

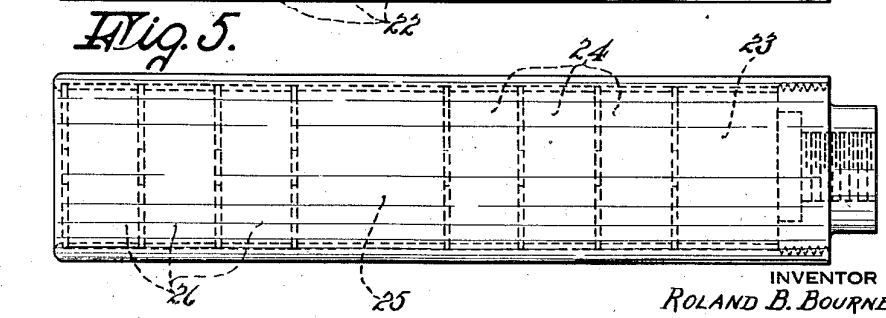
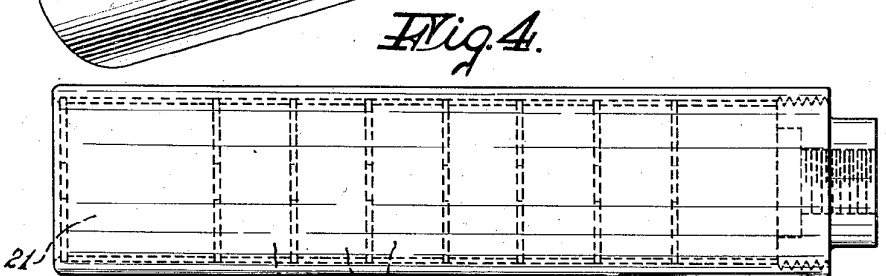
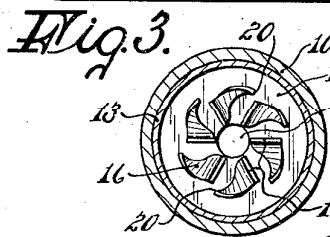
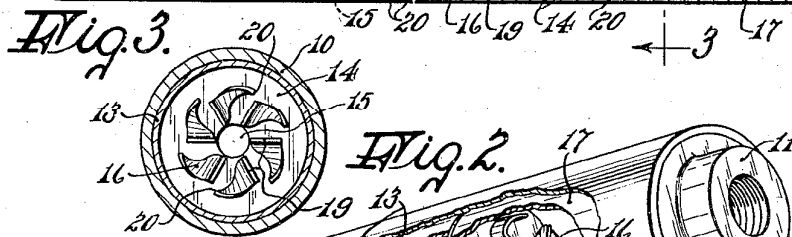
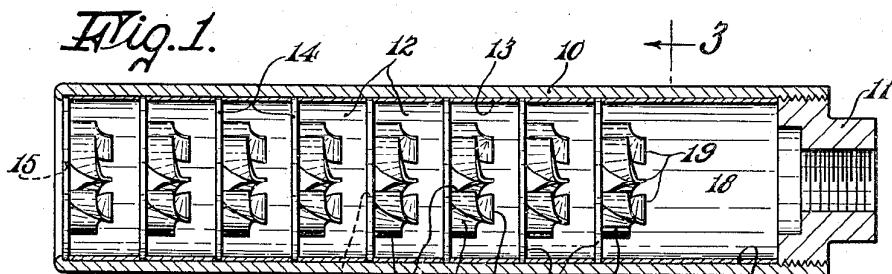
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2,375,617

GUN SILENCER

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GUN SILENCER

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13 Claims. (Cl. 181-47)

The present invention relates to a device for silencing the report noise of firearms.

The prime purpose of the invention is to provide gas discharge delaying means by giving the gases a more vigorous whirl and of longer duration than has heretofore been accomplished in devices of this character. The more gas that can be given a rapid whirling motion, the longer the time which must elapse for the final discharge of the gas. Since the report noise is a function of the rate of rise of pressure of the gas as it enters the atmosphere, it will be seen that this delaying action results directly in reducing or preventing report noise.

Referring to the drawing,

Fig. 1 shows a longitudinal cross-sectional view of the device with the interior vanes and partitions shown in full;

Fig. 2 shows an isometric cut-away view exposing the vane system in the whirl chambers;

Fig. 3 is a section on line 3-3 of Fig. 1;

Fig. 4 is a side view showing a modified arrangement of chambers; and

Fig. 5 is a side view showing a further modification.

Referring to Fig. 1, the device comprises a cylindrical chamber 10 having at its inlet end a threaded header 11 adapted to be screwed on the end of the firearm, and a series of whirl chambers 12 formed by the spacers 13 and the transverse partitions 14. The partitions 14 each have a centrally located aperture 15 for the passage of the projectile, and are fitted with a plurality of vanes 16 disposed around the periphery of the aperture 15 and so shaped as to translate the direction of the expanding gases in a whirl chamber into a peripheral motion in the annular space existing between the outside of the vane assembly and the inside of the spacer, which is contiguous to the inside of the silencer casing.

At the inlet end of the silencer a relatively long spacer 17 is used to form an initial expansion chamber 18, the gas therein being given a whirling motion by the first set of vanes it encounters. The outlet end of the casing is spun over or otherwise formed to prevent the transverse partitions 14 from blowing out and to permit the inlet member 11 being screwed in tightly against the assembly of transverse headers and spacers.

The vane assembly is best shown in Fig. 2. The motion of the expanding gases as they enter an expansion chamber has both radial and longitudinal components. The shape of the vanes is such that this motion will be changed into a peripheral whirl with the least possible amount of

turbulence. The leading edges 19 of the vanes extend radially, and preferably lie in a plane parallel to the transverse partitions, while the trailing edges 20 of the vanes extend longitudinally and are elements of a cylindrical surface. The vanes can be considered as airfoils having a small angle of attack at the leading edge. They extend from one partition, to which they may be affixed by welding, about two thirds of the distance to the next partition. All the whirl chambers preferably rotate the gas in the same direction.

Fig. 4 shows an embodiment of the invention wherein the expansion chamber 21 is positioned at the outlet end of the silencer instead of at the inlet end. This arrangement of whirl chambers 22 and expansion space 21 may give a slightly better performance than that of Fig. 1, depending on the nature and quantity of the powder charge. The vane structure in the whirl chambers has not been shown in order to avoid complexity.

Fig. 5 shows an embodiment of the invention employing an expansion chamber 23, a series of whirl chambers 24, a second expansion chamber 25, and a final series of whirl chambers 26. This arrangement results in a lighter weight silencer for the same performance than where a single expansion chamber is used. Here again the vane structure in the whirl chambers has been omitted. I have found that the optimum arrangement is to have the space taken up by expansion chambers about one quarter of the total volume of the silencer.

What I claim is:

1. A gun silencer comprising a cylindrical casing, centrally apertured partitions extending transversely within the casing and defining whirl chambers, and a plurality of vanes secured to each such partition and surrounding the aperture therein, each vane being in the form of a warped surface and extending partway from the partition towards the opposite wall of the whirl chamber in a direction towards the muzzle of the firearm, each vane having its leading edge extending substantially radially of the chamber and its trailing edge substantially perpendicular to the partition, said trailing edges collectively lying on a cylindrical surface concentric with and spaced from the cylindrical wall of the casing.

2. A gun silencer comprising a cylindrical casing having means for attachment to the barrel of a firearm, a plurality of centrally apertured partitions extending transversely within the casing and defining between certain of them whirl

chambers, each of said whirl chambers containing a plurality of vanes secured to one partition forming a wall thereof and surrounding the aperture therein, and formed to divert gas from the central passage through said apertures and to give it a whirling motion circumferentially of the chamber, said vanes being spaced from the outer wall and from the second partition wall of said chamber, certain of said partitions being spaced further apart to form one or more expansion chambers.

3. A gun silencer comprising a cylindrical casing having means for attachment to the barrel of a firearm, a plurality of centrally apertured partitions extending transversely within the casing and defining between certain of them whirl chambers, each of said whirl chambers containing a plurality of vanes secured to one partition forming a wall thereof and surrounding the aperture therein, and formed to divert gas from the central passage through said apertures and to give it a whirling motion circumferentially of the chamber, said vanes being spaced from the outer walls and from the second partition wall of said chamber, certain of said partitions being spaced further apart to form one or more expansion chambers, one of said expansion chambers being located adjacent the muzzle of the firearm.

4. A gun silencer comprising a cylindrical casing having means for attachment to the barrel of a firearm, a plurality of centrally apertured partitions extending transversely within the casing and defining between certain of them whirl chambers, each of said whirl chambers containing a plurality of vanes secured to one partition forming a wall thereof and surrounding the aperture therein, and formed to divert gas from the central passage through said apertures and to give it a whirling motion circumferentially of the chamber, said vanes being spaced from the outer wall and from the second partition wall of said chamber, certain of said partitions being spaced further apart to form one or more expansion chambers, one of said expansion chambers being located adjacent the discharge end of the silencer.

5. A gun silencer comprising a cylindrical casing having means for attachment to the barrel of a firearm, a plurality of centrally apertured partitions extending transversely within the casing and defining between certain of them whirl chambers, each of said whirl chambers containing a plurality of vanes secured to one partition forming a wall thereof and surrounding the aperture therein, and formed to divert gas from the central passage through said apertures and to give it a whirling motion circumferentially of the chamber, said vanes being spaced from the outer wall and from the second partition wall of said chamber, certain of said partitions being spaced further apart to form one or more expansion chambers, one of said expansion chambers being located adjacent the muzzle of the firearm and another between groups of said whirl chambers.

6. A gun silencer comprising a cylindrical casing having means for attachment to the barrel of a firearm, a plurality of centrally apertured partitions extending transversely within the casing and defining between certain of them whirl chambers, each of said whirl chambers containing a plurality of vanes secured to a partition forming a wall thereof surrounding the aperture therein, and formed to divert gas from the central passage through said apertures and to give it a whirling motion circumferentially of the chamber, each

vane being in the form of a warped surface and extending partway from the partition towards the opposite wall of the whirl chamber in a direction towards the muzzle of the firearm, each vane having its leading edge lying in a plane substantially parallel to that of the partition and extending substantially radially of the chamber and its trailing edge substantially perpendicular to the partition, said trailing edges collectively lying on a cylindrical surface concentric with and spaced from the cylindrical wall of the casing, certain of said partitions being spaced further apart to form one or more expansion chambers.

7. A gun silencer comprising a cylindrical casing having means for attachment to the barrel of a firearm, a plurality of centrally apertured partitions extending transversely within the casing and defining between certain of them whirl chambers, each of said whirl chambers containing a plurality of vanes secured to a partition forming a wall thereof surrounding the aperture therein, and formed to divert gas from the central passage through said apertures and to give it a whirling motion circumferentially of the chamber, each vane being in the form of a warped surface and extending partway from the partition towards the opposite wall of the whirl chamber in a direction towards the muzzle of the firearm, each vane having its leading edge lying in a plane substantially parallel to that of the partition and extending substantially radially of the chamber and its trailing edge substantially perpendicular to the partition, said trailing edges collectively lying on a cylindrical surface concentric with and spaced from the cylindrical wall of the casing, certain of said partitions being spaced further apart to form one or more expansion chamber, and one of said expansion chambers being located adjacent the muzzle of the firearm.

8. A gun silencer comprising a cylindrical casing having means for attachment to the barrel of a firearm, a plurality of centrally apertured partitions extending transversely within the casing and defining between certain of them whirl chambers, each of said whirl chambers containing a plurality of vanes secured to a partition forming a wall thereof surrounding the aperture therein, and formed to divert gas from the central passage through said apertures and to give it a whirling motion circumferentially of the chamber, each vane being in the form of a warped surface and extending partway from the partition towards the opposite wall of the whirl chamber in a direction towards the muzzle of the firearm, each vane having its leading edge lying in a plane substantially radially of the chamber and its trailing edge substantially perpendicular to the partition, said trailing edges collectively lying on a cylindrical surface concentric with and spaced from the cylindrical wall of the casing, certain of said partitions being spaced further apart to form one or more expansion chambers, one of said expansion chambers being located adjacent the discharge end of the silencer.

9. A gun silencer comprising a cylindrical casing having means for attachment to the barrel of a firearm, a plurality of centrally apertured partitions extending transversely within the casing and defining between certain of them whirl chambers, each of said whirl chambers containing a plurality of vanes secured to a partition forming a wall thereof surrounding the aperture therein, and formed to divert gas from the central passage through said apertures and to give it a whirling motion circumferentially of the chamber, each

vane being in the form of a warped surface and extending partway from the partition towards the opposite wall of the whirl chamber in a direction towards the muzzle of the firearm, each vane having its leading edge lying in a plane substantially parallel to that of the partition and extending substantially perpendicular to the partition, said trailing edges collectively lying on a cylindrical surface concentric with and spaced from the cylindrical wall of the casing, certain of said partitions being spaced further apart to form one or more expansion chambers, one of said expansion chambers being located adjacent the muzzle of the firearm and another between groups of said whirl chambers.

10. A gun silencer having a central through passage, a plurality of whirl chambers having vanes positioned to leave a free space at one end of each chamber and between the vanes and the outer wall of the chamber, and shaped to impart a whirling action to the gas, and one or more expansion chambers of larger size than the whirl chambers.

11. A gun silencer having a central through passage, a plurality of whirl chambers having vanes positioned to leave a free space at one end of

each chamber and between the vanes and the outer wall of the chamber, and shaped to impart a whirling action to the gas, and one or more expansion chambers of larger size than the whirl chambers, one of said expansion chambers being located adjacent the muzzle of the firearm.

12. A gun silencer having a central through passage, a plurality of whirl chambers having vanes positioned to leave a free space at one end of each chamber and between the vanes and the outer wall of the chamber, and shaped to impart a whirling action to the gas, and one or more expansion chambers of larger size than the whirl chambers, one of said expansion chambers being located adjacent the discharge end of the silencer.

13. A gun silencer having a central through passage, a plurality of whirl chambers having vanes positioned to leave a free space at one end of each chamber and between the vanes and the outer wall of the chamber, and shaped to impart a whirling action to the gas, and one or more expansion chambers of larger size than the whirl chambers, one of said expansion chambers being located adjacent the muzzle of the firearm and another between groups of said whirl chambers.

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