

(No Model.)

2 Sheets—Sheet 1.

J. P. HOLLAND.
CARTRIDGE FOR ORDNANCE.

No. 420,623.

Patented Feb. 4 1890.

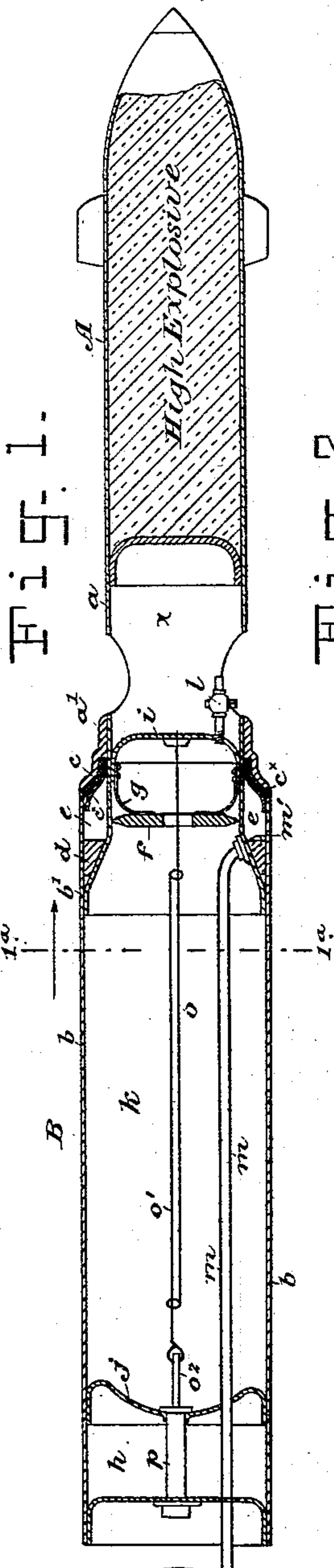
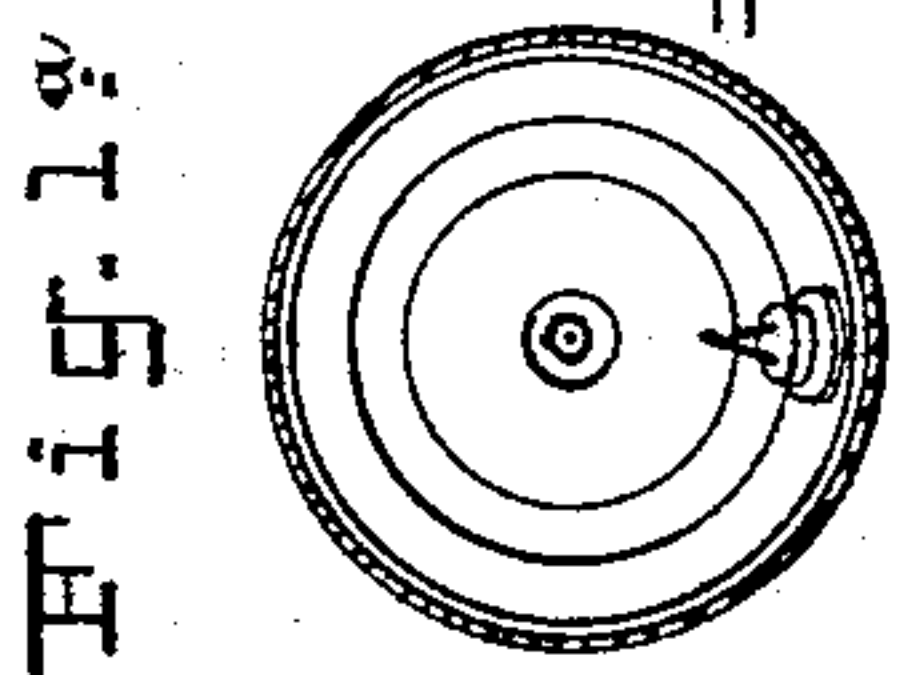
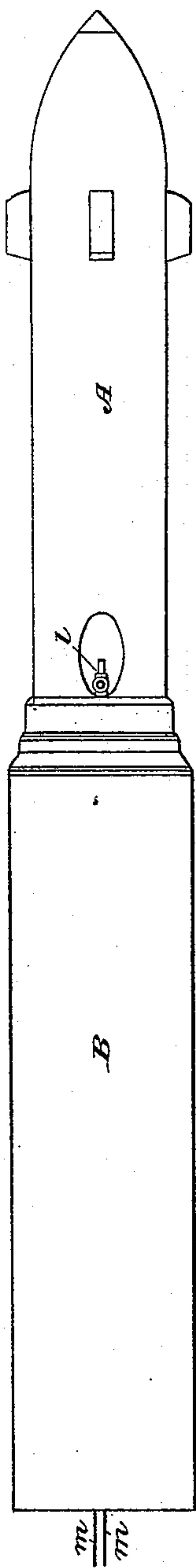


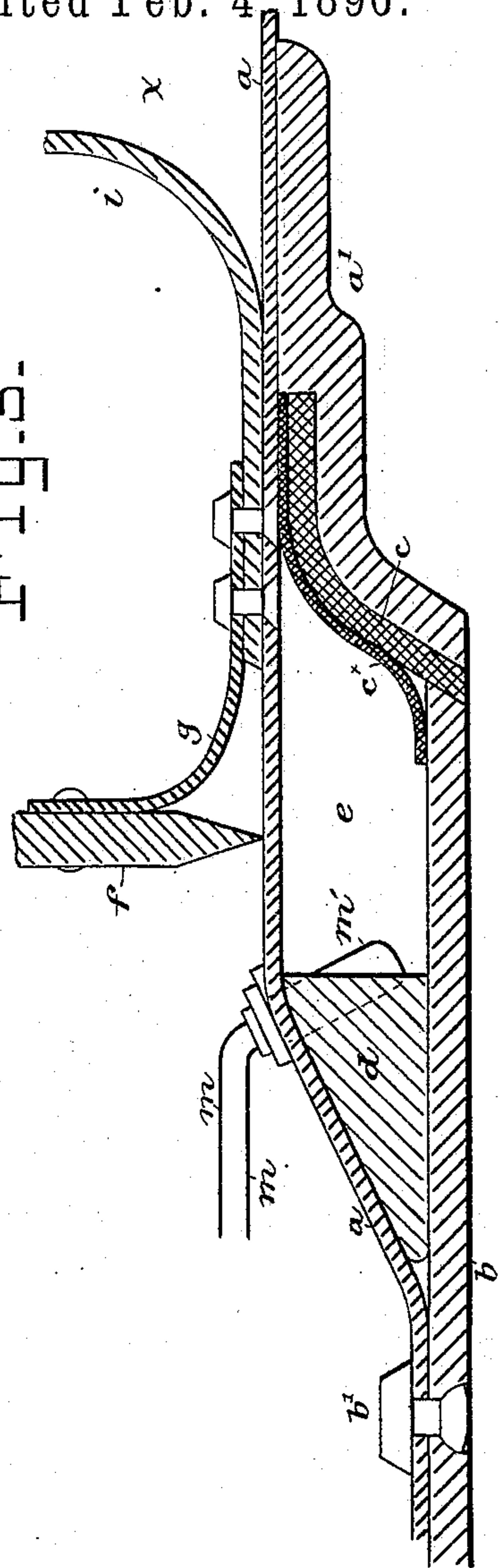
Fig. 2.



WITNESSES:

E. B. Bolton
H. Caplinger

Fig. 3.



INVENTOR:

John P. Holland.

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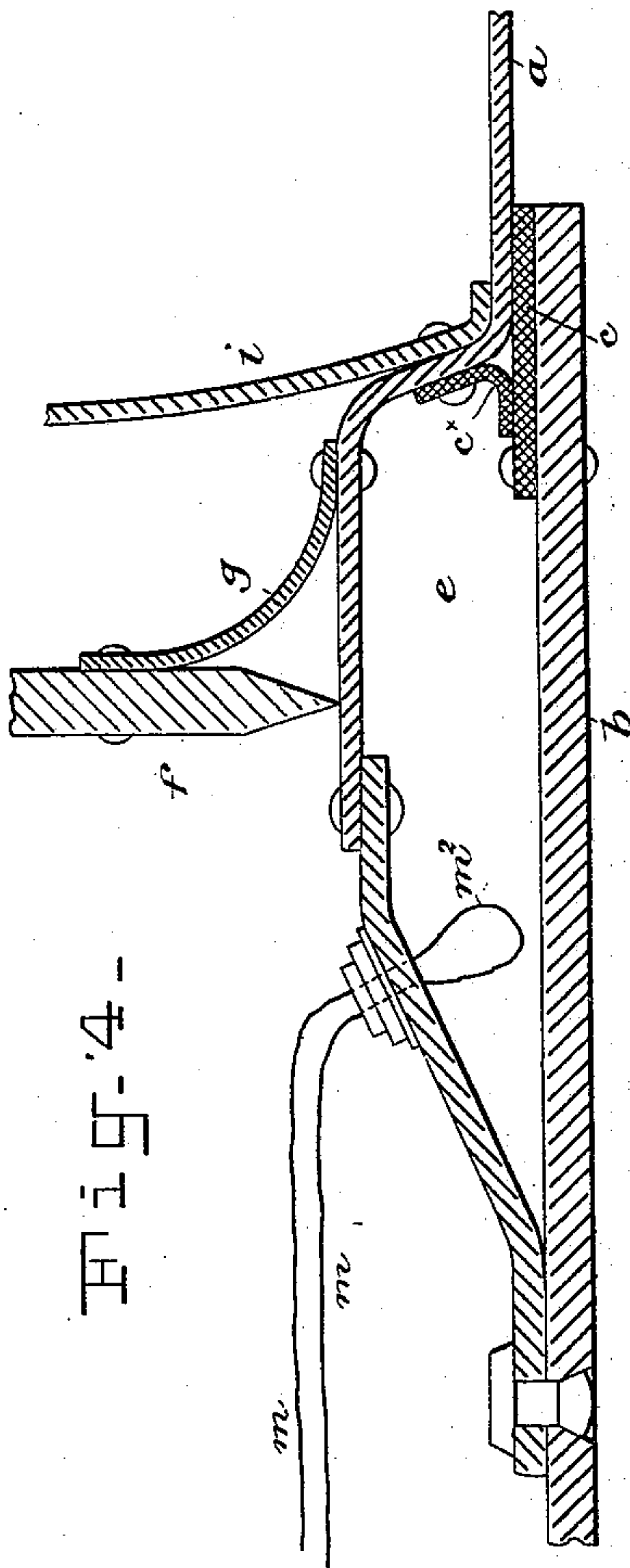
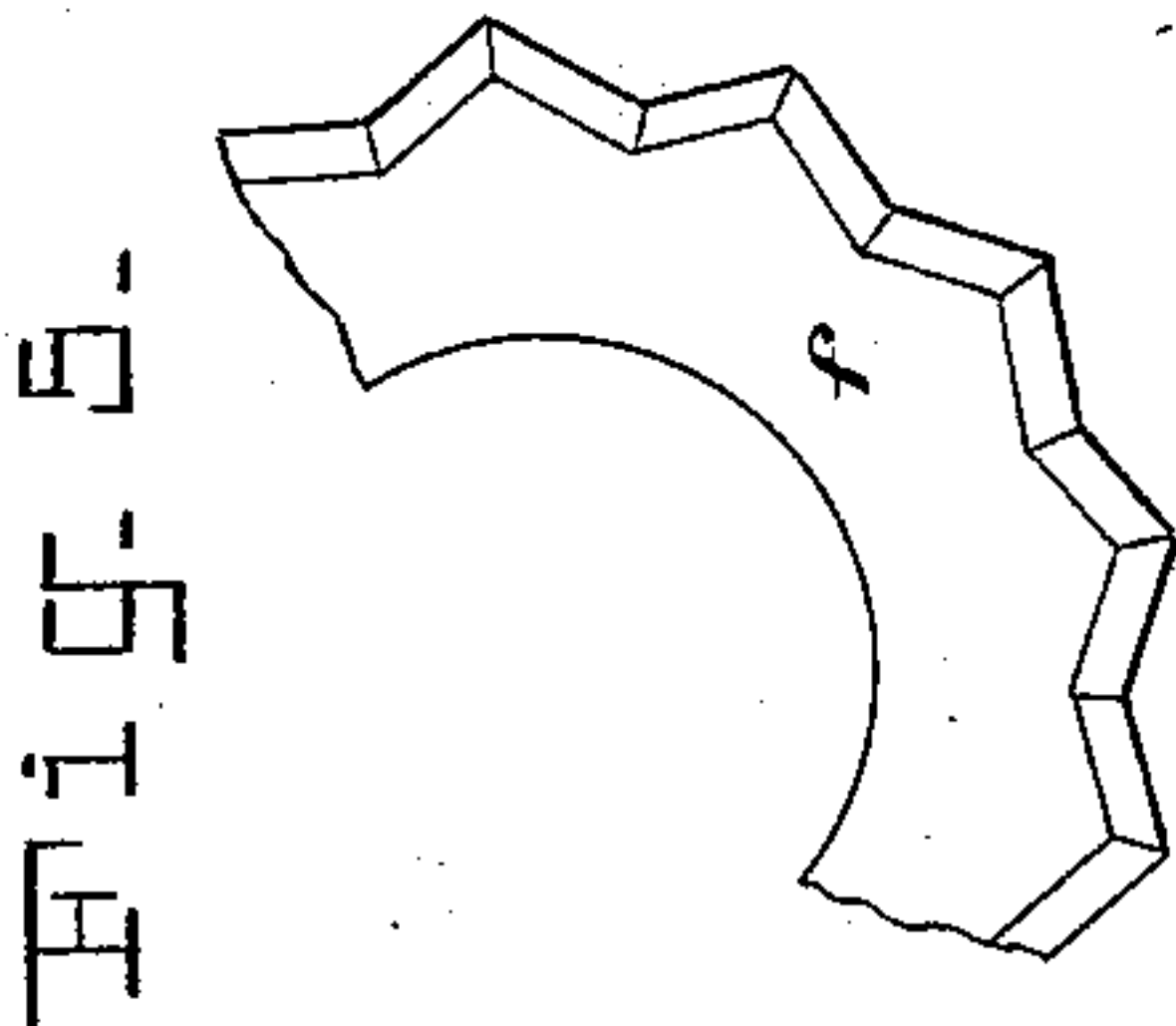
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INVENTOR:

John P. Holland,

By Henry Connel
Attorney.

WITNESSES:

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UNITED STATES PATENT OFFICE.

JOHN P. HOLLAND, OF PASSAIC, NEW JERSEY.

CARTRIDGE FOR ORDNANCE.

SPECIFICATION forming part of Letters Patent No. 420,623, dated February 4, 1890.

Application filed April 2, 1888. Serial No. 269,310. (No model.)

To all whom it may concern:

Be it known that I, JOHN P. HOLLAND, a citizen of the United States, and a resident of Passaic, in the county of Passaic and State of New Jersey, have invented certain Improvements in Cartridges for Ordnance, of which the following is a specification.

My invention relates to a cartridge for ordnance, and particularly to a cartridge wherein the projectile is a "shell" and contains a charge of some high explosive.

My cartridge comprises a projectile, a casing attached thereto, which occupies the powder-chamber of the gun, and a firing or expelling charge or charges contained in said casing.

One important object of my invention is to provide a separator for separating the projectile from the casing and liberating a gaseous cushion-charge within the latter, and another is to provide means for overcoming the inertia of the projectile by a comparatively moderate force, and afterward to apply that force necessary to impart to the projectile a high velocity and extended range.

In the accompanying drawings I have shown my improvements embodied in a practical form.

Figure 1 is an axial section of the cartridge. Fig. 1^a is a cross-section on line 1^a 1^a in Fig. 1, and Fig. 2 is a side view of the same. Fig. 3 is a fragmentary sectional view on a scale about seven times that of Figs. 1 and 2. Fig. 4 is a view similar to Fig. 3, illustrating a slightly-modified construction; and Fig. 5 is a fragmentary detached view illustrating another form of the cutter for severing the projectile from the casing.

A represents the projectile, and B the casing attached thereto. The projectile may be constructed of the elongated form shown, its shell being of brass or other similar metal or alloy. The main portion of the shell will be filled with a charge of some high explosive—as dynamite, for example—and back of this charge will be left a vacant space *x*. The cylindrical shell *a* of the projectile A extends back into the larger cylindrical shell *b* of casing B, where it is expanded and secured to the latter at *b'*. Near its base the projectile is provided exteriorly with a ring *a'*, between the flared rear edge of which and the body

of the projectile (see Fig. 3) are arranged two packing-rings *c c'*, of leather or other like material. The free edge of the thicker leather ring stands between the ring *a'* and the front end of the casing B, while the thinner ring *c'* laps over the joint inside. A ring *d*, of wood, compressed paper, or the like, by preference fills the triangular space at the junction of the flared end of the projectile-shell *a* and the shell *b* of the casing. This construction leaves an annular chamber *e* between the front end of the casing A and the rear end of the projectile where they overlap, and this chamber is filled with a charge of gunpowder or other similar explosive. For convenience I will call this the "initial" charge.

Within the hollow rear portion or base of the projectile-shell opposite to chamber *e*, I arrange a hard-steel cutter *f* in the form of a disk or annulus, its sharp edge bearing on the shell *a* of the projectile all around. This cutter may be held in position by a support or supports *g* of any kind.

At the rear end of the casing B is a chamber *h*, to contain the main charge of gunpowder or the like. This I will call, for convenience, the "firing-charge."

Within the base of the projectile is arranged a stout head or partition *i*, and within the casing B is arranged a stout head or partition *j*. Between these partitions is a comparatively large chamber *k*, which is filled with some gaseous fluid under high tension. I prefer air or carbonic acid, either liquid or gaseous. This I will call, for convenience, the "cushion-charge." This charge may have a tension of from ten to one hundred and twenty-five atmospheres. I do not limit myself in this respect. The gas under tension may be introduced at a cock-controlled inlet *l* in the head *i*, access being had to the same through an aperture formed in the shell of the projectile.

The initial charge may be ignited in any way. I have shown herein means for igniting it by electricity. The conductors *m m'* pass through the casing B to the chamber *e*, and may be connected therein by a loop of platinum wire *m'* in a well-known way. When the cartridge has been inserted and the electric circuit closed, the initial charge in chamber *e* is ignited. This charge, which

is comparatively small, accomplishes three results—namely, it forces in the shell *a* of the projectile onto the cutter *f*, and thus severs the projectile from the casing B. It thus liberates the gaseous cushion-charge in chamber *k* and raises the temperature of said charge, and it assists said charge in overcoming the inertia of the projectile and setting it in motion. Of course the gaseous charge in expanding would rapidly cool under ordinary conditions; but the intense heat generated by the explosion of the initial charge supplies heat to make good this loss.

To the head *i* or some other part of the projectile is secured a rod or wire *o*, which extends back into the chamber *k*, and on its rear end it has a loop which embraces a similar rod or wire *o'*, which has on its forward end a loop that embraces the wire *o*. The rear end of wire *o'* is connected with the stem *o²* of a friction-primer *p*, arranged in chamber *h*. When the projectile has advanced far enough to cause the loop on wire *o* to engage that on wire *o'*, the latter draws out the stem *o²*, and thus causes the primer to explode and ignite the main or firing charge in chamber *h*. This charge does not act on the projectile until the latter is well under way, and then it does not act directly, but through the medium of the interposed gaseous cushion-charge. Consequently all shocks tending to explode the charge in the projectile are avoided.

The casing B remains in the gun after the discharge.

The wires *o o'* simply provide a convenient device for causing the projectile to ignite the firing-charge when it has moved a predetermined distance. Any flexible connector—such as a light chain or a coil of fine wire—would serve as well to connect the projectile with the stem of the primer or other igniting device.

The common friction-primer is a simple and well-known device, and I prefer to use it; but any ignitor will serve.

The sharp edge of the cutter *f* may be smooth or serrated. In Fig. 5 I have shown it serrated, and I prefer this form, as with it the separation of the projectile is effected with less force.

The object sought is to separate the projectile from the casing and to liberate the cushion-charge, and so far as this part of the invention is concerned any form or kind of separator may be employed. It will be observed by inspection of Fig. 1 that the cushion-chamber *k* extends into the hollow base of the projectile from the point *b'* to the head or partition *i*, and it is only necessary to provide means for severing the shell of the projectile where it forms the wall of the cushion-chamber in order to release the cushion-charge and separate the projectile from the cartridge-casing. If this wall be weakened sufficiently by some means, the pressure of

the cushion-charge on the projectile will effect the separation.

In Fig. 4 I have shown a construction where-in the employment of the ring *a'* is avoided and the diameter of the casing B is reduced to very nearly that of the projectile A. In this construction the chamber *e* is formed by contracting the hollow base of the projectile.

Having thus described my invention, I claim—

1. A cartridge for ordnance, having a projectile charged with a high explosive, as dynamite, and having a gaseous cushion of high tension arranged between said projectile and a main firing-charge, and means, substantially as described, for automatically liberating said gaseous cushion at the moment of firing, as set forth.

2. A cartridge for ordnance, having a casing connected with a projectile, a gaseous cushion-charge of high tension arranged within said casing, and a separator which separates the projectile from the casing and liberates the cushion-charge at the moment of firing, substantially as described.

3. A cartridge for ordnance, having a projectile with a hollow base and a disk-like or circular cutter arranged within said base and having an initial charge arranged in an annular chamber about the base of the projectile where the cutter is situated, and an ignitor for said charge, whereby the projectile-shell is cut by the explosion of said initial charge.

4. A cartridge for ordnance, having a projectile with a hollow base connected with the cartridge-casing and a cutter arranged within said base, a firing-charge, a gaseous cushion-charge of high tension arranged between said firing-charge and the projectile, an initial charge in an annular chamber around the base of the projectile where said cutter is situated, and ignitors for said initial and firing charges.

5. A cartridge for ordnance, comprising a projectile with a hollow base, a casing which overlaps the hollow base of the projectile and is attached thereto, thus forming an annular chamber containing the initial charge, a cutter arranged within the hollow base of the projectile where said annular chamber is situated, an ignitor for said initial charge, a chamber containing the firing-charge and an ignitor for the same, a gaseous cushion-charge of high tension arranged between said firing-charge and the projectile, and a flexible connector connecting the projectile with the ignitor of the firing-charge.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

JOHN P. HOLLAND.

Witnesses:

HENRY CONNETT,
J. D. CAPLINGER.