

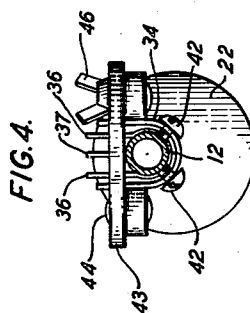
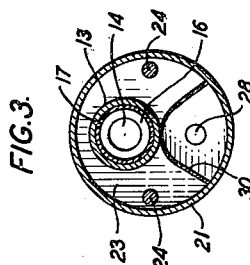
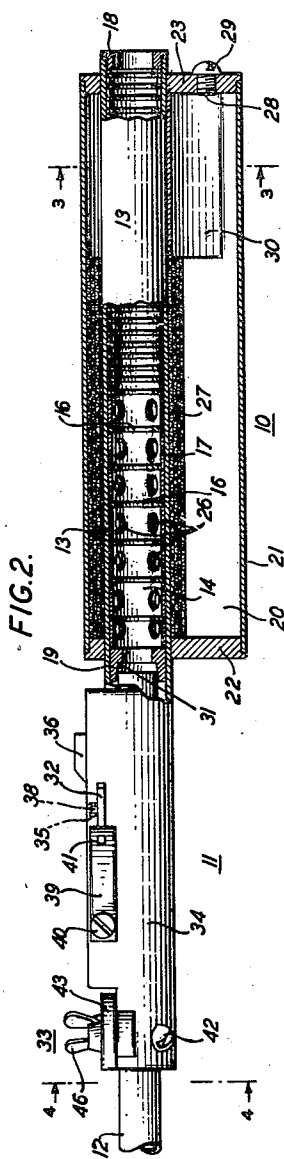
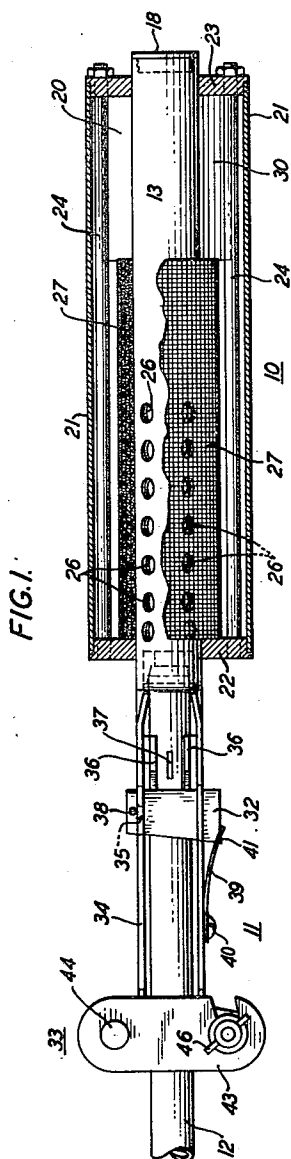
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## FLASH AND BLAST REDUCER

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## UNITED STATES PATENT OFFICE

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## FLASH AND BLAST REDUCER

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1 Claim. (Cl. 89—14)

1

This invention relates to firearms and more particularly to the reduction of flash and muzzle blast.

The principal object of the invention is to reduce the flash and muzzle blast associated with the discharge of a firearm. Other objects are to improve the efficiency of a reducer for this purpose and provide for quick attachment and detachment.

When avoidance of detection is a consideration it is of importance to reduce to a minimum not only the muzzle blast but also the flash which accompanies the discharge of a firearm. Also, it is desirable that the device for accomplishing this be adapted for quick attachment or detachment. Furthermore, the device should not interfere with the accuracy of fire.

In accordance with the present invention there is provided a device which is very effective both as a silencer and as a flash reducer, does not interfere with the accuracy of fire, and is quickly attachable to, or detachable from, the muzzle of a standard firearm. The reducer comprises an inner chamber through which the bullet passes, an outer expansion chamber communicating with the inner chamber, and heat-absorbing material within one or both of the chambers. This material may comprise metallic elements having a large surface area such, for example, as baffles or screen. In order to prevent flashing at the breech an escape hole is provided in the outer wall of the expansion chamber. However, if silencing is of more importance than flash reduction this hole may be closed.

For maximum efficiency the elements within the inner chamber should have as small clearance as possible for the bullet. However, if the clearance is too small and if the reducer is not properly aligned with the bore of the barrel, the bullet may accidentally come into contact with the elements and be deflected, producing a poor dispersion pattern. To avoid this the clearance may be increased toward the front end. If these elements are annular baffles, for example, the diameters of the holes therein may be progressively increased toward the front end of the chamber. Also, to improve the efficiency, the forward baffles are preferably more closely spaced than the others. For attaching the reducer firmly in position there may be provided a clamping device comprising a conical seat which fits the muzzle, a wedge which fits behind the forward sight, and a pivoted bar which is swung across the barrel of the firearm.

The invention will be more fully understood

2

from the following detailed description and by reference to the accompanying drawings, in which like reference characters refer to similar or corresponding parts and in which:

5 Figs. 1 and 2 are, respectively, a top and a side view, partly in section, of a flash and blast reducer in accordance with the invention attached to the muzzle of a firearm; and

10 Figs. 3 and 4 are cross-sectional views taken, respectively, along the lines 3—3 and 4—4 of Fig. 2.

Figs. 1 and 2 show a flash and blast reducer 10 in accordance with the invention attached by means of a clamping device 11 to the muzzle 15 of the barrel 12 of a firearm. The reducer 10 comprises an inner chamber 14, through which the bullet passes, and an outer expansion chamber 20, each containing heat-absorbing material in the form of metallic elements having a large 20 surface area. The walls of the inner chamber 14 are formed by the metal tube 13. Within the chamber 14 are a number of annular metallic baffles 16 transversely positioned throughout the chamber, separated from each other by the metal 25 spacing rings 17, and held tightly in place by the annular threaded end piece 18 which screws into the internally threaded end of the tube 13. The special annular element 19 at the rear end of the tube 13 is securely fastened to the tube 30 13 as, for example, by brazing.

Greater efficiency, for a given weight, is obtained if the baffles 16 nearer the muzzle end of the chamber 14 are spaced more closely than those at the other end. Also, for maximum efficiency the clearance for the bullet as it passes 35 through the baffles 16 should be as small as possible without allowing the bullet to touch the edge of the hole, which would deflect the bullet and interfere with the accuracy of fire. However, due to a possible slight misalignment of the 40 silencer 10 with the bore of the barrel 12 and to other causes, such as the flexural vibration of the barrel and the silencer, this minimum clearance cannot be maintained throughout the length of the chamber 14. Therefore, the clearance is 45 increased toward the front end of the chamber by progressively increasing the diameters of the holes in the baffles 16 to insure a safe clearance for the bullet during its passage through the silencer 10.

To improve further the effectiveness of the 50 reducer 10 an outer expansion chamber 20 is built around the inner tube 13. The outer walls of the chamber 20 are constituted by the metal tube 21 and the flanged end pieces 22 and 23. The end 55 pieces 22 and 23 are held tightly against the ends

of the tube 21 by means of the two rods 24, fit the inner tube 13 tightly, and may be brazed or otherwise secured thereto. A number of holes 26, through the inner tube 13 and the spacing rings 17, permit the powder gases to enter the expansion chamber 20. As shown, the holes 26 are arranged in four rows spaced at 90 degrees. They need extend for only half, or less, of the length of the chamber 20. The chamber 20 contains heat-absorbing material in the form of metal screen 27 wrapped around the tube 13. The efficiency of the device, both in silencing and in flash reduction, increases as the amount of this material is increased. However, to save weight, the screen 27 does not entirely fill the chamber 20. It should, however, at least cover the holes 26 with several layers. The U-shaped piece 30 prevents the roll of screen 27 from sliding forward on the tube 13. Fig. 3 is a cross-sectional view taken through the member 30, in the direction of the arrows. In order to prevent the gases from reentering the barrel 12, and possibly causing a flash at the breech, there is provided an escape hole 28 in the outer wall of the chamber 20, preferably located at the front end. However, if good silencing action is considered to be of more importance than flash reduction the hole 28 may be closed, as by the screw 29. The chamber 20 may be eccentrically positioned about the inner tube 13, with the larger part underneath, in order to clear the line of sight.

The reducer 10 is securely attached to the muzzle of the barrel 12 by means of the clamping device 11 which comprises a conical seat 31 formed in the element 19, a wedge 32, and a three-point rear clamp 33. The seat 31 fits over the muzzle of the barrel 12 and is made conical so that it will accommodate variations in the outer diameter of the muzzle. The clamping device 11 includes a U-shaped trough 34 which is a continuation of the tube 13 and extends below and along the sides of the barrel 12. The trough 34 may be formed by splitting the rear portion of the tube 13 along the top and spreading to form the sides. The wedge 32 slides through slots in the sides of the trough 34, over the upper side of the barrel 12, and fits against the rear of the guards 36 which are associated with the forward sight 37. Near the narrower end of the wedge 32 there is provided a pin 38 which will pass through a notch 35 in the upper edge of the adjacent slot, when the wedge is withdrawn past the sight guards 36, but will not pass through the other slot. This prevents the wedge 32 from being entirely withdrawn, with the possibility of being lost. After the wedge 32 has been pushed into position it is prevented from working loose by the spring 39 which swings on a pivot 40 and has a hole 41 fitting over a corner of the wedge. The rear clamp 33 makes three points of contact with the barrel 12, two provided by the screws 42 in the trough 34 and the third by the bar 43 which

swings on the pivot 44 across the upper side of the barrel and is held in place by the wing nut 46. Fig. 4 is a cross-sectional view through the barrel 12 just at the rear of the clamping device 11 in the direction indicated by the arrows.

It is seen that no modification of the standard barrel 12 is required for mounting the reducer 10. To remove the reducer it is only necessary to loosen the nut 46, swing the bar 43 around, lift and swing the spring 39 and partially withdraw the wedge 32.

What is claimed is:

A device for attaching a flash and blast reducer to the muzzle of a firearm having a fixed projection on the barrel thereof comprising a U-shaped trough attached to the rear end of the reducer and adapted to receive the barrel, a conical seat attached to the front end of said trough and adapted to fit over the muzzle, two opposed slots in the sides of said trough, a wedge adapted to extend through said slots and over the barrel back of the projection to hold said seat against the muzzle, means for holding said wedge securely in position, means for preventing the removal of said wedge from one of said slots, and an adjustable rear clamp associated with said trough and adapted to contact the barrel at three circumferentially spaced points.

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