May 22, 1962 C W. MUSSER 3,035,494

RECOIL ADJUSTING DEVICE

Filed Jan. 26, 1960

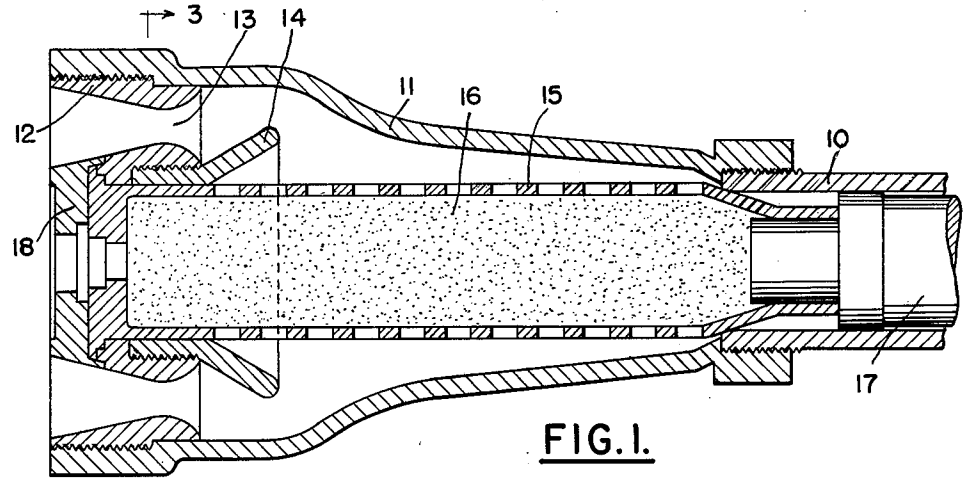


FIG. 1.

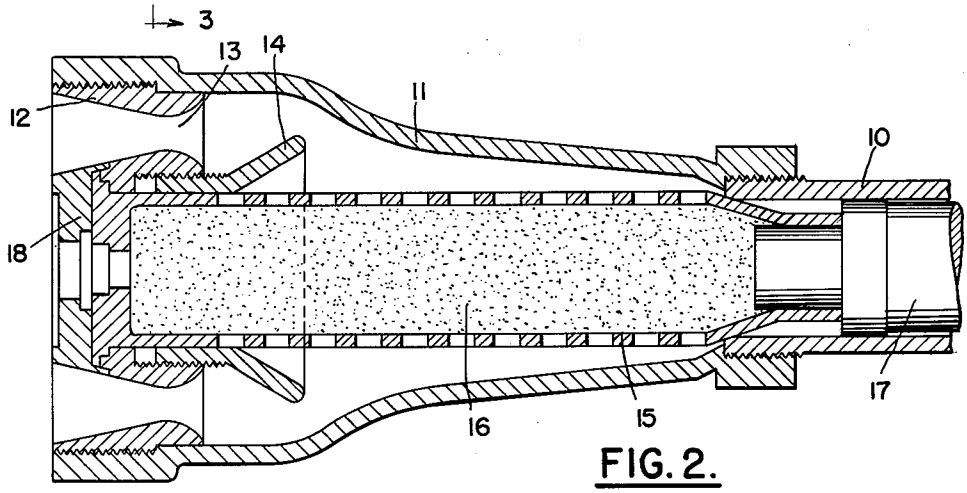


FIG. 2.

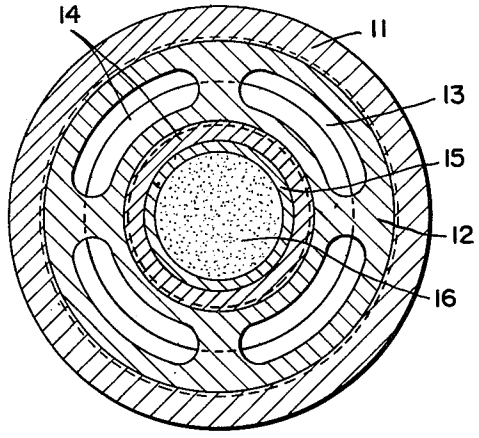


FIG. 3.

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RECOIL ADJUSTING DEVICE

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1 Claim. (Cl. 89—1.7)
(Granted under Title 35, U.S. Code (1952), sec. 266)

The invention described herein may be manufactured and used by or for the Government for governmental purposes without the payment to me of any royalty thereon.

This invention relates to weapons which function upon firing to produce a rearward blast of gas whereby recoil of the weapon is minimized. More particularly, it provides means which are operable to adjust such recoil to any desired value.

As is well understood by those skilled in the art, recoilless weapons normally include a barrel which is perforated to emit the gases by which the recoil is neutralized. Surrounding this barrel is a chamber which receives these gases and discharges them through a plurality of venturi openings at the breech end of the weapon.

Experience has shown that the recoil of the weapon is very sensitive to slight irregularities in the surface of the venturi openings. Due to difficulties in manufacture and to erosion during the use of the weapon, it is practically impossible to ensure that the venturi openings are such as to minimize recoil to the desired degree. The present invention avoids this difficulty by the provision of a ring or baffle which may be advanced into the chamber to any desired extent.

The invention will be better understood from the following description when considered in connection with the accompanying drawings and its scope is indicated by the appended claim.

Referring to the drawings:

FIG. 1 is a sectional view of a recoilless weapon with the recoil compensator in its extreme rear position,

FIG. 2 is a similar view showing the recoil compensator somewhat advanced into the chamber, and

FIG. 3 is a cross-section taken on the line 3—3 of FIG. 1.

The recoilless weapon illustrated by these figures includes a barrel **10** which has fixed to its breech end a chamber **11**. Threaded into the rear end of the chamber **11** is a removable liner **12** which has a plurality of venturi openings **13**. Threaded into the forward end of the member **12** is a conical ring **14** which may be adjusted longitudinally to different positions as indicated by FIG. 2.

The weapon illustrated by the various figures is adapted to fire a cartridge which includes a perforated casing **15** containing a propellant **16** and is closed at its forward end by a projectile **17**, this cartridge being held in place by a breech member **18** of a well known type.

As previously indicated, the conical member **14** is arranged to be adjusted longitudinally. This adjustment functions to change the area of the path of the gases from the cartridge to the venturi openings. It also lengthens the travel of the gas immediately adjacent the head of the cartridge. This results in higher efficiency since more of the powder is burnt.

In use the recoil compensator **14** functions somewhat in the nature of a baffle, since the powder gases, in order

to get through the restricted area between the compensator **14** and the chamber **11**, have to experience a drop in pressure. This reduces the pressure of the gases at the point where they are entering the venturi openings. Since the pressure at the entrance of the venturi openings is somewhat lower than in the chamber, the mass rate of flow through the venturi openings is reduced. This permits the venturi openings to function even after it has eroded to a slightly larger size, thus by adjustment of compensator **14** forward and backward, the recoil can be adjusted to zero or to any other desired value.

Those familiar with recoilless guns will understand that this invention more than provides replaceable or adjustable venturi openings, by reason of the fact that the member **14** may be adjusted forwardly to compensate for erosion or wear in the venturi openings, thus prolonging the useful life of those openings. As shown in the drawing even though the forward and outer end portion of member **14** may be subject to erosion, nevertheless with forward adjustment its outer end may be brought closer to chamber wall **11** due to the slope of this wall. This member **14** is an advantage for two reasons. It functions as a preliminary constriction although erosion may occur at the outer end of member **14** and the adjacent wall **11**. When member **14** wears and it is adjusted forwardly it cooperates with a new and nearer wall portion **11** where erosion has not been as serious. Another inherent advantage in member **14** which will be appreciated by those familiar with recoilless weapons is the fact that it functions to change the gas flow to an extent from laminar flow to turbulent flow, which latter counteracts the effect of erosion to a noticeable degree.

I claim:

A recoilless type weapon comprising in combination, a barrel, means forming a chamber fixed to a breech end portion of said barrel for reception axially thereto, a perforate casing of propellant spaced radially from said chamber forming means and communicating with said barrel, a removable liner fixed within a rear end portion of said chamber forming means, said liner being provided therein with a plurality of equally angularly spaced venturi openings, a breech member for holding a round within said weapon, said liner axially positioning the rear end of said perforate casing of propellant, and a member having a cylindrical portion threaded within said liner and being outside said perforate casing of propellant, said member having a forwardly and radially outwardly flaring ring portion forming with a rearwardly flaring portion of said chamber forming means a preliminary constriction through which propellant gases pass prior to passing rearwardly through said venturi openings, a wall of said chamber forming means adjacent the outer end of said flaring ring portion having an oppositely directed slope from that of said ring portion threaded within said liner, whereby said ring member may be adjustably moved forwardly to provide compensation for wear in the venturi openings.

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