United States Patent

Bryant et al.

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[45] **June 20, 1972**

[54] GUN BLAST STRIPPER AND DIFFUSER

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[73] Assignee: **The United States of America as represented by the Secretary of the Navy**

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[52] **U.S. Cl.** ..... **89/14 C**, 89/37.5 R

[51] **Int. Cl.** **B64d 7/02**, F41f 17/12

[58] **Field of Search** ..... 89/14 R, 14 C, 14 D, 14 SB, 89/37.5 R

[56] **References Cited**

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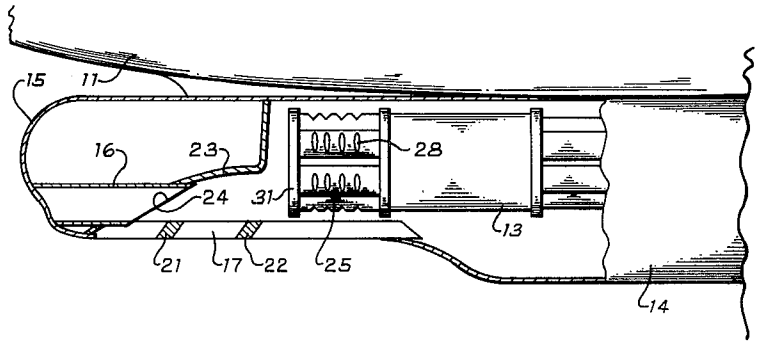
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[57] **ABSTRACT**

An apparatus for diffusing and directing the energy from a gun blast from aircraft mounted guns including a stripper attached to each said gun, said stripper having a plurality of openings for directing energy from a gun blast in a downward direction, a curved acceleration ramp positioned forward of said guns, and one or more cascades for directing energy downwardly.

3 Claims, 6 Drawing Figures



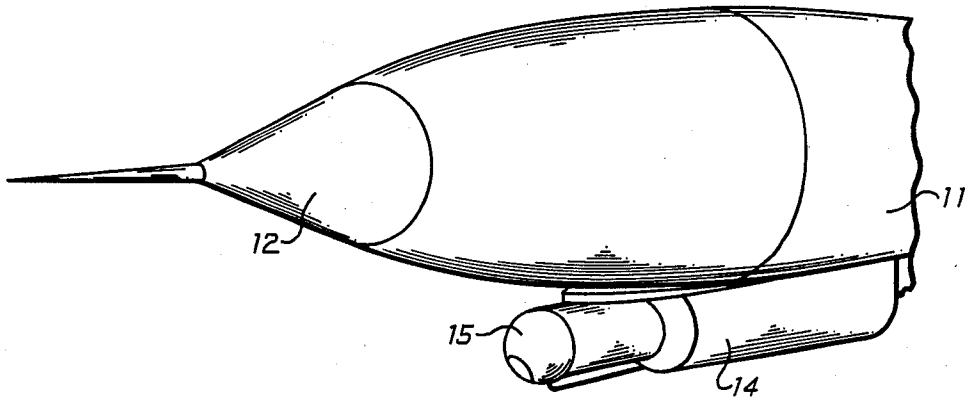


Fig. 1

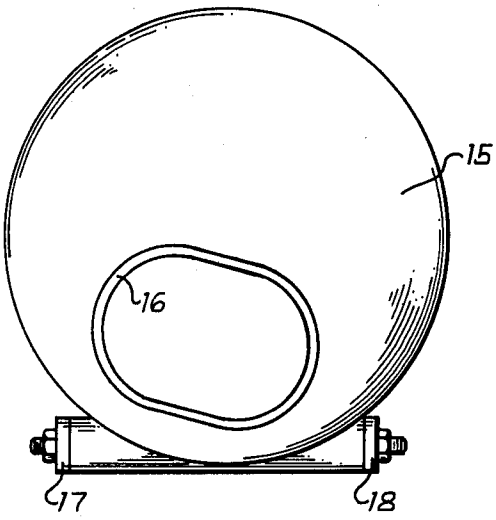


Fig. 2

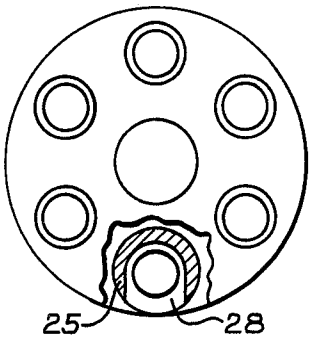


Fig. 3

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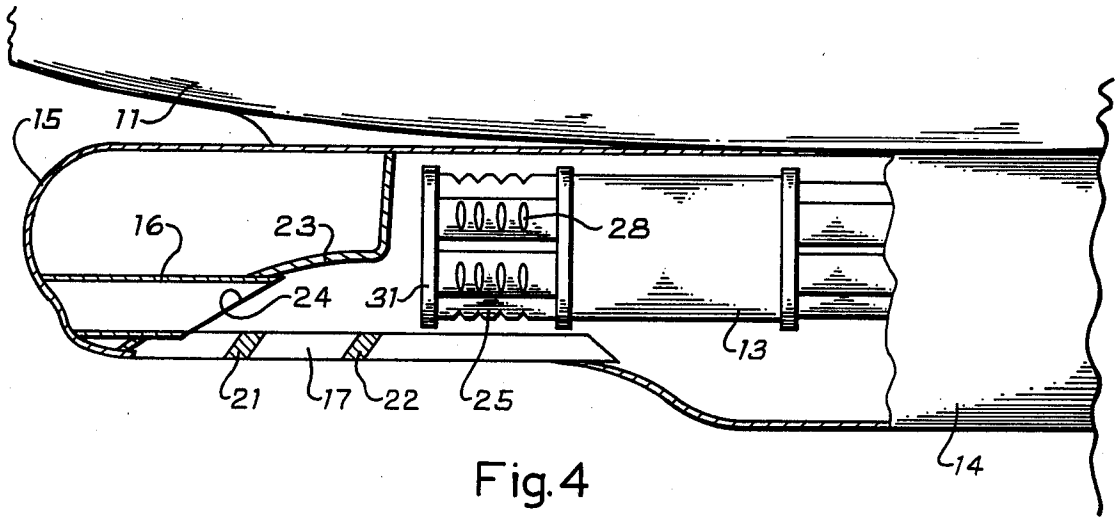


Fig. 4

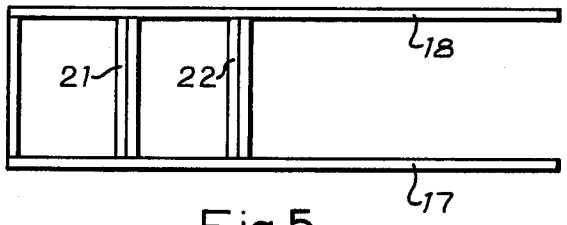


Fig. 5

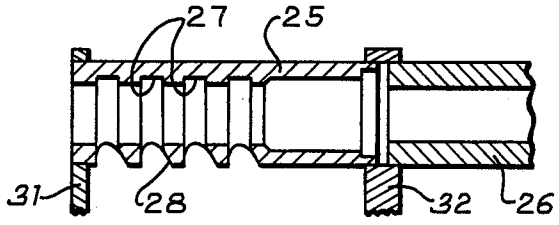


Fig. 6

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GUN BLAST STRIPPER AND DIFFUSER

BACKGROUND OF THE INVENTION

The present invention relates to an auxiliary device for automatic weapons, such as a machine gun, and more particularly relates to an auxiliary device for preventing damaging shock waves from causing engine "flame out" and protecting fragile equipment on an aircraft from the shock produced by firing a weapon, such as a rapid firing cannon.

The use of auxiliary devices attached to or adjacent to gun barrels is quite old in the gun art. For example, the idea that a baffle just outside the muzzle could be used to provide a thrust to reduce the recoil momentum dates back prior to World War I. These devices which are referred to as muzzle brakes, have had widespread use, particularly during World War II on antitank guns. Heretofore, however, there has not been any need to diffuse or direct a gun blast in any particular direction. Most present day military aircraft, such as the McDonnell Douglas Corporation Phantom II, has a radome in the forward fuselage and a Gatling type cannon is positioned in the forward fuselage beneath the radar. The repeated shock waves created by firing the weapon can have an adverse effect on the relatively frangible hardware of the radar system. Accordingly, it is desirable to reduce as much as possible, this adverse effect caused by repeated and rapid firing of the weapon.

Also gun installations located forward of jet engine inlet ducts frequently cause engine operational problems such as compressor stall or engine flame out when the weapon is fired at moderate to high altitudes (35,000 to 50,000 feet and above). The engine problems are related to interruption of the air flow due to pressure and/or temperature changes to normal air inlet flow of the engine due to muzzle blast effects. The diffusion and deflection of muzzle blast and residue from engine inlets can improve or prevent the detrimental engine operational effects caused by firing the weapon. The diversion and diffusion of muzzle blast away from the engine air inlet ducts is therefore also a desired result of any muzzle diffuser located forward of the engine inlets on a high performance jet aircraft.

SUMMARY OF THE INVENTION

The present invention relates to a gun blast stripper and diffuser that is provided on an aircraft for diverting gases from guns attached on the aircraft. A stripper is attached to each gun barrel and the stripper is provided with a plurality of slots which direct energy downwardly. A shroud is placed around each weapon, and an opening is provided in the bottom of the shroud for permitting escape of the gases stripped from the guns. An acceleration ramp is positioned forward of the strippers and a fire tube is provided through the acceleration ramp and dome of the shroud to permit passage of the bullets. A pair of strakes are positioned in the shroud opening and one or more cascades are provided transverse to the strakes in order to direct the gun blast energy downwardly.

It is therefore a general object of the present invention to provide an apparatus for stripping, diffusing and deflecting the gun blast from an aircraft mounted weapon.

Other objects and advantages of the present invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a partial isometric view of a forward end of an aircraft showing a gun blast diffuser attached thereon;

FIG. 2 is a front view of a diffuser showing a dome having a fire tube therein;

FIG. 3 is an end view, partially broken away, showing gun barrels and strippers attached thereto;

FIG. 4 is a partial sectional view showing a preferred embodiment of the present invention;

FIG. 5 is a bottom view showing strakes and cascades; and

FIG. 6 is a partial sectional view showing a stripper attached to a gun barrel.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings, a forward end of an aircraft fuselage 11 is shown having a radome 12. A gun 13, such as a multi-barrel machine gun, is mounted to fuselage 11 and a shroud 14 surrounds the barrels of gun 13. As shown in FIGS. 1, 2, and 4 of the drawings, shroud 14 has a spherical dome portion 15 on its forward end and a firing tube 16 is provided through dome portion 15 for providing an exit for bullets fired from gun 13. Shroud 14 is provided with a longitudinally extending bottom opening and a pair of strakes 17 and 18 are positioned in the opening. A pair of cascades 21 and 22 are attached to strakes 17 and 18 and are slanted to facilitate diffusion of the muzzle blast of gun 13. A curved ramp 23 is provided in shroud 14 forward of guns 13 and ramp 23 is curved downwardly to deflect the muzzle blast of gun 13 downwardly and over cascades 21 and 22. As best shown in FIG. 4 of the drawing, firing tube 16 passes through curved ramp 23 and tapered end 24 of tube 16 serves as a pickoff lip to further diffuse the muzzle blast and divert it over cascades 21 and 22.

Referring now to FIGS. 3, 4, and 6 of the drawing, a stripper 25 is provided on the end of each gun barrel 26. By way of example, gun 13 might be a machine gun having six barrels 26 which are rotatable, and gun 13 is designed so that a projectile is fired through the lowest positioned barrel 26. A plurality of enlarged chambers 27 are provided in each stripper and each chamber is provided with an aperture 28 that permit escapage of gases produced by firing gun 13. Forward plate 31 and rear plate 32 are provided for positioning strippers 25 with barrels 26, and apertures 28 in strippers are positioned so, that upon firing of gun 13 the gases will pass through the bottom opening of shroud 14.

In operation, a large portion of the gas produced by firing gun 13 is stripped into collection chambers 27 of strippers 25 and guided downwardly past the aft portion of strakes 17 and 18. Some of the remaining expanding gas is collected and guided downwardly by cascades 21 and 22. Curved ramp 23 and pickoff lip 24 also direct the expanding gases downwardly so that only a very small amount of gas exits through firing tube 16 with the projectile.

It can thus be seen that the blast hood and diffusion stripper of the present invention directs the energy produced by firing the guns away from the inlet ducts of the jet engine and thus eliminates the problem of engine flameout during high altitude and high angle of attack while firing the guns.

We claim:

1. A device for deflecting a gun blast from an aircraft mounted gun having a plurality of rotatable barrels comprising:
   - a hood surrounding said gun, said hood having a longitudinally extending bottom opening and a curved ramp attached inside said hood forward the end of said gun for deflecting gas through said bottom opening,
   - a firing tube attached to said hood and extending through said curved ramp for providing a passageway for projectiles fired from said gun, and
   - a gas stripper attached to each said barrel and having a plurality of collection chambers therein, with each said collection chamber having a single aperture for permitting passage of gas through said bottom opening.

2. A device for deflecting a gun blast from an aircraft mounted gun as set forth in claim 1 having a pair of cascades positioned transverse to said longitudinally extending bottom opening.

3. A device for deflecting a gun blast from an aircraft mounted gun as set forth in claim 1 wherein a spherical dome is provided on the forward end of said hood.

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