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MUZZLE EQUALIZER AND BLAST MINIMIZER FOR GUN

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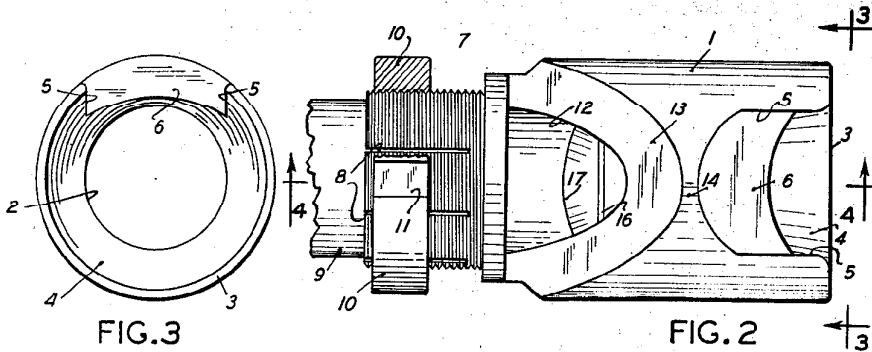
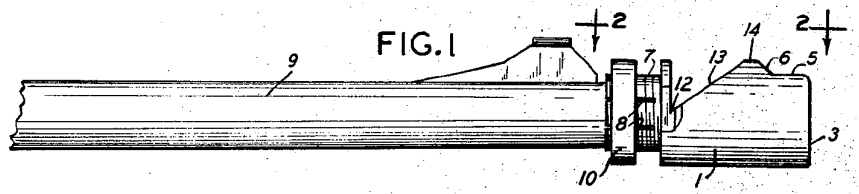


FIG. 3

FIG. 2

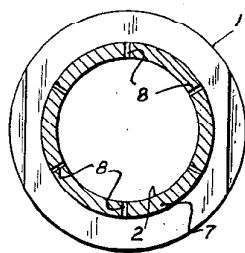


FIG. 5

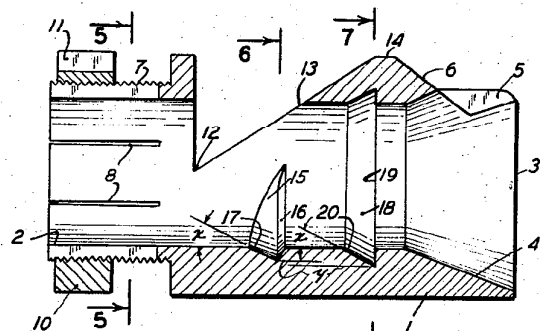


FIG. 4

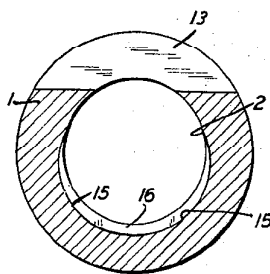


FIG. 6

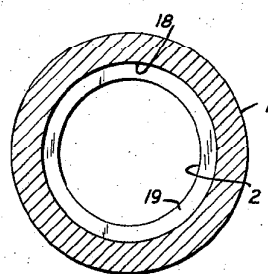


FIG. 7

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MUZZLE EQUALIZER AND BLAST MINIMIZER FOR GUN

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5 Claims. (Cl. 89-14)

My present invention is closely related to the gun muzzle equalizer described and claimed in my pending United States application bearing Serial No. 601,993 filed August 3, 1956, on which further proceedings are now abandoned. The essential differences between the device disclosed in the pending application and the present invention herein set forth is in the provision of means whereby the expanding gases are deflected and/or otherwise channeled not only to hold the gun barrel from jumping upwardly but also to minimize the effects of the recoil and muzzle blast.

The compressed gases emerging from the muzzle end of a gun barrel of a high powered rifle immediately behind the bullet move at a velocity greater than the velocity of the bullet as they leave the constriction imposed upon them by the barrel. These compressed gases, as they escape from the gun barrel and reach the atmosphere, normally expand in the form of a cone. In the process of their expansion, an excessive recoil shock results causing discomfort to the person firing the gun, forcing the gun barrel to jump upwardly, thus preventing the keeping of the gun on the target, and causing excessive muzzle blast.

Furthermore, as the compressed gases leave the gun barrel, a partial vacuum is formed therein and a momentary onrush of air into the barrel results. It is within the contemplation of this invention to control these compressed gases and this onrushing air by deflection and/or constriction or, by otherwise channeling them, and particularly the compressed gases so that the inherent disadvantages created by the expansion of the compressed gases are either entirely eliminated, or satisfactorily solved.

The quintessence of the invention is to provide a device adapted either for removable attachment to the muzzle end of the gun barrel, or modifying the gun barrel so as to make this device an integral part thereof, which employs these expanding gases and onrushing air to reduce the recoil shock, minimize the blast and eliminate the tendency of the gun to climb upwardly on being fired.

The principal object of my invention is to provide a device for the muzzle end of a gun barrel having means for directing upwardly some of the compressed gases emanating from the muzzle, two stage means for partially constricting these gases to act as a brake therefor, and finally, means for conjointly directing the remaining compressed gases upwardly and outwardly through a gradually enlarged discharge end.

A corollary to the principal object of my invention is to provide means in the device for employing the air entering the gun barrel as the compressed gases are discharged to assist in controlling the gun firing position of the gun by eliminating the tendency of the gun to climb upwardly on being fired.

Another object of my invention is to provide a unitary device possessing structural characteristics which performs the above functions without materially increas-

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ing the weight, nor the length of the gun, nor measurably disturb its balance.

A still further object of my invention is to provide a device which may be firmly secured to the muzzle end of a gun barrel without the services of a gunsmith and which, when properly attached, practically eliminates its radial or forward slippage on the gun barrel during long periods of firing.

A still further object of my invention is to provide a muzzle equalizer and blast minimizer which is sturdy but light in weight, compact and inexpensive, easy to attach and apply to a standard gun barrel without disturbing the front sight nor damage the barrel.

A full and complete understanding of my invention and other objects, advantages and novel characteristics thereof will become apparent and readily understood from the following detailed description which must be read in connection with the disclosures in the accompanying drawing forming a part hereof, and in which:

Fig. 1 is a side elevational view of the device embodying the principles of my invention shown mounted on the muzzle of a gun barrel;

Fig. 2 is an enlarged top plan view, partially broken away, of the device embodying the principles of my invention taken on line 2-2 of Fig. 1;

Fig. 3 is a front elevational view taken on line 3-3 of Fig. 2;

Fig. 4 is a sectional elevation of the device embodying the principles of my invention taken on line 4-4 of Fig. 2 to show the structural characteristics of the interior;

Fig. 5 is a sectional elevation taken on line 5-5 of Fig. 4;

Fig. 6 is a sectional elevation taken on line 6-6 of Fig. 4 to show the details of construction of the semi-circular eccentric groove; and

Fig. 7 is a sectional elevation taken on line 7-7 of Fig. 4 to show the details of construction of the circular groove.

The device embodying my invention consists primarily of a unitary body member 1, preferably cylindrical in contour, having a bore 2 centrally disposed therethrough, the diameter of which is slightly larger than the diameter of the bore of the gun barrel to which the device is attached or is an integral part thereof, when measured from the bottom of the rifling grooves, thereby permitting a definite break in contact of the bullet with the gun bore without effecting the control of the compressed gases and onrushing air by the structural characteristics of the unitary body member 1. The front end 3 of the body member has a counterbore which is tapered rearwardly, as shown at 4. A cut out portion, as shown at 5, is made directly above the tapered counterbore 4 and has a rearwardly inclined face 6 formed therein.

An externally threaded collet 7, formed at the rear end of body member 1, has a plurality of open ended slots 8 formed longitudinally therein to provide a slight tapering rearwardly thereof. Collet 7 fits over the muzzle end of a gun barrel 9 fancifully represented in Fig. 1. An internally threaded lock nut 10, having a transversely positioned slot 11 therein for a spanner wrench, is threadably secured about externally tapered collet 7 when the same is properly positioned on the muzzle end of the gun barrel to thereby firmly compress the slotted collet against the barrel and thereby hold the body member clamped tightly thereon to prevent its lateral or radial displacement during the firing operation. This tight connection between the gun barrel and body member is assured when once properly connected since the heat generated during firing tends to slightly expand the gun barrel and even more firmly unite the collet and barrel as one. Of course, if the de-

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vice is made as an integral part of the barrel, no problem of a tight connection exists.

An angular cut out or notch 12 is made transversely of body member 1 immediately in front of the muzzle end of gun barrel 9 and sufficiently deep to penetrate the interior of bore 2 as graphically shown in Figs. 1, 2 and 4. The rear portion of the cut out is vertically positioned while the front face slopes forwardly and outwardly, as shown at 13 and almost meets the top of face 6 of the cut out portion 5 at their common apex 14. The function of this cut out portion will be explained forthwith.

A crescent shaped eccentric groove 15 is formed in bore 2 approximately midway of and below the cut out portion 12 of body member 1. The front wall 16 of groove 15 is positioned at right angles to the bore 2 while the base 17 of the groove 15 is inclined rearwardly at an obtuse angle to the bore 2. Another groove 18 is formed within bore 2 slightly in front of the crescent shaped eccentric groove 15 approximately below the apex 14 formed by the junction of the respective faces 6 and 13 of cut out portions 5 and 12 respectively. Groove 18 is an iota deeper than the eccentric groove 15, in fact it is almost imperceptible and difficult to reveal in the drawing, but its front wall 19 is parallel to the front wall 16 of groove 15 as indicated by the lines marked y in Fig. 4 and its base 20 is rearwardly inclined at the same angle as the angle of base 17 of groove 15 as graphically shown by the lines marked x in Fig. 4.

The specific function of these structural characteristics as well as the others, will now be explained.

Modus operandi

The device embodying the principles of my invention dealing as it does with compressed gases seeking to expand after escaping from a gun barrel, employs Newton's physical law of motion in controlling the movement of these gases and their ultimate dissipation as well as controlling the onrushing air entering the gun barrel to fill the partial vacuum created by the emergence of the gases from the gun barrel. As these gases escape from the gun barrel a limited amount is deflected upwardly and expands through the cut-out portion 12 of the device. Newton's physical law referred to above states that for every action there is an equal and opposite reaction—the jet propulsion principle—comes into play and as these gases expand upwardly through cut-out 12, a corresponding downward reaction results which, acting against the body member 1 secured to the gun barrel 9, helps to suppress the muzzle rise usually accompanying the recoil shock. The same principle comes into play but with lesser effect when the onrushing air begins to enter the gun barrel to fill the partial vacuum created by the emergence of the compressed gases and this also helps to suppress muzzle rise. As the remaining gases leave the device through its front, their expansion upwardly through cut-out portion 5 is a further aid to muzzle holddown.

Resistance to the smooth flow of the compressed gases which do not escape through cut-out 12 is first offered by the crescent shaped eccentric groove 15 and then by circular groove 18 in bore 2. The presence of these grooves possessing the structural characteristics delineated above creates a sufficient turbulence in the bore 2 and resistance to the smooth flow of the escaping compressed gases toward the front of the device so as to create a momentary trap or a brake therefor—thus a sufficient restrictive force is imposed upon these compressed gases which counteracts the normal excessive recoil on firing of a high powered rifle and thereby minimizes the same.

As these remaining gases seek to escape through the body member 1, the counterbore at the front thereof allows them to spread over a much larger area making it easier for their expansion. This structural characteristic of the device and the escape of some of the gases through cut-out 12, minimizes the muzzle blast normally encountered when no blast suppressor or similar device is employed.

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As some changes are possible in the embodiment of the invention above set forth, it is to be understood that all matter herein set forth or shown in the accompanying drawing is to be interpreted as illustrative of the invention, and not in a limiting sense, but any permissible change must fall within the purview of the following claims, in which I claim as new and desire to secure by Letters Patent:

1. A new article of manufacture to be used in conjunction with guns adapted to fire projectiles, comprising a body member supportable by and projecting in advance of the muzzle of a gun barrel, said body member having a bore in line with the bore of the barrel through which a projectile may pass but being slightly larger in diameter, a counterbore formed at the front end of said body member in line with the bore thereof but uniformly tapering outwardly therefrom, a cut-out portion formed in said body member immediately above said tapered counterbore, the face of which extends angularly and rearwardly from the front of said body member, another cut-out portion formed immediately in back of said first cut-out portion and entering into the bore of said body member with its face extending angularly and forwardly toward the front of said body member, a circular groove formed in the bore of said body member immediately below the juncture of the respective faces of said cut-out portions, a crescent shaped eccentric groove formed within said bore immediately in back of said circular groove and below the rearwardly positioned cut-out portion, and means for anchoring said body member to the muzzle end of a gun barrel.

2. A new article of manufacture to be used in conjunction with guns adapted to fire projectiles, comprising a body member supportable by and projecting in advance of the muzzle of a gun barrel, said body member having a bore in line with the bore of the barrel through which a projectile may pass but being slightly larger in diameter, a counterbore formed at the front end of said body member in line with the bore thereof but uniformly tapering outwardly therefrom, a cut-out portion formed in said body member immediately above said tapered counterbore the face of which extends angularly and rearwardly from the front of said body member, another cut-out portion formed immediately in back of said first cut-out portion and entering into the bore of said body member with its face extending angularly and forwardly toward the front of said body member, a circular groove formed in the bore of said body member immediately below the juncture of the respective faces of said cut-out portions, a crescent shaped eccentric groove formed within said bore immediately in back of said circular groove and below the rearwardly positioned cut-out portion, the front wall of each of said grooves being parallel to each other with the circumference of the wall of the circular groove being greater than that of the wall of the crescent-shaped groove and the base of each of said grooves being angularly disposed to the bore of said body member, and an externally threaded collet having a plurality of longitudinal slits therein extending from said body member and adapted to fit over the muzzle end of a gun barrel, and a lock nut threadably secureable thereto to anchor said collet to said muzzle end of a gun barrel.

3. A new article of manufacture to be used in conjunction with guns adapted to fire projectiles, comprising a body member supportable by and projecting in advance of the muzzle of a gun barrel, said body member having a bore in line with the bore of the barrel through which a projectile may pass but being slightly larger in diameter, a counterbore formed at the front end of said body member in line with the bore thereof but uniformly tapering outwardly therefrom, a cut-out portion formed in said body member immediately above said tapered counterbore the face of which extends angularly and rearwardly from the front of said body member, another cut-out portion formed immediately in back of

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said first cut-out portion and entering into the bore of said body member with its face extending angularly and forwardly toward the front of said body member, a circular groove formed in the bore of said body member immediately below the juncture of the respective faces of said cut-out portions, and a crescent shaped eccentric groove formed within said bore immediately in back of said circular groove and below the rearwardly positioned cut-out portion.

4. A new article of manufacture to be used in conjunction with guns adapted to fire projectiles, comprising a body member supportable by and projecting in advance of the muzzle of a gun barrel, said body member having a bore in line with the bore of the barrel through which a projectile may pass but being slightly larger in diameter, a counterbore formed at the front end of said body member in line with the bore thereof but uniformly tapering outwardly therefrom, a cut-out portion formed near the rear of said body member and entering into the bore of said body member with its face extending angularly and forwardly toward the front of said body member, a circular groove formed in the bore of said body member immediately to the rear of said tapered counterbore, a crescent shaped eccentric groove formed within said bore immediately in back of said circular groove and below the rearwardly positioned cut-out portion, the front wall of each of said grooves being parallel to each other with the circumference of the wall of the circular groove being greater than that of the wall of the crescent-shaped groove and the base of each of said grooves being angularly disposed to the bore of said body member, and means for anchoring said body member to the muzzle end of a gun barrel.

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5. A new article of manufacture to be used in conjunction with guns adapted to fire projectiles, comprising a body member supportable by and projecting in advance of the muzzle of a gun barrel, said body member having a bore in line with the bore of the barrel through which a projectile may pass but being slightly larger in diameter, a counterbore formed at the front end of said body member in line with the bore thereof but uniformly tapering outwardly therefrom, a cut-out portion formed near the rear of said body member and entering into the bore of said body member with its face extending angularly and forwardly toward the front of said body member, a circular groove formed in the bore of said body member immediately to the rear of said tapered counterbore face of said cut-out portion, a crescent shaped eccentric groove formed within said bore immediately in back of said circular groove and below the rearwardly positioned cut-out portion, an externally threaded collet having a plurality of longitudinal slits therein extending from said body member and adapted to fit over the muzzle end of a gun barrel, and a lock nut threadably secureable thereto to anchor said collet to said muzzle end of a gun barrel.

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