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2,098,617

SPREADER TUBE

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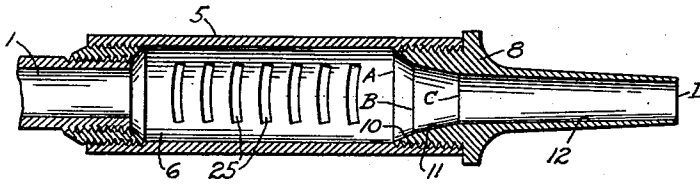


Fig. 1

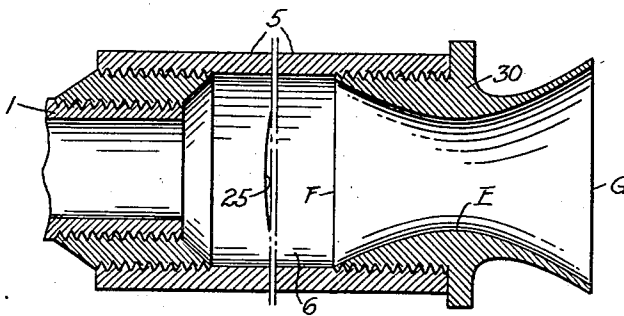


Fig. 2

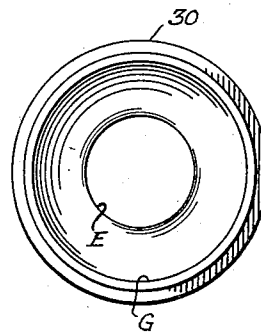


Fig. 3

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2,098,617

SPREADER TUBE

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14 Claims. (Cl. 42-79)

This invention relates to a spreader tube for use with shot guns and similar firearms, having for its object to produce a construction which is simple in parts and less costly to manufacture as well as more efficient in use than those heretofore proposed.

With these and other objects in view the invention resides in the novel details of construction and combinations of parts as will be disclosed more fully hereinafter and particularly pointed out in the claims.

Referring to the accompanying drawing forming a part of this specification and in which like numerals designate like parts in all the views:—

Fig. 1 is a vertical sectional view of the muzzle of a shot gun barrel to which is secured a compensating device of heretofore known construction;

Fig. 2 is a foreshortened vertical sectional view of a construction similar to that shown in Fig. 1 except that the subject matter of this invention has been substituted for the shot tube shown in said Fig. 1; and

Fig. 3 is an end elevation of the spreader tube shown in Fig. 2.

This invention is somewhat closely related to the devices shown in U. S. Letters Patent 1,605,393 dated November 2, 1926 and No. 1,636,357 dated July 19, 1927 both granted to Richard M. Cutts, Jr., and No. 1,773,260 dated August 19, 1930 granted to Richard M. Cutts, all of which are directed to compensating devices for the muzzle ends of rifles and shot guns. The device of this invention is more closely allied with that of the last named patent, the principal difference between these two devices being that the device of the patent is particularly adapted to concentrate the pellets of the shot column into a close mass formation, whereas the present device is not so concerned with this concentration. In order to bring out these differences, reference will be had first to Fig. 1 of the drawing which illustrates a device made in accordance with said Patent No. 1,773,260.

The gun barrel is indicated by the numeral 1 and externally threaded thereon, at the muzzle, is a hollow cylindrical casing 5 providing the chamber 6 of an internal diameter greater than the bore of the barrel so that the gases of combustion, issuing from the barrel, may immediately expand within said chamber. At the forward end of said casing there is threaded a shot tube generally indicated by the numeral 8 which is axially bored to provide a conical surface 10 extending from the extreme inner end A of the tube

to a point such as B. There is also provided a second conical surface 11 joining said surface 10 and extending from the point B to a point such as C, the slope of the surface 11 being different from the slope of the surface 10. Lastly, the tube is provided with a third internal surface 12 which may be conical or cylindrical according to whether or not a choke effect is desired, said surface 12 extending from the point C to the outer end D of said tube.

As previously stated, the gases of combustion will expand upon entering the expansion chamber 6 from the barrel muzzle and in this expansion, because gases are disposed between the individual pellets of the column of shot, cause some of the shot pellets to move laterally away from the axis of the shot column, wherefore the conical surface 10 is provided for creating between the points A and B a compression chamber for the forwardly moving gases, as well as for creating a means for receiving the outermost shot pellets and directing them, in their forward travel, back toward the axis of the shot column. The surface 11 between the points B and C creates a recompression chamber for the gases and the shot pellets so that at point C all shot pellets are disposed substantially within the confines of the original transverse area of the shot column. In other words, the internal diameter of the tube 8 at the point C is substantially equal to the bore of the barrel, according to whether or not a choke effect is desired, wherefore the diameter of the shot column as it travels from the point C to the outer end D of the tube is substantially equal to its original diameter, and the distance of this travel from C to D is such that the individual pellets in the shot column will have no substantial lateral movement toward or away from the axis of the column.

Openings 25 are provided in the walls of the expansion chamber 6 for the purpose of releasing the gases of combustion as they emerge from the gun muzzle, but it is to be distinctly understood that these gases are moving at a tremendous forward velocity so that the conical surfaces 10 and 11 will positively function to increase the pressure of the gas to a degree producing a material counteraction of the recoil of the gun before the openings 25 will have exhausted sufficient gas to reduce the pressure within the chamber 6. The openings 25 permit an escape of the gases to an extent where little effective pressure is left within the shot column as it enters the chamber C—D of the tube 8 and therefore there will be no undesirable lateral shot velocities at the exit end

D of said tube, wherefore all of the pellets in the shot column will travel together as a substantially compacted mass to the target.

According to the present invention the shot gun barrel 1 at its muzzle is provided with a hollow cylindrical casing 5 which is substantially a duplicate of the casing shown in Fig. 1 and described in detail in Patent No. 1,773,260 referred to above, having the plurality of openings 25 in its walls. However, instead of having the shot tube indicated by the numeral 8, there is substituted a spreader tube indicated in Figs. 2 and 3 by the numeral 30, the main purpose of which is not so much to concentrate the individual shot pellets into a shot column suitable for longer firing ranges, but rather to provide a means for permitting an intended but slight lateral deflection of the shot pellets in a direction away from the axis of the shot column, so that with the use of this spreader tube a wider coverage of a target results, to the end that better results are obtained with the use of this spreader tube at short firing ranges.

The internal surface of this spreader tube 30 is formed as shown, substantially as a double cone, so that said tube has its smallest diameter at E substantially midway the ends of the tube. In other words, the innermost end of said tube F has an internal diameter substantially equal to the internal diameter of the expansion chamber 6, which diameter gradually decreases toward the throat E of the spreader tube, and then gradually increases from the throat toward the outermost end G of said tube. This internal surface of the tube 30 may taper evenly or it may be formed as a succession of flat conical surfaces as was the case with the tube 8 shown in Fig. 1, though the former is preferable.

It will therefore be seen that by this invention those shot pellets which, in the expansion chamber 6, have moved laterally away from the axis of the shot column (due to the pressure of the gases of combustion within the shot column) will strike the internal forwardly tapered surface of the innermost portion of the spreader tube 30 and be directed back toward the axis of the shot column in the forward travel of said pellets, and that after the throat E is passed there will be no confining tube wall (as was the case of the tube shown in Fig. 1) to hold all of the pellets in columnar formation, whereby the pellets may spread laterally due to the divergence of the tube surface from the throat to the outermost end of the tube. In other words, the outermost shot pellets are those which have moved appreciably away from the shot column in the expansion chamber, leaving the remainder of the pellets to travel forwardly as a column toward and through the throat E. When these outermost pellets strike the surface F—E their travel will be deflected into a direction toward the shot column, and thereafter they will strike the pellets in said column. This will have the effect of opening said column which is loosely compacted since it is not choked by the throat E. Hence, the returned outermost pellets will not only again be deflected by striking the pellets of the column, but they will start various deflections among all of the pellets in said column, resulting in an opening out of the column into a wide even pattern. The dimension of the throat at E will vary with each make of shot gun, and is such that it does not choke the shot column proper, being wide enough for the column normally to go through without being impeded and being

short enough to give substantially tangential point contact (if any at all) with said column. However, the throat surface does catch only the outer layer of pellets, which are gradually being deflected laterally by gas disturbance and other causes, and these outer pellets are again deflected on impact with the throat surface and impinge the pellets of the shot column, in a manner similar to that previously described.

As will be observed from the drawing the shot tube 8 is readily replaceable by the spreader tube 30 through the threaded connection with the outer end of the expansion chamber 6, wherefore a single gun may be readily adapted through interchange of the tubes for both long and short range firing. The use of the spreader tube 30 gives wider target patterns, with even shot pellet distribution, than are possible with either improved cylinder or full cylinder tubes such as 8 shown in Fig. 1. Also some of the gases under increased pressure from chamber 6 will pass the throat E along with the shot pellets before the powder wads substantially seal said throat, with the result that this gas, by its pressure, will aid slightly in the lateral dispersion of the pellets after leaving said throat.

It is obvious that those skilled in the art may vary the details of construction without departing from the spirit of this invention and therefore it is desired not to be limited to the exact foregoing disclosure except as may be demanded by the claims.

What is claimed is:

1. In a gun adapted to fire a plurality of projectiles with a single powder charge and provided with a muzzle, the combination of an expansion chamber to receive the gases of explosion as they emerge from said muzzle together with the projectiles said chamber permitting a deviation of said projectiles from the established line of flight; and a spreader tube at the forward end of said chamber coaxial with said chamber and said muzzle, said tube having two concentric tapered interior surfaces respectively tapering in opposite directions and having their respective smaller diameters joined to form a throat, the diameter of the throat being greater than the bore of the muzzle.

2. A device of the character described and adapted to be attached to the muzzle of a shot gun or the like, said device provided with an expansion chamber to receive the gases of explosion as they emerge from the muzzle together with the shot pellets, said device provided with an end member axially bored to provide substantially conical surfaces of opposite slopes coactingly affecting the projected shot, said surfaces joined to form a throat having a diameter greater than the bore of the gun.

3. A device of the character described and adapted to be attached to the muzzle of a shot gun or the like, said device provided with an expansion chamber to receive the gases of explosion as they emerge from the muzzle together with the shot pellets, said chamber permitting a deviation of said pellets from the established line of flight, said device provided with an end member axially bored to provide two substantially conical surfaces of opposite slopes, one surface for deflecting the deviated pellets from their line of travel, and the other surface for permitting the pellets to continue in the line of their deflected travel, said surfaces joined to form a throat having a diameter greater than the bore of the gun.

4. In combination with a shot gun, an expansion chamber to receive the gases of explosion as they leave the muzzle, said chamber having tapered means to arrest the lateral dispersion of the shot pellets from the mass leaving said muzzle and to return them in a deflected course to the pellets not so dispersed, the smallest diameter of said means being greater than the bore of the muzzle, and oppositely tapered means in prolongation of the arresting and returning means to permit the returned pellets to continue in the line of their deflected course.

5. In a gun adapted to fire a plurality of projectiles with a single powder charge with resultant lateral dispersion of said projectiles upon leaving the muzzle of said gun due to the presence between said projectiles in the barrel of the gun of some of the gases of explosion and the expansion of said gases upon leaving said muzzle, the combination of an expansion chamber associated with the muzzle of said gun to receive the gases of explosion as they leave said muzzle together with the projectiles including those to which a lateral velocity has been imparted by a portion of said gases; an end member for the chamber provided with a bore coaxial with said barrel, said bore having a forwardly and inwardly tapered surface providing means to arrest the lateral dispersion of those projectiles so affected by said gases and return them in a deflected course to the other of said projectiles said surface also providing means to increase the pressure of the expanded gases in said chamber, the smallest diameter of said surface being greater than the bore of the barrel; and means comprising another and oppositely tapered surface of said bore to permit a lateral dispersion of all of said projectiles due to the presence therebetween of gases under increased pressure after passing said first named surface.

6. A device of the character described and adapted to be attached to the muzzle of a shot gun barrel or the like, said device comprising an expansion chamber to receive the gases of explosion and the shot pellets as they emerge from the muzzle, and an end member for said chamber provided axially with two tapered surfaces of opposite slopes, said surfaces joined at their smallest diameters to form a throat having a diameter greater than the bore of the barrel, one surface tending to concentrate the shot pellets and the other slope permitting their dispersion during their forward travel.

7. In combination with a shot gun, an expansion chamber to receive the gases of explosion as they leave the muzzle; a pattern tube to receive the shot column, the smallest diameter of said tube being greater than the bore of the muzzle; and means incorporated in said tube to disperse the pellets of the shot column into a wide pattern upon leaving said tube.

8. In combination with a shot gun, an expansion chamber to receive the gases of explosion as they leave the muzzle; a pattern tube to receive the shot column, the smallest diameter of said tube being greater than the bore of the muzzle; and means incorporated in said tube and comprising oppositely directed substantially conical surfaces to disperse the pellets of the shot column into a wide pattern upon leaving said tube.

9. In combination with a shot gun, an expansion

chamber to receive the gases of explosion as they leave the muzzle; a pattern tube to receive the shot column; and means incorporated in said tube to disperse the pellets of the shot column into a wide pattern upon leaving said tube, said means comprising two concentric tapered interior surfaces respectively tapering in opposite directions and having their respective smaller diameters joined to form a throat, the diameter of the throat being greater than the bore of the muzzle, and the larger diameter of the rearmost surface being substantially equal to the inside diameter of said chamber.

10. In combination with a shot gun, an expansion chamber to receive the gases of explosion as they leave the muzzle; a pattern tube to receive the shot column; and means incorporated in said tube to disperse the pellets of the shot column into a wide pattern upon leaving said tube, said means comprising two substantially equal concentric tapered interior surfaces respectively tapering in opposite directions and having their respective smaller diameters joined to form a throat, the diameter of the throat being greater than the bore of the muzzle, and the larger diameters of said surfaces being substantially equal to the inside diameter of said chamber.

11. In combination with a shot gun, an expansion chamber to receive the gases of explosion as they leave the muzzle, said chamber having means to arrest the lateral dispersion of the shot from the mass leaving said muzzle and to return them to the shot not so dispersed to create a disturbance in the loosely compacted mass whereby all of said shot are caused to travel in substantially true flight upon leaving said means in a pattern of wide diameter, said means including a forwardly and outwardly flared internal surface at its discharge end.

12. A spreader tube for attachment to a shot gun, said tube having two concentric tapered interior surfaces respectively tapering in opposite directions and having their respective smaller diameters joined to form a throat, the diameter of the throat being greater than the bore of the gun to which said tube is to be attached.

13. A spreader tube for attachment to a shot gun, said tube having two concentric tapered interior surfaces respectively tapering in opposite directions and having their respective smaller diameters joined to form a throat, one of said surfaces at its greatest diameter joining the inner surface of an expansion chamber for receiving the gases of explosion from the gun, the diameter of the throat being greater than the bore of the gun to which said tube is to be attached.

14. A spreader tube for attachment to a shot gun, said tube having two substantially equal concentric tapered interior surfaces respectively tapering in opposite directions and having their respective smaller diameters joined to form a throat, one of said surfaces at its greatest diameter joining the inner surface of an expansion chamber for receiving the gases of explosion from the gun, the diameter of the throat being greater than the bore of the gun to which said tube is to be attached.

RICHARD M. CUTTS, JR.