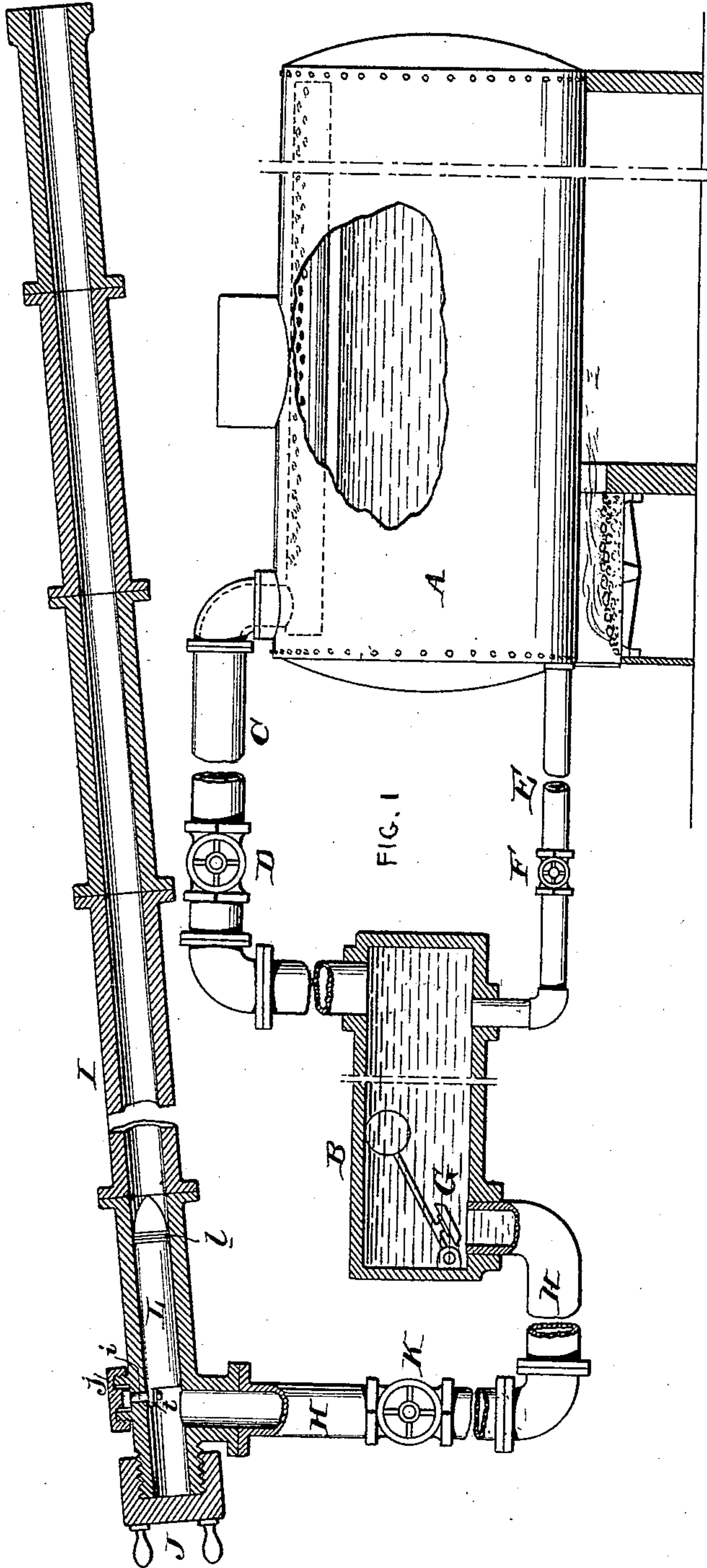


(No Model.)

T. J. LOVEGROVE.
GUN.

No. 441,676.

Patented Dec. 2, 1890.



Witnesses:
Henry D. ...
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Inventor:
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UNITED STATES PATENT OFFICE.

THOMAS J. LOVEGROVE, OF NEW EGYPT, NEW JERSEY.

GUN.

SPECIFICATION forming part of Letters Patent No. 441,676, dated December 2, 1890.

Application filed April 4, 1890. Serial No. 346,579. (No model.)

To all whom it may concern:

Be it known that I, THOMAS J. LOVEGROVE, of New Egypt, Burlington county, New Jersey, have invented an Improvement in Guns, of which the following is a specification.

My invention has reference to guns; and it consists of certain improvements, which are fully set forth in the following specification and shown in the accompanying drawing, which forms a part thereof.

The object of my invention is to utilize the enormous expansive force of highly-heated liquid retained in a closed receptacle or vessel and permitted suddenly to expand, changing from the liquid to the vapor form.

In carrying out my invention I provide a gun with suitable devices for heating water or other suitable liquid to a high degree, and maintaining the same in the liquid condition, with provision for supplying said highly-heated liquid to the breech of the gun.

The drawing is a sectional elevation of a gun and connecting apparatus embodying my invention.

A represents a boiler of any suitable construction in which water or other liquid is highly heated.

B is a charging-chamber and connects by a pipe C with the top of the boiler A, and by a pipe E with the bottom of the boiler A. The pipe C may have a valve D, and the pipe E is provided with a check-valve F. From the charging-chamber B the liquid passes through a pipe H to the breech of the gun I, which may be made in sections and of phosphor-bronze or other suitable material. The pipe H may have a valve K, if desired.

G is a float-valve adapted to close the pipe H as soon as the liquid in the charging-chamber B has been forced into the gun.

J is the head of the breech, which may be screwed on or otherwise secured in place after the projectile L has been inserted.

The operation of the device is as follows: The shell is placed in the breech of the gun, as shown in the drawing. Upon closing the valve K and opening the valve F the charging-chamber B becomes filled with the highly-heated liquid from the boiler A. The valve F is then closed. The rising of the liquid in the chamber B opens the float-valve G, the valve K being closed. The valve K is then

opened and the pressure of the vapor from the boiler A, acting through the tube or pipe C, forces the liquid from the charging-chamber B through the pipe H into the breech of the gun and discharges the projectile. When the liquid from the charging-chamber B has been forced into the gun, the float-valve G will have closed the entrance to the pipe H, so as to prevent needless reduction of pressure in the boiler A, which would take place if the vapors passing through the pipe C were permitted to escape through the gun.

To prevent the movement of the projectile before the chamber P is fully charged, a connection may be made between the projectile and the gun, which will normally hold the projectile to the gun, but will be broken by the force of the liquid at the moment the chamber is fully charged. In the drawing I have shown such a connection. The projectile is formed with a slotted projection *t*, in which fits a pin *i*, inserted through the breech of the gun and held in place by a screw-cap *j*. When the projectile is fully charged, the force of the liquid breaks the pin *i* and releases the projectile. When the gun is reloaded, the cap *j* is removed and a new pin *i* is inserted in place.

I do not limit myself to the mere details of construction herein set out, as they may be greatly modified without in the least departing from the spirit of my invention.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of a gun, a boiler for containing a liquid heated to a high temperature, a pipe or passage leading from the boiler to the breech of the gun, and valves to control the passage of the highly-heated liquid to said gun.

2. The combination of a gun, a boiler for containing a liquid heated to a high temperature, a pipe or passage leading from the boiler to the breech of the gun, a charging-chamber arranged in said pipe or passage, a pipe connecting the upper part of the boiler with the charging-chamber, and valves to control the passage of the highly-heated liquid to said gun.

3. The combination of a gun, a boiler to heat a liquid to a high degree of temperature,

a charging-chamber, a pipe to supply liquid from the boiler to the charging-chamber, a pipe connecting the upper part of the boiler with the charging-chamber, a pipe or passage-way from the charging-chamber to the breech of the gun, and one or more valves for controlling the flow of the highly-heated liquid to the breech of the gun.

4. The combination of a gun, a boiler to heat a liquid to a high degree of temperature, a charging-chamber, a pipe to supply liquid from the boiler to the charging-chamber, a pipe connecting the upper part of the boiler with the charging-chamber, a pipe or pas-

sage-way from the charging-chamber to the breech of the gun, a float-valve to control the passage from the charging-chamber to the breech of the gun, and a valve to control the passage of the liquid from the charging-chamber to the gun independent of said float-valve.

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

THOMAS J. LOVEGROVE.

Witnesses:

A. J. DUNN,

ERNEST HOWARD HUNTER.