

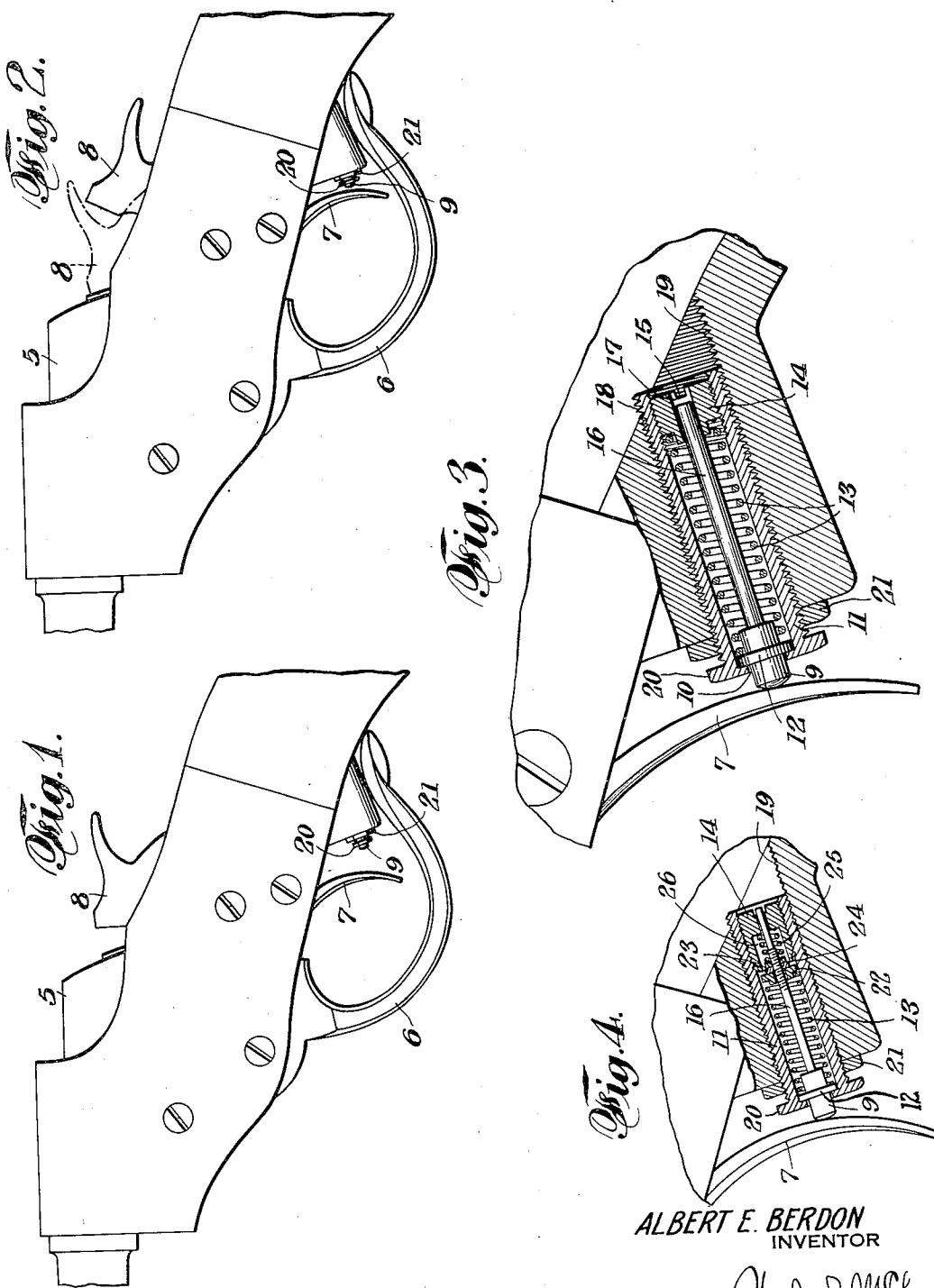
July 7, 1936.

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2,046,996

TRIGGER PULL COMPENSATION FOR FIREARMS

Filed Dec. 5, 1933



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## UNITED STATES PATENT OFFICE

2,046,996

## TRIGGER PULL COMPENSATION FOR FIREARMS

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Application December 5, 1933, Serial No. 700,951

12 Claims. (Cl. 42—69)

The objects of this invention are to overcome and eliminate the effect of the finger pull force released immediately following the instant of "let-off" before actual firing and to provide simple and practical mechanism accomplishing this purpose, readily applicable to existing firearms.

The foregoing and other desirable objects are attained by the novel features of construction, combinations and relations of parts hereinafter described, illustrated in the accompanying drawing and broadly covered in the claims.

The drawing accompanying and forming part of the specification illustrates certain practical and at present preferred embodiments of the invention, but it will be understood that the structure may be modified and changed in various ways all within the true intent and broad scope of the invention.

Fig. 1 is a part side elevation of the action of a firearm having the invention incorporated therein and showing the hammer and trigger in the half-cocked or safety position.

Fig. 2 is a similar view of the same parts showing the hammer fully cocked and the trigger free but ready to engage the compensator provided therefore immediately following the instant of "let-off", the broken lines in this view indicating the firing position of the hammer.

Fig. 3 is an enlarged broken sectional detail of the trigger pull compensating mechanism showing the trigger engaging same just after releasing the sear.

Fig. 4 is a sectional detail of a modified form of the invention.

The action shown is more or less conventional, involving breech block structure 5, operable by finger guard lever 6, and trigger 7, controlling hammer 8, through the usual sear and notch, the latter detail not appearing in the illustrations.

In the half-cocked condition appearing in Fig. 1, the trigger occupies an intermediate position and in the fully cocked condition, the trigger occupies a more rearwardly position as in Fig. 2. The traverse from this to the sear releasing position will vary in different firearms and this factor is taken account of in positioning the compensating means to be described, since the latter to be most effective, must be so disposed and so powered as to pick up the trigger loading practically the instant of release by the "let-off" of the hammer.

While the precise form of compensating device may vary, particularly to suit requirements of different firearms, that form shown in detail in Fig. 3, is preferred at present, because of its sim-

plicity, accuracy, dependability and durability.

This particular embodiment comprises a button or plunger 9, protruding through an opening 10, in the end of a sleeve-like casing 11, and supported by the latter in position just clear of or starting contact with the back of the trigger at the position of sear release.

Button 9 is shown as having a surrounding annular flange or collar 12, forming a stop engaging the end of the casing to limit outward movement of the button and providing an abutment for the compression spring 13, the latter bearing at its opposite end against the screw plug 14, adjustable in the inner end of the casing. For purposes of adjustment, this plug is shown as kerfed 15 at 15, to take a screw driver or like tool.

The flange or collar portion 12 is indicated as having a smooth sliding fit in the one end of the casing and to further assure smooth action, the button is guided from the opposite end of the casing by having a rod extension 16 of the same sliding through a central guide opening 17, in the tension adjusting screw plug.

The button or plunger is preferably tensioned to assume the pull on the trigger existing immediately following the instant of "let-off". This may be determined and effected by measuring the pull on the trigger just before or at the instant of "let-off", measuring the pull immediately after "let-off" and then setting the spring abutment to give the button a tension substantially equal to the difference between these two pull pressures and properly positioned to be engaged by the trigger at the instant following release. The effect of the spring tensioned button or plunger will then be to automatically compensate for the changed load on the trigger and prevent involuntary muscular reaction, such as might pull the gun "off" in the fraction of time between release of the sear and start of travel of the projectile.

It is essential for accomplishment of the full benefits that the compensator be accurately located with respect to the trigger. For this reason, it is shown as having a relatively fine adjustable mounting, consisting of an external screw 18 on the button housing or casing to engage a corresponding screw seat 19, in the stock of the firearm. The exposed head 20 of the casing is shown in the nature of a nut or the like, to receive a wrench for turning the same in the screw seat and a lock nut is indicated at 21, for fixing the casing firmly in the proper position of adjustment.

In practice, the usual procedure is to set the button to a compression approximately equal to

the trigger pull at the instant before "let-off", less the pull at the instant just subsequent to "let-off" and to then position the spring barrel, so that the trigger will just reach the button at the moment of "let-off." In such relation, the device does not interfere with or alter the trigger action. Similarly, in cocking the piece, the device does not interfere even though the trigger may draw back to or actually touch the button. Immediately the trigger is "unloaded" by release of the sear, the button backed by the predetermined spring pressure assumes the load dropped by the hammer load, so that the finger can detect no change in the trigger pull. Consequently, there is then no change in the muscular tension of the finger, hand and forearm at the time of firing and there is thus no involuntary pulling the gun off the target in the interval between "let-off" and actual firing of the shot. The invention is readily applicable to existing firearms of various kinds at relatively low cost and accomplishes the purposes for which it is intended efficiently and practically. While applicable to different kinds of firearms, the invention is of particular utility for light accurate shooting guns, such as target pistols and rifles. In these guns, the trigger pull may run as high as eight pounds or more. Expert marksmen recognize the effect of this more or less eight pounds "trigger finger slap" and endeavor to offset the same by special grip and "trigger squeeze" to prevent such suddenly released force from shifting the gun before the bullet is started. The present invention it will be seen, without altering or interfering with the trigger action, automatically applies a load to the trigger substantially at the instant of "let-off" and approximating the load on the trigger which has existed up to that time. Accordingly, there is no appreciable change on the trigger finger pull up to and past the time of actual firing. The objectionable trigger finger slap may therefore, with this invention, be entirely eliminated. In addition to not interfering with the usual trigger action and which in many guns is regulated to suit a personal taste, the device is so small and light in weight as to not objectionably affect either the appearance or the "balance" of the gun.

In the form of the invention illustrated in Fig. 4, the same compensation for trigger unloading is automatically accomplished with the added effect of constant contact of the trigger with the compensating button. In this construction, the abutment for the compensating spring 13 is a washer like element 22, loose on the stem 16 and having its extreme backward position thereon determined by a nut or similar element 23, adjustable on a screw threaded portion of the stem, said abutment being of a size to engage and be stopped by the inner end portion 24 of screw plug 14. A spring 25 seated in a cavity 26, in the screw plug 14 and acting against the back of the nut or shoulder 23 on the stem serves to thrust the plunger outwardly into engagement with the back of the trigger. This may be a relatively light spring of only sufficient power to keep the plunger against the back of the trigger, but if desired, may be of sufficient strength to replace the spring normally provided in the action to hold the trigger in its proper following relation to the hammer. In the simple contacting engagement of the plunger with the trigger, the main or compensating spring is idle, simply moving with the plunger between the fixed abutment 12, at the forward end of the plunger and

the floating abutment 22, resting against the back stop 23. The parts are relatively so positioned however, that in the hammer releasing movement of the trigger, the clearance between the floating abutment 22 and the abutment shoulder 23 on the inner end of plug 14, will be taken up approximately at the moment of release of the hammer, consequently applying the load of the compensating spring to the trigger at the instant following let-off of the hammer, with the same trigger pull compensating effect as above described. Adjustment of plug 14 in the main spring barrel and adjustment of the stop 23 on the screw stem, enable proper tensioning of the main and auxiliary springs and timing of the action or effect of the main compensating spring, the latter determined by the spacing between the floating spring abutment and the adjustable abutment or stop 24.

The invention being of broad scope, the terms employed herein are used in a descriptive rather than in a limiting sense, except possibly as may be required for true understanding of the invention over the prior art.

What is claimed is:

1. In combination with the trigger action of a firearm, a trigger-loading device tensioned to oppose the trigger movement with a force approximating the necessary pull before "let-off" less the pull at the instant subsequent to "let-off" and positioned to act on the trigger immediately after the instant of "let-off".
2. In combination with a firearm having a trigger, a cushioning member tensioned to oppose trigger movement with a force sufficient to render the trigger pull after "let-off" approximately equal to the trigger pull at the instant of "let-off" and means for supporting said device clear of the trigger up to "let-off" and engageable by the trigger the instant after "let-off".
3. In combination with the trigger of a firearm, means for opposing the trigger movement with a force related to that of the trigger pull and a mounting for positioning said means clear of the trigger in its first range of movement and engageable by the trigger immediately following "let-off".
4. A trigger pull compensating device, comprising an externally screw-threaded casing, a spring in said casing, a trigger engageable plunger operating in said casing and tensioned by said spring and a screw seat engageable by said externally screw-threaded casing for supporting said casing with the plunger in position for combination with a trigger and means for variably tensioning said plunger without altering the relation of the same to the trigger and independently of the setting of the casing in the screw seat aforesaid.
5. A trigger pull compensating device, comprising a spring barrel, means for positioning the same in respect to a trigger, a trigger engageable plunger operable in said barrel, a spring in the barrel operating on said plunger, a screw plug in the barrel for variably tensioning said spring, said positioning means including a screw seat and said spring barrel being externally screw-threaded and adjustably engaged in said screw seat.
6. A trigger pull compensator, comprising in combination, an externally screw-threaded spring barrel having a head at one end with an opening therethrough, said barrel being internally screw-threaded at the opposite end, a screw plug adjustable in said opposite end and having

a central guide opening, a plunger having a button portion protruding through said opening in the head end of the barrel and having a stem operable in the guide opening in the screw plug, 5 a stop shoulder on said plunger within the barrel, a spring in the barrel interposed between said stop shoulder and said screw plug and a screw seat for supporting said barrel with the protruding button portion of the spring pressed 10 plunger in properly associated relation with the trigger of a firearm.

7. A trigger pull compensator, comprising in combination, an externally screw-threaded spring barrel having a head at one end with an 15 opening therethrough, said barrel being internally screw-threaded at the opposite end, a screw plug adjustable in said opposite end and having a central guide opening, a plunger having a button portion protruding through said opening in 20 the head end of the barrel and having a stem operable in the guide opening in the screw plug, a stop shoulder on said plunger within the barrel, a spring in the barrel interposed between said stop shoulder and said screw plug, a screw seat 25 for supporting said barrel with the protruding button portion of the spring pressed plunger in properly associated relation with the trigger of a firearm, said head portion of the barrel being exposed to enable turning of the barrel in the 30 screw seat and a lock nut on the externally threaded barrel for securing the same in adjusted relation in the screw seat.

8. In combination with the trigger action of a firearm, a trigger loading device tensioned to 35 approximately compensate the trigger pull the instant after "let-off", means for rendering said compensating device effective only after "let-off", said device including a member acting on the trigger and repressible thereby, a compensating spring acting on said member to oppose hammer releasing movement of the trigger, a floating abutment for said spring carried by said member and a stop positioned for engagement by said floating abutment after predetermined movement 40 of said member effected by the trigger.

9. In combination with the trigger action of a firearm, a trigger loading device tensioned to approximately compensate the trigger pull the instant after "let-off", means for rendering said 45 compensating device effective only after "let-

off", said device including a member acting on the trigger and repressible thereby, a compensating spring acting on said member to oppose hammer releasing movement of the trigger, a floating abutment for said spring carried by said member, a stop positioned for engagement by said floating abutment after predetermined movement of said member effected by the trigger and spring means for yieldingly holding said member in cooperative engagement with the trigger during the preliminary movement necessary to bring the floating abutment into engagement with the stop aforesaid. 5

10. In combination with a trigger, a compensating member, spring means for holding said compensating member lightly engaged with the back of said trigger and means for applying a greater opposing spring force to the movement of said member at the end of a predetermined, preliminary travel of the same, including a second spring acting on said plunger, a loose abutment for said spring movable with the plunger and a relatively fixed abutment engageable by said spring abutment in the course of movement of said plunger. 10

11. In combination with a trigger, a compensating member, spring means for holding said compensating member lightly engaged with the back of said trigger, spring means for applying a greater opposing spring force to the movement of said member at the end of a predetermined, preliminary travel of the same and including devices for adjustably predetermining said lesser and greater spring forces, a loose abutment for the second spring means movable with the plunger and a stationary abutment engageable by said loose spring abutment in the course of travel of said abutment. 20

12. A trigger pull compensating device for a firearm, comprising a spring barrel externally 30 screw-threaded for cooperating with similar screw threads on said firearm adjacent the trigger whereby said device may be adjustably mounted, a trigger engageable plunger operable in said barrel, a spring in said barrel operating 35 on said plunger and means in said barrel for variably tensioning said spring whereby operation of the trigger may be affected. 40