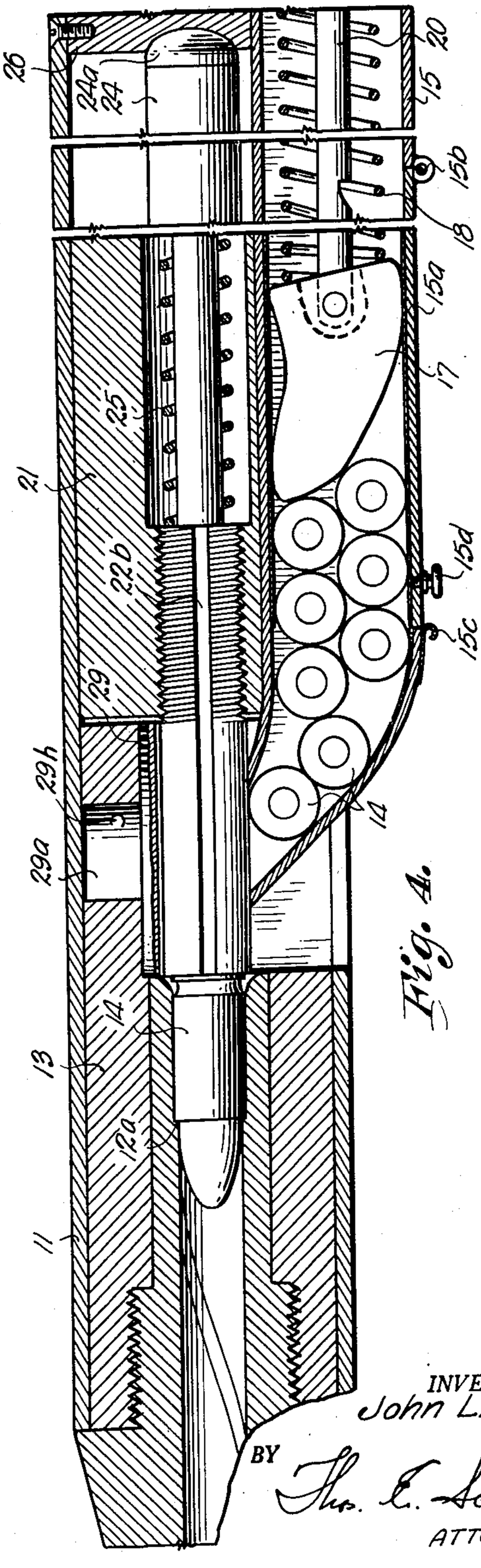

Fig. 4.

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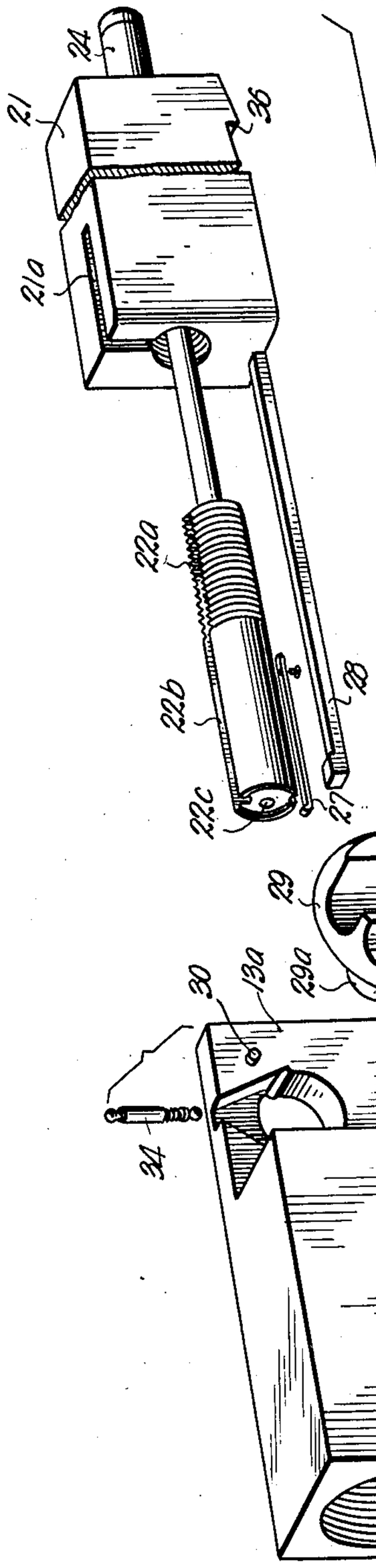

Fig. 7.

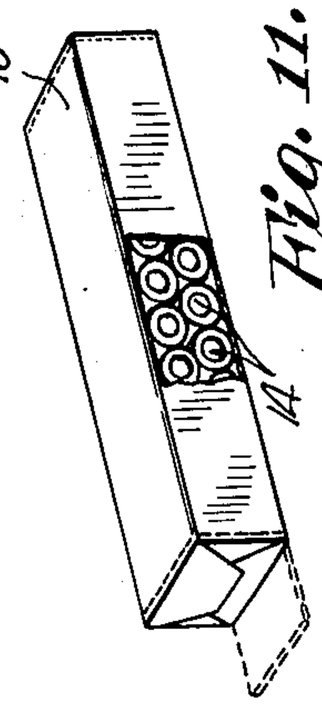

Fig. 11.

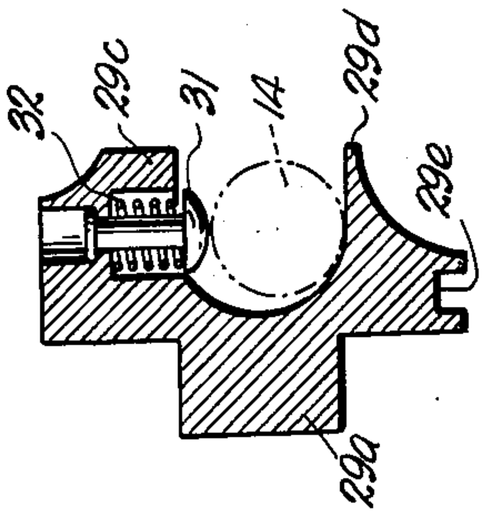

Fig. 10.

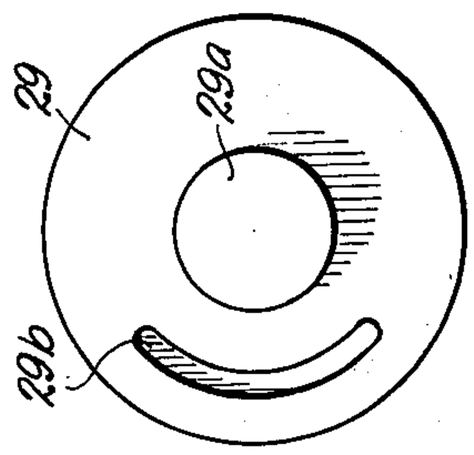

Fig. 9.

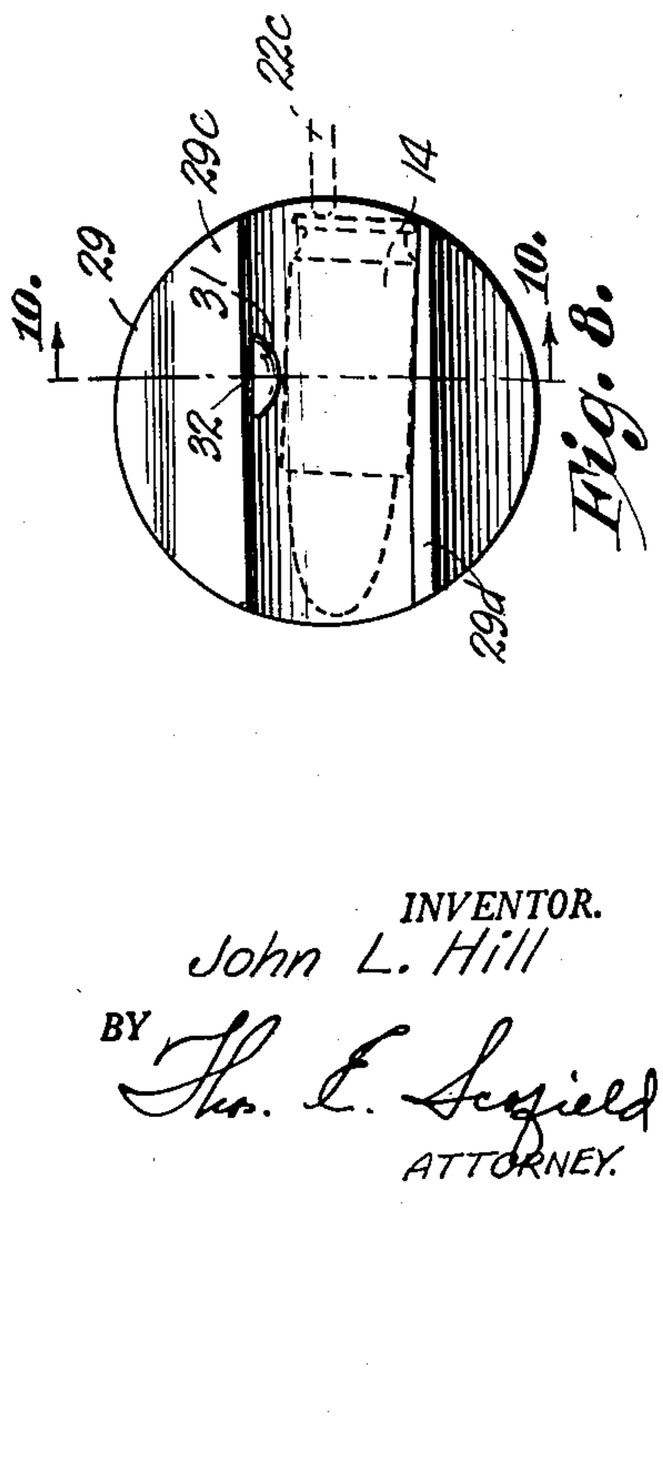

Fig. 8.

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GUN ACTION

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Application November 4, 1949, Serial No. 125,549

5 Claims. (Cl. 89—33)

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This invention relates to improvements in a gun action for automatic, semiautomatic and manually operated guns and refers more particularly to that portion of the action mechanism which transfers cartridges from the magazine to the gun barrel. This transfer mechanism comprises a rotatable disk constructed to receive the cartridges singly in a slot or trough formed on one of its faces, and rotate them through a 90° angle in alignment with the barrel bore so they are successively inserted into the firing chamber with each actuation of the bolt.

It is recognized that many different types of mechanism have been employed to load cartridges from a magazine to the gun barrel. The difficulty with such apparatus, however, is that it almost invariably involves an intricate association of parts which are fragile, subject to breakage and failure with the continued rough use which mechanism of this sort is subjected.

An object, therefore, of the present invention is to provide a simple positive mechanism for transferring cartridges from the magazine to the gun barrel.

Another object is to provide a magazine in which the cartridges are arranged within an enclosure extending longitudinally or parallel with the gun barrel eliminating the necessity of an excessively strong spring necessary to support the weight of the column of cartridges as well as energy to feed the cartridges to the action.

A further object is to provide a mechanism in which the operating parts are reduced to a minimum, are rugged and designed to withstand wear and usage over long periods without failure.

Another object is to provide a gun action and magazine assembly permitting the use of preloaded sealed dispensable containers for the cartridges wherein cartridges are charged as a unit in said preloaded container eliminating the necessity of filling a magazine with individual cartridges against the pressure of a strong magazine spring.

Other and further objects will appear from the following description.

In the accompanying drawings which form a part of the specification and are to be read in conjunction therewith, there is shown an embodiment of the invention.

Fig. 1 is a side view of an automatic gun provided with a gun action and magazine which embodies the invention.

Fig. 2 is a top view of the gun indicating the position of the magazine extending parallel with the gun action and stock.

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Fig. 3 is an enlarged vertical section of the action.

Fig. 4 is an enlarged horizontal section of the action and magazine.

Fig. 5 is a view taken along the line 5—5 in Fig. 3 in the direction of the arrows.

Fig. 6 is a view taken along the line 6—6 in Fig. 5 in the direction of the arrows.

Fig. 7 is an exploded view of the action and bolt structure.

Fig. 8 is a side view of the transfer disk showing the grooved cartridge receptacle.

Fig. 9 is a reverse view of the disk from that shown in Fig. 8.

Fig. 10 is a view taken along the line 10—10 in Fig. 8 in the direction of the arrows.

Fig. 11 is a perspective view of the dispensable container in which the cartridges are packed and loaded as a sealed unit into the magazine—seals port at perforations on three sides when broken by magazine follower and remain attached to the dispensable container.

To facilitate an understanding of the invention and to simplify its explanation, the bolt mechanism simulating that of a German automatic pistol is shown. Referring to the drawings and particularly Figs. 1 and 2, at 10 is shown a gun stock having mounted thereon a receiver 11 and a barrel 12 threaded at its rear end to engage the internally threaded portion of chamber block 13. The barrel is bored and rifled to receive cartridges 14, best indicated in Figs. 3 and 4. Along one side of the receiver 11 extends a magazine 15 with a loading port in its side for the introduction of cartridges introduced to the magazine in a sealed dispensable container 16, shown in Fig. 11. The port in the magazine through which the cartridge container is inserted has a closure plate 15*a* hinged at 15*b* and held shut by means of a spring latch 15*c*. A knob 15*d* on the closure plate is an aid in opening and closing the loading port. To insert the cartridge container into the magazine, follower 17 is retracted against the force of coil spring 18 by manually moving the knob 19 rearwardly along a slot in the side of the magazine shown in Fig. 1. The handle or knob 19 is attached to the retractor rod 20 and coil spring 18 surrounds the rod rearwardly of the follower which is attached to its forward end.

Behind chamber block 13 and within the receiver 11 is a bolt mechanism detailed in Figs. 3, 4 and 7. The bolt mechanism comprises bolt block 21 longitudinally drilled to receive the cartridge injector bolt and recoil mechanism. The bolt proper consists of an elongated rod or cylin-

drical member 22 threaded over a portion of its length as shown at 22*a*, to screw into the internally threaded portion of the bolt block. The forward end of the bolt, including the threaded portion, is longitudinally grooved at 22*b*, as is the bolt block at 21*a*, to accommodate passage of the stationary ejector 23 upon reciprocation of the bolt. The ejector is attached to the receiver or outside case of the gun and trips the shell from the bolt after extraction from the barrel, as will be hereinafter described. The hole through the bolt block has a shoulder near the back upon which seats the rim of sleeve 24 enclosing the rear end of recoil spring 25. The sleeve has a rear closure 24*a* which fits into plate 26 at the end of the action. That portion of the bolt rearwardly of threads 22*a* is of reduced diameter and serves as a guide for the recoil spring. The rear end of the recoil spring abuts against the rear closure 24*a* and the forward end against a shoulder formed in the bolt 22, where the threaded portion of the bolt commences. Beneath the bolt and adjacent its forward end is an extractor 27 attached at its rear end to the bolt and having sufficient resiliency to spring out and engage, by means of its hooked end, the rim of the cartridge prior to extraction of the cartridge from the barrel. Beneath the bolt block and rigidly attached thereto or forming an integral part of the block is the forwardly extending disk actuator 28. The front end of the actuator has an enlarged head with a shoulder for engagement with notches in the periphery of the transfer disk hereinafter explained. Positioned in a longitudinally drilled hole in the forward end of the bolt is a firing pin 22*c*.

A rearwardly extending plate 13*a* from chamber block 13 is apertured to receive a stud or stub shaft 29*a* extending from one side of transfer disk 29, shown in Figs. 4, 7, 9 and 10. In the same face of the disk from which stud extends is an arcuate slot 29*b* into which fits a pin or stop 30 mounted upon and extending outwardly from plate 13*a* as shown in Fig. 7. Stub shaft 29*a* of the disk bears in the aperture formed in the chamber block and the disk has rotative movement through a 90° angle limited by the travel of the stop 30 in the arcuate slot 29*b*. The opposite face of the transfer disk from that abutting plate 13*a* has a groove or cartridge slot formed therein and extending diametrically across the face of the disk. Parallel ridges 29*c* and 29*d* extend across the disk and form the opposite sides of the trough or slot in which is retained the individual cartridges 14 as they are transferred from the magazine to the gun barrel. The ridge portion 29*c* is drilled to receive a detent 31 held in place by coil spring 32 and adapted to impose a tilting pressure upon each cartridge as it is received in the groove of the disk. The lower surface of the cartridge slot is tapered slightly, as shown in Fig. 8, to permit canting of the cartridge out of alignment with the firing pin to avoid accidental firing of the cartridge before it is injected into the barrel.

Extending between a socket 29*h* in the periphery of stub shaft 29*a* and a similar socket in the bottom of screw plug 33, best shown in Fig. 5, is an over-center spring 34. This spring assures positive rotation of the transfer disk through its 90° cycle. The edge of the disk is grooved at 29*e*, as indicated in Figs. 3, 5, 6 and 10, to receive the disk actuator 28 extending forwardly from bolt block 21. The edge of the disk is notched within the groove, as indicated at 29*f* and 29*g* in Figs. 3

and 6, to be engaged by the disk actuator upon operation of the bolt which oscillates the disk through its 90° cycle. Initially it is rotated by the bolt action to receive a cartridge from the magazine and, upon subsequent operation of the bolt, the cartridge slot and cartridge are brought into alignment with the bolt and positioned so the cartridge can be slid from the disk to the gun barrel upon further movement of the bolt.

The operation of the gun action is briefly as follows: To begin with, a sealed container preloaded with cartridges is inserted through the side port of the magazine with the follower 17 retracted. The front and rear ends of the dispensable container are perforated around the edges so the forward pressure of the follower disrupts or bends down the ends of the package and permits feeding of the cartridges forwardly through the magazine, as indicated in Fig. 4. With the bolt in a forward position, as shown in Figs. 3 and 4, the cartridge groove or slot in the side of the transfer disk will be parallel with the gun barrel and in alignment with the bolt. Cartridges fed from the magazine through its forward restricted end arrive at the transfer disk in a position 90° from the axis of the gun barrel and at right angles to the groove in the face of the disk, as indicated in Fig. 4. Retraction of the bolt by means of bolt handle 35 shifts the bolt mechanism rearwardly retracting with it disk actuator 28. Shoulder 28*a* on the actuator engages notch 29*f* on the disk rotating it through an angle of 90° so the cartridge groove in the disk is parallel with the axis of the incoming cartridge. The force of follower spring 18 causes the cartridge adjacent the disk to enter the groove, as indicated in Figs. 8 and 10. Positive action and rotation of the disk through an arc of 90° is assured by over-center spring 34, while the limits of the disk travel are governed by stop pin 30 operating in the arcuate slot 29*b*. With the bolt in a retracted position the cartridge slot of the disk is rotated so the most advanced cartridge in the magazine will register with and readily fall into the slot. At this time the recoil spring 25 is retracted within sleeve 24 with sear notch 36 in the bottom of the bolt block engaged by an upwardly extending sear not shown, actuated through pivoted levers by trigger 37. This trigger release mechanism for the bolt block including the sear and actuating levers is conventional and has, therefore, been omitted from the drawing. When the trigger is pressed to fire the gun the bolt block is released, the force of coil spring 25 carrying the block and bolt mechanism forward. Simultaneously, the disk actuating extension 28 moves with the block, its front end face 28*b* abutting the notch 29*g* of the transfer disk before the injector portion 22*a* of the bolt reaches the disk. This trips the disk and rotates it in an opposite direction through an angle of 90° limited again in its travel by stop 30 as shown in Fig. 3. The cartridge lying in the groove of the disk is now shifted to a position in alignment with the bolt and gun barrel. While so positioned the spring actuated detent 31 cants the cartridge in the manner shown in Fig. 8 so the primer is out of alignment with firing pin 22*c* and premature firing is avoided. The forward force of the recoil spring, besides actuating the disk, advances bolt 22 through the groove of the transfer disk sliding the cartridge from the disk into the gun barrel. It is then fired by pin 22*c* when the forward end of the shell is seated against the shoulder 12*a* machined in the firing chamber of the barrel.

As the injector bolt 22*b* pushes home the cartridge into the gun barrel the hooked end of extractor 27 engages the rim of the cartridge. Upon firing of the cartridge the explosive force causes the bolt to be thrust rearwardly, the empty cartridge case being extracted from the barrel due to engagement of extractor 27 to the rim of the cartridge. The bolt and cartridge case slide through the disk slot and thence rearwardly to a position where ejector 23 abuts the top of the cartridge and trips it downwardly through an ejection port 38 in the bottom of the receiver. After the cartridge case has passed the transfer disk in its rearward travel, shoulder 28*a* of the disk actuator again trips the disk through its 90° rotation placing the disk in its initial position to receive another cartridge from the magazine.

In this manner the cartridges are successively fed from the magazine to the disk, thence to the gun barrel and after firing are extracted and ejected and a new cartridge loaded automatically as long as the trigger is pressed to a firing position. Releasing of the trigger permits the trigger sear to engage the notch in the bolt block and hold the block in a retarded position thereby temporarily interrupting firing action until the trigger is again pressed.

It will be noted that the cartridges are supplied to the magazine in preloaded dispensable containers by inserting a container unit ahead of follower 17. By locating the magazine parallel with the gun barrel and feeding the cartridges through the magazine while held in a position normal with the axis of the barrel there is avoided the necessity of using an excessively strong magazine spring and entailing no handling of individual cartridges in operating the gun. Conventionally, the cartridges are fed through the magazine from below so the spring must not only support the weight of the column of cartridges but must have sufficient force in excess of the weight of the cartridges to feed them into the gun action. It is appreciated that no novelty resides in the bolt and trigger mechanisms shown and explained, but it is believed that the transfer disk, magazine design and the use of a dispensable sealed preloaded cartridge container are features which are unique in automatic, semiautomatic and manually operated gun construction.

From the foregoing it will be seen that this invention is one well adapted to attain all of the ends and objects hereinabove set forth together with other advantages which are obvious and which are inherent to the structure.

It will be understood that certain features and subcombinations are of utility and may be employed without reference to other features and subcombinations. This is contemplated by and is within the scope of the claims.

As many possible embodiments may be made of the invention without departing from the scope thereof it is to be understood that all matter herein set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

Having thus described my invention, I claim:

1. In a gun action for automatic, semiautomatic and manually operated guns, the combination with a bolt having an injector, extractor, ejector and disk actuator operable therewith, of a barrel, a cartridge magazine, a bolt actuated transfer disk between the barrel and cartridge magazine, said disk having a cartridge groove extending diametrically across one face thereof, said groove lying in the plane of the barrel bore and oscillated with the bolt by means of the disk actuator to receive the individual cartridges from the magazine and transfer them into position for insertion into the barrel.

2. A gun action as in claim 1 with a cartridge magazine extending parallel with and at the side of the gun stock, the cartridges within said magazine positioned transversely with respect to the axis of the gun barrel and all in the same direction.

3. A gun action as in claim 1 wherein the cartridge groove is rotated out of alignment with the bolt when receiving a cartridge from the magazine and into direct alignment with the bolt when the cartridge is transferred from the disk to the barrel.

4. A gun action as in claim 1 with an overcenter spring and a limiting stop operable with the disk to effect positive oscillation of the disk through its operating cycle.

5. In a gun action for automatic, semiautomatic and manually operated guns the combination with a bolt mechanism including an injector, firing pin, extractor, ejector and disk actuator all operable with the bolt, a cartridge magazine along one side of the gun stock, a transfer disk oscillatable in a plane parallel to the axis of a gun barrel and having a cartridge groove extending diametrically thereof, said disk actuator adapted with the operation of the bolt mechanism to engage said disk and oscillate it from a position where the groove receives a cartridge from the magazine to a position in which the groove is in direct alignment with the bore of the barrel, and means timing the bolt action with the bolt oscillation whereby the injector, firing pin and extractor members of the bolt are advanced through the groove in the disk in the firing cycle and withdrawn from the groove during the loading cycle.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
789,142	Chichester	May 9, 1905
1,451,339	Kottas	Apr. 10, 1923
2,448,081	Conway	Aug. 31, 1948
2,479,770	Olson	Aug. 23, 1949

FOREIGN PATENTS

Number	Country	Date
710,282	France	June 1, 1931