United States Patent [19]

Kaltmann

[11] **3,710,683**

[45] **Jan. 16, 1973**

[54] **MUZZLE-BRAKE WITH A FLASH HIDER FOR AUTOMATIC WEAPONS AND GUNS**

[75] Inventor: **Hans-Joachim Kaltmann**, Dusseldorf, Germany

[73] Assignee: **Rheinmetall GmbH**, Dusseldorf, Germany

[22] Filed: **Oct. 5, 1970**

[21] Appl. No.: **77,834**

[30] **Foreign Application Priority Data**

Oct. 24, 1969 Germany.....P 19 53 539.8

[52] **U.S. Cl.**.....**89/14 B**, 89/14 C, 89/14 E

[51] **Int. Cl.**.....**F41c 21/18**

[58] **Field of Search**.....89/14 R, 14 B, 14 C, 14 D, 89/14 E

[56] **References Cited**

UNITED STATES PATENTS

2,322,370 6/1943 Lance.....89/14 C

FOREIGN PATENTS OR APPLICATIONS

633,617 10/1963 Belgium.....89/14 B

911,049 6/1946 France.....89/14 B

Primary Examiner—Stephen C. Bentley

Attorney—Ernest G. Montague

[57] **ABSTRACT**

A muzzle-brake with a flash hider for automatic weapons and guns, which comprises an integral device which includes a first section forming a flash hider. The latter comprises a conical sleeve which is widening forwardly. A second section forms a muzzle-brake and follows the first section. The muzzle-brake has a rearwardly increasing outer diameter and a cylindrical bore. The wall of the second section has a plurality of rows of radial bores distributed over the periphery, and the wall of the first section has axial bores which are widening in axial and radial direction.

3 Claims, 2 Drawing Figures

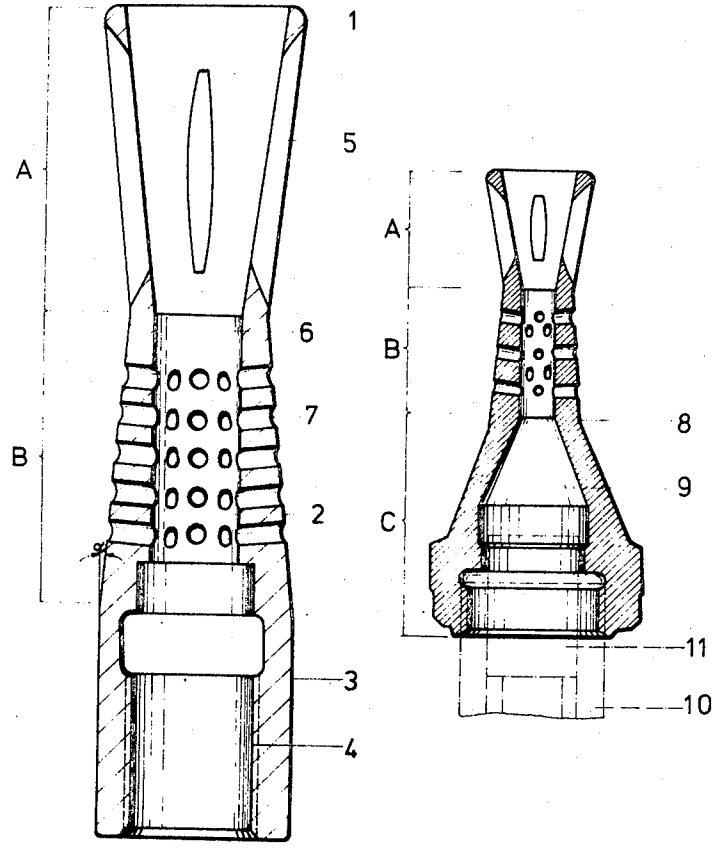


Fig. 1

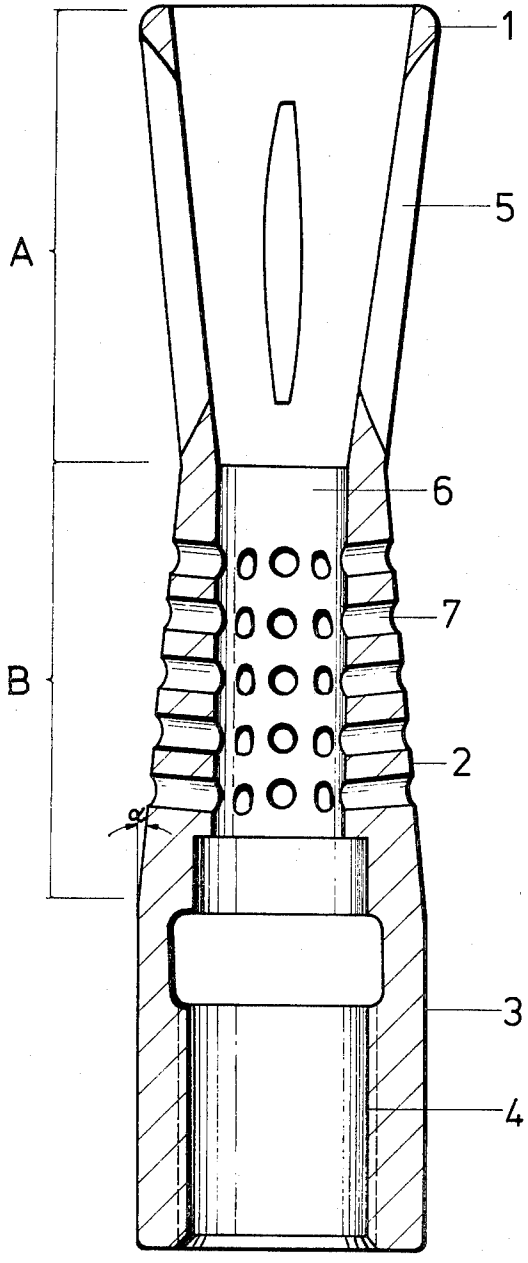
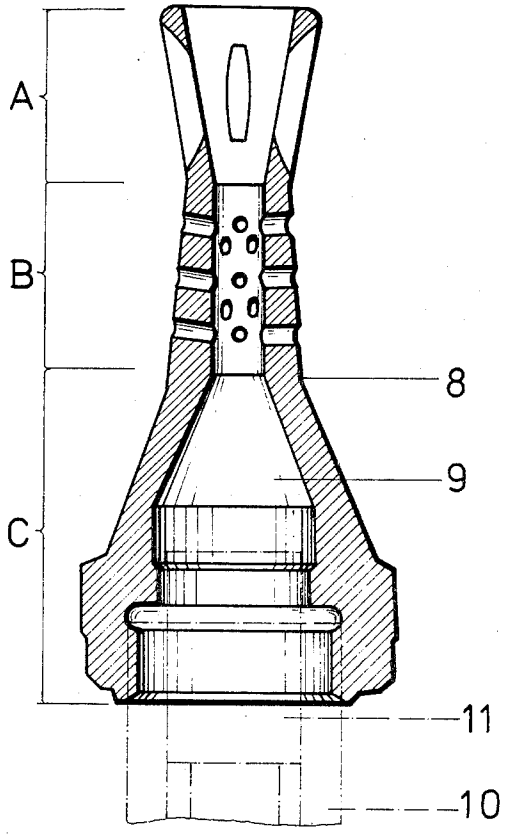


Fig. 2



Inventor
Hans-Joachim Kaltmann
By Lawrence Pennington
Attorney

MUZZLE-BRAKE WITH A FLASH HIDER FOR AUTOMATIC WEAPONS AND GUNS

The present invention relates to a muzzle-brake with a flash hider for automatic weapons and guns.

Upon shooting with stronger propelling charges and in case of high efficiency guns, respectively, muzzle-brakes are mounted on the muzzle, in order to consume the strong recoil forces occurring upon emergence of the shell from the barrel. Such muzzle-brakes have mostly lateral openings and guiding faces, through which the occurring gases are by-passed. As a disadvantage, however, an increased flame formation occurs thereby, on the one hand, and a gas pressure effect, as well as a sight obstruction to the gunner or the adjacent gunner, on the other hand.

For the prevention of the first mentioned drawback, in particular with weapons with small calibers, by example, machine guns, the muzzle-brake is equipped additionally with a flash hider. The known devices of this type, which consist mostly of a plurality of individual parts, do not satisfy, however, since by such arrangement other drawbacks, as sight obstructions by smoke formation occur. In the combined devices, composed of a plurality of individual parts, show, in addition, after a comparatively short time of operation, a contamination of the powder gases, which brings about, on the one hand, a reduction of the effect of the muzzle-brake and, on the other hand, renders more difficult the disassembly of the device and even makes the latter in many instances unusable.

For the prevention of the gas pressure effect disturbing to the gunners, in a known recoil retarder equipped with lateral gas exit slots and designed for a manually operated weapon, openings provided behind the slots and obliquely disposed forwardly are arranged in the wall of the recoil retarder. By this arrangement the viewing conditions of the gunners is worsened by the gases concentratingly occurring in the muzzle range.

It has been recognized, that in the known combined devices a mutual influence of the muzzle-brake onto the flash hider and vice versa occurs, whereby the influence could not be foreseen as to its extent.

It is one object of the present invention, to provide a muzzle-brake with a flash hider for automatic weapons and guns, which shows with an optimum effect even in case of a longer use no disturbing side effects, which in addition has a simple structure, in order to prevent soiling to a great extent and to make possible, respectively, an easy cleaning.

It is another object of the present invention, to provide a muzzle-brake with a flash hider for automatic weapons and guns, wherein the device, consisting of an integral structural part, has a forward first section forming the flash hider, which in known manner comprises a forwardly widening conical sleeve, as well as a second section forming the muzzle-brake, following the first section, and having a rearwardly increasing outer diameter and cylindrical bore, the wall of which has a plurality of rows of radial bores distributed over the periphery, while the wall of the forward section, forming the flash hider has axial slots widening in axial and radial direction and passing through the wall.

It has been found, that such basic type of structure, is applicable in weapons of a smaller caliber, as well as in cannons and guns, thus also in weapons of a larger

caliber with advantage and that the obtainable effects in relation with the muzzle-brake and with the flash hider are constant in weapons of different calibers, if the sections forming the flash hider and the muzzle-brake stand in a predetermined ratio relative to each other as to their dimensions and in particular are about of equal length. Particularly advantageous and constant results have been obtained, if the outer wall of the second section forming the muzzle-brake is rearwardly enlarged at an angle of about 3°–5° relative to the longitudinal axis and the radial bores are disposed perpendicularly to the outer wall.

Furthermore, it has been found that in relation to the obtainable effect, the size and the number and, thereby, the cross-section of the bores provided in the wall of the muzzle-brake are in a particular relation to the caliber of the weapon. As advantageous it has been found, when the total cross-section of these bores corresponds to about 60-times of the caliber and the cross-section of one bore corresponds about to the caliber of the weapon. In other words, about 60 bores, the measurements of which are at a predetermined ratio to the caliber of the weapon, are distributed over the periphery of the muzzle-brake.

As experiments performed with the subject matter of the present invention indicate, not only optimum effects have been obtained in relation to the muzzle-brake and the flash hider, rather, in addition, an appreciable reduction of the detonation pressure effect on the gunners is experienced.

An advantageous advancement of the present invention for the use of weapons with a movable barrel, by example, in machine guns, resides in the fact that the device has a third section following the muzzle-brake with a recoil amplifier as a retaining chamber.

With these and other objects in view, which will become apparent in the following detailed description, the present invention will be clearly understood, in connection with the accompanying drawings, in which:

FIG. 1 is an axial section of a muzzle-brake with a flash hider; and

FIG. 2 is an axial section of the same device with a recoil amplifier for weapons having a movable barrel.

Referring now to the drawings, and in particular to FIG. 1, a muzzle-brake 2 is combined with a flash hider 1 and comprises an integral structure member, which has at its rear end an extension 3 with an inner thread 4 for screwing thereto the weapon barrel and the gun barrel, respectively. The forward section A forming the flash hider 1 comprises a forwardly widening conical sleeve, in the wall of which axial slots 5 are provided which are widened in axial and radial direction. The second section B, form in the muzzle-brake, is of about equal length as the first section and has a cylindrical shell passage bore 6. The outer diameter of the muzzle-brake increases in rearward direction at an angle of about 3°–5°. In the wall of the muzzle-brake are distributed five rows of 12 bores 7 each over the periphery and in particular perpendicularly towards the outer wall. Due to the fact, that the outer diameter of the muzzle-brake is reduced in forward direction and the radial bores 7 are disposed perpendicularly to the outer wall, the exit edges of the bores are disposed on their backside always on a larger diameter than on the front side, whereby a gas stream declination in the direction

of shooting takes place. The cross-section of each bore 7 corresponds about with the caliber.

Referring now, again, to the drawing and in particular to FIG. 2, the device disclosed in this Figure is designed for an automatic weapon with a movable barrel relative to the weapon housing, as it is the case in many machine guns. The opening of the breech block is operated in connection with these weapons by the breech block is operated in connection with these weapons by the barrel recoiled by the gas pressure. These weapons require thus a gas capture chamber as a recoil amplifier, which gas capture chamber is disposed in front of the muzzle. The shown device 8 which is designed in its front sections A and B in the same manner as described in connection with FIG. 1, has a rearward section C with a forwardly reducing gas collecting chamber 9. The device is screwed on the weapon housing indicated in the drawing in point-dotted lines and surrounding the barrel, in which weapon housing 10 the barrel equipped with a guide sleeve 11, shown likewise in point-dotted lines, is displaceably guided.

While I have disclosed several embodiments of the present invention, it is to be understood that these embodiments are given by example only and not in a limiting sense.

I claim:

1. A muzzle-brake with a flash hider for automatic weapons and guns, comprising

an integral device including

a first section forming a flash hider,

said flash hider comprising a conical sleeve widening forwardly,

a second section forming a muzzle-brake and following said first section,

said muzzle-brake having a rearwardly increasing outer diameter and a cylindrical bore,

the wall of said second section having a plurality of rows of radial bores distributed over the periphery,

the wall of said first section having axial bores widening in axial and radial direction,

the outer diameter of said second section is rearwardly increased relative to the longitudinal axis for an angle of about 3°–5°, and

said radial bores are perpendicular to said outer wall.

2. A muzzle-brake with a flash hider for automatic weapons and guns, comprising

an integral device including

a first section forming a flash hider,

said flash hider comprising a conical sleeve widening forwardly,

a second section forming a muzzle-brake and following said first section,

said muzzle-brake having a rearwardly increasing outer diameter and a cylindrical bore,

the wall of said second section having a plurality of rows of radial bores distributed over the periphery,

the wall of said first section having axial bores widening in axial and radial direction,

the cross-section of said radial bores provided in the wall of said muzzle-brake corresponds about to the caliber of the weapon, and

the total cross-section of said bores corresponds about with 60-times of the caliber of the weapon.

3. A muzzle-brake with a flash hider for automatic weapons and guns, comprising

an integral device including

a first section forming a flash hider,

said flash hider comprising a conical sleeve widening forwardly,

a second section forming a muzzle-brake and following said first section,

said muzzle-brake having a rearwardly increasing outer diameter, and a cylindrical bore,

the wall of said second section having a plurality of rows of radial bores distributed over the periphery,

the wall of said first section having axial bores widening in axial and radial direction,

a third section following said muzzle-brake adapted to be used with weapons having a movable barrel, and

said third section including an accumulation chamber to operate as a recoil amplifier.

* * * * *