

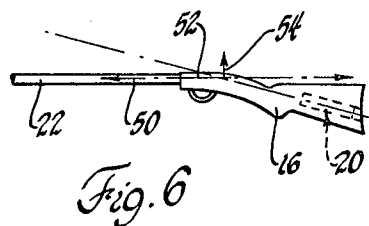
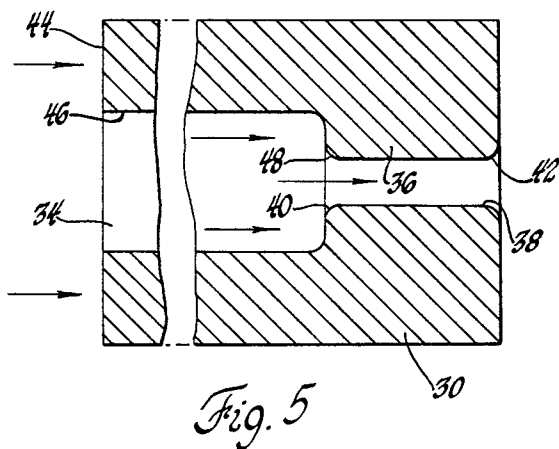
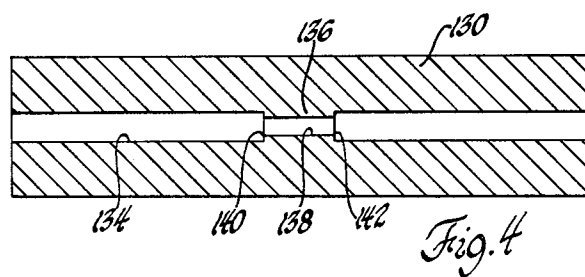
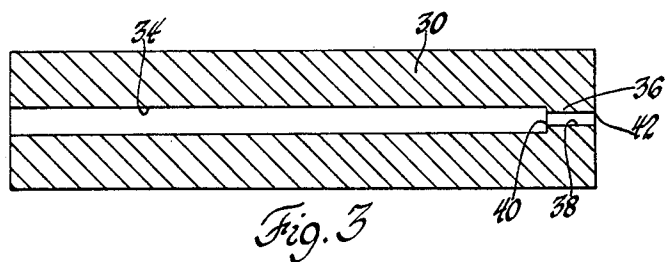
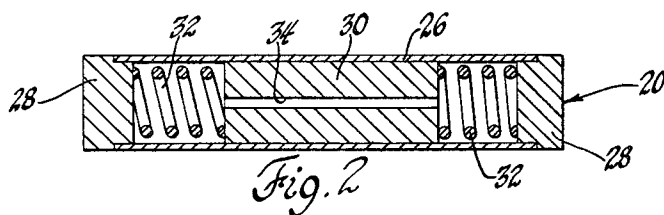
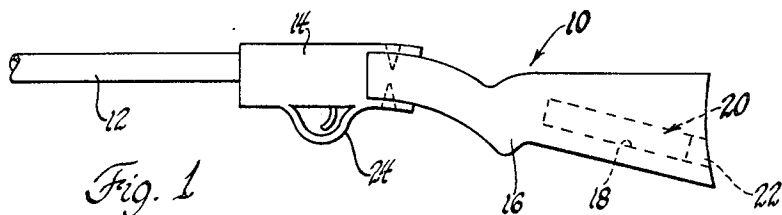
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S. C. BAKER

3,408,062

RECOIL SNUBBING DEVICE

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INVENTOR

Stephen C. Baker

BY

Dale A. Winnie

ATTORNEY

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3,408,062

RECOIL SNUBBING DEVICE

Stephen C. Baker, Detroit, Mich., assignor to Su-Ev, Inc.,
Birmingham, Mich., a corporation of Michigan

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ABSTRACT OF THE DISCLOSURE

A shock-absorbing device and system for use in a gun barrel stock, including a cylindrical tube closed at opposite ends, having a cylindrical mass lightly biased in centered relation therewithin, an axial bleed hole through the mass, a restricted orifice in the bleed hole, and intended to be inclined at an angle as disposed within the stock of a gun.

This invention relates to fire arms in general and, more particularly, to rifles, shotguns and like fire arms used in hunting, skeet and trap shooting or the like.

The recoil or kick incident to firing shotguns and like small arms is an age old and universal problem. Matching the shot or load to the weight of the gun, padding and cutting the stock or frame, and numerous accessory devices have been tried without much success.

It is generally accepted that the recoil effect can be controlled to some extent in the gun construction. Stock length, drop and pitch are all due consideration. High comb roll-over check pieces, oversized pistol grips and beavertail forearms are all useful when used in a way to give better weight and balance to the gun. However, in almost all instances, and no matter what is used, the instructions given in firing a gun are to lean into it and hold it secure against the shoulder.

This invention is directed principally to a means for absorbing recoil. However, its use also requires an understanding of how it may serve this purpose most effectively. Accordingly, the following description of a preferred embodiment of the invention will help most to understand and appreciate its objects and advantages.

Referring to the drawing:

FIGURE 1 is a side elevation of a gun having the recoil snubbing device of this invention incorporated therein.

FIGURE 2 is a longitudinal cross-sectioned view of the device itself.

FIGURE 3 is an enlarged longitudinal cross-sectioned view of a part of the device shown in the previous drawing figure.

FIGURE 4 is similar to the last mentioned drawing figure and shows a modification.

FIGURE 5 is a considerably enlarged cross-sectioned detail of the part shown by FIGURE 3.

FIGURE 6 is a schematic of a gun with force vectors shown thereon.

The gun 10 is shown to include a barrel 12 on a frame 14 and secured to the stock 16. Within the stock is a bore 18 and within this bore is the recoil snubbing device 20 of this invention. It is made close fitting for the bore hole and is bottomed in the bore hole and held by a suitable end closure on plug 22.

It will be noted that the bore hole 18, and consequently the snubbing device 20, is at an angle relative to the gun barrel 12 and that the angle of ascent is over the gun holding position under the stock and near the trigger mechanism 24.

The snubbing device 20 includes a cylindrical or tubular part 26, closed at both ends by suitable closure members 28. These are to provide a relatively air tight chamber within the cylindrical body part 26. This air tightness is further obtained in the disposition of the whole device

in the bore hole 18 of the stock of the gun, as previously mentioned.

Within the cylindrical body part 26 is a weighted member 30, cylindrical in shape and closely fitted in the body part but reciprocal between the ends thereof. It is centered by light springs 32, one at each end, engaging it and the closure members 28.

A small bore hole is provided centrally through the weighted member 30 and this affords a means for air trapped in one or the other ends thereof to pass to the other end when the weighted member moves relatively in one direction or the other.

Referring to FIGURE 3, the bore hole 34 through the weighted member 30 is not of the same size throughout its full length. It includes a restriction 36 near one end forming a smaller bore hole passage 38 and entrance and exit orifices 40 and 42 at opposite ends. These orifices serve first in one capacity, as entrance or exit orifices, and then in the other as the weighted member 30 moves first in one direction and then the other, as later described.

In FIGURE 4, the weighted member is identified as 130 to distinguish it from the other weighted member and in view of the modifications it includes. The bore hole 134 in it is interrupted by a restriction 136 centrally thereof to provide a smaller bore hole passage 138 with entrance and exit orifices 140 and 142 on opposite sides thereof.

The major advantage in use of the snubbing device 20 with the gun 10 is obtained with use of either of the weighted members 30 or 130.

When the gun 10 is fired, the rearward thrust motivates the stock 16 and the body part 26 of the snubbing device also rearwardly. However, the weighted member has an inertial resistance to such movement. Besides this initial inertial resistance, there is a pressure head built up as it moves relatively towards the closure member at the leading end thereof. This head provides a damping effect which builds in proportion to the shock load and is relieved as the entrapped air bleeds through the bore hole in the weighted member. There is also a negative pressure at the trailing end of the weighted member both resisting its movement and drawing the entrapped air through the bore hole from the other end.

The damping and cushioning effect on the gun is obvious.

Aside from what is at first obvious, however, is the advantage gained by the angular disposition at which the snubbing device is provided and the use of a restriction in the bore hole through the weighted member.

Taking the restrictions first, reference should be made to FIGURE 5.

With the weighted member 30, the restriction 36 is provided farthest from the gun barrel 12. The smaller annular wall 44 about the larger bore hole 34 at the leading end first acts to compress the air at that end and affords a larger orifice 46 for the escape of air. The inner annular wall 48 formed by the restriction also acts to compress the air but different volumes of air are involved. The density of the air is greater under pressure and the entrance losses at the orifices 46 and 40 differ. There is also an exit loss at the orifice 42.

The entrance losses at orifices 46 and 40, with the exit loss at orifice 42 prove to be greater than in the reverse situation; that is, turning the weighted member end-for-end, or in its return effort. The result is a greater cushioning effect when the weighted member is disposed as shown and less reaction when it seeks to regain its centered position in the cylindrical body part 26.

A like but lesser advantage is obtained with the weighted member 130 since the advantage of the spaced restriction is still obtained but the entrance and exit losses are balanced in having like orifices at each end.

The angular disposition of the snubbing device 20 in

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the gun stock 16 should be such as produces the following result.

Looking at FIGURE 6, it will be seen that the recoil force is in an axial line rearwardly relative to the gun barrel 12. This is normally over the stock 16 to enable sighting down the barrel. Assuming that the gun is held tight against one's shoulder, the more one leans into the gun the higher the principal point of contact with the stock and the less the movement force over this point; which is the pivotal point for recoil when the gun is held in accord with usual instructions.

The moment force can not be eliminated because it passes over the stock; it can only be minimized. This, of course, reduces the muzzle whip or kick of the barrel normally experienced.

The center of gravity for most guns is well forward on the frame 14 and in this instance has been designated as at 50.

It will be appreciated that the angle at which the snubbing device 20 is disposed points it over the weight center of the gun. In this particular instance it is also over the rearmost hand-holding position for the gun.

Now then, with assurance that the snubbing device will absorb the major part of the recoil, which it does, the gun may be held lighter against the shoulder and the true center of gravity for the gun is allowed to be more nearly its pivotal point. Under these conditions, the recoil snubbing effort acts in part to resist recoil, as by vector line 52, and in part as a vertical movement force, represented by vector line 54, which is counteracting to the kick normally experienced in firing a gun.

A snubbing device mounted in the stock parallel to the barrel will reduce the recoil shock but has a movement increasing effect as regards kick. When disposed at an angle but held tight against the shoulder, the full advantages are still not obtained. Similarly when disposed straight in the stock, and the gun is held lightly, a noticeable kick is still present, though recoil is less.

However, both experienced shooters able to shift the pivot point forward closer to the weight center of the gun, and inexperienced shooters not anticipating and fearing the recoil, and consequently holding the gun easier, are able to experience the full advantages of the recoil device of this invention installed in accord with the teachings set forth.

I claim:

1. A shock absorbing device, comprising;
a tubular member having a weighted cylindrical member provided therein for close fitted axial aligned reciprocal movement between the ends thereof,
means for centering said cylindrical member and for closing the ends of said tubular member,
means for mounting said tubular member for shock loading longitudinally thereof,
and an air bleed hole provided axially through said cylindrical member and including a restriction between the ends thereof.

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2. The shock absorber device of claim 1, said air bleed hole including different size passageways joined in said cylindrical member between the ends thereof.

3. The shock absorber device of claim 2, said restriction being provided at the junction of said different size passageways.

4. The shock absorber device of claim 2, said restriction being provided by the junction of said different size passageways.

5. The shock absorber device of claim 1, said restriction being provided closer to one end than the other of said air bleed hole.

6. The shock absorber device of claim 2, said passageways being joined closer to one end than the other of said air bleed hole and providing said restriction at their junction.

7. The shock absorber device of claim 2, the smaller of said passageways being provided centrally within said bleed hole and forming said restriction itself and at its junction with the larger of said passageways.

8. A recoil shock absorbing device for use with guns having a stock and a barrel supporting receiver engaged thereto, and comprising;

a bore provided in said stock at an angle to said receiver and the gun barrel supported thereby,
a tubular member closed at both ends and having a weighted cylindrical member provided for close fitting reciprocal movement therein,
soft yielding means for centering said cylindrical member in said tubular member,
an air bleed hole provided centrally through said cylindrical member and including axially aligned and connecting passageways of different sizes, and the larger of said passageways being disposed towards said receiver with said tubular member disposed for use in said gun stock bore.

9. The recoil shock absorbing device of claim 8, said gun stock bore being provided at an angle disposing the axial line thereof relatively over the pivotal center of said gun for simultaneous recoil shock absorption and muzzle whip resistance in the vectorial division of the forces acting on said cylindrical member in the firing of the gun.

References Cited

UNITED STATES PATENTS

837,601	12/1906	Behr	42—74
1,783,348	12/1930	Taylor	267—1
3,290,815	12/1966	Edwards	42—74
3,300,889	1/1967	Baker	42—74

ARTHUR L. LA POINT, *Primary Examiner.*

R. M. WOHLFARTH, *Assistant Examiner.*