June 27, 1950 G. B. CRANDALL 2,512,850

PATTERN CONTROL MEANS FOR SHOTGUNS

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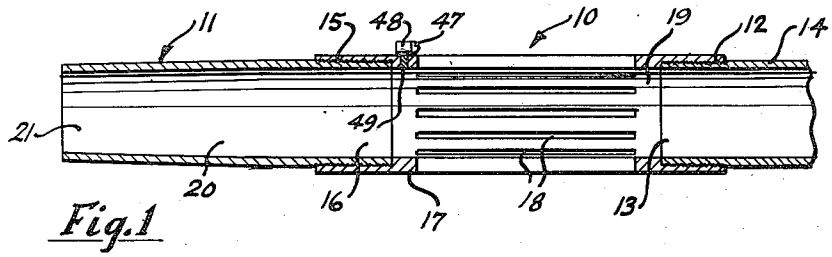


Fig. 1

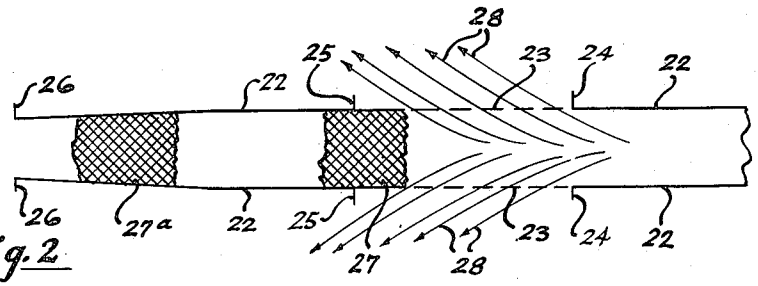


Fig. 2

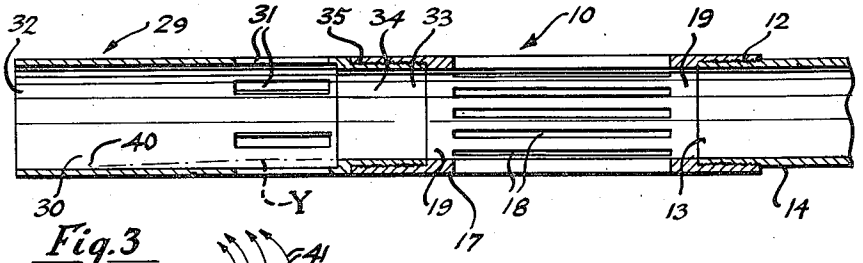


Fig. 3

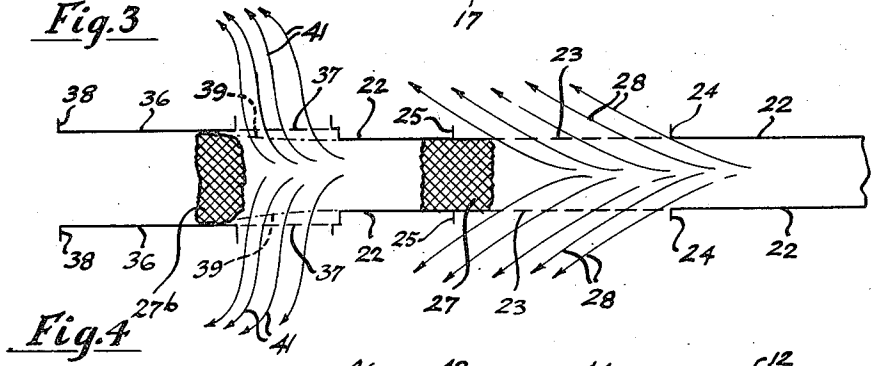


Fig. 4

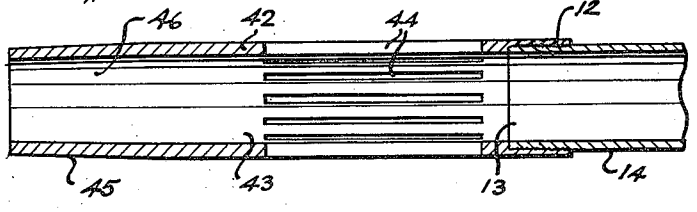


Fig. 5

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PATTERN CONTROL MEANS FOR SHOTGUNS

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2 Claims. (Cl. 42—79)

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This invention relates to shot pattern control means for shotguns.

Known pattern control devices for shotguns are obtainable in various sizes as attachments which may be threaded onto the end of the barrel of the firearm to control the distribution of the shot and improve the target pattern. A full choke, which is an attachment having a final restricted bore, will cause between 75% and 80% of the shot to be distributed within a 30-inch circle at a distance of 40 to 50 yards. A modified choke will give a 65% distribution and an improved cylinder, which actually has no restriction at all but is merely a continuation of the true diameter of the bore of the gun, will give a 50% pattern. A serious disadvantage, however, attends the use of chokes in that a sharp muzzle blast is experienced which is annoying not only to the firer but to fellow sportsmen standing nearby.

Compensators have been provided which have vent holes allowing some of the gases to escape before the shot leaves the mouth of the choke, but, in every instance, such vent holes are for the purpose of reducing recoil or kick and serve actually to aggravate the annoyance to a by-stander due largely to the directing of the gases to either side of the muzzle. Conventional compensators and chokes are considered as very noisy attachments and although used widely in order to obtain an improved pattern with less recoil, they are used in spite of the disadvantage of discomfort not only to the firer of the weapon but to by-standers.

It is the particular object of the present invention to provide improved attachments for shotguns which include a vent piece in which the vents are in the form of a plurality of axial slots of considerable length which are adapted to allow escape of the gases and dissipation of the same to reduce muzzle blast.

Another object of the invention is to provide attachments as before including a vent piece in which the slots, due to their substantial length, allow the gases to proceed in a forward direction due to their momentum so that blast noise will not be directed either back towards the firer or to either side in the direction of by-standers.

A further object of the invention is to provide attachments for shotguns including a vent piece in which the surfaces of the bore mate with the bore surfaces of the gun barrel to confine the shot in the desired manner and yet allow escape of gases through the vents which are of such a width that the shot will not pass therethrough.

A still further object of the invention is to provide a light weight pattern control device for the muzzle of a shotgun barrel which is formed substantially of a simple tube having longitudinal slots in parallelly spaced apart radial relation extending longitudinally over a substantial portion thereof to allow the escape of propellent gases in a forward direction under their own momentum without unduly impeding the latter in their forward movement.

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A still further object of the invention is to provide attachments for shotguns comprising a vent piece and a pattern tube designed to be attached thereto for skeet shooting in particular in which the entry dimensions of the bore of the skeet tube are in excess of the exit dimensions of the bore of the vent piece and the barrel of the gun to which the vent piece is attached.

A still further object of the invention is to provide a vent piece and pattern tubes therefore which have an entry bore of the same diameter as the bore of the gun to which the vent piece is attached, the said pattern tubes having constricted bores to substantially conform with chokes of various characteristics and sizes.

With these and other objects in view, the invention generally comprises a light weight pattern control device formed from a thin wall tubular body having a continuous and uniform inner bore diameter equal to the diameter of the muzzle bore of the shotgun barrel to which the device is designed to be attached. Vent means in the form of longitudinally extending slots are provided in the tubular body of such width that the smallest shot cannot pass therethrough exteriorly of the body. These vents are of such length that shot or propellent gases are allowed to exhaust under their own momentum forwardly without materially impeding their forward direction of movement.

An alternative includes in the combination a pattern tube which may be integrally formed with the tubular body and which determines initial shot distribution. In this connection the entry bore of the pattern tube must be of a diameter equal to the diameter of the bore of the tubular body.

Another alternative concerns the provision of an alternative form of pattern tube particularly adapted for skeet shooting and having a pattern controlling bore the diameter of which is greater than the diameter of the bore of the tubular body. This modification includes enlarged vents in the pattern tube designed to substantially complete the exhaust of gases and being of a length less than the distance between the entry of its bore

and the point of engagement of shot with the walls thereof.

Other objects of the invention will be apparent from a study of the following specification taken in conjunction with the accompanying drawings.

In the drawings,

Figure 1 is a sectional view of pattern control means according to my invention showing a vent piece mounted on the muzzle end of a conventional shotgun barrel and in turn mounting a pattern tube in the form of a choke of improved type.

Figure 2 is an illustrative diagrammatic view of walls of the gun barrel and pattern control means of Figure 1 indicating gases escaping from the vents of the vent piece and further indicating the effect of the bore restriction of the pattern tube on shot moving through the bores and shown at two locations therein.

Figure 3 is a sectional view of a modified form of pattern control means showing a vent piece as in Figure 1 by mounting a pattern tube of distinctive design, which I recommend for skeet shooting and the like being therefore known as a skeet tube and having vents of particular characteristics.

Figure 4 is a diagrammatic illustrative view of the walls of the bores of the pattern control means and gun barrel of Figure 3 showing gases escaping from the vents of the vent piece and the skeet tube, and showing the effect of the enlarged bore of the skeet tube on the distribution of shot by illustrating two positions of shot in the bores.

Figure 5 is a sectional view of pattern control means equivalent to that disclosed in Figure 1 by illustrating that the two components, that is to say, the vent piece and the pattern tube, may be formed in one piece if desired.

Referring to the drawings and particularly to Figure 1, pattern control means according to my invention are shown, and comprise generally a vent piece 10 and a pattern tube 11. The vent piece 10 is threaded internally for mating with threads 12 on the muzzle end 13 of a conventional shotgun barrel 14. The other end of the vent piece 10 is designed for mating with threads 15 on the entry end 16 of the pattern tube 11.

The vent piece in the body portion 17 between its ends has a plurality of vents 18 (preferably 12 in number) which extend over a major portion of the muzzle 13 and entry end 16 of the pattern tube 11. Vents 18 according to my invention, must be of a width which is less than the smallest diameter of shot for which it is to be used. Therefore, as a ball of shot passes through the bore 19 of the body 17, each ball of shot will not tend to pass through the slots 18, but the latter serve to provide a means of exhausting the gases before the shot enters into the pattern tube 11. In accordance with the invention, the walls of the body 17 are comparatively thin, that is to say, their thickness is comparable with the thickness of the walls of the muzzle end 13 of the shotgun barrel 14. It will be noted that the bore 19 of the body 17 is continuous and uniform in diameter and equal to the diameter of the bore of the muzzle end 13 of the shotgun barrel 14 as illustrated in all forms, that is to say, the forms of Figure 1, Figure 3, and Figure 5.

I prefer to supply at least three pattern tubes to the sportsman which would substantially correspond to conventional chokes. An improvement, however, will be evident in that the entry end 16 of the bore 20 of the pattern tube 11 has its surfaces meeting or in line with the surfaces of bore 19 of the vent piece 10. The bore 20 is

restricted towards the muzzle end 21 in accordance with the amount of choking required, that is, full choke, medium choke, or the improved cylinder type of bore which has no restriction whatever.

Referring to Figure 2, the effect of my pattern control means will readily be appreciated. The walls of the bores of the barrel 14, vent piece 10 and pattern tube 11 are represented by the lines 22, the chain lines 23 indicating that openings or vents 18 are located in this region which is bounded by the right angular lines 24 and 25. Terminal lines 26 indicate the muzzle end 21 of the pattern tube 11. The irregular hatched areas 27 and 27*a* illustrate the two positions of a charge of shot as it proceeds through the bores 27 indicating that the shot is relatively undisturbed by the exhaust of gases (indicated by lines 28) forwardly through the vents 18. It is important to note that due to the considerable length of the vents 18 that the gases are allowed to proceed substantially in the direction of their momentum, that is, forwardly. The shot will proceed through into the pattern tube and be restricted diametrically to distribute the charge in a more longitudinal manner as at 27*a*, so that it is well packed and concentrated before it leaves the muzzle terminal points 26. The amount of restriction in the bore of the pattern tube 11 will, of course, determine the final distribution in the pattern of shot at a target.

In the sport of skeet shooting in particular, muzzle blast from conventional types of chokes is excessive and usually annoying to bystanders. I, therefore, provide a particular design of pattern tube 29 shown in Figure 3 which may be mounted on the vent piece 10. This specific embodiment of pattern tube hereinbefore referred to as a skeet tube has an enlarged cylindrical bore 30 of a dimension in excess of the diameter of the bore 19 of the vent piece 10. Enlarged vents 31 (preferably six in number) are provided to allow a final exhaust of gases before the charge (not shown) leaves the muzzle end 32 of the skeet tube 29. The skeet tube has an entry end 33 having a bore 34 designed for mating with the bore 19 of the vent piece 10. This entry end also carries threads 35 for mating fixture with the vent piece substantially as shown.

In service, the effect of this particular combination of pattern tube, that is, the skeet tube and vent piece, may be visualized by referring to Figure 4. There, as before, similar numerals apply to that portion of the pattern control means corresponding to the elements shown in Figure 1. In this case, however, it will be observed that lines 36 represent the enlarged bore 30 of the skeet tube 29 and then chain lines 37 represent vents 31 and terminal lines 38 the muzzle end 32. Here the shot 27 proceeds toward the skeet tube 29 confined as before, but upon reaching the enlarged bore of this latter tube it spreads out as indicated by lines 39 and engages the walls of the bore 36 at a point more clearly indicated by numeral 40 in Figure 3, the ball of the shot substantially following the path Y. Gases which have not been exhausted through the vents 18 of vent piece 10 will be exhausted through vents 31 as indicated by lines 41, being moved forwardly as indicated by the reverse curved nature of these exhaust lines by the rushing gases proceeding forwardly after exhausting from the vents 18 of the vent piece 10. 27*b* indicates the shot charge after it has passed the vents 31, showing its spreading to

meet the walls 36 of the bore of the skeet tube and being substantially undisturbed insofar as the distribution of shot in the charge is concerned. As a result, therefore, the shot 27b will be expelled from the muzzle 32 of the skeet tube 29 substantially by its own momentum, maximum control on the distribution of a shot being thereby accomplished by the muzzle end surfaces of the bore 30. A further advantage is that muzzle blast is substantially obviated as regards bystanders since the gases proceed forwardly as described, those gases which do pass out of the vents of the skeet tube being of relatively small volume as compared with the volume of gases passing out the vents 18. Vents 31 are preferably very large and may be of a width greatly in excess of the balls of shot proceeding through the bore 30 in order to allow as quick an exhaustion of the remaining gases as possible so that the distribution in the charge 27b will remain substantially in effect by these gases.

Figure 5 is included merely to illustrate that the pattern control means of my invention may be incorporated in one unit if desired, in which case the device is comprised of a body 42 having a bore 43 of the same diameter as the bore of the gun barrel 14. A plurality of vents 44 are provided which substantially correspond to vents 18 of Figure 1 having the same characteristics. The muzzle end 45 of this device is formed integrally with the body 42 and has a restricted bore 46 substantially as indicated and corresponding to the restriction necessary for various choking effects, one end of this combined vent piece and pattern tube is designed for mating with threads 12 on the muzzle end 13 of barrel 14. It will be appreciated, of course, that the skeet tube and vent piece of Figure 3 may be made in one piece in a similar manner. An example of an obvious additive feature is illustrated in Figure 1 where a sighting bead 47 mounted in a sighting mount 48 is fastened into the body 17 of the vent piece 10 by the lug 49.

Experiment with the pattern control means of Figure 1, in particular, has shown an improvement over the pattern distribution obtainable with standard chokes of a further ten per cent concentration with the different pattern tubes. The specific design of skeet tube shown has proved capable of placing substantially ninety per cent of the shot within a thirty-inch circle at twenty-five yards as compared with roughly sixty per cent within the circle under similar conditions with former types of chokes normally used in skeet shooting. A particular advantage derives from confining the bores of the attachments described to an entry dimension which corresponds to the dimension of the bore of the gun barrel 14 since the shot will be confined as it travels through these bores and the wadding or packing will not wobble to disturb the distribution of the shot on the final target. Many obvious modifications will be apparent to gun makers apart from the specific embodiments described and, therefore, it is intended that the present disclosure should not be construed as limiting in any way other than that indicated by the scope of the following claims.

What I claim as my invention is:

1. A light weight shot pattern control device for the muzzle of a shotgun barrel, comprising, a vent piece in the form of a tubular body having a continuous and uniform bore of a diameter equal to the diameter of the muzzle bore of the shotgun barrel, means for fastening one end of said tubular body to the muzzle of the shotgun barrel and providing alignment of the bore of said body with the bore of the muzzle of the shotgun barrel, said body having a plurality of radially positioned parallelly spaced apart longitudinally extending slots forming vent means for allowing the exhaust of propellent gases from the bore thereof exteriorly and forwardly of said body, said tubular body having walls substantially equal in thickness to the thickness of the walls of the shotgun barrel at the muzzle end, and pattern controlling means comprising a pattern tube extending from the other end of said body designed to determine distribution of shot by controlling the latter as they pass therethrough substantially under the influence of their momentum alone, said pattern tube having a pattern controlling bore of a diameter greater than the diameter of the bore of said tubular body and a plurality of radially positioned parallelly spaced apart longitudinally extending slots forming vent means in said pattern tube.

2. A light weight shot pattern control device for the muzzle of a shotgun barrel, comprising, a vent piece in the form of a tubular body having a continuous and uniform bore of a diameter equal to the diameter of a muzzle bore of the shotgun barrel, means for fastening one end of said tubular body to the muzzle of the shotgun barrel and providing alignment of the bore of said body with the bore of the muzzle of the shotgun barrel, said body having a plurality of radially positioned parallelly spaced apart longitudinally extending slots forming vent means for allowing the exhaust of propellent gases from the bore thereof exteriorly and forwardly of said body, said tubular body having walls substantially equal in thickness to the thickness of the walls of the shotgun barrel at the muzzle end, pattern controlling means comprising a pattern tube extending from the other end of said body designed to determine distribution of shot by controlling the latter as they pass therethrough substantially under the influence of their momentum alone, said pattern tube having a pattern controlling bore of a diameter greater than the diameter of the bore of said tubular body, and a plurality of radially positioned parallelly spaced apart longitudinally extending slots forming vent means in said pattern tube, the vent slots of the latter being wider than the diameter of shot propelled through said pattern tube and extending in longitudinal dimension a distance less than the distance from the entry end of said pattern tube to the point of engagement of shot with the surfaces of the bore of said pattern tube.

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