No. 646,569. Patented Apr. 3, 1900.

W. L. BREATH.

PROJECTILE.

(Application filed Feb. 4, 1898. Renewed Oct. 17, 1899.)

(No Model.)

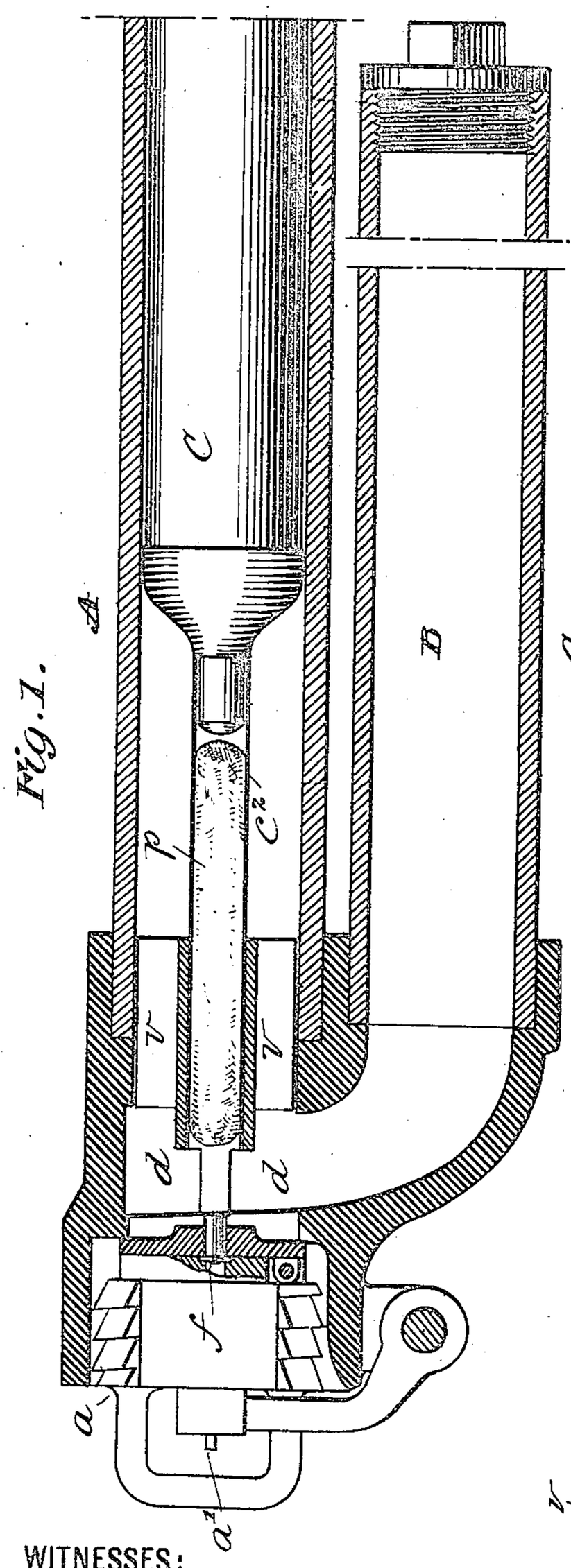

Fig. 1.

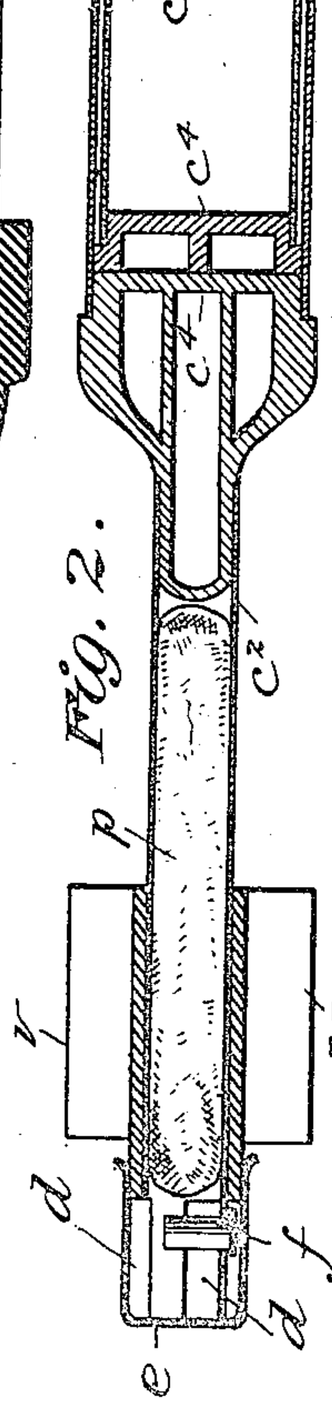

Fig. 2.

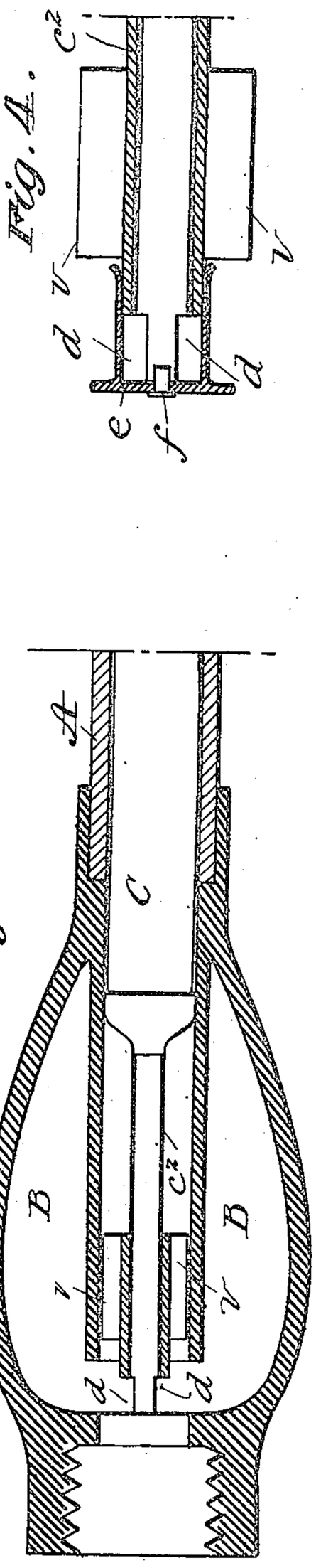

Fig. 4.

Fig. 3.

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PROJECTILE.

SPECIFICATION forming part of Letters Patent No. 646,569, dated April 3, 1900.

Application filed February 4, 1898. Renewed October 17, 1899. Serial No. 733,932. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM L. BREATH, a citizen of the United States, residing at New York city, in the county of Kings and State of New York, have invented certain new and useful Improvements in Projectiles, of which the following is a full, clear, and exact description.

This invention relates to pneumatic guns adapted for firing high explosives and to projectiles for such guns.

One of the objects of the invention is to simplify the construction of the gun and the operation of loading and firing. Another object is to provide a gun which will not become unduly heated by rapid firing, and a still further object is to provide a construction of shell or projectile in which the firing charge, the explosive, and the primer are contained in a single structure or frame, whereby the operator is required to handle but a single piece in loading the gun and an obvious advantage in packing and shipping the ammunition is obtained.

The invention will be described in detail with reference to the accompanying drawings, in which—

Figure 1 represents a longitudinal section of one form of gun and projectile in place ready for firing. Fig. 2 is a sectional view of the projectile in shipping condition. Fig. 3 is a sectional view of another form of gun, and Fig. 4 shows a modification of the base of the projectile.

It is preferred to use with the projectile herein described a gun having an air-compression chamber communicating with the rear of the barrel behind the projectile, in which the gases generated by the combustion of the charge will compress the air and react upon the base of the projectile, furnishing what is technically known as a "low-pressure" discharge. I have therefore in this case associated my improved projectile with a gun of this character, although it may be used in other forms of guns.

In Fig. 1, A represents the barrel of the gun; B, the air-compression chamber, communicating with the barrel at the rear end thereof; *a*, a breech-block of the usual construction, having segments of screw-thread with spaces between, whereby a fraction of a rotation will serve to release it from its seat, and *a'* the firing-pin.

The projectile consists of the usual cylinder C, provided with compartment *c* for the dynamite, nitroglycerin, or other high explosive and with the usual conical forward end *c'*, carrying the fuse or exploding-cap. The cylinder is provided with an axial rearward tubular extension c^2, firmly fixed to the main cylinder and adapted to carry inside thereof a bag or cartridge of powder *p*, constituting the firing charge. The charge-chamber is separated from the explosive-chamber by diaphragms c^4 c^4, with an air-space between, preventing conduction of heat. Upon the outside of the tube c^2 the vanes *v*, which direct the flight of the projectile, are fixed. The extreme rear end of the tube c^2 is of skeleton formation or provided with openings *d*, through which the gases generated by the combustion of the powder charge may pass into the air-compression chamber B and the barrel. When the projectile is constructed, this open rear end is covered by a cap *e*, which holds the powder charge in the tube, prevents the entrance of moisture, and may be used to retain a firing-cap or primer *f* in place, the primer being passed transversely through an opening in the side of the tube *c*, with its head resting against the side of the cap *e*. The projectile will be shipped or handled with the cap *e* in place; but when it is about to be placed in the gun the cap *e* is removed, the primer taken out, and the projectile placed in position in the gun, after which the primer is put in place on the breech-block, as indicated in Fig. 1, where it will be directed toward the powder charge in the projectile. In Fig. 4 cap *e* is shown provided with primer *f* and is not intended to be removed from the base of the projectile when it is inserted in the gun. It is of thin material, which the explosion destroys at the instant of firing. This is simpler and entails fewer acts upon the operator in loading.

As before stated, the gun is loaded by placing the projectile in the position shown in Fig. 2 or as in Fig. 3, where it will be seen that the rear end of tube c^2 communicates freely with the air-chamber B. When fired,

the primer flashes forward into the tube c^2 and ignites the powder charge p therein. The rear portions of the charge burning first, the gases generated escape rapidly rearward into the air-compression chamber and cause the air and gases to bank up therein. The pressure soon reaches the base of the projectile through the space around the outside of the tube c^2, and it commences to move along the barrel. As it does so the unburned portion of the charge continues to burn and adds to the initial pressure which started the projectile. Thus the final impetus given the projectile is not dependent upon the expansion of the initially-generated gases, since the slow burning of the charge keeps adding or piling up the pressure immediately behind the projectile as it moves along the barrel, the principle of the operation being much the same as in the "multicharge" gun, and many of the advantages claimed for the multicharge gun are obtained by the method of firing described herein.

Another point of advantage in this projectile is that the burning powder does not come in contact to any serious extent with the gun, but is confined to contact with the tube c^2 of the projectile which goes out of the gun, and does not even radiate heat to any serious extent to the parts of the gun. Only the gases generated by the combustion of the charge come in contact with the breech and adjoining portions of the gun, and they while being hot are not nearly of the same temperature as the flame at the point of combustion. In consequence of this this gun may be fired many times at short intervals without danger of prematurely discharging the explosive or disabling the piece. In other guns of this class, even where the charge is fired into a chamber separate from the barrel and is caused to burn more or less completely in said chamber, the heat generated in the walls of the compression-chamber is soon conducted to the rear of the barrel, and so prevents rapid continuous firing.

In the gun shown in Fig. 3 the air-chamber surrounds the rear end of the barrel, and so affords a more symmetrical formation and one which may be constructed at less expense than the form shown in Fig. 1; but, as before stated, the projectile described may be used in other styles of guns and still obtain many of the benefits of my invention.

Having thus described my invention, I claim—

A projectile for guns provided with a hollow tailpiece, open at its rear end and carrying therein the firing charge, in combination with a removable cap adapted to cover the open end of the tailpiece, and a cap or primer held in place by the removable cap, substantially as described.

In witness whereof I subscribe my signature in presence of two witnesses.

WILLIAM L. BREATH.

Witnesses:
HARRY BAILEY,
FRANK S. OBER.