Feb. 9, 1960 C W. MUSSER 2,924,149

RECOILLESS GUN WITH REVERSE GAS FLOW

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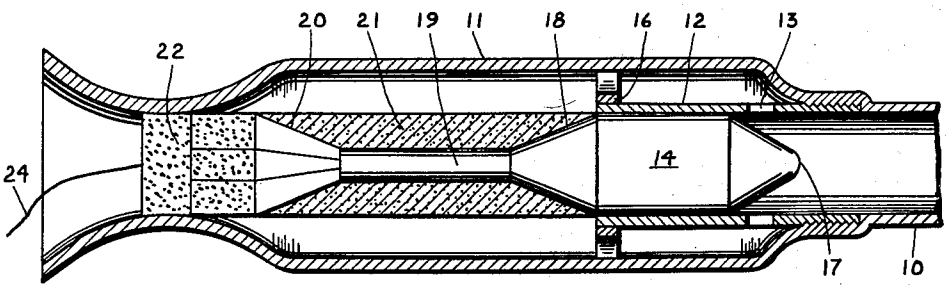

FIG. 1.

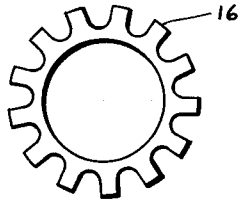

FIG. 3.

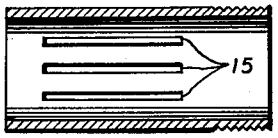

FIG. 2.

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RECOILLESS GUN WITH REVERSE GAS FLOW

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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 of any royalty thereon.

This invention relates to recoilless guns, and has for its principal object the provision of an improved arrangement of parts and method of operation whereby a more nearly complete burning of the propellant is effected.

As applied to guns having a gas chamber with a central orifice venturi, the gun of the present invention differs from those of the prior art in that it avoids an excessive efflux of the propellant from the venturi without a considerable increase in the volume of the chamber. As hereinafter explained, this highly desirable result is achieved by an improved arrangement wherein the gases generated by the firing of the projectile are initially made to travel in one direction and are thereafter forced to reverse their direction of travel. Obviously, this longer travel of the gases and more complete burning of the propellant results in a more efficient gun.

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 gun constructed in accordance with the present invention,

Fig. 2 is a sectional view of one form of the forward support for the projectile, and

Fig. 3 is a detail of the support in Fig. 1.

The gun of Fig. 1 includes a barrel **10** and a gas chamber **11** which is provided with a venturi orifice at its rear end. Extending from the nozzle into the chamber is a support **12**. This support is provided with openings **13** which are arranged to admit gas to the barrel **10** when the projectile main body of **14** is in its illustrated rest position. Alternatively, the openings between the chamber **11** and the barrel **10** may be in the form of slots **15** as indicated by Fig. 2. In either case the support is anchored to the casing of the chamber **11** by an anchoring member **16** of a form to afford ready flow of the gases therethrough.

The projectile **14** is generally of a type well known to those skilled in the art in that it includes a generally conical nose **17**, an adapter **18**, a boom **19**, fins **20** and a charge **21** adapted to be fired by an electric primer (not shown) which is connected to a lead **24**. The projectile **14** differs from those of the prior art in that a body **22** of frangible material, such as sintered sand, is affixed to its fins in a manner to close the throat of the venturi orifice in the chamber **11**.

During the ignition phases in the operation of the gun described above, the powder gases start streaming forwardly out of the openings **13** into the barrel **10**. At

the same time, the projectile starts to move forward and the mass of sintered sand starts to move rearwardly out of the throat of the venturi, the openings through which the gases pass and the mass of the sintered sand going through the venturi being so proportioned that the venturi is substantially opened at the instant that projectile closes the openings **13** (or the openings **15** of Fig. 2).

When the projectile has moved far enough to close the openings **13**, the flow of the gases in a forward direction is stopped. The powder particles are then masses in the forepart of the chamber and their flow is reversed resulting in prolonged time of travel to the venturi. Since the burning time of powder is measured in milliseconds this reversal of the propellant enables it to burn more completely and results in a smaller efflux of the propellant without increasing the volume of the chamber. As a result, the gun is more efficient since even a small decrease in the percentage of the propellant ejected through the venturi increases the energy within the gun.

After the projectile has passed the orifices **13** or **15**, the gases cannot flow ahead of the projectile but they can flow through the bore of the gun and also around through the openings in the support **12**, thereby lessening the resistance to the flow of gases into the region of the projectile.

While the gun has been shown as having a smooth bore, it is to be understood that the barrel **10** may be rifled and that projectile may be provided with a rotating band without departing from the spirit and scope of the present invention.

I claim:

The combination with a recoilless gun, of a projectile therefor including a generally conical nose at its fore end, a main body portion to which said nose is affixed, an axial boom extending rearwardly of the main body of the projectile, stabilizing fins affixed to a rear portion of said boom, an adapter between said boom and the main body of said projectile, a propelling charge around said boom between said fins and said adapter, means for firing said charge, and a mass of frangible sintered sand affixed to said fins, said gun having a barrel, a gas chamber around said projectile anud forming a venturi orifice in rear thereof initially substantially closed by said mass of sintered sand, said chamber having an outer wall secured the gun barrel, a tubular support for the main body of said projectile, a perforate anchoring member between a rear portion of said tubular support and an outer wall of said chamber, said tubular support being perforate radially outside of said conical nose portion of said projectile and in advance of the main body portion of the projectile, whereby on ignition of said propelling charge gas at first moves forwardly through the perforate portion of said tubular support and then after breakage of the frangible sintered sand moves rearwardly out of the venturi orifice giving the propellant a longer burning time.

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