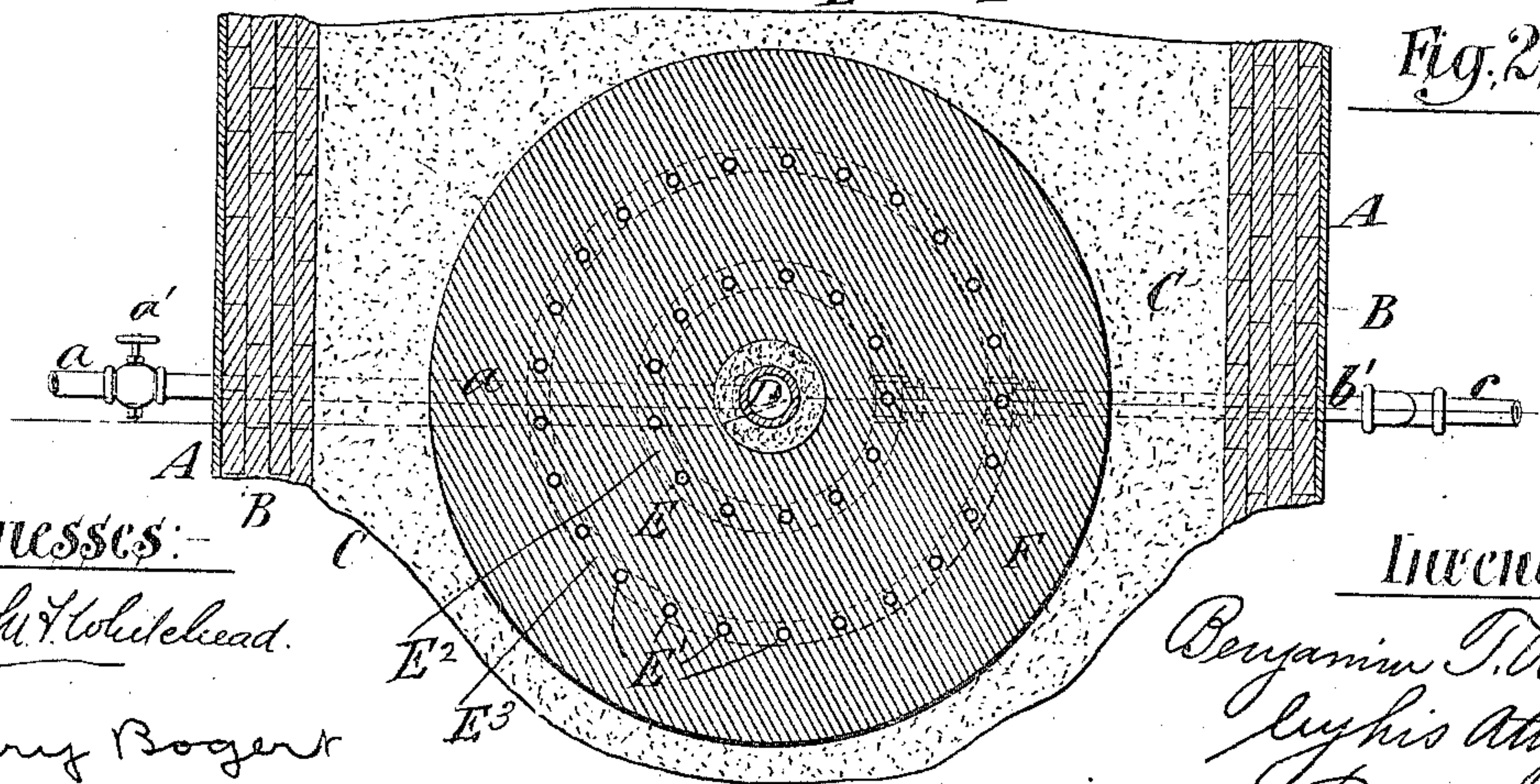
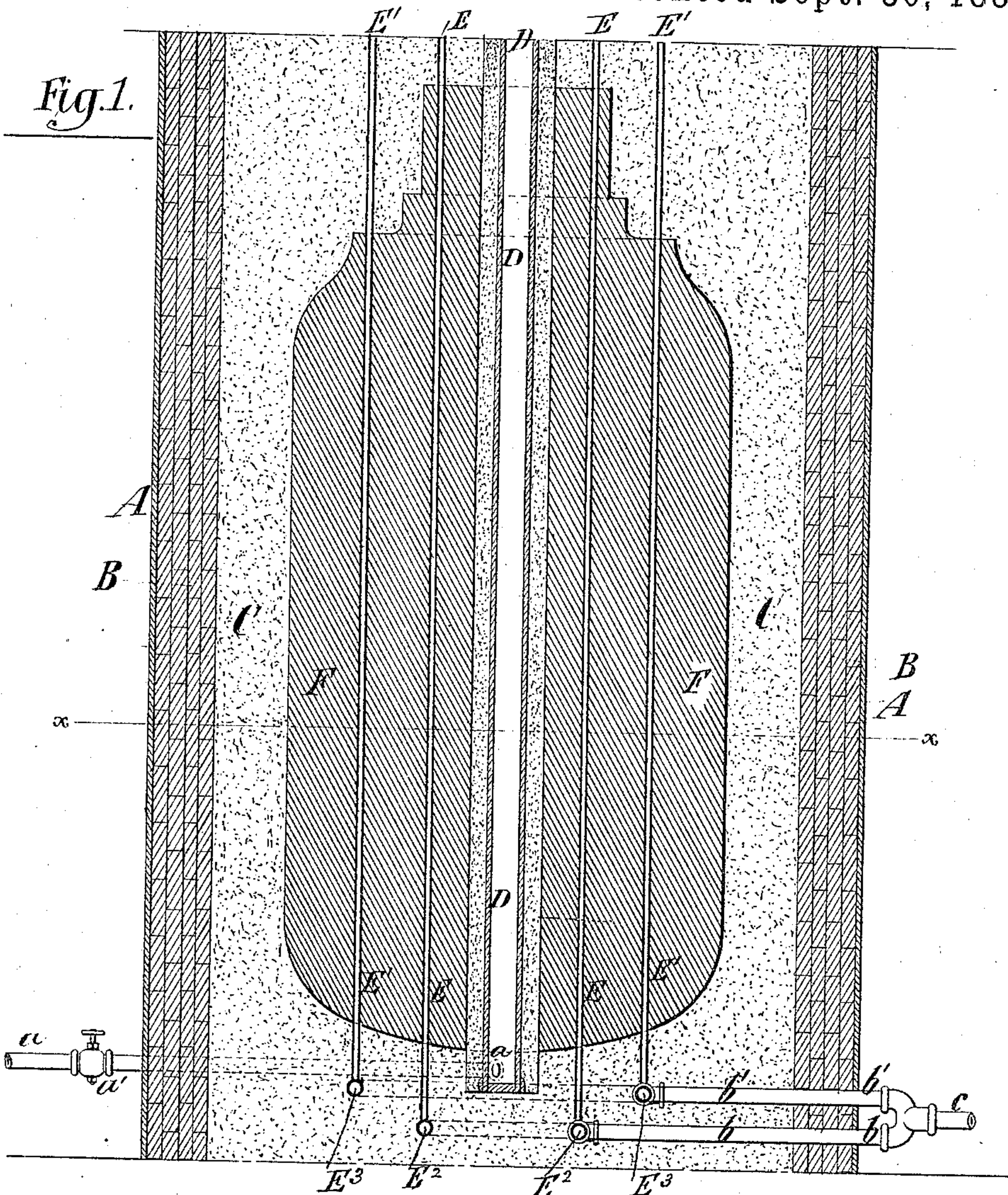


(No Model.)

B. T. BABBITT.
MOLD FOR CASTING CANNON.

No. 305,777.

Patented Sept. 30, 1884.



Witnesses:-
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UNITED STATES PATENT OFFICE.

BENJAMIN T. BABBITT, OF NEW YORK, N. Y.

MOLD FOR CASTING CANNON.

SPECIFICATION forming part of Letters Patent No. 305,777, dated September 30, 1884.

Application filed February 28, 1884. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN T. BABBITT, of the city and county of New York, in the State of New York, have invented a new and useful Improvement in Molds for Casting Cannon, of which the following is a specification.

My invention relates more particularly to a mold in which is used a hollow core, through which steam, water, or other cooling-fluid is circulated after casting, to cause the metal of the gun to contract inward or toward the center; but the invention may be employed in the absence of such hollow core, if desired.

The invention consists in the combination, with a mold for a cannon, of a number of tubes extending lengthwise of the mold and external to the core, and through which steam or other cooling-fluid may be circulated or passed after the said tubes are enveloped by the molten metal. These tubes for cooling-fluid may be arranged in one or more circular series around the core, and each series may be supplied with fluid from an annular pipe, with which all the tubes of that series are connected, and with which a supply-pipe is also connected. By the circulation of steam or other cooling-fluid through the tubes above described a gradual cooling of the mass of metal in the breech portion of the gun is effected and unequal strains produced by unequal expansion are avoided. The expansion of the tubes when they are enveloped in molten metal will simply increase their length, and the arrangement of the tubes lengthwise of the mold prevents them from in any way resisting the contraction of the cast metal, and leaves them free to slightly change their position relatively to each other as the cast metal sets around them and contracts upon them. After casting, the tubes are cut off where their ends protrude from the gun, as will be more fully hereinafter described.

In the accompanying drawings, Figure 1 is a vertical section of a mold embodying my invention and the breech portion of a gun cast therein, and Fig. 2 is a transverse section of the mold and gun on the dotted line *xx*, Fig. 1.

Similar letters of reference designate corresponding parts in both figures.

A designates the external structure or iron flask of the mold. B is a lining of brick with-

in the flask, and C is the sand or filling of the mold.

D designates the core, which, in this example of my invention, is hollow, and is supplied with steam, water, or other cooling-fluid through a pipe, *a*, in which is a suitable valve, *a'*, for controlling the supply of the cooling-fluid.

E E' designate tubes, which may consist of ordinary steam-pipe, and which extend lengthwise of the mold and approximately parallel with the core D.

As here shown, the tubes are arranged in two circular series around the core, the tubes E forming the inner series nearest the core, and the tubes E' forming the outer series farthest from the core.

I do not necessarily arrange the tubes in circular series or employ two series of tubes; but such an arrangement is very appropriate, because of the circular form of the gun, and two circular series of tubes are sufficient to produce good results.

In casting a gun entire the outer series of tubes, E', may extend through the breech portion only, and the inner series of tubes, E, may extend through the gun nearly to the muzzle.

As here shown, the tubes E of the inner series are connected with and receive their supply of cooling-fluid from an annular header or pipe, E², and the tubes E' of the outer series are similarly connected with and receive their supply of cooling-fluid from a similar annular header or pipe, E³, the two annular pipes E² E³ receiving their cooling-fluid through branches *b b'* from a common supply-pipe, *c*. The hollow core D and the tubes E E' may be extended above the top of the mold, and are connected with suitable pipes for conducting away the water, steam, or other cooling-fluid from them.

It is believed to be most advantageous to supply water to the hollow core D and steam to the tubes E E'; but water, steam, or any other fluid which will have a cooling action on the hot metal of the gun may be used, and the temperature and volume of the cooling fluid or fluids may be varied at the discretion of the manufacturer and as the kind of metal

used in the gun may demand. The pouring in of the molten metal F envelops all the tubes E E', and the steam or other cooling-fluid may be passed through them simultaneously with the passing of water or other fluid through the hollow core, or may follow the cooling of the core.

The tubes E E', or any arrangement of tubes for cooling-fluid, may be used in the absence of a hollow core, D, and with an ordinary solid core.

The expansion of the tubes E E' when enveloped in molten metal will simply elongate the tubes, and as they extend separately through the gun freedom is afforded for any change of their relative position which may result from the contraction of the metal upon and around them.

After the gun is removed from the mold the protruding ends of the tubes are cut off close to the gun.

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

1. The combination, with a mold for a cannon, of a number of tubes for cooling-fluid, ex-

tending lengthwise thereof and external to the core, substantially as and for the purpose herein described.

2. The combination, with a mold for a cannon and a tubular core therein for a cooling-fluid, of a number of tubes for cooling-fluid, extending lengthwise of the mold and external to the tubular core, substantially as and for the purpose herein described.

3. The combination, with a mold for a cannon, of tubes for cooling-fluid, extending lengthwise thereof and arranged in a circular series, and an annular header and supply-pipe, with which said tubes are connected and from which they are supplied, substantially as and for the purpose herein described.

4. The combination, with a mold for a cannon, of the hollow core D and its supply-pipe *a*, the circular series of tubes E E', the annular headers E² E³, and the supply-pipes *b b'*, all substantially as herein described.

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Witnesses:

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