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R. H. S. HUGHES

2,212,683

CONTROL FOR RECOIL

Filed Jan. 19, 1937

FIG. 1.

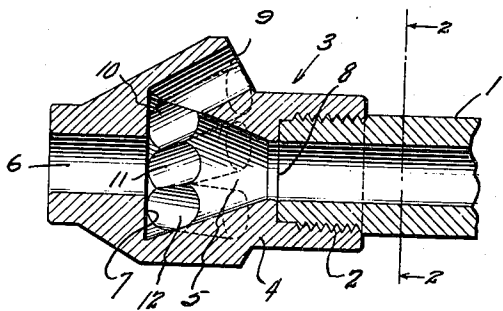


FIG. 2.

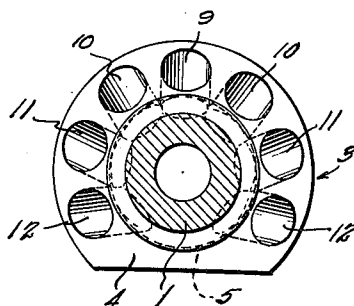


FIG. 3.

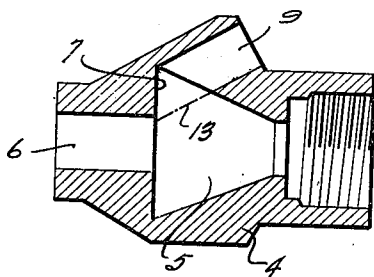


FIG. 4.

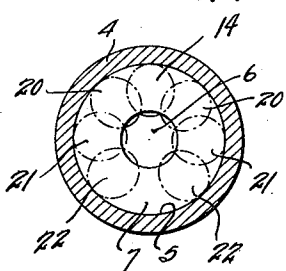
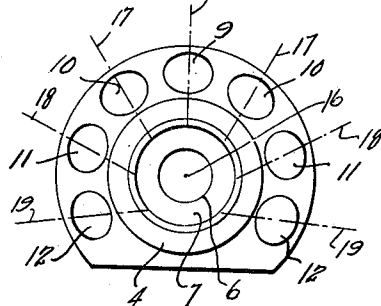


FIG. 5.



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UNITED STATES PATENT OFFICE

2,212,683

CONTROL FOR RECOIL

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6 Claims. (Cl. 89—14)

My invention relates to a recoil control mechanism, and it is of particular use in connection with the control of recoil of firearms such as cannon, shot guns, pistols, rifles, and so forth.

This application is an improvement upon my copending applications Serial Nos. 39,492, filed September 6, 1935 and 58,574, filed January 10, 1936.

In recoil mechanisms it is desirable that the port area be as large as possible, preserving strength. Moreover it is desirable that the maximum reaction surface on the gas shoulder in the gas chamber be in line and covered by the projected port areas.

It is an object of my invention to provide for a large port area for release of reaction forces without the ports running into each other, and to provide such a structure with great strength and neatness in appearance.

Another object of the invention is to provide a maximum reaction area in the gas shoulder without overlapping of projected port areas on the shoulders.

The best reaction effects are obtained when there is but slight overlap of projected port areas on the gas shoulder.

Yet another object of the invention is to provide a construction in which the interfering reaction of the ports one with the other is greatly minimized.

With these and other objects in view, which may be incident to my improvements, the invention consists in the parts and combinations to be hereinafter set forth and claimed, with the understanding that the several necessary elements comprising my invention may be varied in construction, proportions and arrangements, without departing from the spirit and scope of the appended claims.

In order to make my invention more clearly understood, I have shown in the accompanying drawing means for carrying the same into practical effect without limiting the improvements in their useful applications to the particular constructions which, for the purpose of explanation, have been made the subject of illustration.

In the drawing:

Figure 1 is a cross sectional view taken through the longitudinal axis of my recoil mechanism;

Fig. 2 is a view taken along the line 2—2 of Figure 1, looking in the direction of the arrows;

Fig. 3 is a diagrammatic sectional view of my recoil mechanism showing how the projected port area falls on the gas shoulder;

Fig. 4 is a diagrammatic view showing the pro-

jected port areas on the gas shoulder taken from a view looking directly at the gas shoulder;

Fig. 5 is a diagrammatic view showing the position of the axes of the bores of the ports with respect to the axis of the bore of the firearm.

Referring to the drawing, I have shown a firearm having a barrel 1, which is provided with screw threads 2, on which is screwed a recoil control device which I have generally indicated by the numeral 3. The recoil control device comprises a body 4, a gas chamber 5 and a gas seal 6.

The gas chamber 5 is frusto-conical in shape and terminates at its forward end in a gas shoulder 7. The periphery of the gas shoulder is constructed to substantially coincide with the base of the cone of expanding gases from the muzzle of the firearm. The end of the muzzle I have indicated by the numeral 8.

Rearwardly directed gas ports are provided around the top, the sides and a portion of the bottom of my recoil mechanism. The top gas port I have indicated by the numeral 9, and there are pairs of complemental gas ports 10, 11 and 12. These gas ports are so arranged that their inner ends lie adjacent the gas shoulder and the prolongation of the outer sides of the ports substantially coincide with the periphery of the gas shoulder.

It will be apparent for instance that the port 9 (see Fig. 3) when its area is projected, as indicated by dotted line 13, will form an area 14 (see Fig. 4) which substantially lies wholly on the gas shoulder. In practice a slight overlap is permissible at the inside of this area, the projected area of the port in part lapping over the gas seal 6. The gas seal 6 is slightly larger than the diameter of the bullet and the gas shoulder and gas seal with the bullet in it provide for an area of reaction which will permit the gases in the gas chamber to expand rearwardly to eliminate recoil. The climb of the firearm is minimized by not having the gas ports extend all the way along the lower side of the recoil device 3.

The axis of the bore of port 9, as indicated by line 15, may substantially cross the axis of the bore of the firearm, which axis I have indicated by the numeral 16. The axes 17 of the pair of complemental ports 10 which are similarly skewed do not cross the axis 16 of the bore of the firearm. Similarly the axes 18 of the complemental pair of ports 11, which are similarly formed, do not cross the axis 16 of the bore of the firearm.

It is to be noted that the axes 18 in their extensions are further from the bore of the firearm than are the axes 17. In like manner the axes 19 of the bore of the complementary pair of ports 12 are still further from the axis 16 of the bore of the firearm than are any of the other axes of the bores of the ports.

Referring again to Figure 4, it is to be noted that the projections 20 of the bores of the ports 10 overlap but slightly the projection 14 of the bore of the port 9. There is also but slight overlapping between the projections 21 of the bores of ports 11 on the gas shoulder 7. Again the projections 22 of the bores of ports 12 but slightly overlap the projections 21 above referred to. This provides a maximum reaction area on the shoulder without overlap of projected port areas, which increases the efficiency of the device. By skewing the ports large port areas can be provided for release of reaction forces without sacrificing the sturdiness of construction.

This skewed port construction provides many advantages, one of which is the advantage which comes through having minimization of the reaction of the ports one with the other.

I claim:

1. A recoil control mechanism for a firearm adapted to fire a projectile comprising a body portion with rearwardly directed ports, a gas chamber formed in the body portion, some of the ports having bores whose axes do not cross the axis of the bore of the firearm, said ports being arranged in complementary pairs of similar ports around the body portion, the distance between the axes of the bores of the ports and the axis of the bore of the firearm increasing with each complementary pair of ports from the top of the body downward.

2. A recoil control mechanism for a firearm adapted to fire a projectile comprising a body portion with rearwardly directed ports, a gas chamber formed in the body portion, some of the ports having bores whose axes do not cross the axis of the bore of the firearm, said ports being arranged in complementary pairs of similar ports around the body portion, the distance between the axes of the bores of the ports and the axis of the bore of the firearm increasing with each complementary pair of ports from the top of the body downward, said ports being omitted near the bottom of the body.

3. A recoil control device for a firearm adapted to fire a projectile comprising a body portion with rearwardly directed ports, means to hold the body adjacent the bore of the firearm at the muzzle, a gas chamber formed in the body, and a gas shoulder in the chamber against which the gases from the bore expand, said shoulder being of an area to substantially coincide with the base of a cone of free expanding gases delivered from

the muzzle, some of the ports having bores whose axes do not cross the axis of the bore of the firearm, said ports being arranged in complementary pairs of similar ports around the body portion, the distance between the axes of the bores of the ports and the axis of the bore of the firearm increasing with each complementary pair of ports from the top of the body downward, said ports being omitted near the bottom of the body.

4. A recoil control mechanism for a firearm adapted to fire a projectile comprising a body portion with rearwardly directed ports, a gas chamber formed in the body portion, a gas shoulder in the chamber against which gases from the bore expand, the inner ends of the ports when projected lying substantially wholly on the gas shoulder, some of the ports having bores whose axes do not cross the axis of the bore of the firearm, said ports being arranged in complementary pairs of similar ports around the body portion, the distance between the axes of the bores of the ports and the axis of the bore of the firearm increasing with each complementary pair of ports from the top of the body downward.

5. A recoil control device for a firearm adapted to fire a projectile comprising a body portion with rearwardly directed ports, a gas chamber formed in the body portion, a gas shoulder in the chamber against which the gases from the bore expand, the inner ends of the ports when projected lying substantially wholly on the gas shoulder, some of the ports having bores whose axes do not cross the axis of the bore of the firearm, said ports being arranged in complementary pairs of similar ports around the body portion, the distance between the axes of the bores of the ports and the axis of the bore of the firearm increasing with each complementary pair of ports from the top of the body downward, said ports being omitted near the bottom of the body.

6. A recoil controlling device for guns adapted to fire projectiles, comprising a body adapted for attachment to the muzzle of a gun barrel, said body having a gas chamber therein and having an inlet port and a seal port at the rear and forward ends of said chamber, respectively, and a shoulder extending laterally from the inner end of the seal port to the side wall of the chamber, said device having an arcuate series of discharge ports extending rearwardly and outwardly from the forward part of the chamber, the axes of some of said discharge ports being so positioned as not to intersect the axis of the seal port, the angularity of the axis of at least one of such last named discharge ports to the projection of the axis of the seal port on a plane parallel with the axis of the seal port and containing the axis of said discharge port being different from the angularity of the axis of another of such discharge ports when similarly measured.

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