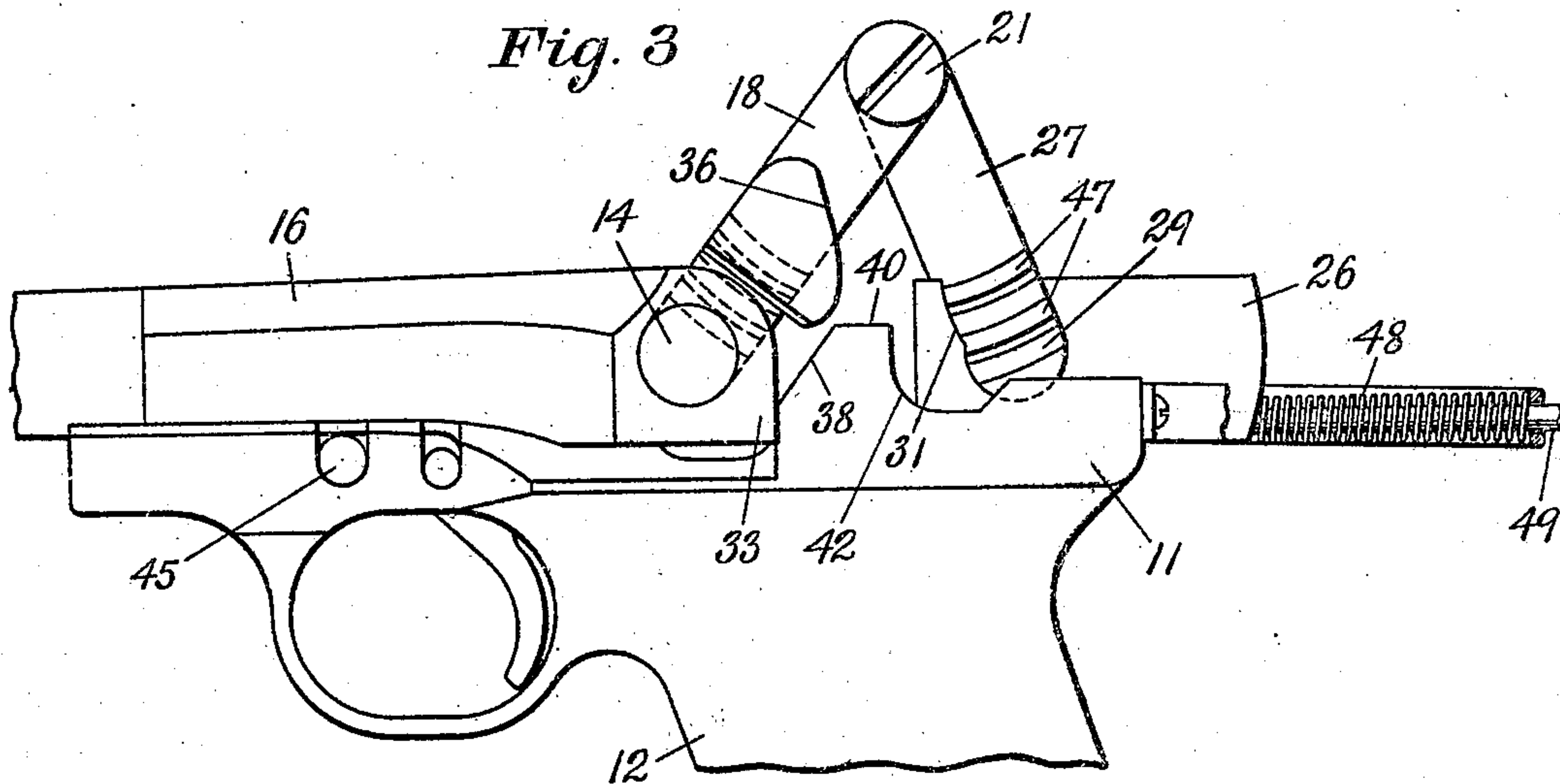
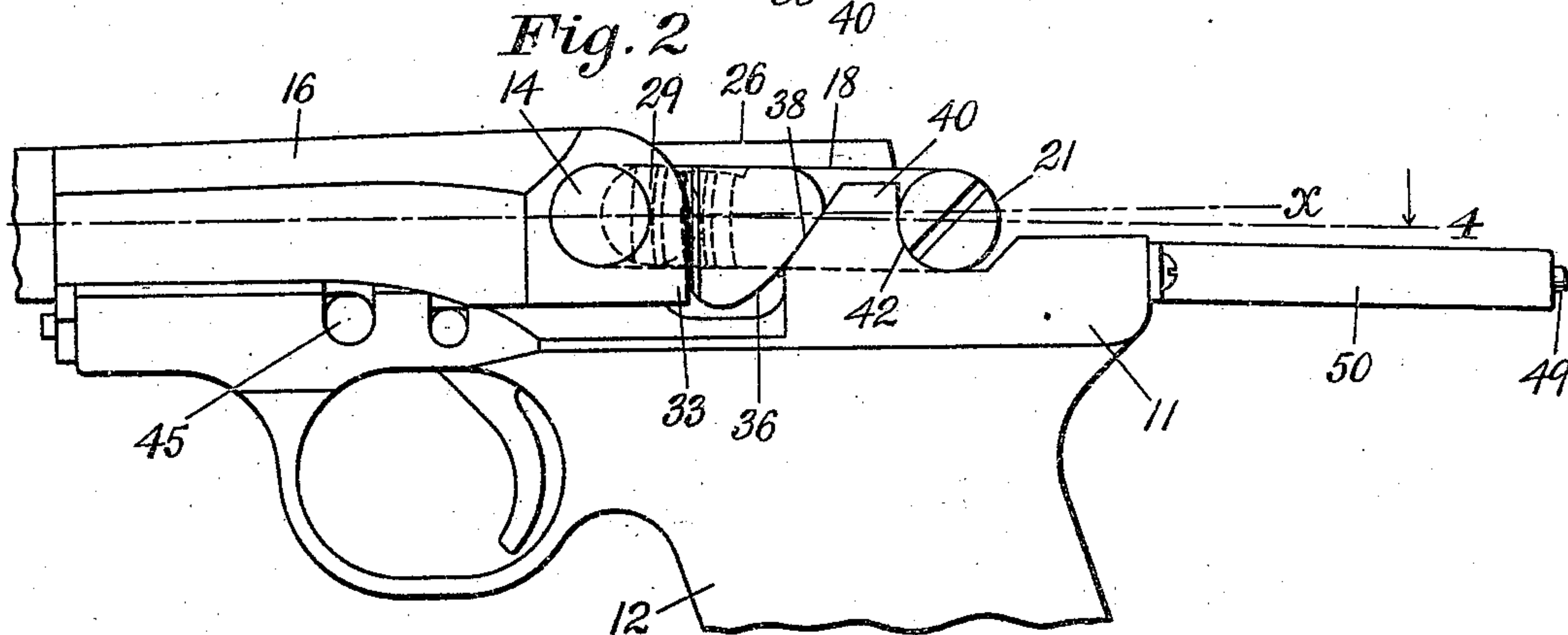
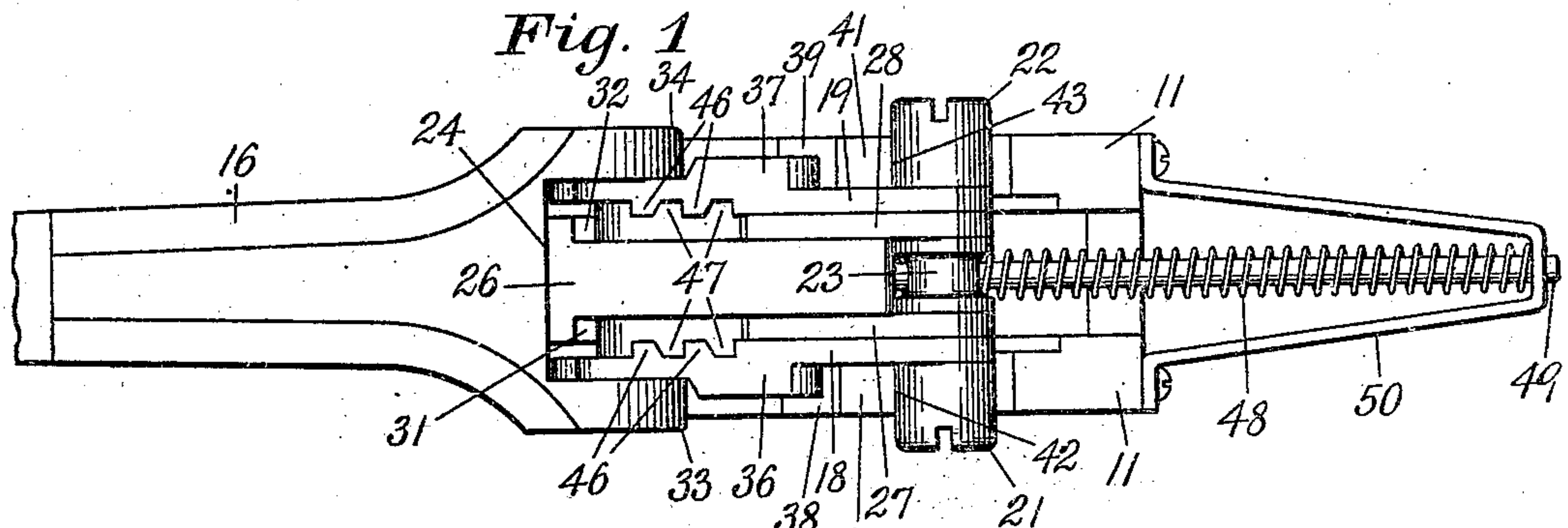


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BREECH CLOSING MECHANISM FOR AUTOMATIC FIREARMS.
APPLICATION FILED APR. 30, 1906.

954,543.

Patented Apr. 12, 1910.

2 SHEETS—SHEET 1.



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Fig. 4

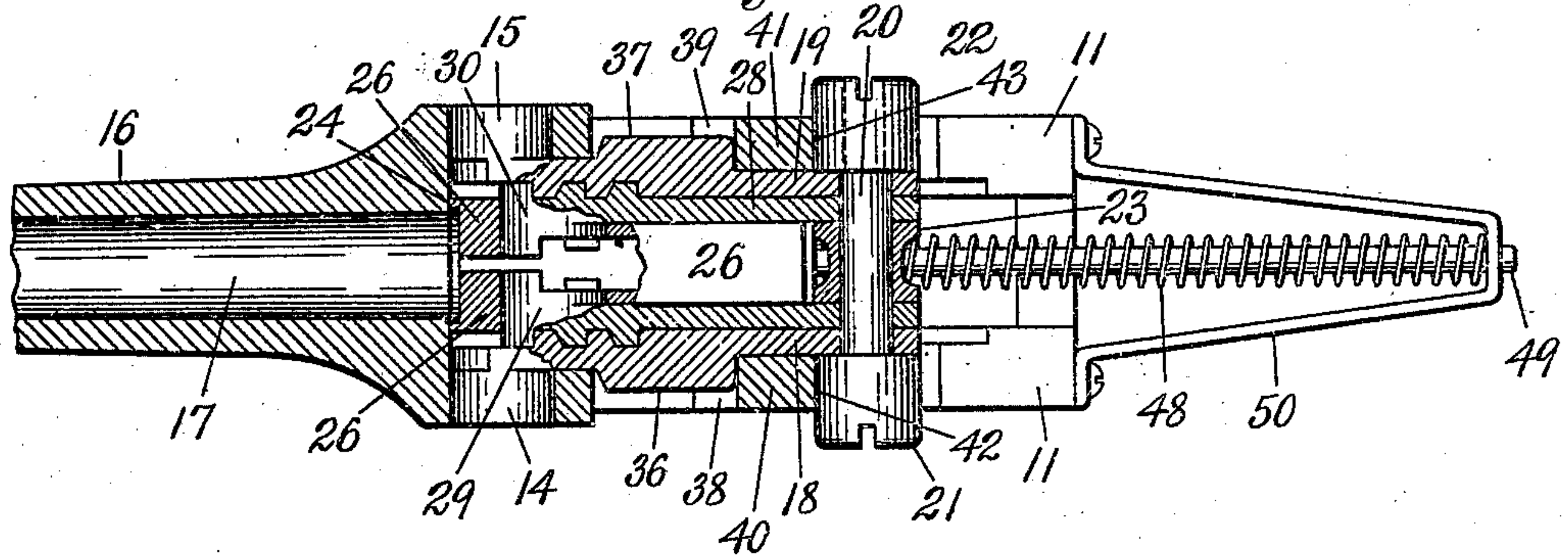
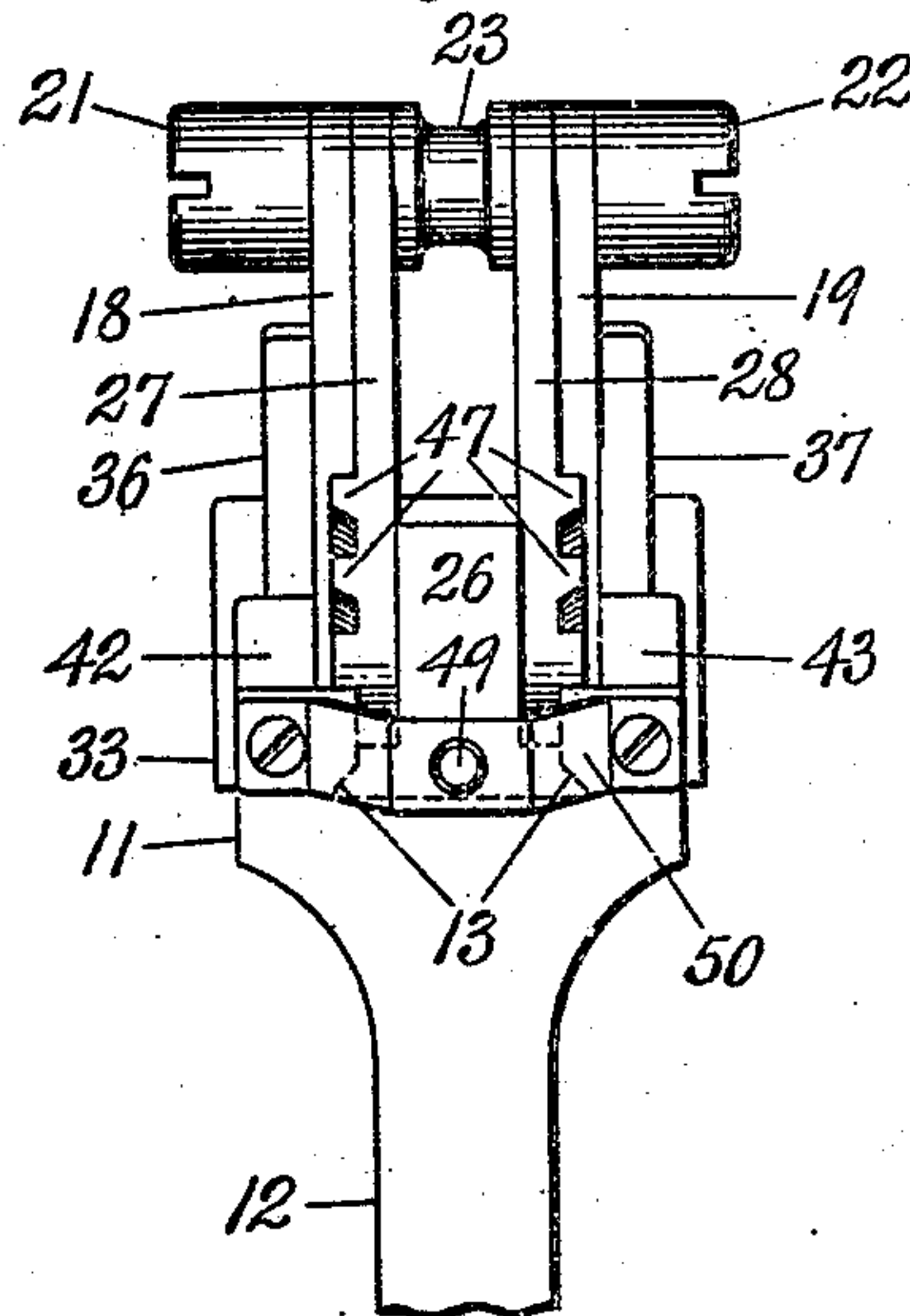


Fig. 5



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UNITED STATES PATENT OFFICE.

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BREECH-CLOSING MECHANISM FOR AUTOMATIC FIREARMS.

954,543.

Specification of Letters Patent.

Patented Apr. 12, 1910.

Application filed April 30, 1906. Serial No. 314,594.

To all whom it may concern:

Be it known that I, CHARLES HENRY AUGUSTUS FREDERICK LOCKHART ROSS, baronet, a citizen of Great Britain, and resident of Balnagowan Castle, in the county of Ross, Scotland, have invented certain new and useful Improvements in Breech-Closing Mechanism for Automatic Firearms, of which the following is a full, clear, and exact specification.

This invention relates to the breech closing mechanism of repeating firearms of the class in which the recoil from the discharge of one cartridge is utilized to open the breech, move the next succeeding cartridge from the magazine into the firing chamber, close the breech, and otherwise prepare the firearm for the next discharge.

Although the invention is applicable to various forms of firearms, it is here shown in connection with that type of automatic pistol in which the undischarged cartridges are generally contained in a magazine inclosed within the grip or handle of the pistol.

Figure 1 is a plan view of a pistol embodying this invention, and shows the parts in the locked or firing position. Fig. 2 is a side view of Fig. 1. Fig. 3 is a side view of the pistol with the parts in their unlocked position. Fig. 4 is a plan of the pistol in section on the line 4 of Fig. 2. Fig. 5 is a rear view of Fig. 3.

The barrel 16 and the bolt 26 are adapted to slide endwise in ways 13 (Fig. 5) formed in the frame 11. The cartridges are carried in a conveniently adjacent magazine (not shown) preferably contained within the grip or handle 12 appurtenant to the frame and are lifted from the magazine by the recoil of the discharge into line with the chamber 17 (Fig. 4) formed in the breech end of the barrel. The firing pin, sear extractor and ejector are carried in the bolt 26. As these parts and also the mechanism by which the cartridges are lifted from the magazine and carried into line with the chamber form no part of the present invention, they are neither shown nor described herein.

The barrel 16 has connected to it a pair of barrel links 18 and 19. These links are pivoted at their front ends by trunnions 14 and 15 to the barrel 16 and are connected at their rear ends by means of the pivot pin 20 to the rear ends of a pair of bolt links 27

and 28. These latter are pivoted at their front ends at 29 and 30 to the bolt 26. When the parts are in the firing position shown in Figs. 1, 2 and 3, these links lie folded side by side, forming a locking toggle device each barrel link 18 or 19 lying next to its corresponding bolt link 27 or 28, the two links 27 and 28 being separated by the bolt 26. The pivot pin 20 extends outwardly from the links on both sides and is provided with a head 21 on one end, and a nut 22 on the other end, which is preferably of the same size as the head 21. A collar 23 is carried on the pivot 20 between the bolt links 27 and 28. The links 18 and 19 have formed on their outer and under surfaces a pair of cams 36 and 37, which are adapted to coöperate with a pair of cam surfaces 38 and 39 formed on the lugs 40 and 41 appurtenant to the frame 11. The rear side of the lugs 40 and 41 is shaped at 42 and 43 to fit the head 21 and the nut 22 of the rear pivot 20.

The above described parts are all so disposed that when they are in the firing position as shown in Figs. 1, 2 and 4, with the bolt 26 in contact with the breech end 24 of the barrel, the cams 36 and 37 of the barrel links 18 and 19 are in contact respectively with the cam surface 38 and 39, the pivot head 21 and the pivot nut 22 resting at the same time against the surfaces 42 and 43. This disposition of the parts in the firing position is preferably so arranged that the axis of the rear pivot 20 may drop a little below the plane of the axes of the front pivots 14 and 15 and 29 and 30, as shown in Fig. 2, the line 4 passing through the center of the pivot 20 while the line x coincides with the plane of the two front pivot axes. This carries the toggle-like device to a safe locking position, so that the direct effect of the recoil as between the barrel and the bolt tends to hold the toggle in its folded or locked position.

Upon the meeting faces of the links 18 and 27 and the links 19 and 28 are formed interlocking projections 46 and 47 which are curved on their front and rear surfaces on arcs struck from the axis of the pivot 21, so as to enable the projections to properly pass by each other and interlock when the links shut down and fold together in the firing position. A suitable stop, as for instance 45, is provided against which the barrel may abut just as the parts reach the

firing position. A rod 49 secured to the rear end of the bolt and extending through the bracket 50 carries a spring 48 which engages the rear end of the bolt and presses it toward the barrel, the bracket 50 sustaining the rearward thrust of this spring.

The operation of the parts is as follows:— When a discharge takes place, the pressure of the recoil is exerted against the front end of the bolt 26, tending to drive it rearward away from the barrel 16. The bolt, however, being secured to the barrel 16 by means of the connections through the four links and the interlocking projections 46 and 47 cannot move backward except by carrying the barrel with it. This action causes the cams 36 and 37 to ride up over the cam surfaces 38 and 39, thus raising the rear ends of the links and unlocking the toggle, thereby allowing the bolt to slide backwards to the position shown in Fig. 3, the movement of the barrel being arrested by the shoulders 33 and 34 coming in contact with the frame lugs 40 and 41, (Fig. 3). The interlocking projections 46 and 47 offer no resistance to this upward movement of the rear ends of the links on account of the concentric relation of those projections to the pivotal connection 20 between the links. As the bolt 26 moves backwards it compresses the spring 48 until its movement is arrested by the meeting of the links 27 and 28 with the surfaces 31 and 32 formed on the bolt. By the time the movement of the bolt is thus arrested, the empty shell is expelled and a new cartridge brought up into line with the barrel chamber. The pressure of the spring 48 now carries the bolt forward again, so that the pivots 29 and 30 approach the pivots 14 and 15 and the ends of the links carrying the pivot 20 drop down to the locking position shown in Figs. 1 and 2.

The interlocking lugs or projections 46 and 47 while not indispensable perform a very important function in securely sustaining the parts in their firing position, so that the strain of the recoil is more directly transmitted to and sustained by the trunnions and the barrel without exerting any appreciable pressure against the rear pivot 20, thereby diminishing the distance and the number of parts through which the strains are transmitted, and increasing correspondingly the rigidity of the structure. In the case of the firearms of small caliber these interlocking lugs may conceivably be dispensed with, but their use is considered highly preferable.

The toggle is herein shown as having a pair of links on each side of the longitudinal center of the bolt. For some purposes, however, one pair of links may be found sufficient. But it is considered preferable thus to employ two pairs of links, disposed symmetrically on opposite sides of the longi-

tudinal center of the firearm. It is not essential, although preferable, that the barrel member to which the links 18 and 19 are connected shall be integral with the barrel, since that member may be a yoke separately attached to the barrel, this being a consideration either incident to the method of manufacture, or to the requirements of other functions of the parts. The firearm is also provided with suitable other mechanism, such as a firing pin, sear, trigger, cartridge elevator, etc. to perform the usual functions of an automatic firearm, but that other mechanism forms no part of the invention described herein, and therefore it is not herein shown and described.

I claim as my invention:—

1. In a recoil operated firearm, a barrel and a breech bolt mounted for sliding movement, and a toggle formed of links pivotally connected to the barrel and bolt members, respectively, and connected with each other to fold together backwardly from said pivotal connections when in firing position.

2. In a recoil operated firearm, means for locking the bolt, comprising a toggle formed of links pivotally connected to the bolt and barrel members respectively, and connected with each other to fold together when in firing position, the links being provided with lugs situated between the pivotal connections which interlock when in said position, and unlock when unfolded from the said firing position.

3. In a recoil operated firearm, a barrel and a breech bolt mounted for sliding movement, a toggle formed of links pivotally connected to the barrel and bolt members, respectively, and connected with each other to fold backwardly together when in firing position, and means for unfolding the links as they are carried back by the sliding movement of the barrel and bolt due to the recoil.

4. In a recoil operated firearm, a barrel and a breech bolt therefor, both mounted for sliding movement, a toggle formed of links pivotally connected to the barrel and bolt members, respectively, and pivotally connected with each other to fold backwardly together when in firing position, and a cam-like abutment interposed in the pathway of the links to unfold the toggle as the parts are forced backwardly by the recoil.

5. In a recoil operated firearm, means for locking the bolt, comprising a toggle formed of links pivotally connected to the bolt and barrel members respectively, and connected with each other to fold them together when in firing position, the links being provided with interlocking lugs situated between their pivotal connections in concentric relation to the axis of the connection between the two links.

6. In a recoil operated firearm, a barrel and a breech bolt therefor mounted for slid-

ing movement, and a toggle composed of two pairs of links pivotally connected to the barrel and bolt members, respectively, and pivotally connected together to fold backwardly together side by side to their locked and firing position.

7. In a recoil operated firearm, a barrel and a breech bolt therefor mounted for sliding movement, a toggle composed of two pairs of links pivotally connected to the barrel and bolt members, respectively, and pivotally connected together to fold backwardly together side by side to their locked position, and means for supporting the links in the latter position with their pivotal connections disposed near a plane which is substantially at right angles with the path of the first opening movement of the links.

8. In a recoil operated firearm, means for locking the bolt to the barrel comprising a toggle composed of a pair of links pivotally connected to the barrel, a pair of shorter links pivotally connected to the bolt, a pivotal connection between the two pairs of links, whereby they lie folded together when in firing position, and means for supporting the toggle in a position in which the pivotal connection between the two pairs of links is carried slightly past the plane of the other pivotal connections.

9. In a recoil operated firearm, a frame, a barrel, and a bolt mounted for sliding movement in the frame, a link connected to the barrel, a shorter link connected to the bolt, and a pivotal connection between the other ends of the two links whereby the links when in their firing position are folded backwardly together side by side in the direction of recoil.

10. In a recoil operated firearm, a frame, a barrel and a bolt mounted for sliding action on the frame, a link connected at one end to the barrel, a shorter link connected at one end to the bolt, a connection pivotally joining the other ends of the two links, whereby the links when in firing position lie folded together side by side extending in the direction of the recoil, and means for engaging and unfolding the links as they are carried back by the recoil.

11. In a recoil operated firearm, the combination with a sliding barrel, and a sliding bolt, of a barrel link connected at its front end to the barrel, a shorter bolt link connected at its front end to the bolt, and adapted to swing in a plane overlapping the plane of movement of the barrel link, whereby they lie folded backwardly together in their locked position, a connection joining the rear ends of the two links, and means for engaging the said rear ends and unfolding the links as they are moved back by the recoil.

12. In a recoil operated firearm, the com-

bination with a barrel, and a sliding bolt, of a link connected at its front end to the barrel, a shorter link connected at its front end to the bolt, a connection joining the rear ends of the two links, and means for interlocking the links when folded backwardly together in the firing position.

13. In a recoil operated firearm, a frame, a sliding barrel, a sliding bolt, a link connected at its front end to the barrel, a shorter link connected at its front end to the bolt, a connection joining the rear ends of the two links, interlocking means on the meeting faces of the two links, and means for engaging and raising the connected rear ends of the links to unlock them as they are moved back by the recoil of the firearm.

14. In a recoil operated firearm, the combination with a frame, a barrel and a sliding bolt, of a link connected at its front end to the barrel, a shorter link connected at its front end to the bolt, a pivotal connection joining the rear ends of the two links, whereby they are adapted to swing backwardly in overlapping planes and lie folded together, interlocking means on the meeting faces of the two links, and means for raising the connected rearward ends of the links to unfold them forwardly as they are moved back by the recoil.

15. In a recoil operated firearm, the combination with a frame, a sliding barrel, and a sliding bolt, of a link connected at its front end to the barrel, a link connected at its front end to the bolt, a pivotal connection joining the rear ends of the two links, whereby they lie folded backwardly together in the firing position, and cooperating cam surfaces appurtenant respectively to one of the links and the frame whereby the recoil unfolds the links to unlock the bolt.

16. In a recoil operated firearm, the combination with a frame, a sliding barrel and a sliding bolt, of a link pivotally connected at its front end to the barrel, a shorter link pivotally connected at its front end to the bolt, and a pivotal connection joining the rear ends of the two links whereby they fold backwardly together in the firing position, the three pivotal axes of the links being so disposed that the axis of the pivotal connection of the links lies below the common plane of the other two axes when the parts are in the firing position.

17. In a recoil operated firearm, a sliding barrel, a sliding bolt, and means for locking the bolt to the barrel, comprising a toggle composed of a pair of links pivotally connected to the barrel, a pair of shorter links pivotally connected to the bolt, a pivotal connection between the two pairs of links, whereby they lie folded backwardly together when in locked position, means for supporting the toggle in a position in which

the pivotal connection between the two pairs of links is carried slightly past the plane of the other pivotal connections, and inclined abutments interposed in the pathway of the
5 toggle to unlock it as it is carried back by the recoil.

In testimony whereof I have signed my

name to this specification in the presence of two subscribing witnesses.

CHARLES L. ROSS.

Witnesses:

ERNEST F. WÜRTELE,
THOMAS CRAIG.