Aug. 30, 1949. H. C. JOHNSTON 2,480,328

FIRING MECHANISM FOR RECOILLESS SHOULDER MOUNTED GUNS

Filed July 13, 1944

4 Sheets-Sheet 1

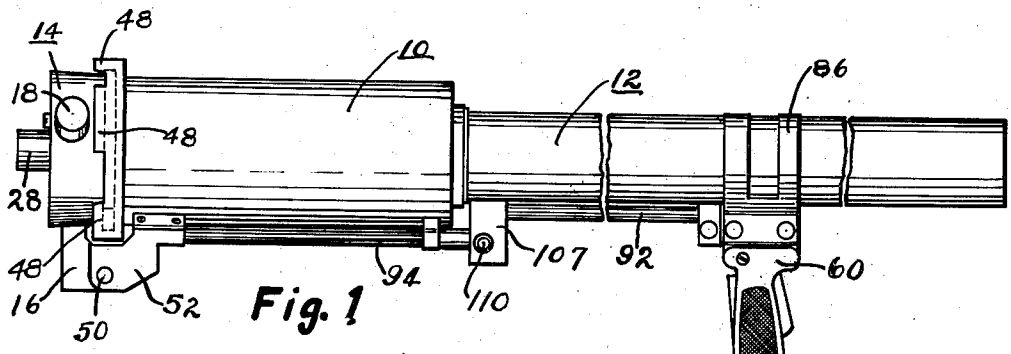


Fig. 1

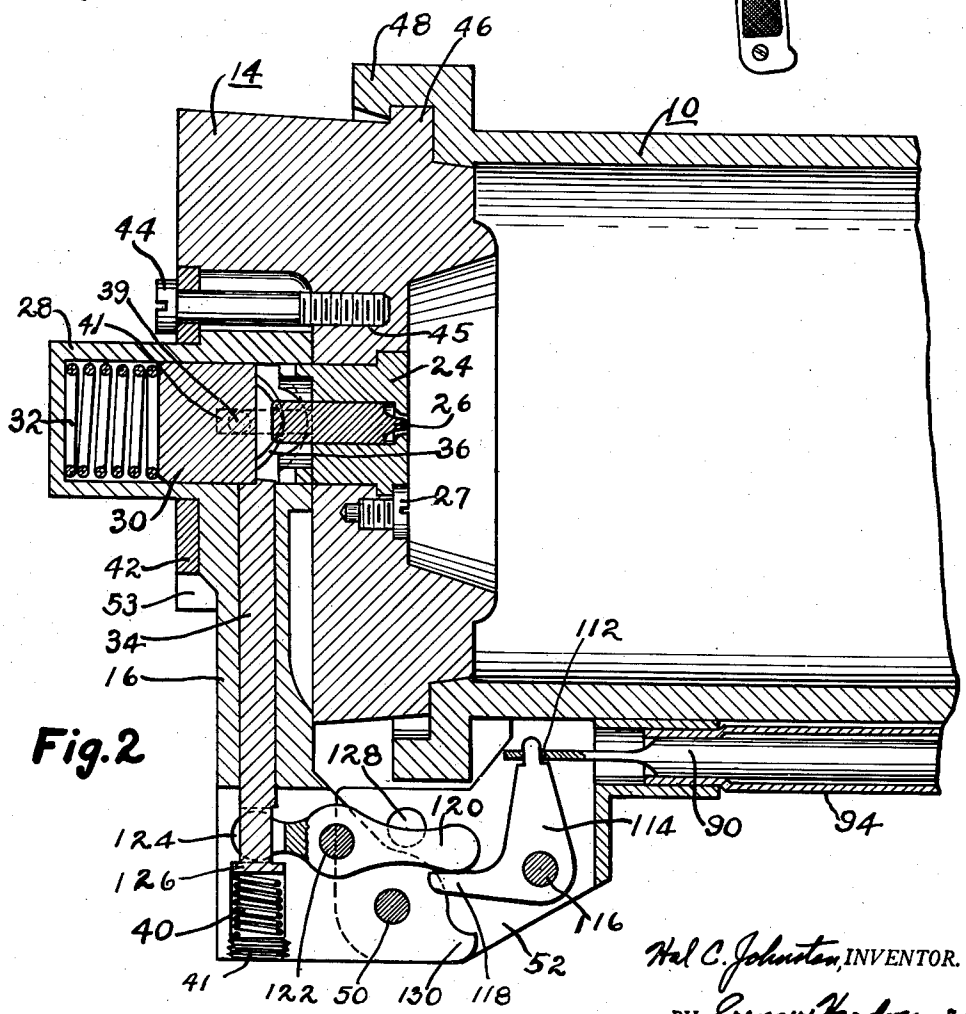


Fig. 2

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4 Sheets-Sheet 2

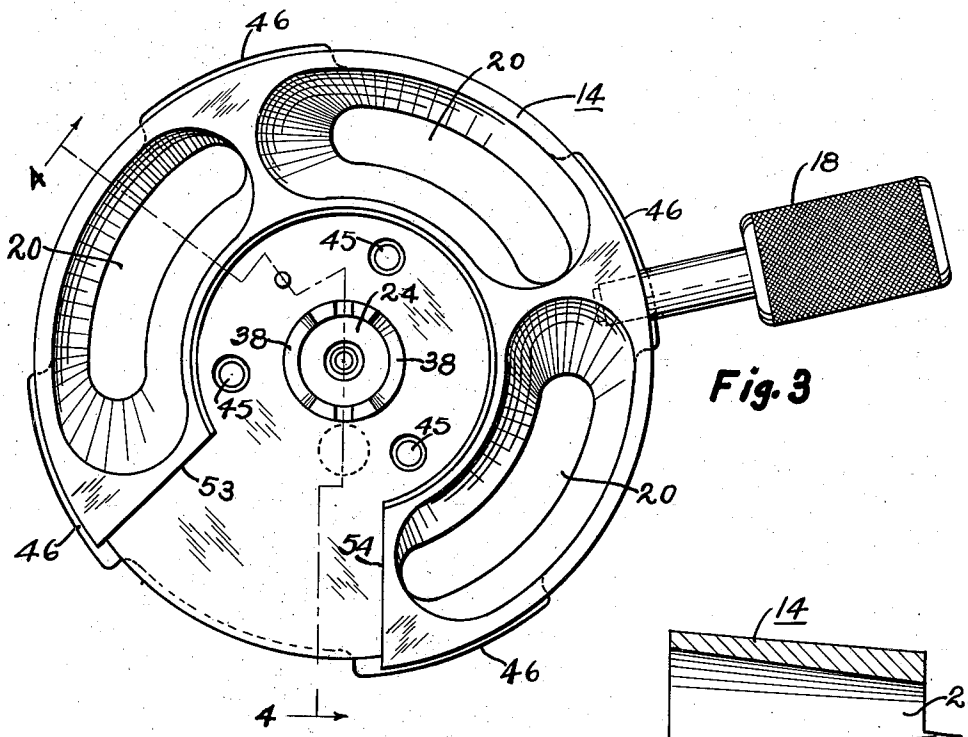


Fig. 3

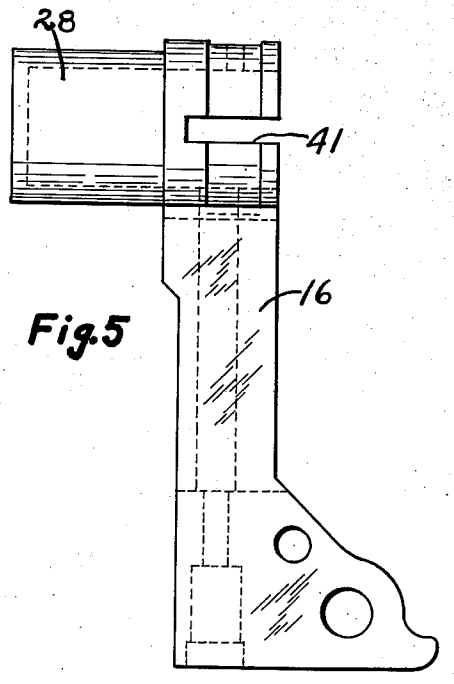


Fig. 5

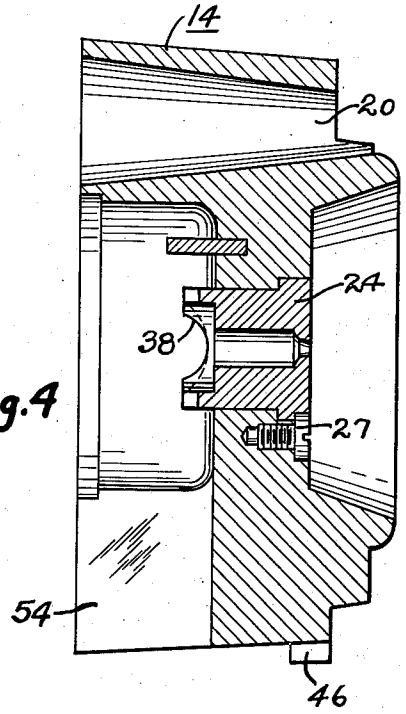


Fig. 4

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FIRING MECHANISM FOR RECOILLESS SHOULDER MOUNTED GUNS

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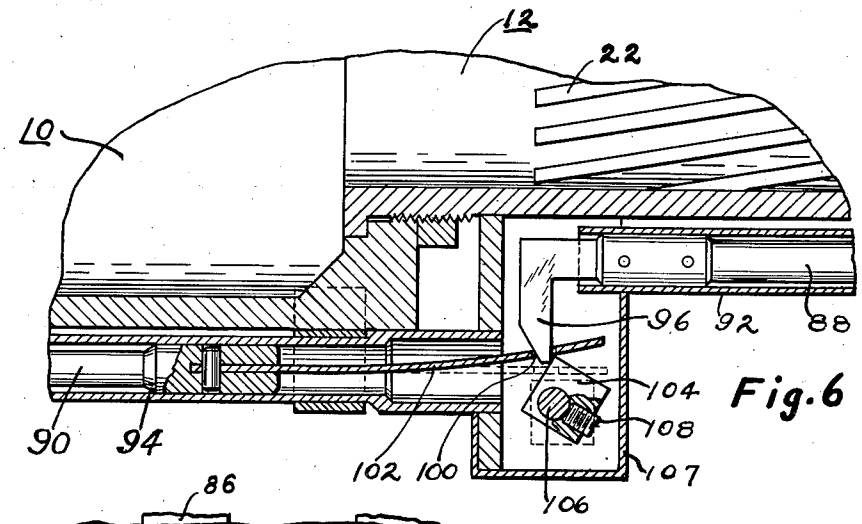


Fig. 6

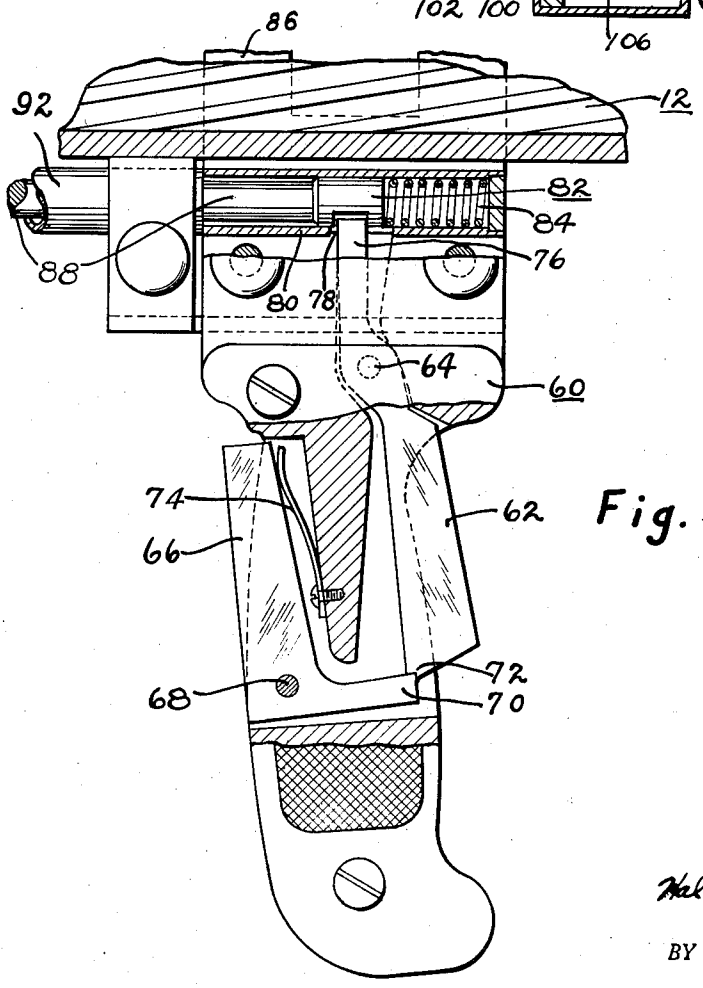


Fig. 7

Hal C. Johnston, INVENTOR.

BY Spencer, Hardman & Fehr, His Attorneys.

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FIRING MECHANISM FOR RECOILLESS SHOULDER MOUNTED GUNS

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4 Sheets-Sheet 4

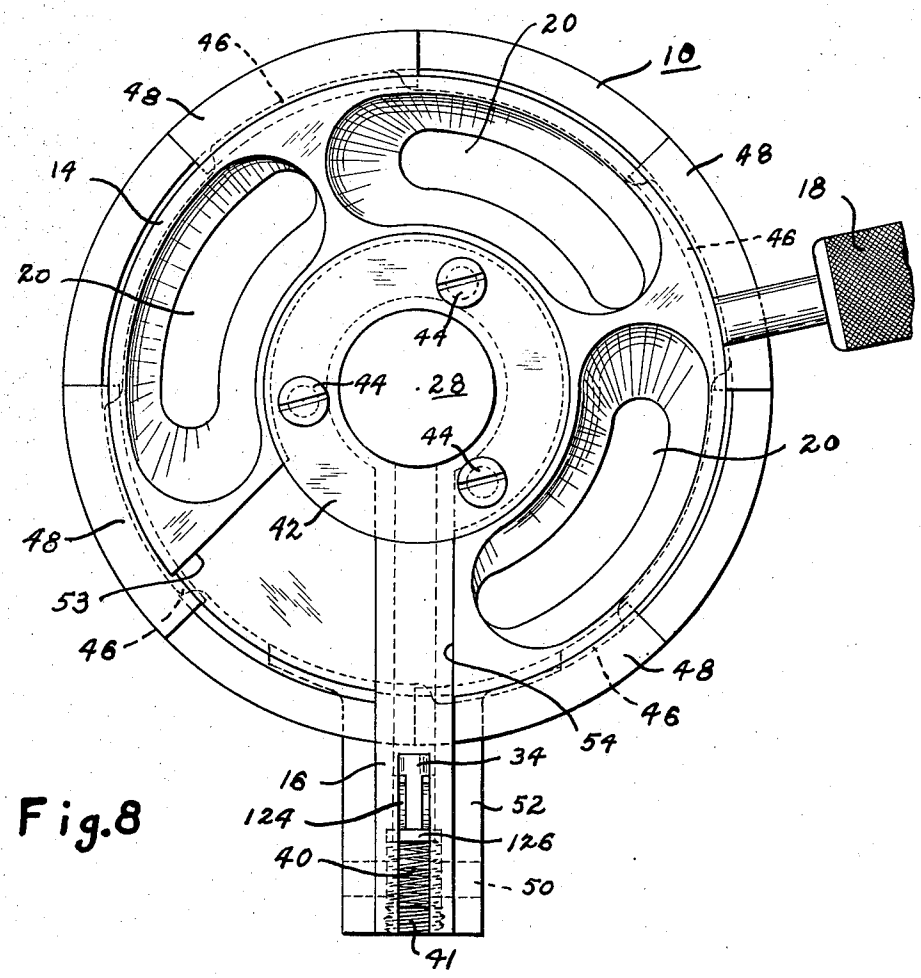


Fig.8

Hal C. Johnston, INVENTOR.

BY Spencer, Hardman & Fehr,

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Patented Aug. 30, 1949

2,480,328

UNITED STATES PATENT OFFICE

2,480,328

FIRING MECHANISM FOR RECOILLESS SHOULDER MOUNTED GUNS

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Application July 13, 1944, Serial No. 544,676

6 Claims. (Cl. 42—69)

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This invention relates to ordnance and more particularly to an improved type of recoilless shoulder mounted gun.

It is an object of this invention to provide a gun which may be carried on the shoulder of one person and which may be cocked and reloaded by another person without throwing the carrier off balance.

Another object of this invention is to provide an improved safety means for preventing accidental or premature firing of the gun. More particularly it is an object of this invention to provide a safety means for preventing the firing of the gun before the person loading the gun has had time to move to a safe position.

A further object of this invention is to provide a gun which is suitable for mass production.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings, wherein a preferred form of the present invention is clearly shown.

In the drawings:

Fig. 1 is an elevational view showing a gun embodying my invention;

Fig. 2 is a fragmentary sectional view showing the arrangement of the sear and the sear operating mechanism;

Fig. 3 is an end view of the rotatable breech block;

Fig. 4 is a sectional view taken on line 4—4 of Fig. 3;

Fig. 5 is an elevational view of the one hinge bracket which supports the breech block and the hammer mechanism;

Fig. 6 is a fragmentary sectional view showing a portion of the safety mechanism;

Fig. 7 is a view with parts broken away, showing a portion of the trigger mechanism; and

Fig. 8 is an end elevational view of the gun.

Referring now to the drawings, reference numerals 10, 12 and 14 designate generally the chamber of the gun, the gun barrel and the breech block, respectively. The breech block 14 is rotatable relative to the hinge bracket 16 which supports the breech block.

The gun is of the type which is designed to be mounted on the shoulder of a soldier or on a light tripod and is designed to exhaust a portion of the gas through the ports 20 of the breech block 14 so as to counteract any tendency of the gun to recoil. Special cartridges (not shown) are used which allow a portion of the gas to exhaust through the ports 20. As shown in Figs. 3 and 4, the shape of the ports is such that the gasses exhausting therethrough overcome the torsional force produced by the projectile contacting the rifling 22 formed in the barrel 12.

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As shown in Fig. 4, an insert 24 has been provided in the breech block 14 which serves to guide the firing pin 26. A cap screw 27 holds the insert in place. The hinge bracket 16 is provided with a hammer housing 28 within which the hammer 30 is slidably mounted. A coil spring 32 disposed within the housing 28 biases the hammer towards the firing pin 26. A sear 34 latches the hammer 30 in its rear position when the gun is cocked. The hammer 30 is provided with cam projections, such as the projections 36, which cooperate with the cam surfaces 38 provided on the insert element 24. The arrangement is such that upon rotation of the breech block 14 by means of the handle 18 the cam surfaces 38 engage the cam segments 36 so as to cam the hammer 30 to the rear against the spring 32 so as to store up energy in the spring 32. The sear 34 is biased into latching engagement with the hammer 30 by means of the spring 40 arranged as shown in Fig. 2. The hammer 30 is provided with a pair of guide pins 39 which slide in slots 41 in the hammer housing.

The breech block 14 is held in place relative to the hinge bracket 16 by means of the plate 42 (see Fig. 2) which in turn is held in place by means of a plurality of cap screws, such as the cap screw 44, which engage the tapped recesses 45 in the breech block 14. Lugs 46 are provided on the breech block 14 which engage beneath the locking flanges 48 provided adjacent the end of the chamber 10. In order to reload the gun, the breech block 14 is rotated the necessary amount to disengage the lugs 46 from the flanges 48 after which it is possible to swing the breech block 14 away from the rear end of the chamber 10. The breech block 14 swings about the pivot 50 which is the main pivot for the hinge bracket 16. The pivot pin 50 is carried by the stationary hinge bracket 52 which is secured to the bottom side of the chamber 10 as shown. The amount of rotation necessary for disengaging the lugs 46 from the locking flanges 48 is enough to cock the gun with the result that no further operation is necessary for cocking the gun. The cocking takes place as the breech block is rotated from the locked position into the unlocked position. As shown in Figs. 3 and 4, a portion of the breech block 14 is cut away to receive the hinge bracket 16. The side walls 53 and 54 formed by the cut away portion serve to limit the rotation of the breech block. Inasmuch as these guns are intended to be supported on the shoulder during

operation, it is very essential that the gun be reloaded without the exertion of any force which might tend to throw the carrier off balance. Experience has shown that any pushing or pulling on the gun tends to throw the carrier off balance whereas the rotational forces produced when reloading the above described gun do not have that effect.

Adjacent the front end of the barrel I have provided a combined trigger and safety means disposed within a handle 60. As best shown in Fig. 7, the trigger comprises a member 62 pivoted within the handle at 64. A safety element 66 pivoted within the handle at 68 is provided with a projecting portion 70 which is designed to engage within a notch 72 provided in the trigger element 62. A spring 74 normally biases the safety element 66 into trigger engaging position. The upper end 76 of the trigger element 62 is arranged to project through a slot 78 in the trigger rod guide 80 so as to engage the trigger rod mechanism 82. A spring 84 pushes against the front end of the trigger rod mechanism as shown. By virtue of the above described arrangement it is apparent that in order to operate the triggers 62 it is necessary to first push in on the safety element 66 and then push in on the trigger 62.

The handle 60 is secured to the barrel 12 by means of a suitable mounting strap arrangement 86. The trigger rod mechanism comprises a first or front trigger rod section 88 which extends from the handle 60 towards the rear end of the barrel 12 and a second trigger rod section 90 which is offset from the first section and extends along the lower side of the firing chamber 16. The rod section 88 is slidably mounted within the protective tube 92 as shown. The second or rear trigger rod section 90 is slidably mounted within a similar protective tube 94 which is secured to the lower side of the firing chamber 16. As shown in Fig. 6, the first section is provided with a depending arm 96 which is adapted to engage within a hole 100 provided in the flat spring 102. The spring 102 is carried by the second trigger rod section 90. The spring 102 is a flat spring which would normally assume a position out of engagement with the element 96 (as shown in dotted lines) but which may be cammed into engagement with the element 96 by means of the rotatable cam element 104 carried on the shaft 106 which in turn is supported by the housing 107. A set screw 108 prevents relative rotation between the cam 100 and the shaft 106. A knob 110 is provided on the outer end of the shaft 106 for manually manipulating the cam 104. Referring to Fig. 6, it is obvious that when the front trigger rod section 88 is pulled forward by the trigger 62, the projecting arm 96 pulls the rear trigger rod 90 forward and also causes the cam 104 to be rotated out of spring lifting position. By virtue of this construction, a second pull on the trigger 62 will not cause operation of the rear trigger rod section 90 unless and until the cam 104 has been reset so as to cam the spring 102 into its upper position in engagement with the element 96. It is also apparent that it would be impossible to operate the cam 104 unless the aperture 100 in the spring 102 is properly lined up with the projection 96. Thus, if the individual carrying the gun fails to release his pressure on the trigger 62, it would be impossible to reset the cam 104. The mechanism shown in Fig. 6 serves very effectively as an added safety for preventing premature operation of the trigger rod 90.

As shown in Fig. 2 the rear end of the trigger rod 90 is provided with an aperture 112 for engagement with the bell crank 114 which is mounted to rotate about the pivot 116 carried by the hinge bracket 52. The arm 118 of the bell crank 114 is arranged to lift the front end of the sear operating lever 120. The lever 120 is mounted to rotate about the shaft 122 carried by the hinge bracket 16. The rear end of the lever 120 is provided with a forked portion 124 arranged to operate the sear pin 34. The lower end of the sear pin 34 is provided with a head 126 against which the forked portion 124 pushes when it is desired to fire the gun. The sear pin has a flat portion directly above the head 126 which is straddled by the forked portion 124 of the lever 120.

A stop 128 carried by the hinge bracket 52 limits the swinging movement of the hinge bracket 16 which is provided with a stop engaging surface 130 as shown in Fig. 2.

Since a gun of this type is designed to be carried and fired by one person and reloaded by another, it is important to provide the necessary safety means for preventing the premature firing of the gun before the person reloading the gun has had a chance to move away from behind the exhaust ports in the breech. By virtue of the safety means described hereinabove the person loading the gun must turn the knob 110 so as to reset the safety mechanism before the person firing the gun can effectively pull the trigger and the resetting can only be done when the trigger is in its forward position whereby the safety element 66 will also have a chance to move into safety position. Thus, both of the safety devices are reset before each firing of the gun.

While the form of embodiment of the invention as herein disclosed, constitutes a preferred form it is to be understood that other forms might be adopted as may come within the scope of the claims which follow.

What is claimed is as follows:

1. In a firearm, a firing pin, a firing pin operating mechanism comprising trigger rod means having a first section and a second section, a projection provided on one of said sections, a substantially flat spring carried by the other of said sections and movable from a first position in interlocked engagement with said projection to a second position out of interlocked engagement with said projection, said spring being biased out of interlocked position, and means for manually moving said spring into the interlocked position, and trigger means for operating said sections in unison when said spring is in said first position.

2. In a shoulder type of firearm, means forming a firing chamber of a given diameter, a barrel of smaller diameter projecting from the front end of said chamber whereby there is formed an offset in the outer contour of the firearm intermediate the ends thereof, trigger means adjacent the front end of said firearm, shell firing mechanism including a sear adjacent the rear end of the firearm, and a pair of trigger rods extending from said trigger means towards the rear of the firearm, one of said trigger rods being disposed adjacent the bottom side of said barrel and the other of said trigger rods being disposed adjacent the bottom side of said firing chamber and having means for operating said sear, one of said rods having a projecting portion, said second named rod having means for releasably engaging said projecting portion.

3. In a firearm, a firing pin, a firing pin operating mechanism comprising in combination, a pair of trigger rod sections, means for releasably connecting said sections together whereby a pull on one of said sections may be transmitted to the other of said sections, and connecting means including safety means for automatically disengaging said sections during each operation of said firing pin, trigger means for operating said sections, and manual means for reconnecting said connecting means.

4. In a firearm, a firing pin, a firing pin operating mechanism comprising a pair of trigger rods, means for releasably connecting said rods together so as to operate as one rod, said means comprising an apertured blade spring carried by one of said rods and an arm carried by the other of said rods for engaging in an aperture of said blade spring, said blade spring being biased away from engagement with said arm and arranged to become disengaged from said arm during each operation of said firing pin, and manual means for moving said spring into engagement with said arm.

5. In a firearm, a firing pin, a firing pin operating mechanism comprising trigger rod means having a first section and a second section, a projection on one of said sections, a substantially flat spring carried by the other of said sections and movable from a first position in engagement with said projection to a second position out of engagement with said projection, means for disengaging said projection from said spring upon operation of said rod incidental to firing of the gun, and manually operable means for reengaging said spring with said projection.

6. In a recoilless shoulder type gun adapted to be mounted upon the shoulder of and fired by a first person and to be cocked and loaded by a second person, a barrel, a firing chamber and firing mechanism at one end of the barrel, a handle located adjacent an intermediate portion of the barrel containing a combined trigger and safety means operable by the first person, said

combined trigger and safety means including a continually biased means for normally preventing its effective operation capable of being overcome by the active proper manipulation by the first person, a normally disconnected connecting means extending from said handle and trigger to said firing mechanism and having a normally disconnected portion including a continuously operable biasing means for normally biasing said portion to the disconnected condition, and a second safety device for said second person located adjacent the end of the barrel remote from said trigger and handle to be readily operable by the second person, said second safety device including manually operable means operable by said second person to overcome the continuously operable biasing means for connecting said normally disconnected portion to render operable said connecting means to operate the firing mechanism.

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