

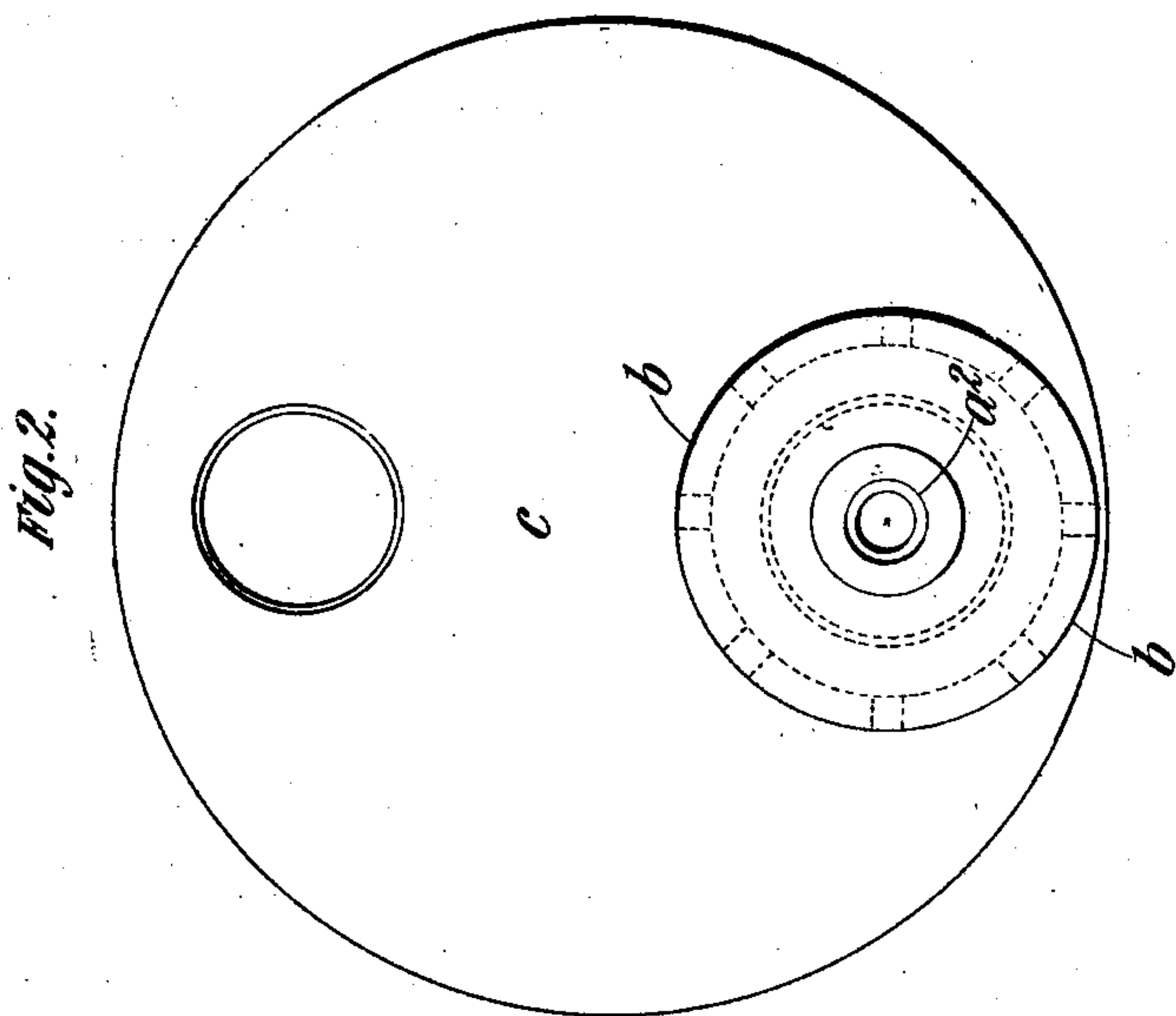
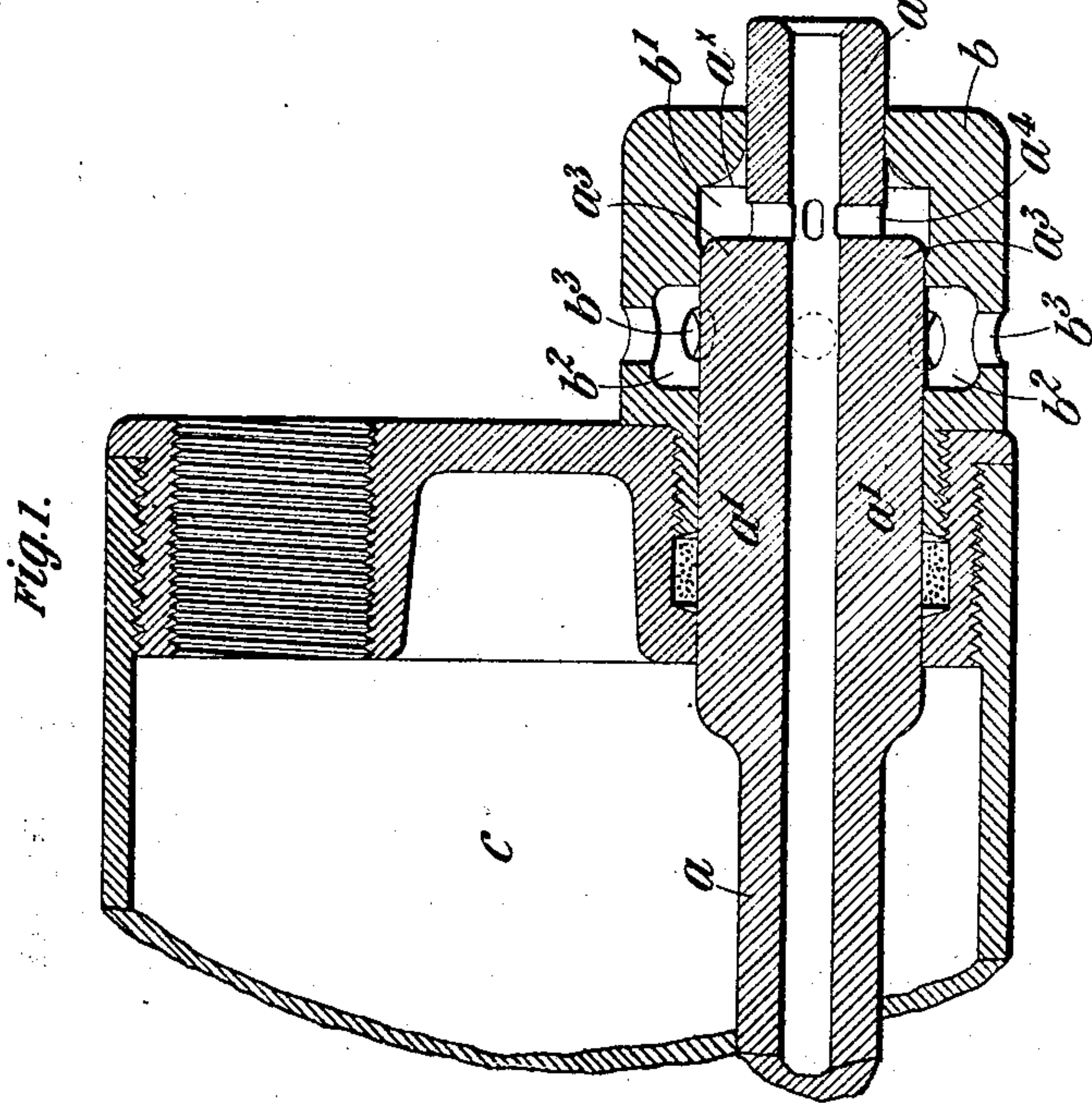
(No Model.)

2 Sheets—Sheet 1.

H. S. MAXIM.
GAS OPERATED ORDNANCE.

No. 567,604.

Patented Sept. 15, 1896.



Witnesses:

Robt F. Gaylord
James H. Catlow.

Inventor:

Hiram S. Maxim,
by Duncan & Page,
Attorneys

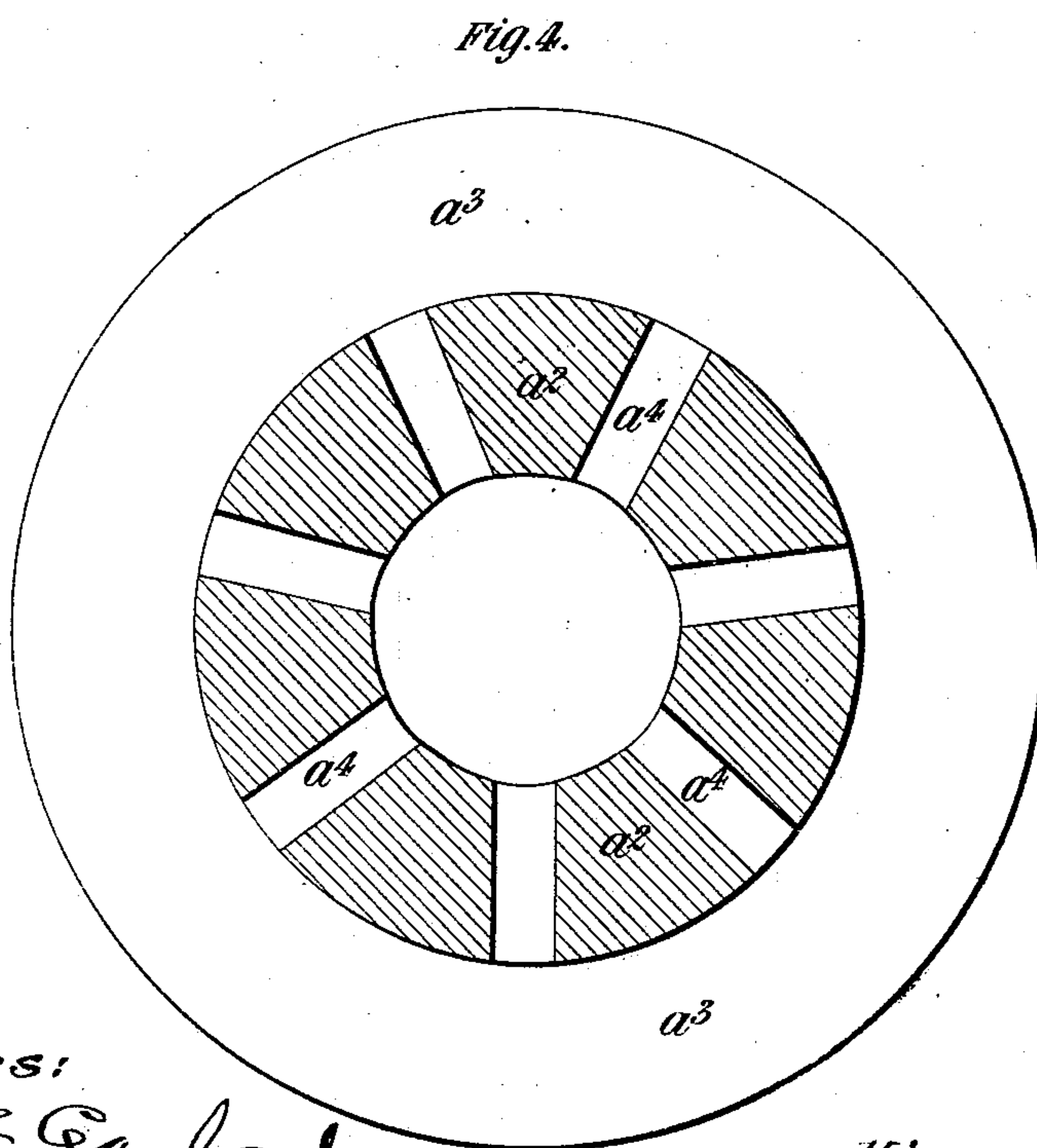
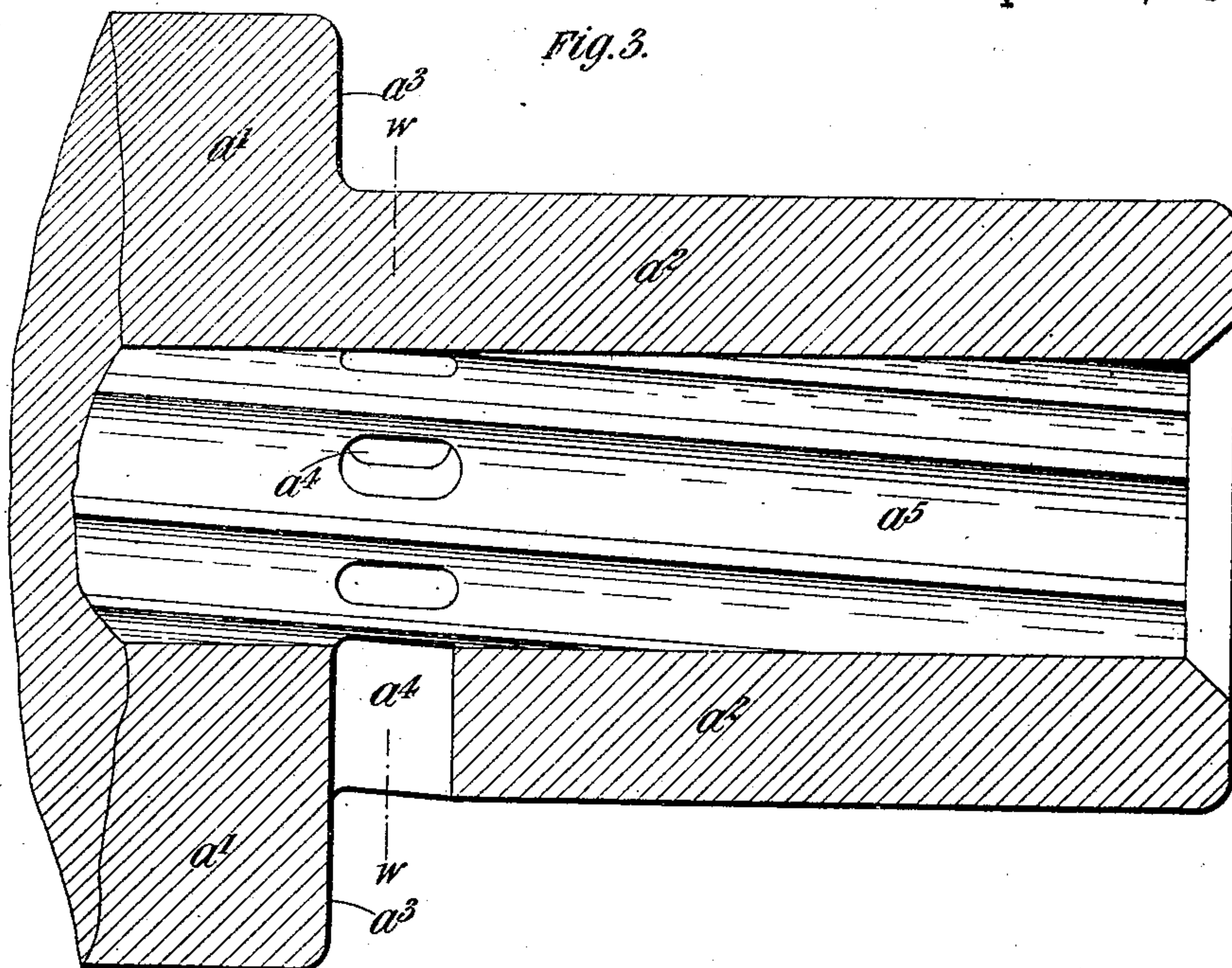
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UNITED STATES PATENT OFFICE.

HIRAM STEVENS MAXIM, OF BEXLEY, ENGLAND, ASSIGNOR TO THE MAXIM-NORDENFELT GUNS AND AMMUNITION COMPANY, LIMITED, OF LONDON, ENGLAND.

GAS-OPERATED ORDNANCE.

SPECIFICATION forming part of Letters Patent No. 567,604, dated September 15, 1896.

Application filed January 3, 1895. Serial No. 533,702. (No model.) Patented in England October 27, 1894, No. 20,627; in France December 14, 1894, No. 241,573; in Belgium December 15, 1894, No. 113,218; in Germany December 24, 1894, No. 84,767; in Italy December 27, 1894, XXIX, 37,950, LXXIV, 256, and in Austria February 9, 1895, No. 45/470.

To all whom it may concern:

Be it known that I, HIRAM STEVENS MAXIM, mechanical engineer, a citizen of the United States, residing at Bexley, Kent, England, have invented certain new and useful Improvements in and Relating to Automatic Guns, (for which I have obtained Letters Patent as follows: In England, No. 20,627, dated October 27, 1894; in Belgium, Certificate of Addition to Patent No. 113,218, dated December 15, 1894; in France, Certificate of Addition to Patent No. 241,573, dated December 14, 1894; in Germany, No. 84,767, dated December 24, 1894; in Austria, No. 45/470, dated February 9, 1895, and in Italy, XXIX, 37,950, LXXIV, 256, dated December 27, 1894,) of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to automatic or "Maxim" guns, and has for its object to adapt the same to work more efficiently than heretofore with the cartridges now commonly used in firearms, that is to say, cartridges charged with smokeless powder and light projectiles.

It has been found that with cartridges such as those above referred to the recoil energy is in some instances too feeble to satisfactorily operate the breech mechanism. I have therefore provided improved means whereby the energy of the recoil movement can be increased in such a manner that any form or arrangement of the automatic mechanism can be efficiently operated thereby. It is also known that the accuracy of fire can be considerably increased if the pressure at the instant the projectile leaves the barrel is somewhat low with relation to the initial pressure. With a slow-burning powder, in which a low initial but a high mean pressure is maintained throughout the entire length of the barrel, it has been found that the great pressure on the base of the projectile and the escape of gas radially between the barrel and the projectile at the instant the latter is leaving the barrel often causes the projectile to be thrown slightly out of line,

and the accuracy of fire is consequently interfered with to a serious extent. With a powder in which the greater part of the work is done with a high initial pressure and a relatively low final pressure the accuracy of fire is not interfered with to such a serious extent.

In the device which forms the subject of my present invention provision is also made by which a portion of the gases immediately behind the projectile is allowed to escape just before the projectile leaves the barrel, the gases escaping while the projectile is still engaged with the rifling. In this manner the pressure is reduced sufficiently to admit of much more accurate firing than has been heretofore practicable.

In the accompanying drawings I have shown an advantageous manner of carrying my invention into effect, Figure 1 being a longitudinal section of the muzzle of the gun, and Fig. 2 an end elevation thereof. Figs. 3 and 4 are enlarged views showing, respectively, a longitudinal section and a transverse section (the latter being taken on the line *w* of Fig. 3) of the muzzle end of the barrel.

Referring more particularly to Figs. 1 and 2, the barrel *a* is, according to my present invention, prolonged, so that the muzzle projects through the front end of the cylinder *b*, and said barrel is enlarged at *a'* and formed with a reduced portion *a''*, whereby a shoulder is produced at *a'''*. Immediately in front of this shoulder I cut a series of radial apertures *a⁴*, which extend from the bottom of the grooves of the rifling, as best seen in Figs. 3 and 4, and communicate with a cavity or chamber *b'*, formed between the short cylinder *b*, surrounding the barrel, and the reduced portion *a''* of said barrel, said cylinder being screwed or otherwise connected to the framing or water-jacket *c* of the gun. This surrounding cylinder is provided with an orifice *a^x* at its front end, through which the reduced portion *a''* of the barrel projects when said barrel is in its firing position. An annular cavity or groove *b²*, having exit-apertures *b³*, communicating with the atmosphere, is

formed in the walls of the said cylinder and extends around the enlarged portion of the barrel in proximity to the shoulder a^3 . It will thus be seen that when the gun is fired the barrel first moves backward or recoils by reason of the inertia of the projectile therein. This action is still further increased as the projectile passes forward beyond the apertures a^4 by the high-pressure gases in the barrel entering the cavity of chamber b' and acting upon the shoulder a^3 , thereby assisting the recoil movement by forcing back the barrel. At the same time the pressure of the gases immediately behind the projectile is reduced just before said projectile leaves the barrel, and in this manner the inaccuracy of firing hereinbefore alluded to is avoided. As soon as the shoulder recedes far enough to enter the annular cavity or groove b^2 the gases are at liberty to escape into the atmosphere through the apertures b^3 .

The muzzle end a^2 of the barrel may be made of such a length that on the firing of the gun the muzzle will be fully retracted into the chamber b' , so as to leave a space communicating with the atmosphere between said muzzle and the orifice a^x , through which the gases can escape. In this manner the annular cavity or groove b^2 can be dispensed with.

It will be seen that by reason of the radial apertures a^4 extending outwardly from the bottom of the grooves a^5 of the rifling they do not in any way interfere with the moving projectile, as it is well known that when the projectile is near the muzzle of the barrel it never touches the bottom of the grooves, but only rests on the "lands."

By varying the diameter of the barrel, the area of the shoulder a^3 , the dimensions of the cylinder b , or the number and size of the apertures the apparatus can be modified ac-

ording to the amount of energy required for the efficient and satisfactory operation of the breech mechanism.

By this invention I can avail myself of so much of the energy of the recoil that I am enabled to make the parts of the mechanism much heavier and stronger than heretofore, and thereby much better adapted to the use of charges of smokeless powder.

What I claim is—

1. In an automatic gun the means or apparatus for increasing the recoil energy consisting in the combination with a barrel formed with a shoulder a^3 and radial apertures a^4 , of a surrounding cylinder b having an orifice a^x through which the muzzle a^2 normally projects, said cylinder being provided with a space or chamber b' into which the gases from the barrel enter, to force back the barrel, and from which they escape into the atmosphere substantially as described.

2. In an automatic gun the means or apparatus for increasing the recoil energy consisting in the combination with a barrel having a shoulder a^3 and provided with radial apertures a^4 in proximity to said shoulder, of a surrounding cylinder b having an orifice at its front end through which the muzzle a^2 of the barrel normally projects, and provided with a space or chamber b' into which the gases enter through the apertures a^4 , said gases after forcing back the barrel, passing into an annular cavity or groove b^2 whence they escape by apertures b^3 communicating with the atmosphere, substantially as described.

In witness whereof I have hereunto set my hand this 6th day of December, 1894.

HIRAM STEVENS MAXIM.

Witnesses:

TOM FRANCIS BARNES,
FRANK C. BAISLEY.