

(No Model.)

W. G. HUEY.  
VALVE FOR STEAM GUNS.

No. 556,058.

Patented Mar. 10, 1896.

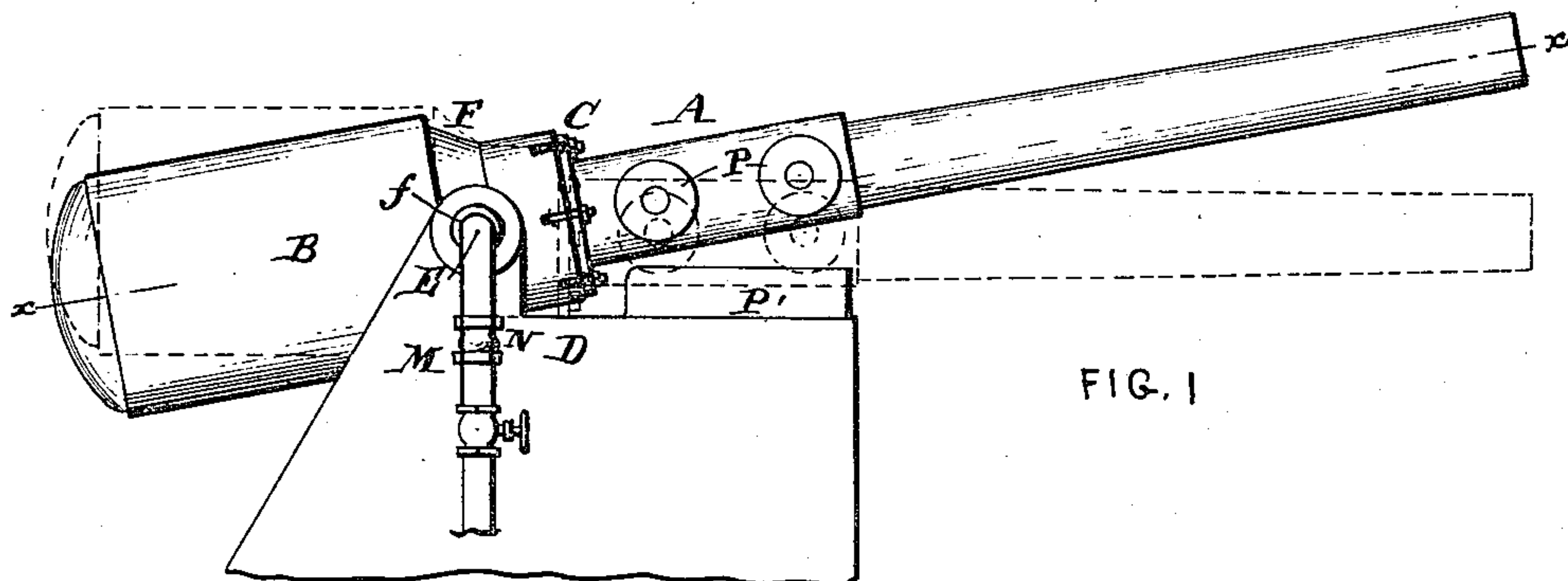


FIG. 1

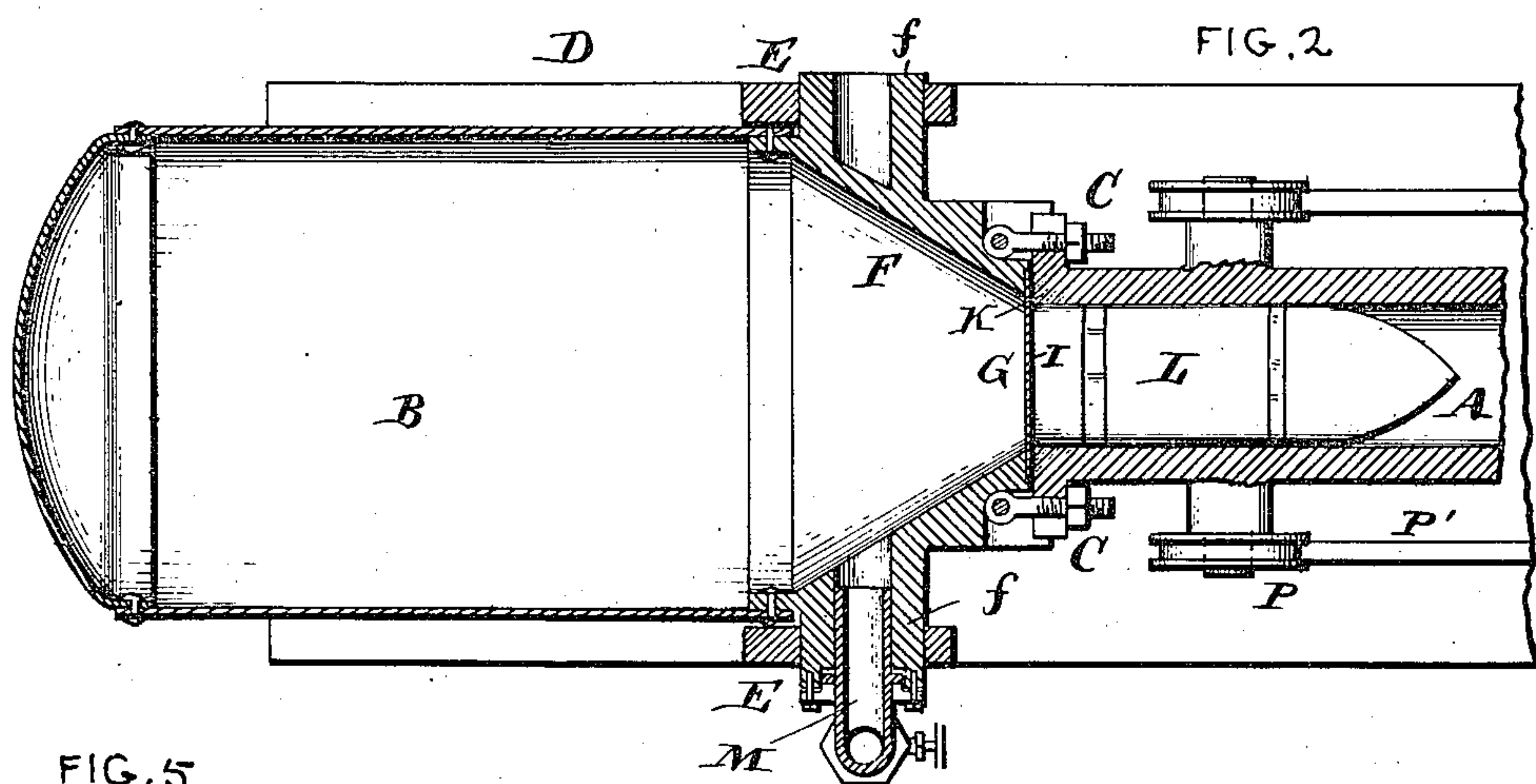


FIG. 2

FIG. 5

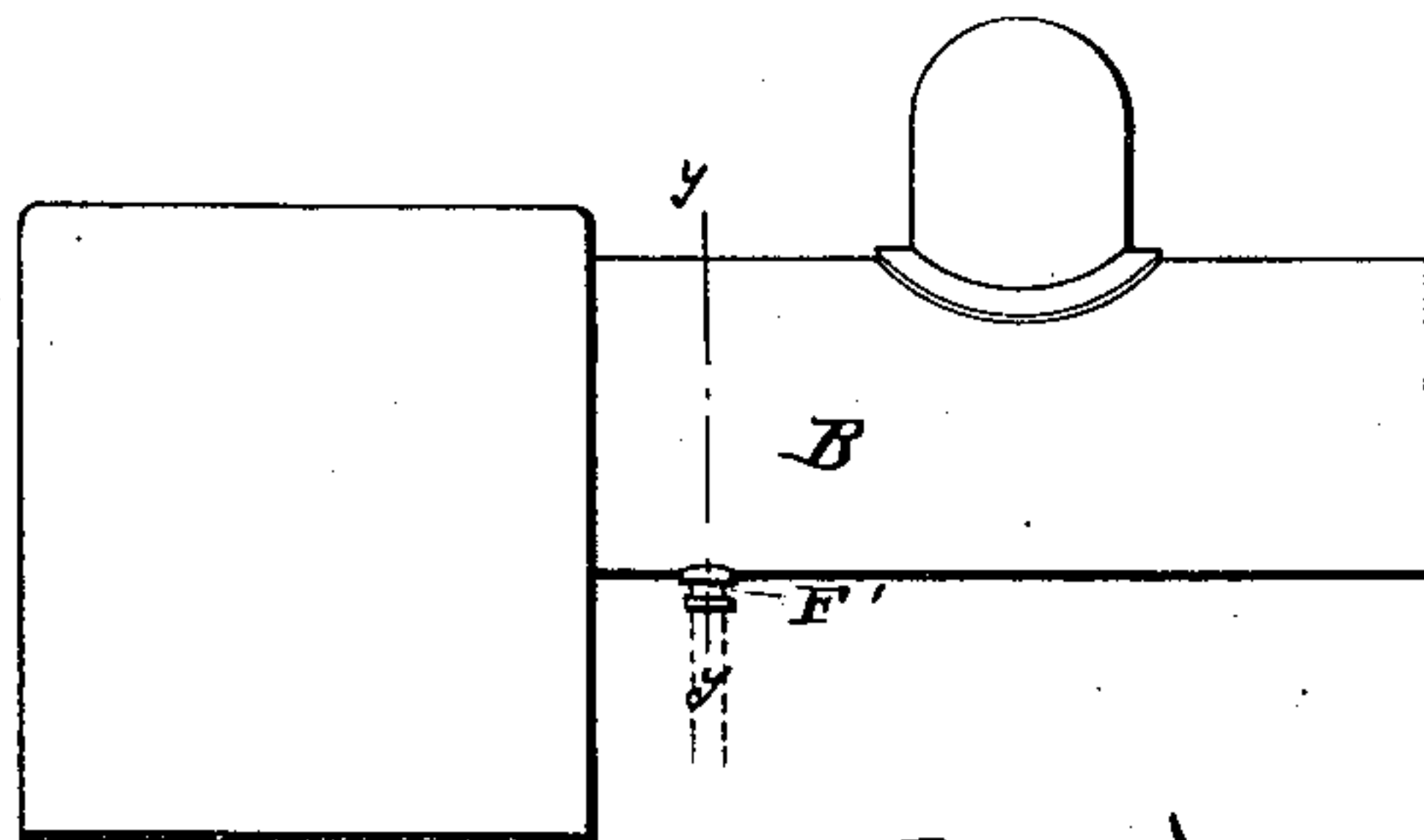
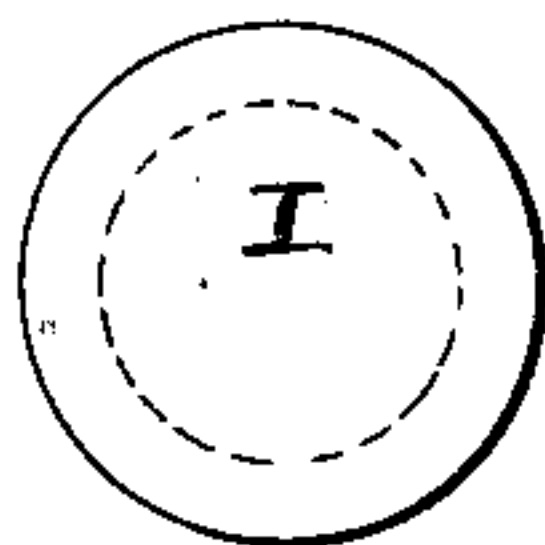


FIG. 3

Witnesses:

Jesse B. Heller.  
H. C. Motherwell

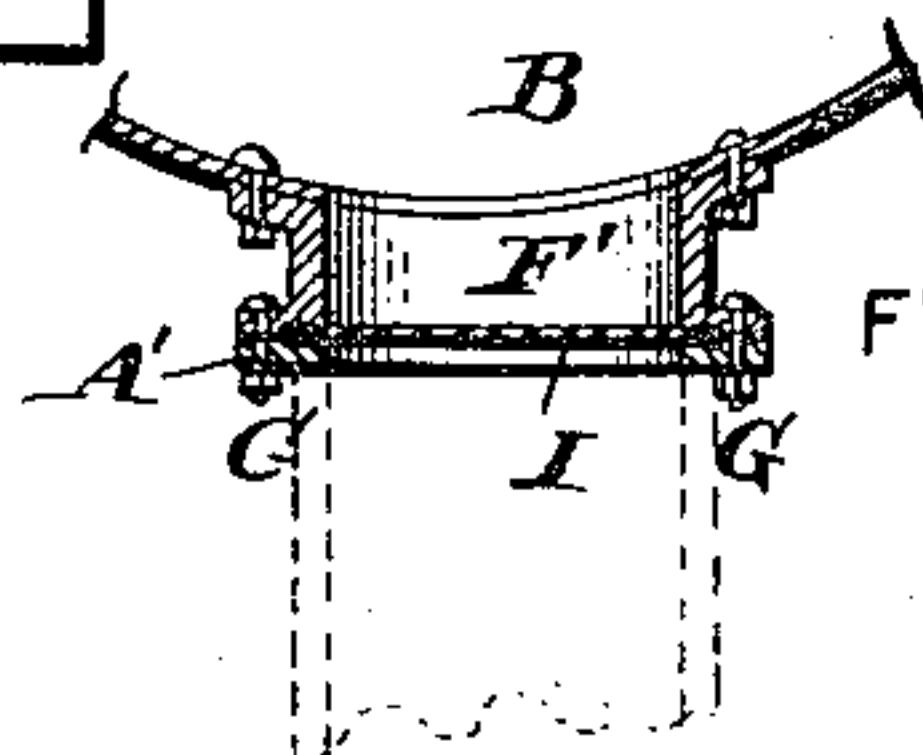


FIG. 4

Inventor.

Wm. G. Huey

By *[Signature]*  
Attorney.



# UNITED STATES PATENT OFFICE.

WILLIAM G. HUEY, OF PHILADELPHIA, PENNSYLVANIA.

## VALVE FOR STEAM-GUNS.

SPECIFICATION forming part of Letters Patent No. 556,058, dated March 10, 1896.

Application filed December 9, 1893. Serial No. 493,199. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM G. HUEY, of the city and county of Philadelphia and State of Pennsylvania, have invented an Improvement in Valves for Steam Guns, Boilers, &c., of which the following is a specification.

My invention has reference to valves for steam guns, boilers, &c.; and it consists of certain improvements which are fully set forth in the following specification and shown in the accompanying drawings, which form a part thereof.

This application particularly relates to valves adapted to hot-water vessels or boilers and so constructed that they will give way under a predetermined pressure, so as to form an unobstructed outlet or passage-way for the water and steam.

The improvement is useful in connection with steam-guns or those employing the expansive properties of water under high pressure, wherein it is desired to liberate the water and steam with great rapidity, so that the explosive tendency may be directed in a predetermined direction and utilized to eject the projectile from the gun.

The invention is also useful in connection with ordinary steam or water boilers or any receptacle containing water under a pressure. In these latter cases when there is an excessive pressure the valve gives way and permits the pressure to expend itself in forcing the water out through the valve-orifice, thereby preventing actual rupture of the boiler.

I do not confine myself to any special use of the invention, as, broadly considered, it is applicable to any boiler or vessel wherein water or liquid is held under pressure and is required to be liberated in case the pressure is raised beyond a given limit.

More especially my invention consists in providing the boiler or vessel containing the water under pressure with a valve comprising a plate of metal of any kind and thickness so long as it is of less strength than that of the boiler or vessel proper, and clamping the said plate over an opening or passage-way, so that when the pressure of the water increases beyond the strength of the disk or plate it shall give way and permit the escape of the said water.

My improvements will be better understood

by reference to the accompanying drawings, in which—

Figure 1 is a side elevation of a steam-gun embodying my invention. Fig. 2 is a sectional elevation of the breech of the gun shown in Fig. 1. Fig. 3 is a side elevation of a boiler having my invention applied thereto. Fig. 4 is a sectional elevation of the valve shown in Fig. 3, and Fig. 5 is a plan view of one of the valve disks or plates.

The structure comprised in Figs. 1 and 2 illustrates a gun adapted to throw projectiles by the explosive or expansive qualities of water under very high pressure. The gun consists of a gun-tube A, a hot-water boiler or vessel B, to which the gun-tube is clamped by clamps C, and a carriage D, to which the movable part of the gun is pivoted and upon which it moves in transverse bearings E.

The boiler or vessel B has a front conical steel neck F, upon which the trunnions *f* are formed, and which neck terminates in an opening G of a diameter substantially equal in area to that of the gun-tube A, so that the steam and vapor may enter the tube A with a velocity equal to that of its passage through the tube. The end of the neck F is preferably slightly recessed, as at H, and into this is fitted the valve disk or plate I of metal having a strength necessitating a given high pressure in the boiler or vessel B before giving way. This disk or plate is firmly clamped between the neck F and the breech of the tube A by suitable clamping-bolts C or otherwise. The edges K of the tube are formed of hardened steel, so that they will tend to cut the disk or plate when it is forced outward by the pressure. In this manner it will be seen that the central part of the plate I is blown out and acts directly upon the projectile L, so that the force of the expanding vapor behind it will cause both it and the projectile to leave the gun with terrific velocity. It will be further observed that when this result takes place the action of the water in suddenly bursting into steam or vapors is permitted to act upon the projectile with instantaneous effect and with a force equal to that which could be exerted through the tube of the gun just as if no valve had been employed. The hot water may be admitted into the boiler or vessel B by a pipe M opening



into it through one of the trunnions *f* and provided with a suitable check-valve *N*. It is immaterial how the water is delivered to the boiler or vessel, and, if desired, may be delivered in the manner described in Letters Patent No. 441,676, dated December 2, 1890, granted to Thomas J. Lovegrove.

After the gun has been fired it is lowered so that the wheels *P* rest upon the guides *P'*, and when the bolts or clamps *C* are loosened the tube *A* is moved forward and a new plate or disk *I* is inserted. Then the tube is clamped once more in position on the neck *F*, a projectile *L* having been previously inserted in the breech, and the gun is once more ready to be charged and fired.

Another application of my invention is illustrated in Figs. 3 and 4, in which is shown a boiler provided below the water-line with a tubular neck or passage-way *F'* covered with a plate or disk *I* clamped in place by an annular ring-plate *A'*, which is held to the neck *F'* by bolts *G*. The disk or plate *I* may be secured in place so as to make a liquid-tight cap *A'* to the opening *f* of the neck in any other suitable manner.

The boiler may be used for any purpose desired so long as it contains hot water under pressure. Hence I do not confine myself to any special use of my invention beyond its use to suddenly liberate the water of the boiler in case the pressure becomes greater than the valve-plate will sustain, so that the discharge of the contents shall take place in a definite direction and through an orifice of predetermined sectional area. Such boilers would include the hot-water boiler of the gun, hot-water boilers for domestic purposes and steam-boilers generally.

The valve-plate should be of a metal having a fusing-point greater than any possible temperature which could be imparted to the water. It will also be observed that the parts which directly clamp or hold the valve-plate are made strong, so that they cannot be injured by the sudden escape of the water upon rupturing the said valve-plate.

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination of a gun-barrel *A* adapted to receive a projectile, a vessel *B* having an open neck *G* and adapted to contain water heated to a very high temperature and pressure, a supply-pipe leading from a source of hot-water supply, a valve in the supply-pipe, means to clamp the open-neck end of

the vessel *B* to the open breech of the gun-barrel, and a rupturable diaphragm interposed between the vessel *B* and barrel *A* adapted to be ruptured to permit of the escape of the water and steam into the gun-barrel to eject the projectile.

2. The combination of a water boiler or vessel adapted to contain water under a high pressure having an opening or orifice, a long tubular barrel adapted to receive a projectile detachably fitted to the boiler or vessel, means to supply water to the boiler or vessel and an interposed valve-plate clamped between the orifice of the boiler or vessel and annular barrel, whereby the pressure imparted to the contents of the boiler or vessel may blow out the center of the plate and force it into the barrel to permit a sudden discharge and vaporization of the water to eject the projectile.

3. The combination of a water boiler or vessel adapted to contain water under a high pressure having an opening or orifice, a long tubular barrel adapted to receive a projectile detachably fitted to the boiler or vessel, and an interposed valve-plate clamped between the orifice of the boiler or vessel and annular barrel, whereby the pressure imparted to the contents of the boiler or vessel may blow out the center of the plate and force it into the barrel to permit a sudden discharge and vaporization of the water to eject the projectile, and a support for the boiler or vessel and barrel whereby both may be moved simultaneously to control the direction of the projectile.

4. The combination of a gun-barrel *A* adapted to receive a projectile, a vessel *B* having an open neck *G* and adapted to contain water heated to a very high temperature and pressure, a supply-pipe leading from a source of hot-water supply, a check-valve in the supply-pipe to permit ingress of hot water into the vessel *B* but prevent egress thereof, means to clamp the open-neck end of the vessel *B* to the open breech of the gun-barrel, and a rupturable diaphragm interposed between the vessel *B* and barrel *A* adapted to be ruptured to permit of the escape of the water and steam into the gun-barrel to eject the projectile.

In testimony of which invention I have hereunto set my hand.

W. G. HUEY.

Witnesses:

ERNEST HOWARD HUNTER,  
B. J. BRANNON.