

(No Model.)

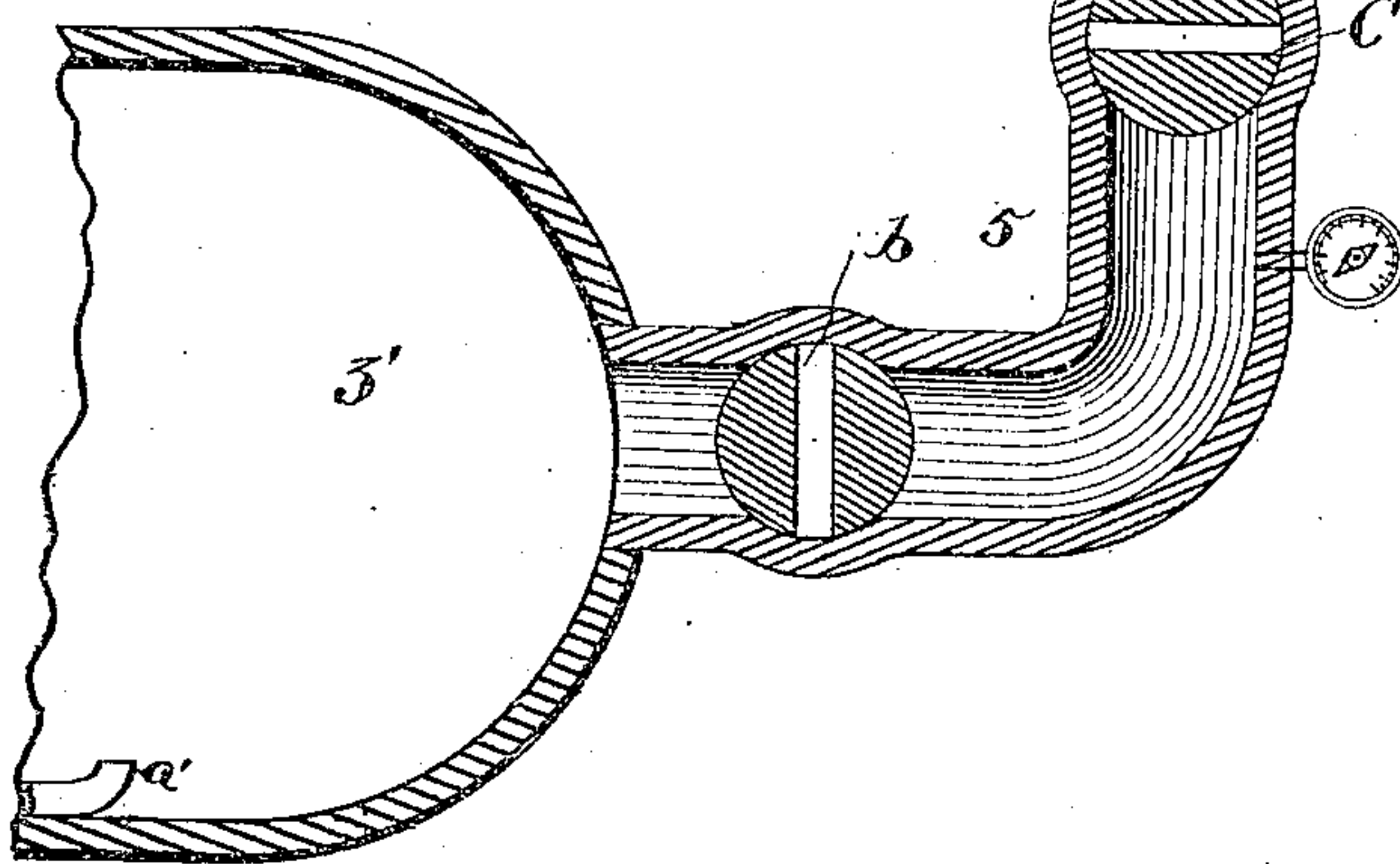
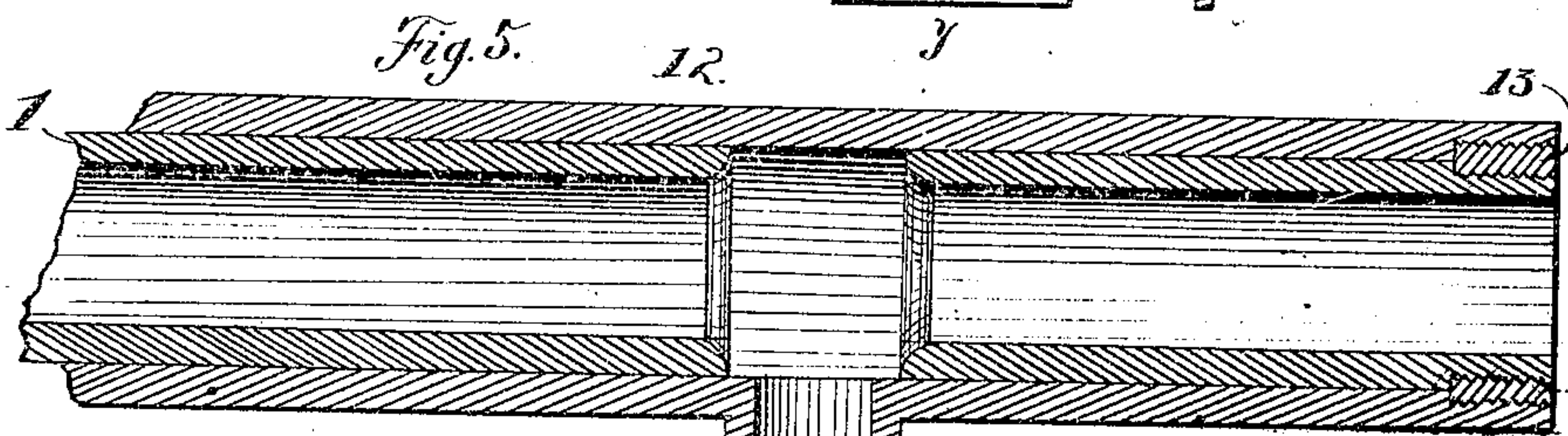
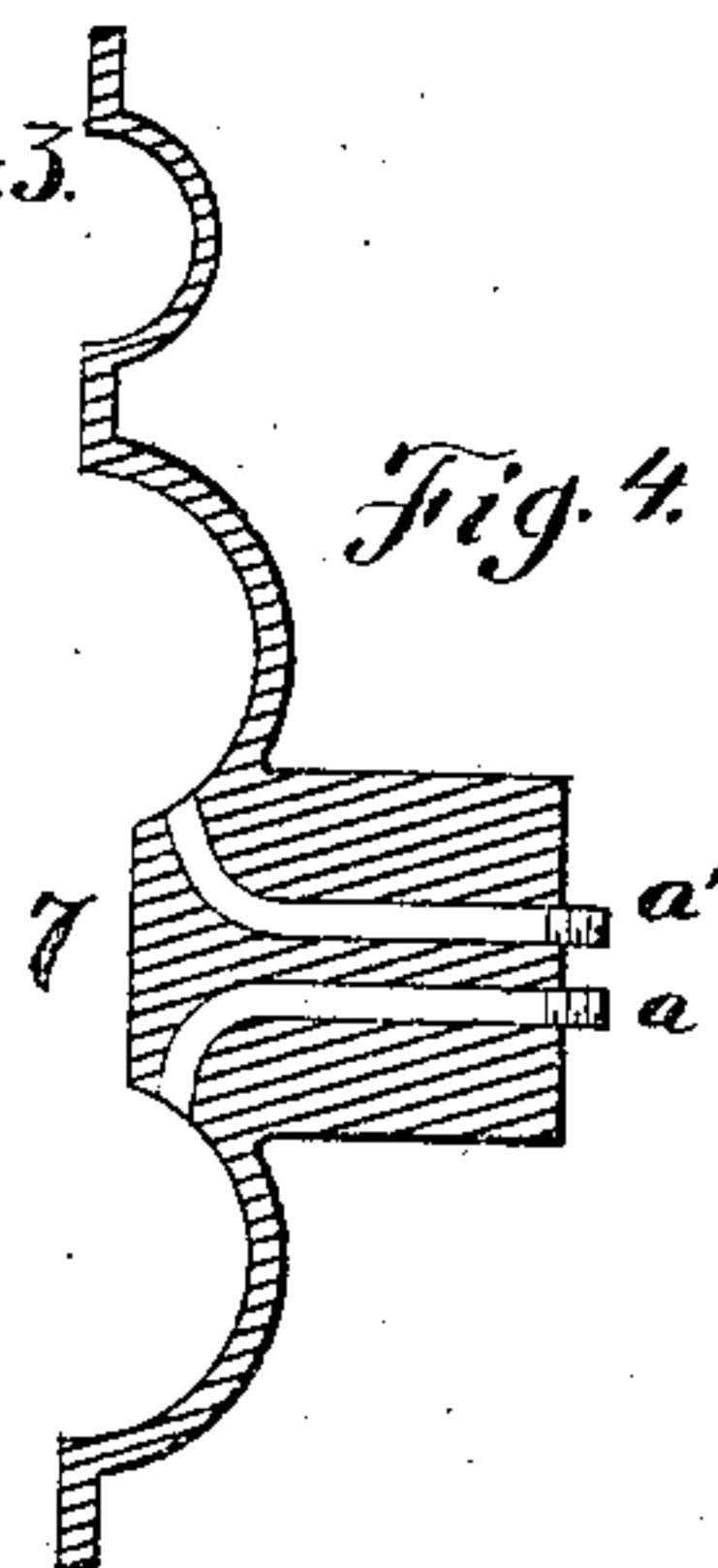
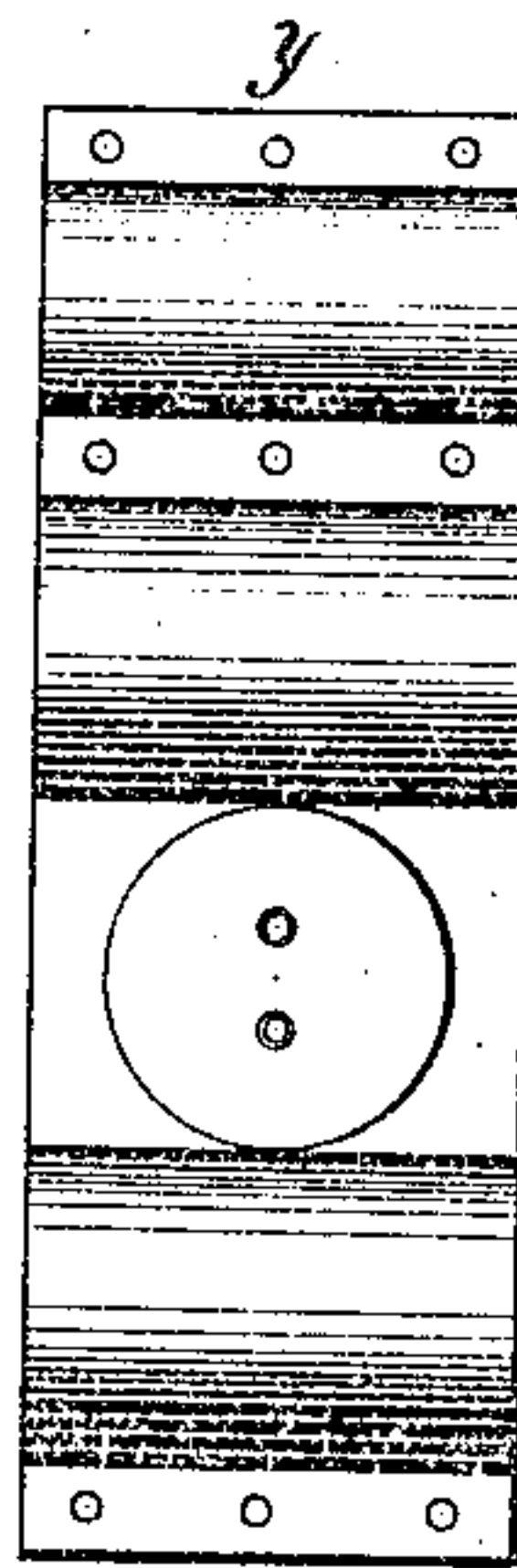
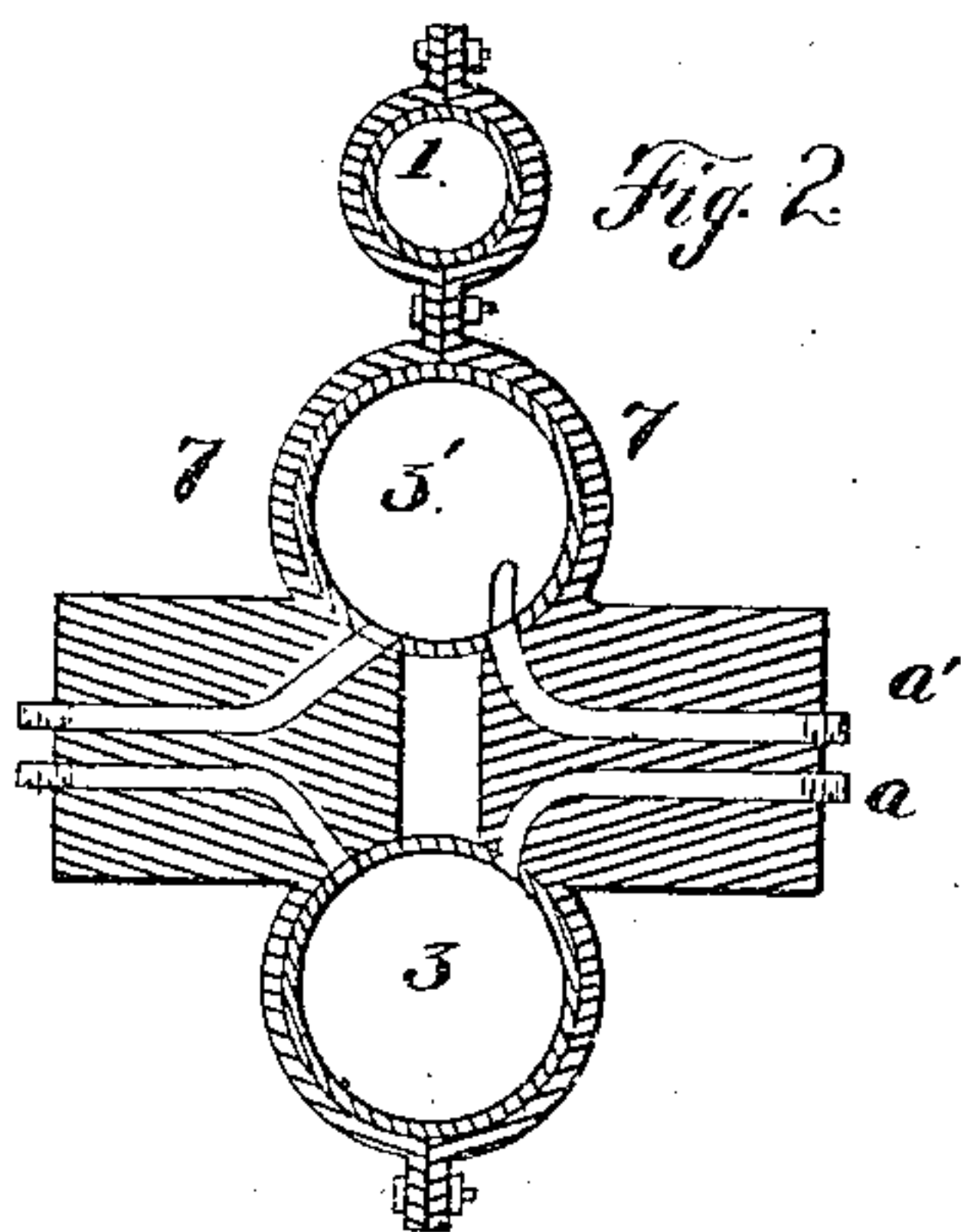
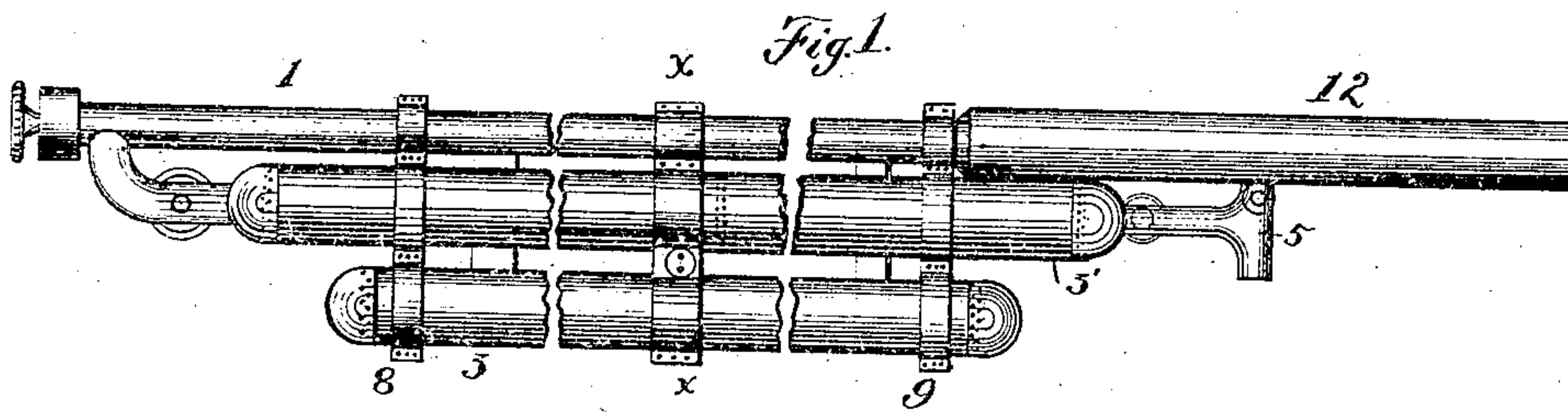
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W. A. BARTLETT.

PNEUMATIC CANNON AND METHOD OF OPERATING THE SAME.

No. 429,593.

Patented June 10, 1890.



Witnesses.  
G. W. H. Brown.  
H. W. Jenner.

Inventor:  
Wallace A. Bartlett

(No Model.)

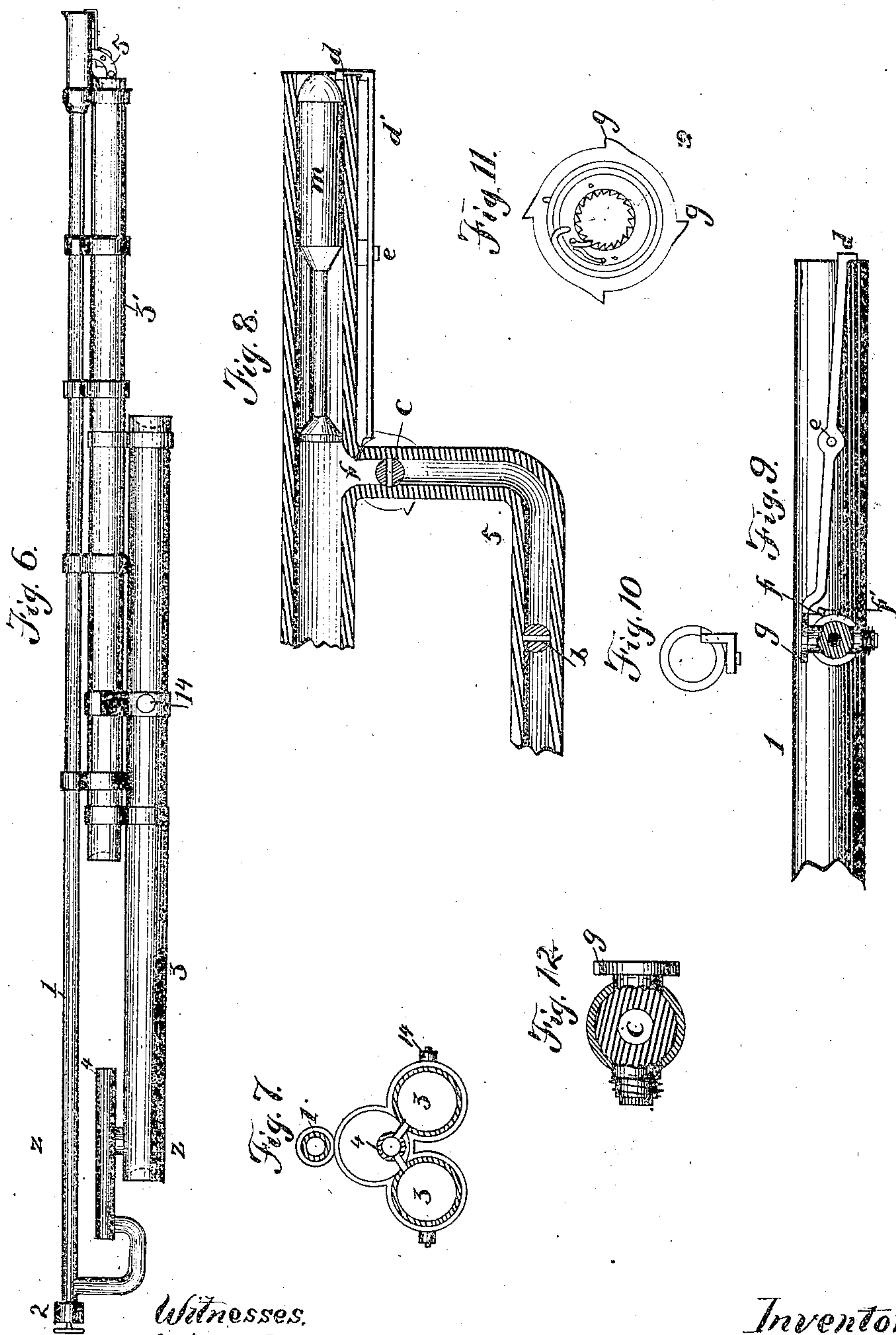
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Wallace A. Bartlett



# UNITED STATES PATENT OFFICE.

WALLACE A. BARTLETT, OF WASHINGTON, DISTRICT OF COLUMBIA,  
ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE PNEUMATIC DYNAMITE GUN COMPANY, OF NEW YORK, N. Y.

## PNEUMATIC CANNON AND METHOD OF OPERATING THE SAME.

SPECIFICATION forming part of Letters Patent No. 429,593, dated June 10, 1890.

Application filed June 25, 1884. Serial No. 136,020. (No model.)

*To all whom it may concern:*

Be it known that I, WALLACE A. BARTLETT, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Pneumatic Cannon and Method of Operating the Same, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to pneumatic or similar cannon for which the gas-pressure used in starting the projectile is generated outside the bore of the gun. The general character of such guns is more fully described in my patents of March 4, 1884.

The present invention consists in a method of operating such guns by a commingling of a heated gas, or a gas which is combustible and serves to raise the temperature in the bore of the gun, with the cold gas from the flask which enters the breech of the gun; also, in a construction of the gun flask and tube by which this method may be conveniently put into operation.

In the drawings, Figure 1 is a side elevation of a gun supported on a compound flask, parts being broken away. Fig. 2 is a cross-section on line *x x*, Fig. 1. Fig. 3 is a side elevation of one of the clasps which support the gun and bear the trunnions. Fig. 4 is a section of same on line *y y*. Fig. 5 is a longitudinal section of the muzzle portion, showing the re-enforcing gas-supply pipe and valves. Fig. 6 is an elevation similar to Fig. 1, showing a modified form of gas-flask. Fig. 7 is a cross-section of same on line *z z*. Fig. 8 is a longitudinal section of muzzle, showing projectile in position to open the valve in re-enforce pipe. Fig. 9 is a bottom view of muzzle-section and valve mechanism. Fig. 10 is a front or muzzle view. Figs. 11 and 12 illustrate the valve-operating device.

The numeral 1 indicates the gun-tube, which has its breech-closing mechanism at 2, which operates in the usual manner. The flasks 3 are filled with compressed air or gas by connections leading to the pipes *a a'* in the trunnion, or in other suitable manner. One section 3' of the flask, which extends forward nearly to the muzzle of the gun, is separated

from the flask 3, either by a partition, as shown in dotted lines, Fig. 1, or by being a separate flask-section, as in Fig. 6. This section contains a combustible gas, as hydrogen, the vapor of naphtha, or a similar vapor, which when united with air forms an explosive mixture. This gas will be under pressure preferably in excess of the air-pressure in the flask 3. The supply to the flask-section 3' is conveyed through pipe *a'*. The valve 4 serves to supply compressed air from the flask 3 to the gun-tube, and by this air-pressure the projectile is driven through the bore of the gun. At a suitable point near to or at the muzzle the projectile engages with and actuates the trip *d*, and this trip rocks lever *d'* on pivot *e*. A valve *b* serves to admit a quantity of the highly-compressed gas in flask 3' to the tube 5, where it is retained between the cocks *b* and *c*. The amount of gas so contained and confined can be readily determined by the pressure-gage 6, and should be regulated and proportioned to the amount of air to be admitted by the valve 4.

The valve *c* can be operated by a spring or by gas-pressure. It is held in closed position until the gun is "fired" by the engagement of the end *f* of lever *d'* with one of the stops *g* on the valve-stem. The valve has a tendency to open instantly when released, and may be constructed similarly to the operating-valves described in either of my patents aforementioned.

The combustible-gas charge having been confined in the space in tube 5, between the valves *b* and *c*, the passage of the projectile *m* through the bore opens the valve *c* as soon as the projectile has passed the mouth of said tube 5. The gas is ignited by percussion or by a friction-primer *f'*, which is fired by lever *d'*, or by an electric spark or otherwise, and may serve either to heat the compressed air in the gun-tube to a high degree, and thus increase the pressure, or by mixing with the compressed air may form an explosive mixture, accordingly as one or another gas is used. This increase of pressure serves to give a final impetus to the projectile as it leaves the muzzle of the gun.



A method of igniting the gas at the proper instant by the passage of the projectile is shown in another application of even date herewith, but the same result may be attained by a time mechanism.

The space between the valves *b c* in the tube 5 may be enlarged to any desired extent, as in Fig. 1. It is important, however, where the combustible gas is used, that the flame should not be permitted to extend back of the cock *b* and so into the reservoir 3'.

Any of the means for operating the valves shown in my patents or other equivalent mechanism may be applied to the valve *c* in the tube 5 without departing from the spirit of my invention.

In Fig. 1 I have represented the gas-flask as made up in sections, the upper section being supported by the lower and extending past the same at each end. The flask-sections and gun-tube are held together by two-part clamps 7 8 9, the plate 7 bearing trunnion 10, through which the pipes *a a'* pass.

The gun-tube 1 is surrounded by a sleeve 12 near the muzzle to give it additional strength and thickness, said sleeve being locked to tube 1 by ring 13, or the part 12 may be simply a heavier section of the tube, as in Fig. 8.

In the modification shown in Figs. 6 and 7 the flask is made up of three sections instead of two, the sections and gun-tube being held together by bands of proper form. One of the bands carries a trunnion-piece 14. The valve 4 is between the lower flask-sections and the tube, and is thus protected.

The same mechanism may be employed whether superheated steam be used in flask 3' and pipe 5 or an explosive gas as the accelerating charge. I prefer the gas-charge, however, and to this end the muzzle-section and tube 5 are made strong enough to withstand the explosion thereof.

I claim—

1. The combination, with a gas-pressure gun, of a gas-flask communicating with the bore at or near the breech, and a separate flask communicating with the bore at some point forward, substantially as described.

2. The method of firing projectiles, which consists in confining different elastic gases in separate reservoirs outside the gun-barrel, admitting one gas to start the projectile and admitting the second gas subsequently to accelerate the movement of the projectile, substantially as described.

3. The combination, with the tube of a gas-pressure gun, of separate flasks, a valve controlling the passage to the breech, and a separate valve controlling the passage from the other flask to the bore.

4. The method of firing projectiles, which consists in confining different elastic gases in separate reservoirs outside the gun-barrel, admitting one gas to start the projectile, and subsequently admitting the second gas, and igniting the mixed gases, substantially as described.

5. In a gas-pressure gun, a sectional flask composed of parallel cylinders arranged one above the other, the gun-tube supported by the upper section, and retaining-bands for the tube and sections, all combined substantially as set forth.

6. The sectional gas-flask, one section above the other, and serving as a support for the tube or barrel, the barrel supported thereby, and the valve, as 4, arranged between the lower flask-section and the barrel and in rear of upper section, all in combination, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

WALLACE A. BARTLETT.

Witnesses:

E. L. WHITE,  
C. W. BROWN.