United States Patent

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[54] **BLOWBACK FIREARM WITH RETARDED EXTRACTION**
2 Claims, 5 Drawing Figs.

[52] **U.S. Cl.** **89/180,** 89/195
[51] **Int. Cl.** **F41c 5/00**
[50] **Field of Search** 89/180, 194, 195, 196, 197; 102/DIG. 1

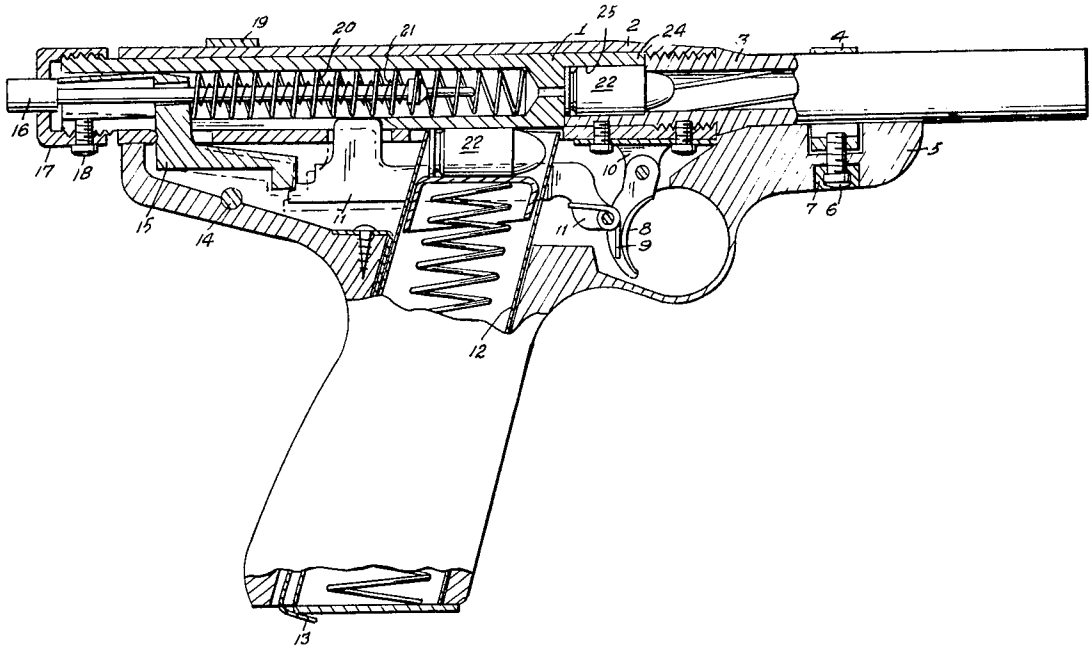
[56] **References Cited**

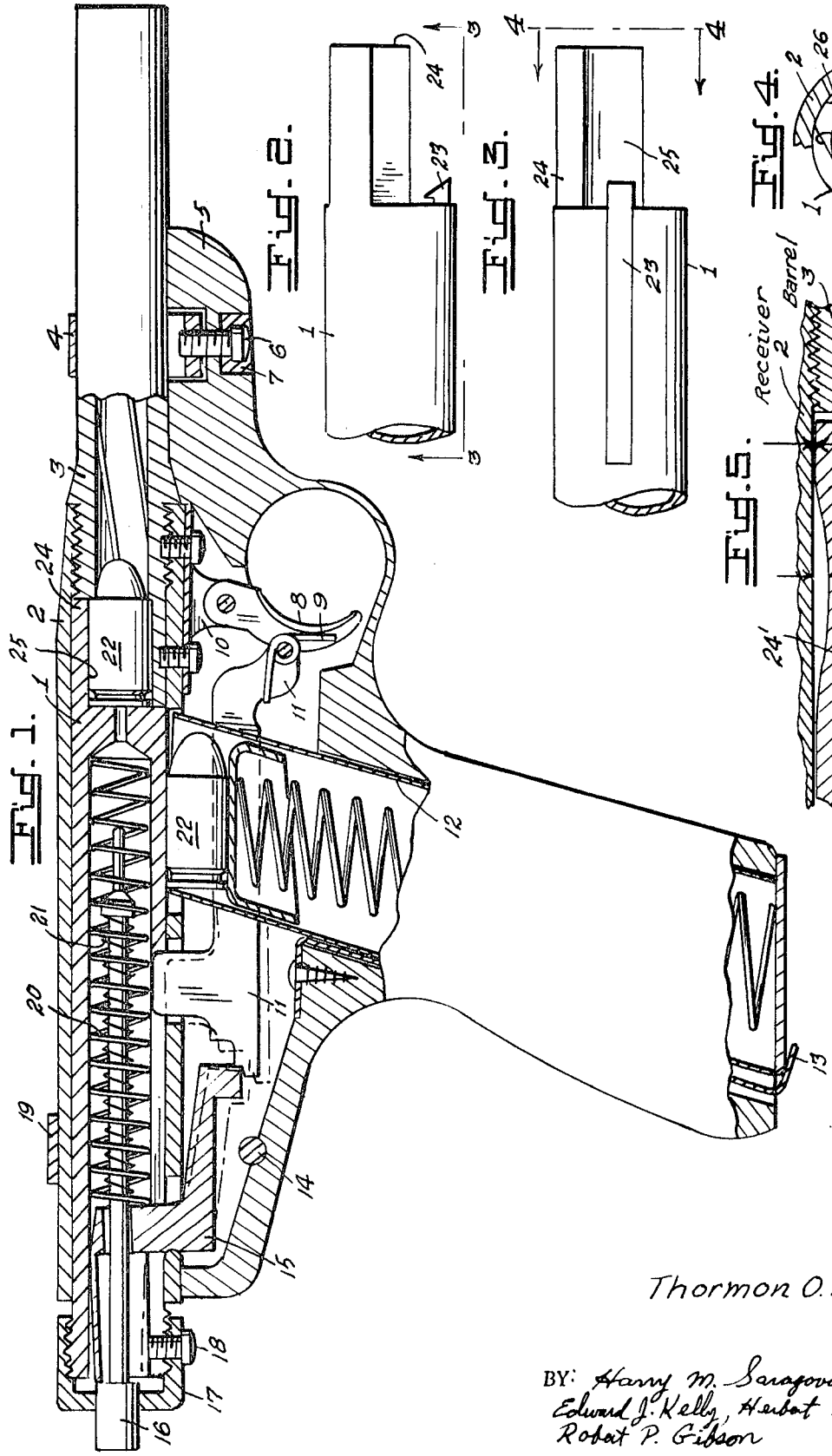
UNITED STATES PATENTS

1,165,621	12/1915	Nelson	89/180
2,297,693	10/1942	Dicke	89/180
3,008,258	11/1961	Johnson	89/180 UX
3,114,290	12/1963	Harvey et al.	89/180 UX
2,632,391	3/1953	Kintzinger	102/DIG. 1

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ABSTRACT: In an automatic weapon, blowback pressure extracts the spent, empty shell. In this invention the rate of extraction due to blowback is automatically retarded in proportion to the force of the explosion. This is advantageous for several reasons. For example, if the explosion, and resultant pressure, is abnormally high, the shell is held in place by a semilocked or retarded bolt. The bolt is automatically released as the pressure drops. This action also assures that the maximum amount of energy will be imparted to the projectile, and that the shell will not be prematurely partially ejected with a blowout of the side of the shell.





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BLOWBACK FIREARM WITH RETARDED EXTRACTION

The invention described herein may be manufactured, used and licensed by or for the Government for governmental purposes without the payment to me of any royalty thereon.

BRIEF SUMMARY

Firearms that employ conventional ammunition must provide sufficient support to the base of the shell or cartridge case during firing to prevent possible rupture of the cartridge case. Rupture can occur if the base of the cartridge case is permitted to move to the rear more than a very small amount during the moment of firing when the pressure is high. Some firearms limit the movement of the base of the cartridge during peak pressure by locking the breech, or by relying upon the inertia of the relatively heavy breech closure to provide a controlled amount of base movement, or by a combination of those features. Retarded blowback guns have some type of mechanism that provides slow initial opening by requiring a moderately heavy mass to be moved with a high mechanical disadvantage, by slowing opening through friction, or both.

The present invention has for an object the provision of simple, inexpensive apparatus to achieve slow blowback, the apparatus offering automatic compensation if a heavy charge tends to blow the breech or bolt back excessively.

In the drawing:

FIG. 1 is a view of the invention as applied in an automatic handgun;

FIG. 2 is a detailed top view of the bolt and cartridge extractor;

FIG. 3 is a side view corresponding with FIG. 2;

FIG. 4 is a front view on line 4—4 of FIG. 3;

FIG. 5 is a view of a modification.

Bolt 1 reciprocates in receiver 2 and serves to close the breech end of barrel 3. More or less standard parts of the firearm include barrel band 4, stock 5, barrel band screw 6, escutcheon 7, trigger 8, trigger spring 9, trigger bracket 10, disconnector 11, magazine 12, magazine catch 13, rear band screw 14, sear 15, firing pin 16, cocking knob 17, cocking knob retaining screw 18, rear band 19, recoil spring 20, firing pin spring 21, ammunition 22, and extractor 23.

FIGS. 2, 3, 4 and 5 illustrate novelty in the bolt and cooperating surface of the firing chamber. At the front end of bolt 1, extension 24 is movable into a cooperating recess in firing chamber 25 of receiver 2 and barrel 3. The surfaces between extension 24 and the receiver-barrel mate as illustrated at 26 and 27. It will be noted that surfaces 27 are preferably tapered, in wedge like manner. At least one of the surfaces 27 is not radial with respect to the center of the barrel. That is, the surface extends in a direction that would be a chord of a circle representing the inner surface of the barrel, as illustrated in FIG. 4. Upon firing of a round of ammunition, high-pressure forces extension 24 tightly into frictional engagement with an area of surface 26 in receiver 2 or barrel 3 or both. If desired, surfaces 27 may be formed in a more or less wedge shape to insure a higher degree of frictional resistance as extension 24 is momentarily deflected outwardly. If the pressure is abnormally high (strong ammunition or such) the frictional resistance is automatically increased. If the pressure is low (weak ammunition or such) the frictional resistance is automatically decreased. The degree of taper of wedge surfaces 27 may be preselected, or materials having the desired coefficient of friction may be preselected, to yield the desired degree of retardation of rearward bolt and shell movement.

From the foregoing it will be observed that ammunition will automatically increase or decrease resistance to rearward bolt movement in proportion to the "strength" of the ammunition. "Weak" ammunition will press extension 24 outwardly only to a limited degree. Therefore, the bolt will slide relatively freely and the weak charge will be sufficient to blow the receiver back against the compression of recoil spring 20, eject the empty shell, cock the firing pin against the compression of firing pin spring 21, and so on. On the other hand, "strong" ammunition will automatically increase resistance to rearward movement of the receiver., bolt, etc. This holds the shell in place until the peak pressure has subsided. More power is delivered to the projectile. The shell does not move rearwardly significantly during high-peak pressure conditions thereby reducing the probability of shell casing rupture as the shell leaves the firing chamber. And, the resistance to rearward movement is automatically reduced as the high pressure subsides thereby automatically allowing blowback of the parts when the pressure is still adequate to assure ejection of the spent shell, recocking, reloading, and so on.

FIG. 5 illustrates a modification of the friction-varying surfaces to provide for a nonlinear variation. Bolt extension 24' is provided with a no clearance area 28 and a clearance area 29, (exaggerated for purposes of illustration). At high pressures a portion or all of the clearance area is reduced to zero due to the high pressure pressing outwardly and bending extension 24'. This pretty much locks the bolt. As the pressure subsides the extension springs back toward its normal position and unlocks the bolt to allow it to move. If desired the surfaces at clearance area 29 may be roughened, or made of materials having a high coefficient of friction, to thereby further increase resistance to movement during the period of peak pressure.

I claim:

1. Apparatus for automatic guns comprising a barrel, a receiver, a firing chamber for receiving shell-type ammunition, a bolt member supporting the rear end of the shell during firing and having forward extension means extending longitudinally alongside of the shell inside of the receiver to give longitudinal reinforcement to the shell casing during firing, said forward extension means being sufficiently elastic or flexible to permit deflection thereof outwardly into frictional contact with said receiver under pressure accompanying the firing to thereby resist rearward movement of the bolt proportional to the strength of the ammunition and to release the resistance as the pressure subsides to permit the bolt and extension to slide freely, and rearward extension means on said barrel, said rearward extension means having a wedge-shaped surface lying alongside of said forward extension means on said bolt, said forward extension means having a cooperating wedge-shaped surface extending longitudinally thereof and extending in a direction that would be a chord of a circle representing the inner surface of the barrel, said wedge-shaped surfaces being in close proximity whereby outward pressure exerted by the shell during firing causes said wedge-shaped surfaces to tightly engage each other to thereby increase the frictional resistance.

2. Apparatus as in claim 1 including two of said wedge-shaped surfaces on said rearward extension of said barrel and two cooperating wedge-shaped surfaces on said forward extension of said bolt, the four wedge-shaped surfaces mating in pairs such that outward pressure during shell firing in said firing chamber increases frictional resistance at each of the pairs.