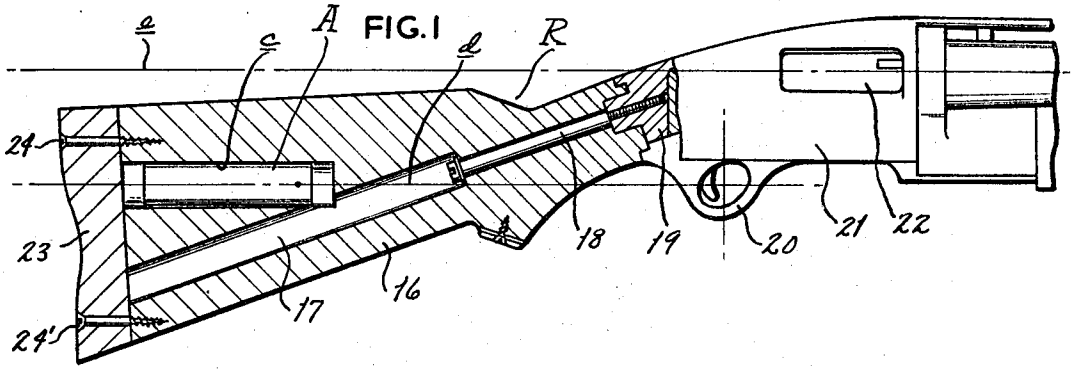
May 7, 1968 J. B. EDWARDS 3,381,405

FIREARM RECOIL REDUCER

Filed Sept. 22, 1966

FIG. 1



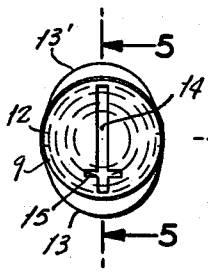
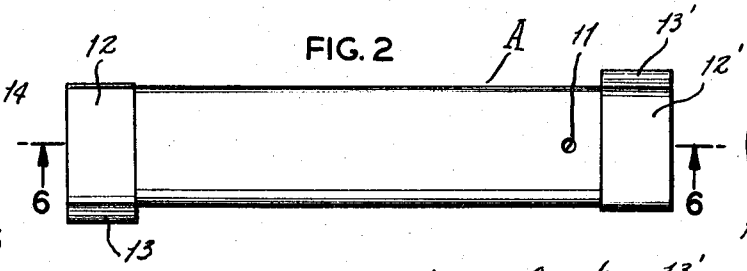


FIG. 3

FIG. 2



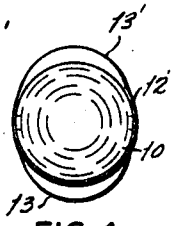


FIG. 4

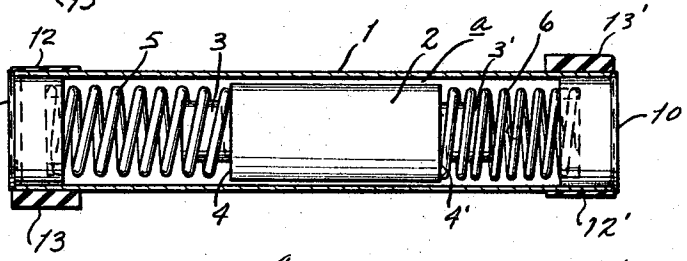


FIG. 5

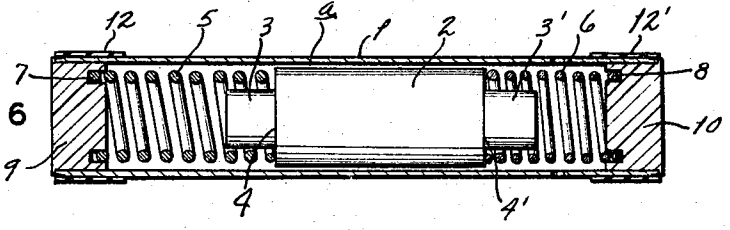


FIG. 6

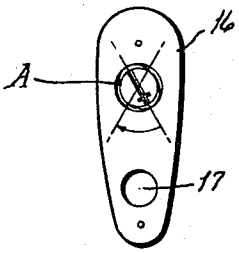


FIG. 7

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FIREARM RECOIL REDUCER

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Continuation-in-part of application Ser. No. 454,435, May 10, 1965. This application Sept. 22, 1966, Ser. No. 581,203

7 Claims. (Cl. 42—74)

ABSTRACT OF THE DISCLOSURE

A recoil reducing device for a firearm utilizing a hollow-sleeve removably disposed in a chamber in the stock of a firearm and having a piston slidably received within the sleeve with a spring on either side of the piston and bearing thereagainst; there being lugs projecting from said sleeve for proper spacing and balancing of the device within the chamber.

This invention relates in general to firearms and, more particularly, to a mechanism for installation within existing firearms for reducing recoil upon firing thereof.

This application is a continuation-in-part of my copending application Ser. No. 454,435, filed May 10, 1965, now Patent No. 3,290,815 entitled, Firearm Recoil Reducer.

It is an object of the present invention to provide a recoil reducer constituting a discrete unit for disposition within a firearm, rearwardly of the breech, for substantially eliminating recoil upon firing with the attendant undesirable effects. Heretofore, various efforts have been expended to develop firearms which embody recoil reducing means which latter thus constitute an integral part of the firearm. The present invention provides an independent comprehensive device for reception within conventional firearms.

It is another object of the present invention to provide a recoil reducer of the type stated which is adapted for facile installation within the stock of substantially any type of rifle, shotgun, submachine gun, or the like, without necessitating a costly modification thereof or reduction in the effective operation of the same; such installation being readily effected by the average firearm user.

It is a further object of the present invention to provide a recoil reducer of the type stated which is adapted for reception within a compartment formed within the stock of a firearm and which embodies unique means allowing for adjustment within such compartment so as to compensate for any individual peculiarities in the construction of the firearm to assure substantial recoil elimination.

It is another object of the present invention to provide a recoil reducer of the type stated which embodies elements for proper adjusted disposition of the reducer within its related firearm, the relative location of said elements being radially determined by the shooter, whether left-handed or right-handed.

It is another object of the present invention to provide a recoil reducer which may be most economically manufactured, being comprised of relatively few parts, all of which are simple in construction; which is extremely durable and reliable in usage; and which, through its simplicity of construction, is adapted for longevity of usage so that replacement or repair is substantially unnecessary.

Other objects and details of the invention will be apparent from the following description when read in connection with the accompanying drawing (one sheet) wherein:

FIGURE 1 is a fragmentary longitudinal view in partial vertical section of the breech and stock portion of a rifle or shotgun incorporating a firearm recoil reducer constructed in accordance with and embodying the present invention.

FIGURE 2 is a side view of the recoil reducer.

FIGURE 3 is an end view of the recoil reducer as viewed from the left end side of FIGURE 2.

FIGURE 4 is an end view of the recoil reducer as viewed from the right hand side of FIGURE 2.

FIGURE 5 is a vertical transverse sectional view taken on the line 5—5 of FIGURE 3.

FIGURE 6 is a transverse horizontal sectional view taken on the line 6—6 of FIGURE 2.

FIGURE 7 is an end view of the stock of the firearm in FIGURE 1 with the butt plate removed.

Referring now by reference characters to the drawing which illustrates the preferred embodiment of the present invention, A generally designates a firearm recoil reducing mechanism comprising a cylindrical sleeve or tubular casing **1**, fabricated of suitable lightweight, durable metal, such as aluminum, within which sleeve there is disposed for axial, slideable movement therein a cylindrical piston **2**, of relatively heavy weight with respect to the weight of sleeve **1** and having an outside diameter slightly less than the inside diameter of sleeve **1** for providing a circumferential air passage therebetween as indicated at *a*. Integrally formed, and coaxial, with piston **2** are extensions **3**, **3'** which project from each end face of piston **2**, being of circular cross-section and of reduced diameter relative to piston **2** so as to define therewith an annular shoulder **4**, **4'**, respectively. Bearing against each shoulder **4**, **4'** are the inner ends of compression springs **5**, **6**, respectively, with the portions thereof adjacent their inner ends being in surrounding relationship to the proximate extension **3**, **3'** which thus serve as spring guides. The inside diameter of springs **5**, **6** are greater than the diameter of the extensions **3**, **3'**. The outer ends of springs **5**, **6** are received within annular recesses **7**, **8**, respectively, formed in the inner face of end closures **9**, **10**, respectively, fixedly received within the opposite ends of sleeve **1**. The cross section of recesses **7**, **8** is substantially equal to the outside diameter of the coil springs **5**, **6** so that the latter are received snugly therein thereby preventing any noise or rattle, as well as assuring stable engagement of the springs for preventing undesired shifting. Furthermore, said recesses serve to bring about a relative reduction in the over-all length of mechanism A to facilitate installation. Each of said end closures is provided with marginal flange or bead which is rolled onto casing **1**, so as to bring about a unified construction between said end closures **9**, **10** and casing **1**. End closures **9**, **10** thus serve as bearing plates for the related spring **5**, **6**. It will be seen that by means of the piston extensions **3**, **3'** and the annular recesses **7**, **8** in end closures **9**, **10**, respectively, compression springs **5**, **6** are restrained against inadvertent axial displacement or shifting so that the same are thus adapted to reliably operate, that is, expand and contract, along their longitudinal axes which coincide with that of piston **2**, thereby assuring of efficient operation of mechanism A in a manner to be described hereinbelow.

Mounted surroundingly of each end portion of mechanism A radially outwardly is a collar **12**, **12'** formed as of plastic or other like material having limited resiliency and being suitably affixed to the confronting outer face portion of sleeve **1** as against undesired rotatable or axially shiftable movement. Each collar **12**, **12'** incoporates a relatively thickened segmental portion defining a lug, as at **13**, **13'**, respectively, which is formed on an arc of approximately 90 degrees. The said lugs **13**, **13'** project from opposite sides of sleeve **1** being in diametrally

opposed relationship, with the center thereof being at a mutual angle of 180°.

The outer face of end closure 9 (FIGURE 3) is provided with a diametrally extending recess 14 of appropriate depth and transverse extent for accommodating a screw driver. Intersecting said recess 14 approximate one of its ends in a relatively short and shallower recess 15 for visual indicator purposes as shown below.

In usage, recoil reducing mechanism A is received within a substantially complementarily formed compartment *c* drilled or otherwise provided within the normally wooden stock 16 of a firearm, such as a rifle, shotgun, or the like, as indicated generally at R; said compartment *c* being formed on an axis, indicated at *d*, parallel to the axis, designated *e*, of the bore within the barrel (not shown) of firearm R. The inner portion of compartment *c* may open within the drawbolt opening 17 normally formed within the stock of a firearm for receiving at its inner end the head of the customary toggle or drawbolt 18 whereby the stock 16 is engaged to the receiver or frame 19 for integrating the stock with the operative parts of firearm R including trigger guard 20, cartridge chamber 21, and gas ejector 22. Compartment *c* will have a length slightly greater than that of mechanism A and be of such diameter so as to accommodate lugs 13, 13'.

The outer end of compartment *c*, just as drawbolt opening 17, is closed by butt plate 23 which is secured to stock 16 as by screws 24, 24'.

With recoil reducing mechanism A inserted within compartment *c* (see FIGURE 1) and with butt plate 23 mounted in closing position, the shooter or rifleman is then free to fire firearm R with a sense of assurance that the theretofore customarily experienced strong recoil has been substantially eliminated. It appears that upon firing of firearm R, the initial and subsequent or secondary recoils are translated through receiver 19 and stock 16 acting upon and being received by piston 2, which latter is driven rearwardly against spring 5 to place same under stress; it being recognized that the said piston 2, by reason of the disposition of mechanism A, will travel in a direction axially parallel to the direction of recoil so that the energy thereof is substantially absorbed by spring 5. Piston 2 will be returned forwardly by unloading of spring 5 and thereby cause a compression of spring 6. Air being driven forwardly by piston 2 will be vented through openings 11 and piston 2 will be forced rearwardly upon subsequent unloading of spring 6 so that reciprocal movement of piston 2 axially of sleeve 1 will continue until springs 5 and 6 have dissipated the energy of recoil. The importance of the provision of air passage *a* becomes all the more evident since without such there could be a freezing of piston 2 within sleeve 1 resulting in a total failure of operation.

As indicated above, extensions 3, 3' and annular recesses 7, 8 assure of axial travel of piston 2 during energy-absorbing action being thereby restrained against inadvertent friction-producing engagement with the inner face of sleeve 1. It may be further stated at this juncture that the said extensions 3, 3' and annular recesses 7, 8 also facilitate ready assembly of mechanism A.

The use of the present invention will prevent the incidence of painful bruises and even numbing by the user, which injurious conditions have been heretofore accepted by riflemen, marksmen, and the like as a risk associated with riflery. Furthermore, the present invention will substantially obviate firearm "jumping" so that users may enjoy the same accuracy upon a second firing as in the preceding firing, wherein rapid fire is undertaken.

When mechanism A is installed within compartment *c*, lugs 13, 13', being diametrally opposed to each other, will assure of appropriate disposition of mechanism A within such compartment *c* as the same serve as spacers, as well as balancers. However, the inherent compressibility of lugs 13, 13', with such being a property of the material of construction thereof, assures of proper accommodation

of mechanism A within its compartment regardless of any imperfections in the generally circular cross-sectional character thereof. Thus, if compartment *c* were of such nature as to tend toward being ovate in cross-section the said lugs 13, 13' would appropriately assure of snug reception of mechanism A therein. Furthermore, the said lugs provide an added cushioning effect so as to prevent any undue transmission of forces from mechanism A to stock 16 with resultant discomfort to the shooter. The user, by utilization of a screw driver, the working end of which is received within recess 14, may turn mechanism A about its longitudinal axis so as to dispose lugs 13, 13' at the desired angle for minimizing any undue sensations received by the shooter upon firing. It has been found that with right-handed shooters the location of lug 13 at a point generally within the arc between 0 and 180 degrees, as viewed in FIGURE 7, is desirable, and with left-handed shooters having a lug dispositioned within the arc of 180 degrees to 360 degrees. However, optimum positioning for right-handed shooters has been somewhere in the vicinity of 100 to 170 degrees and left-handed shooters within the arc of 190 to 260 degrees approximately. Accordingly, mechanism A by lugs 13, 13' allows a very fine degree of adjustment for assuring maximum comfort to the shooter.

In view of the foregoing, it is apparent that the provision of lugs 13, 13' assures positively of the proper positioning of mechanism A so as to protect the shooter. Said lugs 13, 13' compensate for any individual or peculiar imperfections in the compartment *c* so that the axis of mechanism A, indicated at *d*, will be parallel to the axis of the firearm as indicated at *e*, which is the axis of recoil. The parallelism of said axes is of criticality in the proper functioning of mechanism A and the provision of the unique lugs 13, 13' assure of the bringing about of the desired result.

Furthermore, due to the cushioning material of lugs 13, 13', the same will occasion no wear upon the interior wooden wall of compartment *c* so that through long usage, no "play" will develop. Shallow recess 15 serves as a visual indicator as to the relative location of lugs 13, 13' in adjusted positionment of mechanism, A, since said recess 15, as may best be seen in FIGURE 3, is substantially transversely aligned with said lugs 13, 13'.

It will be seen that recoil mechanisms constructed in accordance with the present invention may readily be installed in any existing type of firearm without requiring the skilled services of expert gunsmiths, but may be readily so installed by the average firearm user without costly modification of the particular firearm. Furthermore, as is evident from the foregoing, the recoil mechanism hereinabove described will permit comfortable, consistently accurate and reliable usage of substantially powerful firearms, obviating the various attendant unpleasant effects of recoil which currently have been considered as unavoidable conditions of firearm usage.

It will be appreciated that the springs utilized in the recoil reducers of the present invention may vary in length and specifications in accordance with the forces to be accommodated. It is quite conceivable that under certain circumstances a differential in length or strength of springs might be indicated. Additionally, it is, of course, apparent that the reducers of this invention are in air communication with the bores of the related stock, so that ready venting and replacement are easily effected. Although it has been shown herein preferable to locate the recoil reducers within the gun stocks, it is within the scope of this invention to comprehend the disposition of the same in other locations upon the firearm for absorbing the energies of recoil.

It should be understood that changes and modifications in the foregoing formation, construction, arrangement, and combination of the several parts of the firearm recoil reducer may be made and substituted for these herein shown and described without departing from the nature and principle of my invention.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. In combination with a firearm having a barrel, receiver, and stock integrated into fixed relationship so that no relative movement between the said firearm elements occur when firing, a recoil reducing mechanism disposed in said stock comprising means forming a sleeve, said mechanism disposed within said stock so that one end thereof is directed toward said receiver, a pair of radially projecting lugs being provided on the outer face of said sleeve, said lugs being disposed at opposite ends of said sleeve and on opposite sides thereof, a piston slideably received within said sleeve, resilient means provided in said sleeve for biasing said piston into centered relationship therein.

2. In combination with a firearm having a barrel, receiver and stock integrated into fixed relationship so that no relative movement between the said firearm elements occur when firing, a recoil reducing mechanism as defined in claim 1 and further characterized by said lugs being of arcuate character and disposed at an angle of 180 degrees to each other.

3. In combination with a firearm having a barrel, receiver and stock integrated into fixed relationship so that no relative movement between the said firearm elements occur when firing, a recoil reducing mechanism as defined in claim 2 and further characterized by said lugs being formed of compressible material, and one end closure being provided with a tool receiving recess in its outer end face for permitting adjustment of said mechanism about its axis within the firearm stock.

4. In combination with a firearm having a barrel, receiver, and stock integrated into fixed relationship so that no relative movement between the side firearm elements occur when firing, said stock having a cylindrical chamber, a recoil reducing mechanism disposed in said stock chamber and comprising means forming a sleeve, at least one radially projecting lug being provided on the outer face of said sleeve and being of such radial extent so as to contact the proximate portion of the wall of said chamber for spacing of said sleeve therefrom, a piston slideably received within said sleeve, and resilient means provided within said sleeve for biasing said piston into centered relationship therein.

5. In combination with a firearm having a barrel, receiver, and stock integrated into fixed relationship so that no relative movement between the said firearm elements occur when firing, said stock having a cylindrical chamber, a recoil reducing mechanism as defined in claim 4 and further characterized by said lug being formed of compressible material.

6. In combination with a firearm having a barrel, receiver, and stock integrated into fixed relationship so that no relative movement between the said firearm elements occur when firing, said stock having a cylindrical chamber, a recoil reducing mechanism as defined in claim 5 and further characterized by said lug being of segmental configuration.

7. In combination with a firearm having a barrel, receiver and stock integrated into fixed relationship so that no relative movement between the said firearm elements occur upon firing, a recoil reducing mechanism disposed in said stock comprising means forming a sleeve, a piston slideably received within said sleeve, resilient means provided in said sleeve at opposite ends of said piston for biasing same into centered relationship within said sleeve, closure means provided at opposite ends of said sleeve, and at least one radially projecting spacer lug being provided on the outer face of said sleeve.

References Cited

UNITED STATES PATENTS

1,379,989	5/1921	Johnson	42—74
1,867,708	7/1932	Paton	89—198
2,155,130	4/1939	Hanel	42—74
2,240,681	5/1941	Swartz	42—74
2,518,387	8/1950	Shaw	267—1
3,039,222	6/1962	Hoge	42—74
3,300,889	1/1967	Baker	42—74

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