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RECOIL DEVICE FOR A SHOULDER FIREARM

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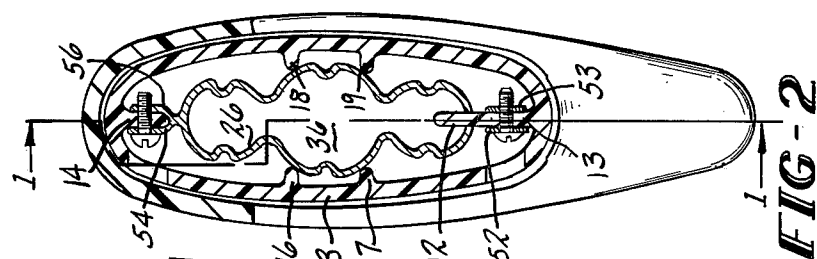


FIG-2

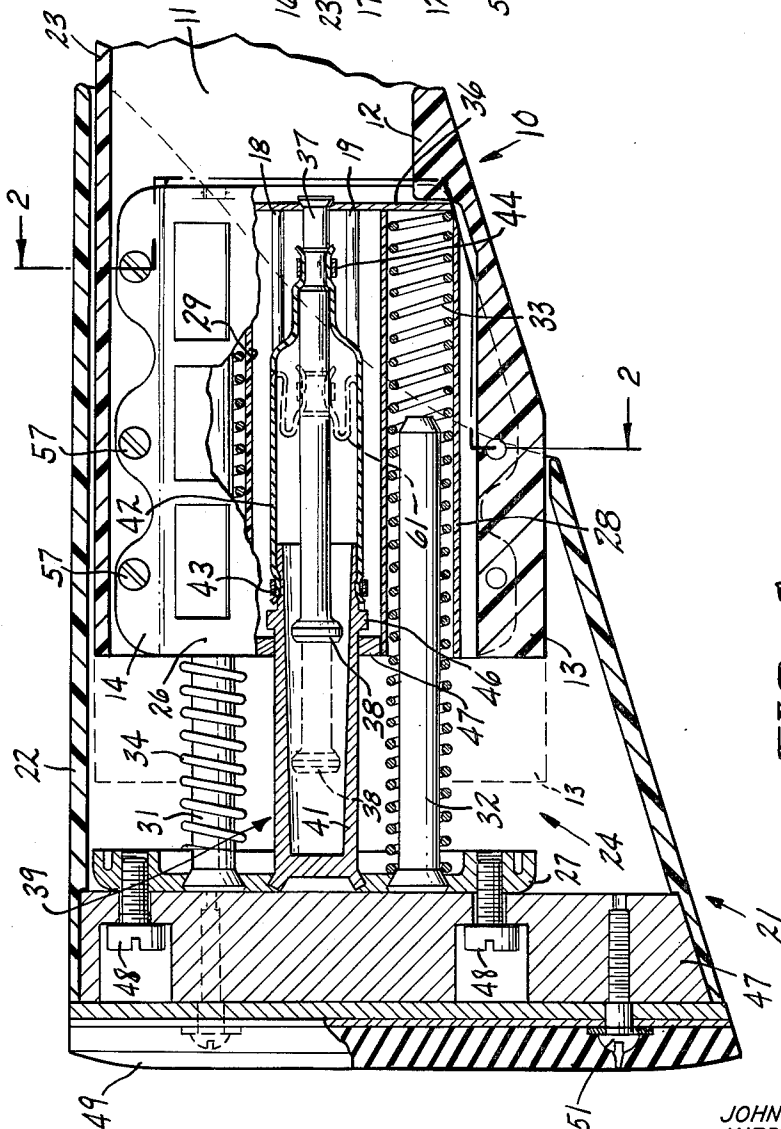


FIG-1

INVENTORS:
JOHN J. KUZMA
KIERAN D. DOYLE
BY *R. S. Thieckler*
ATTORNEY

1

3,209,482

RECOIL DEVICE FOR A SHOULDER FIREARM
John J. Kuzma, North Haven, and Kieran D. Doyle,
Wallingford, Conn., assignors to Olin Mathieson Chem-
ical Corporation, a corporation of Virginia
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7 Claims. (Cl. 42—74)

The present invention relates to firearms and relates in particular to a recoil device useful to buffer or damp the reaction experienced by a shooter upon firing a firearm.

Although the invention is not so limited its primary use falls within the class of firearms fired from the shoulder.

Another feature of the invention is the provision of a firearm butt stock and a cooperating telescoping butt plate-sleeve assembly.

A further feature of the invention is the provision of a novel buffer assembly.

A further feature of the invention is the provision of a novel structure useful to mount or fix a buffer assembly to a firearm butt stock at one end and to a butt plate at the other.

A further feature of the invention is the provision of a buffer assembly having a novel fluid-tight chamber structure.

A further feature of the invention is the provision of a buffer assembly in a recoil device of simple structure which readily lends itself to modern mass production methods.

A recoil device useful to buffer or damp the reaction experienced by a shooter and embracing certain principles of the present invention may comprise a firearm butt stock and a cooperating telescoping butt plate-sleeve assembly, said butt stock being formed with a cavity and at least two internal anchor rails, a buffer assembly including a housing and a relatively moveable head received within said butt stock, said housing being formed with rail engaging fins, fastening means for connecting the housing fins to mating anchor rails, and means for fastening the head to the butt plate-sleeve assembly so that upon firing the firearm the housing, by virtue of its connection with the butt stock and in response to recoil, is driven relative to the head.

A buffer assembly useful in said recoil device and embracing certain principles of the present invention may comprise a housing, a pair of spaced guide cylinders, a cooperating pair of reciprocating guide rods, spring means seated in the guide cylinders and encircling the guide rods for urging said guide rods out of said cylinders, and an intermediate fluid-tight chamber comprising a cylindrical metal portion and a contiguous flexible bladder portion, a reciprocating piston having a throttling head operative to reciprocate in said metallic cylinder, said flexible bladder making a fluid-tight connection to said piston and being operative to flex and follow said piston when the piston reciprocates within the metallic cylinder.

Other features and advantages of the present invention will become more apparent from an examination of the succeeding specification when read in conjunction with the appended drawings in which:

FIG. 1 is a vertical section of the rear end of a firearm stock illustrating a representative embodiment of the recoil device and buffer assembly of the present invention, and

FIG. 2 is a sectional view of FIG. 1 taken along the lines 2—2 and viewed in the direction shown.

Referring now in detail to the drawings the reference numeral 10 designates a firearm butt stock formed with a cavity 11, bottoming lug 12, anchor rails 13 and 14 and locating ribs 16, 17, 18 and 19.

The butt stock 10 is shown in telescoping relationship

2

with respect to a butt plate-sleeve assembly indicated generally by the reference numeral 21. A sleeve 22 of the assembly 21 is operative to receive oval shape side wall 23 of butt stock 10 so that wall 23 is free to move relative to sleeve 22 in a manner which will be described in more detail as the specification proceeds.

As is apparent from the hatching, the oval side wall 23 of the butt stock 10 including bottoming lug 12, anchor rails 13 and 14 and locating ribs 16 through 19 are all molded or formed integrally of plastic material.

Correspondingly, sleeve 22 is similarly fabricated.

It is not intended that the invention be limited to plastic material; however, it is apparent that modern molding techniques as well as modern processes for applying finishes make plastic materials a preferential structural element.

The butt plate-sleeve assembly 21 and the butt stock 10 are held in their normal position (the position shown in FIG. 1) by a connection provided between these members characterizing a buffer assembly 24.

The buffer assembly 24 includes a housing 26 fixed to the butt stock 10 and a cooperating head 27 fixed to the butt plate-sleeve assembly.

The housing 26 includes a pair of spaced guide cylinders 28 and 29 and a cooperating pair of reciprocating guide rods 31 and 32.

Coil springs 33 and 34 seated in mating guide cylinders and encircling cooperating guide rods are maintained under compressive stress and thus operate to urge the guide rods out of their guide cylinders.

Housing 26 includes a base plate 36 to which is riveted a piston 37; the piston 37 formed with a throttling head 38 is operative to reciprocate within a cylinder 39.

The cylinder 39 comprises a metal portion 41 rigidly fixed to head 27 and a contiguous flexible bladder 42 making a fluid-tight connection with the cylinder 41 as at 43 and making a corresponding fluid-tight seal at a point where the bladder 42 is fixed to the piston 37 as indicated by the reference numeral 44.

Cylinder 39, specifically metal portion 41, is fabricated to provide a tapering cavity. The internal diameter of the cylinder 41 is larger at the right end and tapers to a smaller diameter at the left as viewed in FIG. 1. Thus head 38, which is of a fixed diameter, will experience a changing (narrowing) clearance as it moves into the cylinder cavity to develop a throttling effect.

The exterior surface of the metallic cylinder 41 is formed with a collar 46 which cooperates with a mating collar 47 formed on the housing to retain the butt stock 10 and the butt plate-sleeve assembly 21 in the position shown in FIG. 1 in response to the urging of springs 33 and 34.

Head 27 is fixed to butt plate 47 by screws 48.

If desired, a recoil pad or other plate 49 may be secured to the butt plate 47 by suitable means such as screws 51—51 (only one shown).

By way of review it is apparent that the head 27, guide rods 31 and 32 and fluid-tight chamber 39 are all fixed to the butt plate-sleeve assembly while the housing 26 and piston 37 are fixed to butt stock 10.

Note that housing 26 is formed with opposed pairs of rail engaging fins 52, 53, 54 and 56 formed with a roughened surface effective to develop friction.

Mating pairs of fins, such as the fins 52 and 53 are operative to straddle a cooperating anchor rail 13. The fins are fixed to the anchor rails by suitable screws or rivets indicated by the reference numeral 57.

The recoil device and buffer assembly of the present invention operates in the following fashion:

Assume that the fluid-tight chamber 39 contains a quantity of hydraulic fluid and is disposed in a position shown in FIG. 1.

Assume further that the butt plate-sleeve assembly 27 is being held firmly against a shooter's shoulder and that the butt stock 10 is rigidly fixed to a firearm, such as a shotgun, grasped by the shooter.

Upon firing the firearm normal recoil of the butt stock 10 and its connected barrel and receiver will drive the butt stock 10 rearwardly towards the shooter's shoulder causing the oval side wall 23 to move telescopically further into the sleeve 22 from the solid line position to the dotted line position shown in FIG. 1.

Upon this occurrence hydraulic fluid within the metallic cylinder 41 flows past throttling head 38 into the portion of the chamber to the right of the throttling head as viewed in FIG. 1.

Since the bladder portion of the fluid-tight chamber 39 is flexible and fixed to piston 37, the bladder is free to flex to form a wrinkle or return bend tuck evidenced by the dotted lines labeled 61 in FIG. 1.

Thus, the compressive resistance of springs 33 and 34 in combination with the throttling effect of throttling head 38 of piston 37 operate to buffer or damp recoil of butt stock 10 including the connected receiver and barrel (not shown) of the firearm effective to dissipate the energy of recoil. The thrust that would otherwise develop and be transmitted to the shooter's shoulder is reduced.

It is anticipated that the fluid-tight chamber 39 may be filled to varying levels with a wide variety of hydraulic fluids or gases and the bladder 42 fabricated of numerous flexible materials without departing from the spirit and scope of the present invention.

What is claimed is:

1. A recoil device useful to buffer or damp the reaction experienced by a shooter upon firing a shoulder firearm comprising a firearm butt stock and a cooperating telescoping butt plate-sleeve assembly, said butt stock being formed with a cavity and at least two internal anchor rails, a buffer assembly including a housing and a relatively moveable head received within said butt stock, said housing being formed with rail engaging fins, fastening means for connecting the housing fins to mating anchor rails, and

means for fastening the head to the butt plate-sleeve assembly so that upon firing the firearm the housing by virtue of its connection with the butt stock and in response to recoil is driven relative to said head.

2. The device of claim 1 above wherein the anchor rails are disposed generally parallel to the longitudinal axis of the butt stock and the fins of the housing are arranged in pairs to define channels operative to straddle corresponding rails.

3. The device of claim 1 wherein the butt stock is formed at least two opposed longitudinal ribs operative to locate the buffer assembly within the butt stock and to strengthen the butt stock against hoop stress tending to collapse the butt stock inwardly.

4. The recoil device of claim 1 wherein the fins are formed with a roughened surface effective to develop friction between the anchor rails and mating fins.

5. The recoil device of claim 1 wherein the interior of the butt stock is formed with a bottoming lug operative to provide a seat for the buffer assembly.

6. A buffer assembly comprising a housing, a pair of spaced guide cylinders, a cooperating pair of reciprocating guide rods, spring means seated in the guide cylinders and encircling the guide rods for urging said guide rods out of said cylinders, an intermediate fluid-tight chamber comprising a cylindrical metal portion and a contiguous flexible bladder portion, a reciprocating piston having a throttling head operative to reciprocate in said metallic cylinder, said flexible bladder making a fluid-tight connection to said piston and being operative to flex and follow said piston when said piston reciprocates within the metallic cylinder.

7. The buffer assembly of claim 6 in which the metallic cylinder is formed with a tapering internal diameter so as to provide a narrowing clearance between the throttling head and the cylinder as the piston moves into the cylinder.

No references cited.

40 BENJAMIN A. BORCHELT, *Primary Examiner*.