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FIRING MECHANISM FOR PISTOLS

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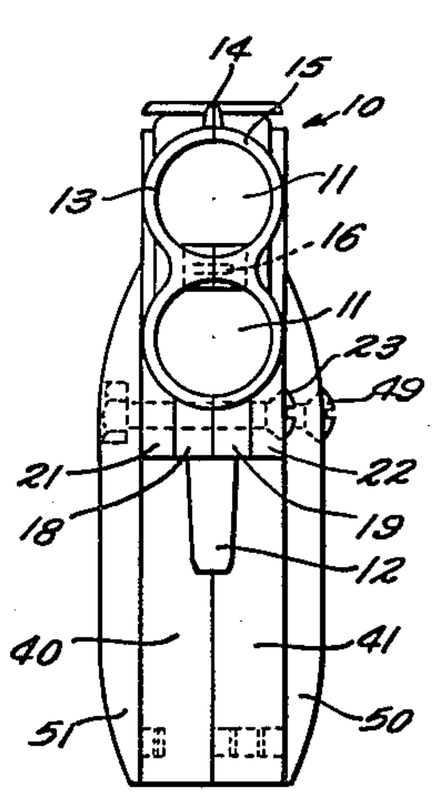

Fig. 1

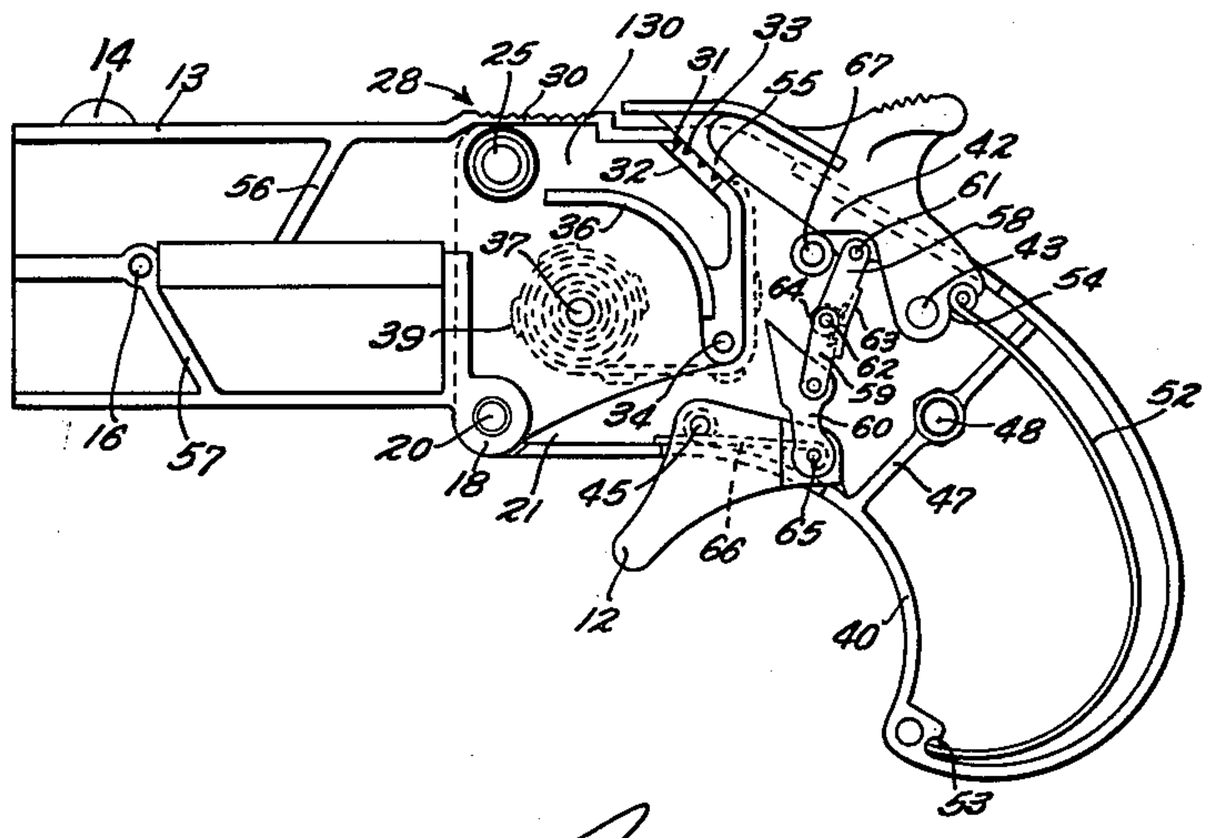

Fig. 2

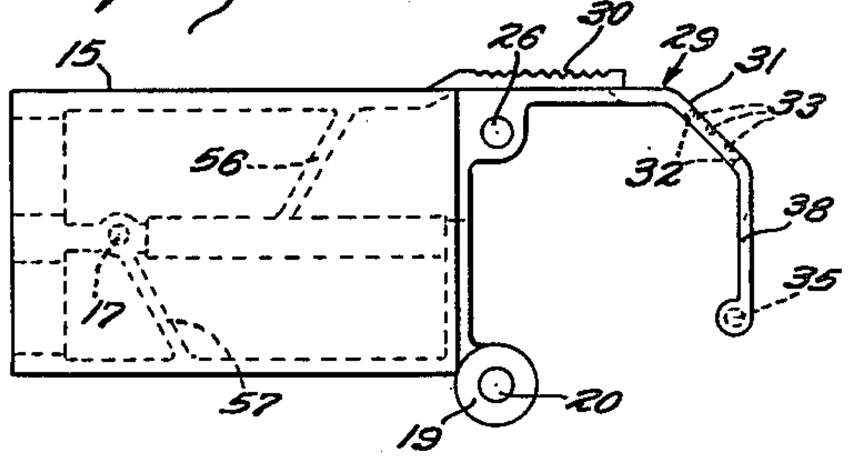

Fig. 3

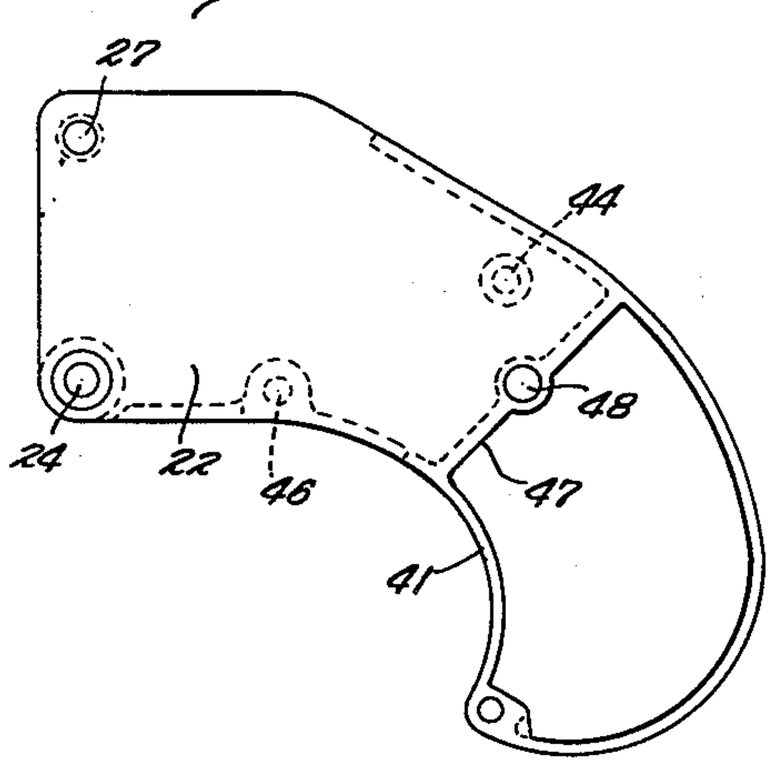

Fig. 4

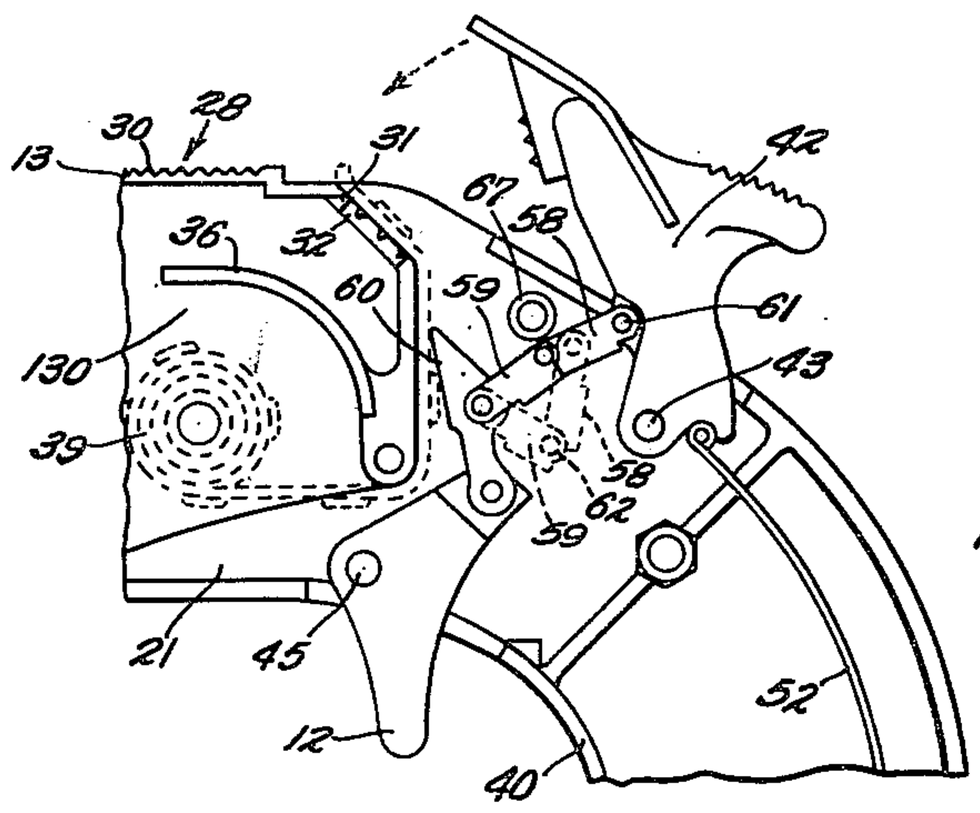

Fig. 5

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FIRING MECHANISM FOR PISTOLS

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6 Claims. (Cl. 42—57)

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The present invention relates to repeater cap pistols, and the like, and has for an object the provision of a device that is easy and safe in operation.

Another object of the invention is to provide a self-action hammer and trigger assembly that is simple in construction and easily operated in positive response to a surprisingly light and smooth trigger pull.

A further object of the invention is to provide a self-action mechanism in which the trigger pull remains uniformly light under progressive loading of the hammer spring and which releases the hammer freely and instantaneously as the latter is raised to a predetermined limit.

A further object of the invention is to provide a repeater cap pistol that serves as an aid to the education of children and others in the operation and care of mechanical devices, by providing a structure that is subject to dismantling, cleaning, and reassembling.

Another object of the invention is to provide a cap pistol of the break-down loading type which is easy and safe to load, and which is incapable of accidentally discharging a cap in the ammunition cap strip until the device is in a safely closed condition.

These and other objects are attained by the means described herein and exemplified in the accompanying drawings, in which:

Fig. 1 is a front end elevational view of a cap pistol embodying the invention.

Fig. 2 is a side elevational view showing the inner face of the right hand side of the device with the operating parts assembled thereon.

Fig. 3 is an elevational view showing the left hand barrel member.

Fig. 4 is an elevational view showing the left hand frame member.

Fig. 5 is a fragmental side elevational view showing the hammer fully raised and also showing in dotted lines the position of the linkage after the hammer falls and before the trigger is released.

It is a rather common characteristic of self-action mechanisms that the trigger pull is rather heavy and lacking in uniformity so that a user aiming the arm develops a detrimental muscular tension and trembling as the trigger movement continues. The self action is, in fact, not used in target score shooting because of this well-known disadvantage.

The present invention obviates this fault completely and permits a child to operate the pistol without experiencing the effects of irregular, or

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increasingly heavy trigger pull. The simulation of aiming and firing is simplified while the effect of the self-action is retained.

The cap pistol 10 of the invention, in the illustrated embodiment, simulates a Derringer gun with characteristic short barrels 11 arranged one above the other, and an unguarded trigger 12. The device is of split construction.

The construction includes a right hand barrel member 13 which includes the entire front sight 14, and a left hand barrel member 15, held in matched position near the forward interior by a stud pin 16 on member 13 seating in a blind hole 17 in member 15. Members 13 and 15 have hinge lugs 18 and 19 respectively with matching holes 20 which together form the center eye of a hinge about which the right and left hand frame members 21 and 22 may turn as a unit on the assembled barrel members. A screw 23 has the end threadedly entered into frame member 21, the center of the screw in holes 20 of the barrel sections serving as the pintle, and the head of the screw 23 seated in a counterbore 24 in the frame member 22. A spring pressed lug 25 located in a bore 26 in the left hand barrel member 15, and yieldably urged through a hole 27 in left hand frame member 22, serves to normally latch the frame and barrel assemblies against hinge movement about the screw 23. By this arrangement the the barrel assembly may swing down about pivot 23 on release of the latch lug 25, in the fashion of "breakdown" guns, thus accessibly exposing the rear portion of the barrel assembly that is normally disposed in concealed and in closed-in relation between the forward parts of the two frame sections. The right hand barrel member 13 has a wall portion 130 at its rear end provided with a flange 28 along the top and rear ends. The left hand barrel member 15 has a flange 29 corresponding to the flange 28 on the companion member 13. The flanges 28 and 29 are serrated along the top faces to simulate a non-glare surface 30—30 behind which said flanges are inclined at approximately 45 degrees to form an anvil 31—31, one or both of which are slightly cut away as indicated at 32 (see Fig. 2) to provide a spark relief slot along the center of the anvil face when the barrel sections are assembled in edgewise abutment along the said flanges. The outer faces of the anvil portions 31—31 have taper grooves 33 sloping toward the cutaway portion 32. The wall portion 130 of the right hand barrel member, or casting 13 has a short pin or lug 34 that enters a matching recess 35 in the left hand barrel member, or casting 15. The wall 130 also

has an arcuate baffle 36 and a pin 37 concentrically thereof. The baffle 36 and pin 37 on said plate 130 extend past the parting line of the barrel members when the latter are assembled as a unit by the pins 34 and 16 and the screw 23, so that the outer edge 38 of flange 29 is nearly flush with the free end of the pin 37 and the edge of arcuate flange 36.

A roll of paper strip ammunition caps indicated in dash lines at 39 is adapted to be seated over pin 37 and the free end of the strip is guided around the free ends of the abutting flanges 28 and 29 and thence upwardly over the outer face and onto the slotted anvil 31.

Frame members 21 and 22 have flanges 40 and 41 respectively, extending along the bottom and rear thereof to form the shape of the handle and to close the space between the side plate portion of said frame, said flanges being cut away to allow the generally triangular trigger piece 12 to project through at the bottom and to allow the hammer arm 42 to pass between them at the top. Hammer arm 42 is pivoted on a pin 43 on the inside of frame 21 and said pin enters a drilled boss 44 on the inside face of frame 22. The trigger 12 is mounted on a pin 45 carried by frame 21 and entered into drilled boss 46 on the inside face of frame 22. A matching pair of rib members 47—47 are drilled at 48 to receive a bolt 49 to hold handle grip plates 50 and 51 together on the open skeleton part of the frame members in a manner common in firearms. A stiff leaf type hammer spring 52 is seated at one end in a notch 53 formed in flanges 40 and 41, while the other end of the spring is seated in a notch 54 in the rear end of hammer arm 42. The striker 55 of hammer 42 is serrated to cooperate with the serrated, or ribbed portion of anvil 31 and to assure the explosion of the cap strip charge on the anvil when the hammer falls thereon under the power of spring 52. This assures escape of spark and smoke through the slot 32—32 in the anvil and against the outer curved face of arcuate flange 36 which protects the cap roll 39 against accidental ignition by sparks, and also directs any sparks and smoke toward an inclined baffle 56 that closes the upper barrel 11 and directs the explosion products into the lower barrel 11 where a forwardly and oppositely inclined baffle 57 causes the smoke to be deflected upwardly into the upper barrel 11. The firing of caps thus causes a moving volume of smoke to issue harmlessly, but realistically, from the open end of the upper barrel 11. However, any sparks from the explosion of the cap under the hammer block are extinguished and particle matter of any kind is effectively baffled against discharge through the barrel.

The improved self action mechanism of the invention, as can be seen in Figs. 2 and 5, comprises a hammer link 58, a toggle link 59 and a feed finger or link 60. Link 58 has its top pivotally connected intermediate the ends of hammer arm 42 by a pin 61. Toggle link 59 has its top end pivoted to the bottom end of hammer link 58 by pin 62. Links 58 and 59 have mutually abutting shoulders 63—63 which are normally disposed with the cooperating abutting edges in a common plane with the axis of pin 62 where they are yieldably held by the action of a small coil spring 64 that encircles pin 62 and presses its opposite end against the respective shoulders 63—63. The feed finger 60 has a pivoted connection midway its ends with the lower end of link 59 while the lower end of said feed finger is pivoted to the rear end of the generally triangular trigger 12 by means of pin 65.

A wire trigger spring 66 has one end hooked about pin 65 and has a single coil encircling the trigger pivot pin 45 and a short forwardly extending end resting on the frame flange immediately ahead of the trigger.

The parts automatically assume the position shown in Fig. 2 wherein the projecting finger portion of the trigger is yieldably held in a forward position ready to be squeezed or pulled back by the user's finger in operating the self action "firing" of the gun. The trigger spring also holds the rear end of the trigger down and the free end of feed finger 60 is held in a lowered position by said end of the trigger. The hammer link 58 and toggle 59 are held in a straight line by their spring 64 and together they hold the feed finger spaced away from the outside face of the flange 38 on which the advancing end portion of cap roll strip 39 is positioned. The hammer rests on the cap anvil 31 under the pressure of the hammer spring 52 and secures the end of the cap strip, and also determines the position of the links 58 and 59 as just described.

In operation, when digital pressure is exerted on the trigger the latter pivots about pin 45, and lifts pin 65 as the pressure of the light trigger spring 66 is overcome. The feed finger 60 is immediately moved about its pivot on pin 65 so that the free end of the feed finger is positively moved against the cap strip resting on flange 36. As the trigger is pressed further back the feed finger will begin to push the ammunition cap strip upward along flange 38 and cause the cap roll on pin 37 to correspondingly unroll. During this same continuing movement the abutment shoulders 63—63 are held together and the trigger link and toggle link remain aligned and exert a smooth powerful end thrust on pin 61 causing the hammer to raise against the resistance of trigger spring 52 and allowing the unspent end of the cap strip to be advanced between the anvil 31 and the hammer block 55 which are progressively separated as the hammer is thus pushed back, loading the rather heavy hammer spring. The parts finally assume the full line position as shown in Fig. 5 wherein the hammer link 58 and toggle link 69 are approaching a horizontal position and the free end of the feed finger is considerably elevated on the flange 38 and the toggle link engages a fixed abutment pin 67 after which slight additional movement causes the trigger link 58 and toggle link 59 to break or jack-knife about pin 62 against the slight resistance of their coil spring 64. This instantaneously releases the hammer 42 to the full force of its loaded spring 52 to explode the cap on the slotted anvil 31. So long as the trigger is held in the retracted position after the hammer fall the linkage remains jack-knifed, or folded, but the free end of the feed finger remains lightly held on the cap strip by spring 64 only. When the trigger is released, the finger 60 is bodily retracted from the cap strip as springs 64 and 66 restore the parts to position for another cycle of operation.

The device is easily taken apart, cleaned and reassembled and thus serves as an educational toy and fosters mechanical interest rather than mere noise making on the part of children.

It is to be noted that when catch 25 is released and barrel portions 28 and 29 are turned downwardly about pivot screw 23, the anvil is raised

up out of cooperative relation to the action of the hammer so that loading with a cap strip roll, such as 39, is both easy and entirely safe. The cap roll 39 is merely placed over the pin 37 so that the free end of the cap strip leads from the bottom of the roll and beyond the lower end of the vertical guide flange. When the pistol is again closed the end of feed finger 60 will turn the free end upward. As the trigger pull is initiated said finger 60 presses the strip against the guide flange and then pushes the strip upwardly to the anvil.

It is to be noted that the hammer spring is progressively loaded by the continuing trigger pull and serves to hold the feed finger 60 securely against the cap strip during feed movement, thus assuring positive feed of the strip and smooth action of the trigger pull as the hammer spring is loaded. All operations are very simple and easy, and in firing all sparks are driven through the cap strip and pass through the anvil slot together with all incidental particle matter. The sparks are extinguished interiorly of the pistol and the particles are baffled against velocity discharge from the front end of the barrel although smoke is permitted to escape from the front of the gun as an interesting visual effect that is entirely harmless to both user and bystanders.

The mechanism provides ease of trigger pull and the unfailing positive return of the trigger when the latter is released after the hammer fall. The absence of heavy pressure on the cap strip, except during positive feed movement, provides noteworthy safety to the user in the interval prior to the hammer fall, in addition to the safe control of the explosion products as previously set forth.

What is claimed is:

1. Self-action hammer mechanism for a pistol comprising a spring urged hammer, a spring urged trigger pivoted intermediate its ends below the hammer, a guide flange extending upright above the level of the trigger pivot, a finger pivoted at its bottom end on the rear end of the trigger and having a free end, a thrust linkage including a spring toggle joint, said linkage pivotally connected at its lower end intermediate the ends of the finger and pivoted at its top end intermediate the ends of the spring urged hammer and serving to normally hold the free end of the finger away from the guide flange when the hammer and trigger are released to the influence of their respective springs, the trigger being manually movable about its pivot against the resistance of its spring whereby the free end of the finger is first moved forwardly into contact with and then slidably upwardly along the guide flange said upward sliding movement of said finger serving to correspondingly elevate the connected lower end of the thrust linkage and cause the latter to thrust endwise against the hammer for pivoting the hammer against the resistance of its spring, and a fixed abutment pin engageable adjacent the spring toggle joint of the thrust linkage for breaking said joint and releasing the hammer to the influence of its spring, release of the trigger to its spring action serving to return the parts to their first described relation.

2. Self-action hammer mechanism of the class described comprising a frame, a spring returned trigger pivoted intermediate its ends on the frame whereby the rear end of the trigger is moved upwardly during manual movement of the trigger against its spring, a hammer pivoted adjacent its rear end on said frame above and rearwardly of the rear end of said trigger, a hammer spring, a finger pivoted at its lower end to the rear end of the trigger, an upright guide flange above the trigger pivot, a toggle link pivotally connected at its lower end intermediate the ends of the finger, a hammer link pivoted at its top intermediate the ends of the hammer, a spring toggle joint connecting adjacent ends of the hammer link and toggle link and releasably holding said links in over-center rigid condition for operation as a straight linkage unit, said unit being proportioned in length so as to hold the finger upright with its free end spaced from the guide flange when the hammer and trigger are released to the influence of their respective springs, and so that manual operation of the trigger initially elevates the finger and causes the linkage unit to pivot the finger on the trigger and contact the free end of the finger on the guide flange at an acute angle to the latter and dispose the pivotal connection of the linkage unit with said finger above the level of the trigger pivot so that further upward movement of the finger under manual trigger movement pivotally shifts the hammer against the resistance of the hammer spring under the end thrust by the linkage unit and causes the latter to transmit progressively increasing proportions of the accumulated energy of the hammer spring to the guide flange through the free end of the finger and correspondingly decreasing proportions of said accumulated energy to the rear end of the trigger in opposition to the manual trigger pull, and a fixed abutment in the path of the linkage unit for shifting the spring toggle joint out of over-center position for releasing the hammer to the influence of the hammer spring.

3. Self-action mechanism for a pistol, a spring powered hammer, pivotally mounted at one end thereof, a trigger biased to inoperative position and pivotally supported intermediate its ends, a feed finger pivoted at its lower end to one end of the trigger, a hammer link pivoted at its upper end to the hammer intermediate the ends of the latter, a toggle link having its lower end pivotally connected intermediate the ends of the feed finger, and having its upper end pivotally connected to the lower end of the hammer link, cooperating abutment shoulders at adjacent ends of the respective links limiting relative pivotal movement in one direction, a spring biasing the links to the said limit of movement, means providing a guide surface for slidable engagement by the free end of the feed finger during digital operation of the trigger, and an abutment pin for engaging the toggle link adjacent its pivotal connection with the hammer link and causing pivotal movement of the links against the yielding bias of their spring as the linkage is bodily moved by the finger during further digital operation of the trigger.

4. Self-action mechanism of the class described comprising a spring urged hammer pivoted at its rear end, a spring urged trigger pivoted intermediate its ends, a guide flange, a feed finger pivoted at its lower end to the rear end of the trigger, a thrust linkage including a spring toggle joint, said linkage pivoted at its top intermediate the ends of the hammer and at the bottom intermediate the ends of the feed finger, and a fixed abutment in the path of movement of the spring toggle joint as said finger and linkage are moved under manual movement of the trigger, manual operation of the trigger initially raising the finger and causing it to pivot, under the influence of the linkage to contact the free end of the finger on the flange and dispose the longitudinal axis of

the linkage on a line passing above the trigger pivot and in position for exerting end thrust to the hammer against the yielding resistance of the hammer spring during continued trigger operation, the counter thrust of the hammer spring being directed, through the linkage and the opposite ends of the finger, partly against the guide flange and partly to the rear end of the trigger for materially diminishing the resistance to manual operation of the trigger until movement of the spring toggle joint against the fixed abutment breaks the toggle joint and releases the hammer to the thrust of the hammer spring.

5. In a device of the class described the combination of a frame having an upright guide, a spring returned trigger, an upright finger pivoted on the trigger and extending alongside the guide, a hammer supported rearwardly of the guide and spring urged toward the guide, a hammer link pivoted at its top to the hammer, a toggle link pivoted at its bottom intermediate the ends of the finger, a spring toggle joint connecting adjacent ends of said hammer link and toggle link whereby said links are normally aligned for withholding the free end of the finger from the guide when said trigger is at the limit of movement under the influence of its return spring, manual movement of the trigger serving to move the free end of the finger to sliding abutment along the upright guide and to thereby elevate the associated pivoted end of the toggle link in the same direction for providing a rearward thrust on the aligned toggle and hammer links to move the hammer against the resistance of its spring, and a fixed abutment spaced rearwardly of the guide in the path of said spring toggle joint as the links are moved under manual movement of the trigger for breaking said toggle joint and releasing the hammer to the influence of its spring.

6. The combination as set forth in claim 4 and further characterized by the fact that the guide flange is carried by a structure which is latched in the operative position and is movable away from said position out of the path of movement of the finger rendering manual operation of the trigger inoperative to move the hammer.

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