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TRIGGER MECHANISM

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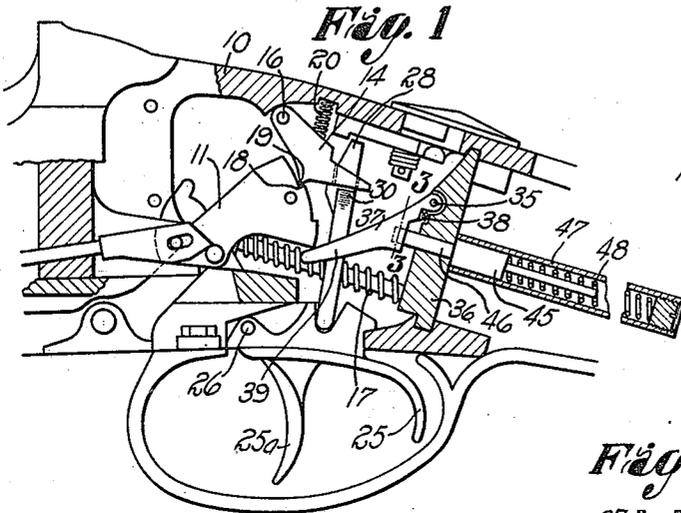


Fig. 2

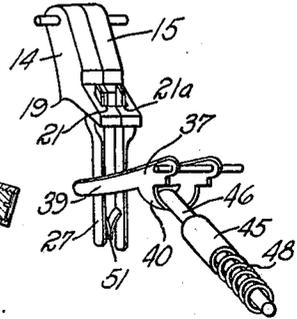


Fig. 3

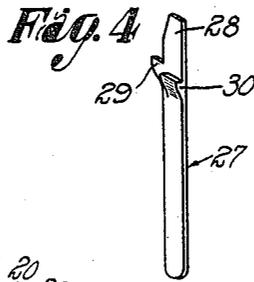


Fig. 5

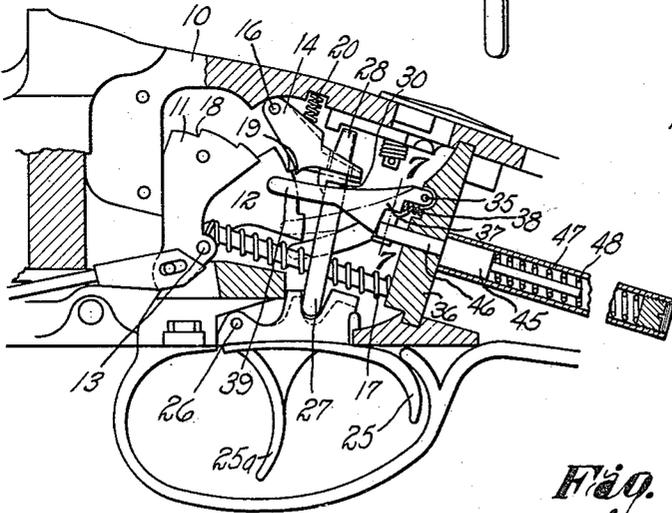


Fig. 6

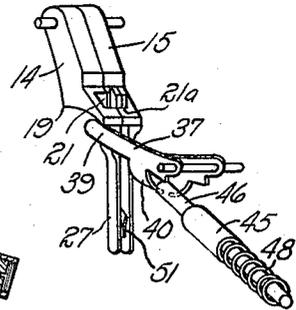


Fig. 7



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## TRIGGER MECHANISM

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This invention relates to improvements in trigger mechanism for double guns (either of the side by side or the over and under types) in which the barrels may be fired in succession upon successive pulls of a single trigger.

The aim of the invention is to provide an improved arrangement wherein "doubling", that is, accidental and unconscious discharge of the second barrel, due to "involuntary pull" after the first barrel has been fired, is prevented.

A further aim of the invention is to provide an improved trigger mechanism having two triggers, each of which may be employed for firing the two barrels in succession, or both of which may be employed, one for firing one barrel and the other the other barrel, and the advantages of which are described more in detail hereinafter.

A further aim of the invention is to provide a trigger mechanism having the above and other advantages and which is characterized by its simplicity in construction, its economy in manufacture, its durability, and by its reliability and effectiveness in operation.

Other objects will be in part obvious and in part pointed out more in detail hereinafter.

The invention accordingly consists in the features of construction, combination of elements and arrangement of parts which will be exemplified in the construction hereinafter set forth and the scope of the application of which will be indicated in the appended claims.

The invention contemplates, broadly, a trigger mechanism having a trigger and a connector adapted to be automatically shifted from engagement with one sear into engagement with the other sear only in the event that the gun is fired upon the first pull of the trigger, the shifting of the connector from one sear to the second sear being delayed during the period in which involuntary pull is likely to take place. To this end, there is provided an inertia member and an intermediate member or changing lever between the inertia member and

the connector, the arrangement being such that upon the first pull of the trigger and the release of one of the hammers, the intermediate member is brought into operative position between the inertia element and the connector and then, after the rebound or anti-recoil of the gun and release of the pulled trigger, the spring behind the inertia member causes the intermediate member to shift the connector into operative relation to the unfired or second sear.

The invention further contemplates a trigger mechanism having two triggers, each having the characteristics above described so that, by successively pulling one trigger, first one barrel and then the second barrel may be fired, and by successively pulling the other trigger, the barrels may be fired in reverse order, or the respective barrels may be fired by pulling the individual triggers. There is thus provided an arrangement whereby the barrels may be selectively fired in the desired order, a feature which is of advantage as, not infrequently, the barrels are loaded with different ammunitions or one of the barrels may be choked more than the other one.

In the accompanying drawing, wherein is shown, for illustrative purposes, one of the embodiments which the present invention may take, it being understood that this disclosure is by way of exemplification and the improvements may be incorporated in guns of various kinds and types and in connection with firing mechanisms of various styles and forms:

Figure 1 is a side elevational view of my improved arrangement with both of the hammers in cocked position and the triggers unpulled;

Fig. 2 is a perspective view of the sears, connectors, intermediate members and inertia element, the parts being shown in the position which they have in Fig. 1;

Fig. 3 is a sectional view through the intermediate members, this view being taken on line 3—3 of Fig. 1;

Fig. 4 is a perspective view of the left hand connector;

Fig. 5 is a view similar to Fig. 1 with the

left hand hammer in fired position and the left hand trigger in pulled condition;

Fig. 6 is a view similar to Fig. 2 but showing the parts with the left hand connector shifted into engagement with the right hand sear; and

Fig. 7 is a view similar to Fig. 3, this view being taken on line 7—7 of Fig. 5.

Referring to the drawing in detail, 10 designates the frame of the gun, the same being shown more or less diagrammatically as it may be of any suitable construction and the particular form and shape thereof form no part of the present invention. The firing mechanism includes a pair of hammers 11 and 12 pivoted as at 13. Respec- 15 tively associated with these hammers are the sears 14 and 15 which may be of any suitable construction and which may be located as desired, depending upon the form and position of the hammers themselves. These sears are pivoted on a pin 16. Each of the hammers is normally urged into firing position by a spring, such as the spring 17. 20 Each of the hammers has, on its outer face, a notch 18 which is adapted to be engaged by a tooth 19 on the respective sear for holding the hammer in cocked position. The sears are normally urged into engagement 25 with the hammers by springs 20 which may be of any suitable form. In the present instance, these sears are provided with tails or rear ends, respectively having notches 21 and 21a in their opposed faces.

The two triggers and their associated connectors are similar in construction and arrangement and, therefore, a description of one will apply to the other. For convenience, the left hand or rearmost trigger and its connector will be described. Corresponding parts of the mechanism associated with the right hand trigger will bear like reference numerals except that such reference numerals will be followed by the letter "a". The left hand trigger 25 is pivoted as at 26 and has a notch in which is seated the lower end of the connector, designated generally by the numeral 27. The upper end 28 of the connector is adapted to normally extend through the notch 21 of the sear 14. Extending forwardly from, and adjacent the upper end of, the connector 27, is a projection or nose 29 which is adapted to engage the under surface of the sear forwardly of the notch 21 so that, when the trigger 25 is pulled, the projection 29 will raise the sear 14 and thus release the left hand hammer 11. The connector 27 further has, on its outer face, a cam 30 which is inclined upwardly and outwardly, this cam being disposed slightly below the level of the upper edge of the nose 29. The lower end of the cam is more or less abruptly curved.

Pivoted, as at 35, to the tang-piece 36 of the frame is an intermediate member or

changing lever, designated generally by the numeral 37. This lever is normally urged upwardly and forwardly by a spring 38 of suitable type. The lever has a forwardly extending finger 39 located at the side of the connector 27 and normally located in the vertical plane of the cam or inclined surface 30. It also has a downwardly and inwardly curved arm or portion 40 adapted to cooperate with the inertia member which will now be described. The forwardly extending fingers 39 are respectively in the planes of movements of the hammers so that, when the hammers are cocked, the rear edges thereof will engage these fingers and thereby cam the fingers back to the full line positions shown in Figs. 1 and 2.

This inertia member may be in the form of a cylinder 45 having a stem 46 extending forwardly through an opening in the tang-piece 36. The mass or cylinder 45 is mounted for sliding movement in a tube 47 which may be connected to the tang-piece 36. Behind the mass 45 and within the tube is a coiled spring 48 normally urging the inertia member to its foremost position. Positioned between the two connectors and normally urging them apart is a light spring 51.

In describing the operation of the trigger mechanism, it may be assumed that it is incorporated in a gun of the over and under type and that the over barrel is associated with the left hand hammer 11 and the under barrel with the right hand hammer 12. When the hammers are cocked, they hold the changing levers in the position shown in Fig. 1. When the left hand trigger 25 is first pulled, that is, raised from the position shown in Fig. 1 to that shown in Fig. 5, the connector 27, due to its nose 29, raises the sear 14 thereby releasing the hammer 11. The over barrel is thus fired and the gun recoils backwardly, but this movement does not affect the position of the inertia element relative to the trigger mechanism until the rearward movement of the gun is checked by the resistance offered by the shooter's shoulder, whereupon the mass will move rearwardly of the tube and, when the forward end of the stem 46 has been withdrawn rearwardly to a slight extent, the portion 40 of the changing lever 37 is released therefrom. The spring 35, which is behind the changing lever, will move the changing lever to the dotted line position shown in Fig. 5 and, in which position, the finger 39 engages the lower end of the inclined cam 30. The spring 35 is too weak to cause the lever to ride up the cam. The rear edge of the portion 40 of the changing lever 37 is now in the path of movement of the stem 46. After the gun has completed its recoil movement, it rebounds forwardly and the mass 45 lags behind the forward jump of the gun and, during this time,

the left hand connector 27 remains in engagement with the left hand sear so that, if the trigger 25 should again be pulled, the other sear will not be released; that is, there can be no "doubling". After the gun has completed its anti-recoil or forward rebound movement, the spring 48 behind the inertia element forces that element forwardly and, due to the engagement of the stem 46 against the portion 40 of the changing lever, the latter is moved from the dotted line position of Fig. 5 to the full line position shown in that figure. When the lever is thus moved, it rides up the cam 30 so that the connector 27 is urged towards the other connector against the pressure of the spring 51. As long as the trigger 25 is held in pulled position, the inner face of the nose 29 of the connector 27 will engage the inner face of the right hand sear 15 forwardly of the notch 21a of that sear so that the upper end 28 of the connector 27 cannot pass into the notch 21a. When the trigger is released, however, it, together with the sear 14 and the connector 27, is forced downwardly by the spring 20 and thus the nose 29 is brought below the level of the tail of the right hand sear 15 with the result that the upper end 28 of the connector 27 will move into the notch 21a of the right hand sear, as shown in Fig. 6. The projection or nose 29 is now in proper relation to the right hand sear 15. When the trigger 25 is again pulled, the right hand sear is raised so as to release the right hand hammer to fire the under barrel. Upon breaking the gun, the hammers will be cocked and the parts of the trigger mechanism will be brought back to the position shown in Fig. 1.

It may be desirable to fire the under barrel first and then the over barrel by employing a single trigger and, in this event, the right hand trigger 25a is pulled a first time to fire the under barrel, and then pulled a second time to fire the over barrel, the operation being exactly the same as that just described in connection with the left hand trigger mechanism. Or, it may be desirable to fire the barrels in succession by using the two triggers, in which event, one of the triggers, depending on which barrel is to be fired first, is pulled, and then the other trigger is pulled to fire the remaining barrel.

From the foregoing description, taken in connection with the accompanying drawing, it will be observed that "doubling", due to involuntary pull, is entirely guarded against. After the trigger is pulled the first time and the barrel is fired, the other barrel cannot be fired by that trigger until after the gun has completed its recoil and its anti-recoil movement, and it is during such movements that involuntary pull takes

place. It will further be observed that, if the trigger is pulled the first time but no shot is fired, the connector will not shift from one sear to the other; that is to say, if the trigger is pulled, one hammer will fail but the connector will not shift to the other sear without the shock or kick from an explosion or unless the butt of the gun is given a sharp rap.

As many changes could be made in the above construction and many apparently widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the language used in the following claims is intended to cover all of the generic and specific features of the invention herein described and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

What is claimed is:

1. In combination, hammers, sears respectively associated therewith, a trigger mechanism including a connector through which said sears are successively operated upon successive pulls of the trigger, and inertia means operatively associated with said connector for shifting the same when the trigger is pulled and the gun fired, said connector being not shifted from one sear to another upon the pull of the trigger after a shot is fired until the gun has substantially completed its forward rebound.

2. In combination, hammers, sears respectively associated therewith, a trigger mechanism including a connector through which said sears are successively operated upon successive pulls of the trigger, an inertia element having a relative rearward movement upon the rebound of the gun, a spring normally urging said inertia element forwardly, and means interposed between said inertia element and connector whereby said spring moves said connector from the fired to the unfired sear upon return of the inertia element to initial position.

3. In combination, hammers, sears respectively associated therewith, a trigger mechanism having a trigger and a connector operated thereby and arranged to move laterally from engagement with one sear into engagement with the other sear when the gun is fired, an inertia element arranged to lag behind the forward rebound of the gun, means for normally urging said inertia element to forward initial position, and means between said connector and inertia element and through which said connector is shifted upon the return of the inertia element to its initial position.

4. In combination, hammers, sears respectively associated therewith and having notches in their opposed faces, a trigger, a connector carried thereby and adapted to be shifted from engagement with one sear into engagement with the other sear when the first barrel is fired, said connector having a portion adapted to move from the notch of one sear into the notch of the other sear when the connector is shifted, an inertia element adapted to lag behind the forward rebound of the gun, means normally urging said inertia element forwardly to initial position, and means between said connector and inertia element for shifting said connector upon the return of the inertia element to initial position.

5. In combination, hammers, sears respectively associated therewith and having notches in their opposed faces and which notches are adapted to register, a trigger, a connector carried thereby and having a nose for engagement with the sears and a portion adapted to engage in said notches, said connector, when the gun is fired, being adapted to shift from operative relation with respect to one sear into operative relation with respect to the other sear, said shifting movement being prevented while the trigger is in pulled condition, an inertia element adapted to lag behind the forward rebound of the gun, a spring normally urging said inertia element to forward initial position, and an operative connection between said inertia element and connector.

6. In combination, hammers, sears respectively associated therewith, a trigger, a connector operated thereby and arranged to move from operative relation to one sear into operative relation with the other sear after the first barrel has been fired and the trigger released, an inertia element adapted to lag behind the forward rebound of the gun and normally urged into forward initial position, and an intermediate member adapted to be brought into operative position between the inertia element and the connector when the rearward movement of the gun is checked.

7. In combination, hammers, sears respectively associated therewith, a trigger, a connector carried thereby and adapted to be shifted from one sear to the other when the first barrel is fired and the trigger is released, an inertia element adapted to lag behind the rebound of the gun and normally urged forwardly, and an intermediate member having a portion adapted to engage and shift said connector, said member also having a portion normally out of the path of movement of said inertia element and adapted to be automatically brought into said path of movement when the rearward movement of the gun is checked.

8. In combination, hammers, sears respectively associated therewith, a trigger, a connector carried thereby and adapted to be automatically shifted from engagement with one sear into engagement with the other sear only in the event that the gun is fired upon the first pull of the trigger, an inertia element adapted to lag behind the gun on the forward rebound thereof, a spring normally urging said inertia element forwardly, and a changing lever movable into operative position between the inertia element and connector when rearward movement of the gun is checked, said spring causing said changing lever to shift said connector as the inertia element moves to initial position.

9. In combination, hammers, sears respectively associated therewith, a trigger, a connector carried thereby and adapted to shift laterally from engagement with one sear into engagement with the other sear when the gun is fired upon the first pull of the trigger, an inertia element adapted to lag behind the gun upon the forward rebound thereof, an intermediate member maintained by said inertia element in a position in which it has no influence on said connector while said inertia element is in its initial position, said intermediate member being released from said inertia element when rearward movement of the gun is checked, and means for moving said intermediate member into operative relation to said inertia element, said inertia element, when returning to initial position, causing said intermediate member to act upon said connector to shift the same.

10. In combination, hammers, sears respectively associated therewith, a trigger, a connector carried thereby and adapted to shift from one sear to another when the first barrel is fired, an inertia element adapted to lag behind the gun on the forward rebound thereof, a spring normally urging said inertia element forwardly, a changing lever adapted to be moved by said spring acting through said inertia element when the latter returns to its initial position, and cam means between said changing lever and connector whereby said connector is shifted when said lever is so moved by said spring.

11. In combination, hammers, sears respectively associated therewith, a trigger, a connector adapted to shift laterally from one sear to another when the first barrel is fired, an inertia element adapted to lag behind the forward rebound of the gun, a spring normally urging said inertia element forwardly, a changing lever having a portion normally out of the path of movement of said inertia element and movable thereinto upon relative rearward movement of the inertia element, and cam means between said changing lever and connector.

12. In combination, hammers, sears respectively associated therewith, a trigger, a connector adapted to shift from one sear to another when the gun is fired, an inertia element, a changing lever normally maintained by said element in a position in which it has no influence on said connector, said changing lever being released from said inertia element when the latter moves rearwardly relative to the gun, and means for moving said changing lever, when so released, into the path of movement of the inertia element.

13. In combination, hammers, sears respectively associated therewith, a trigger, a connector adapted to be shifted laterally from engagement with one sear into engagement with the other sear and having a cam, a pivoted lever having a finger adapted to engage said cam to shift said connector, a spring normally urging said pivoted lever towards said cam, an inertia element adapted to lag behind the forward rebound of the gun, and a spring normally urging said element to forward initial position, said pivoted lever being normally out of the path of movement of said inertia element but moving into said path when said inertia element moves rearwardly with respect to the gun.

14. In combination, hammers, sears respectively associated therewith, a trigger, a connector carried thereby and adapted to shift laterally from one sear to another when the gun is fired, said connector having a cam on its side face, a changing lever having a finger adapted to engage said cam to shift said connector, a spring normally urging said changing lever towards said cam, an inertia element normally holding said changing lever in inoperative position, and a spring behind said inertia element, said changing lever having a portion which is brought into the path of movement of said inertia element when the changing lever is released.

15. In combination, hammers, sears respectively associated therewith and having tail pieces provided with notches in their opposed faces, a trigger, a connector carried thereby and having a nose adapted to engage the under sides of said sears and a portion adapted to engage in the notches, said connector also having a cam surface, a lever having a forwardly and upwardly swinging finger adapted to engage said cam to shift said connector from one sear to the other, a weak spring normally urging said lever upwardly and forwardly, an inertia element adapted to lag behind the forward rebound of the gun, and a spring behind said inertia element, said lever having a part adapted to be engaged by said inertia element to hold the lever against operation

while the inertia element is in initial position, said part being engaged by said inertia element to cause said finger to shift said connector when the inertia element is returned to initial position.

16. In combination, hammers, sears respectively associated therewith, a trigger mechanism having a connector through which said sears are successively operated upon successive pulls of the trigger, a spring normally urging said connector into engagement with one of said sears, an inertia element having a relative rearward movement when the gun is fired, means for normally urging said inertia element forwardly to initial position, and a changing lever maintained by said inertia element in an inoperative position when said inertia element is in initial position, said changing lever being automatically moved to an operative position between said inertia element and connector when the inertia element moves rearwardly with respect to the gun, said changing lever being engaged and returned to its initial position by one of said hammers when the latter is moved to cocked position.

17. In combination, a pair of hammers, sears respectively associated therewith, a pair of triggers, connectors respectively associated with said triggers, each connector being adapted to shift from engagement with one sear into engagement with the other sear when its respective trigger has been pulled and the gun fired, and a single inertia means for controlling the shifting of said connectors.

18. In combination, a pair of hammers, sears respectively associated therewith, a pair of triggers, connectors respectively associated with said triggers, said connectors being respectively associated with the sears and each being adapted to shift from engagement with one sear into engagement with the other sear when its respective trigger has been pulled and the gun fired, an inertia element adapted to move rearwardly of the gun when the same is fired, means normally urging said inertia element forwardly, and a pair of intermediate members respectively interposed between said connectors and inertia element.

19. In combination, hammers, sears respectively associated therewith, a trigger, a connector operated thereby and arranged to move from operative relation with one sear into operative relation with the other sear after the first barrel has been fired and the trigger is released, an inertia element adapted to lag behind the forward rebound of the gun and normally urged into forward initial position, an intermediate member adapted to be brought into operative position between the inertia element and connector when rearward movement of the

- gun is checked, and interengaging means between said intermediate member and inertia element whereby the latter holds the former against operative position during recoil of the gun, said inertia element engaging said intermediate member and moving the same to shift the connector after a shot is fired and when the gun has substantially completed its forward rebound movement.
- 10 20. In combination, a pair of hammers, sears respectively associated therewith, a pair of triggers, connectors respectively associated with said triggers, each connector being adapted to shift from engagement with one sear into engagement with the other sear when the respective trigger has been pulled and the gun has been fired and after the gun has substantially completed its forward rebound movement, an inertia element arranged to lag behind the forward rebound of the gun, a spring normally urging said element forwardly, and a pair of intermediate members respectively interposed between said connectors and said inertia element, said intermediate members being held by said inertia element out of operative positions while said element is in forward position, that intermediate member associated with the pulled trigger being brought into operative position between said inertia element and the respective connector when the inertia element moves rearwardly with respect to the gun.
- 15 21. In combination, hammers, sears respectively associated therewith, a pair of triggers, a pair of connectors respectively associated with said triggers and each adapted to be shifted from one sear to the other, an inertia element adapted to lag behind the forward rebound movement of the gun, a spring normally urging said element into forward initial position, and a pair of intermediate members respectively interposed between said inertia element and connectors, said hammers being arranged, when cocked, to cam said intermediate members to hold them in an inoperative position, said inertia element being adapted to hold said intermediate members in inoperative position while the inertia element is in forward initial position, said inertia element moving out of engagement with said intermediate members when the inertia element moves rearwardly of the gun when the same is fired, the intermediate member associated with the pulled trigger being movable into operative position between the inertia element and the respective connector when rearward movement of the gun is checked, and said member being moved by said element after the gun has substantially completed its forward movement whereby the connector associated therewith is shifted.
- 20 22. In combination, hammers, sears re-
- spectively associated therewith, a trigger, a connector operated thereby and arranged to move from operative relation with one sear into operative relation with the other sear after the first barrel has been fired and the trigger released and the connector has substantially completed its forward rebound movement, an inertia element adapted to lag behind the forward rebound of the gun, a spring normally urging said inertia element into forward initial position, and an intermediate member adapted to be brought from an inoperative position into an operative position between the inertia element and the connector when the former moves rearwardly with respect to the gun, said intermediate member being moved to an operative position when the hammer associated therewith is cocked.
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