

(No Model.)

J. H. BYRNE.  
HAND FIRE EXTINGUISHER.

No. 540,231.

Patented June 4, 1895.

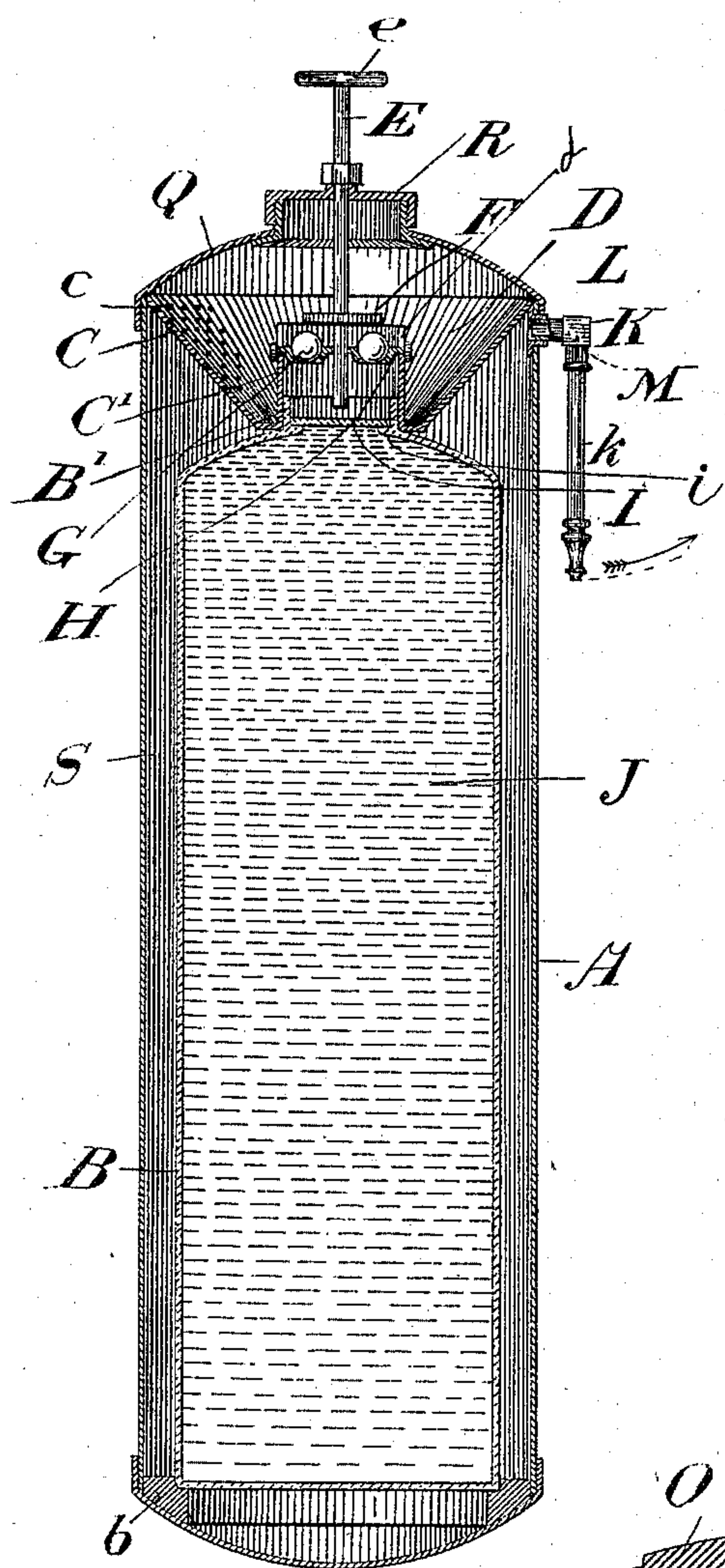


Fig. 1

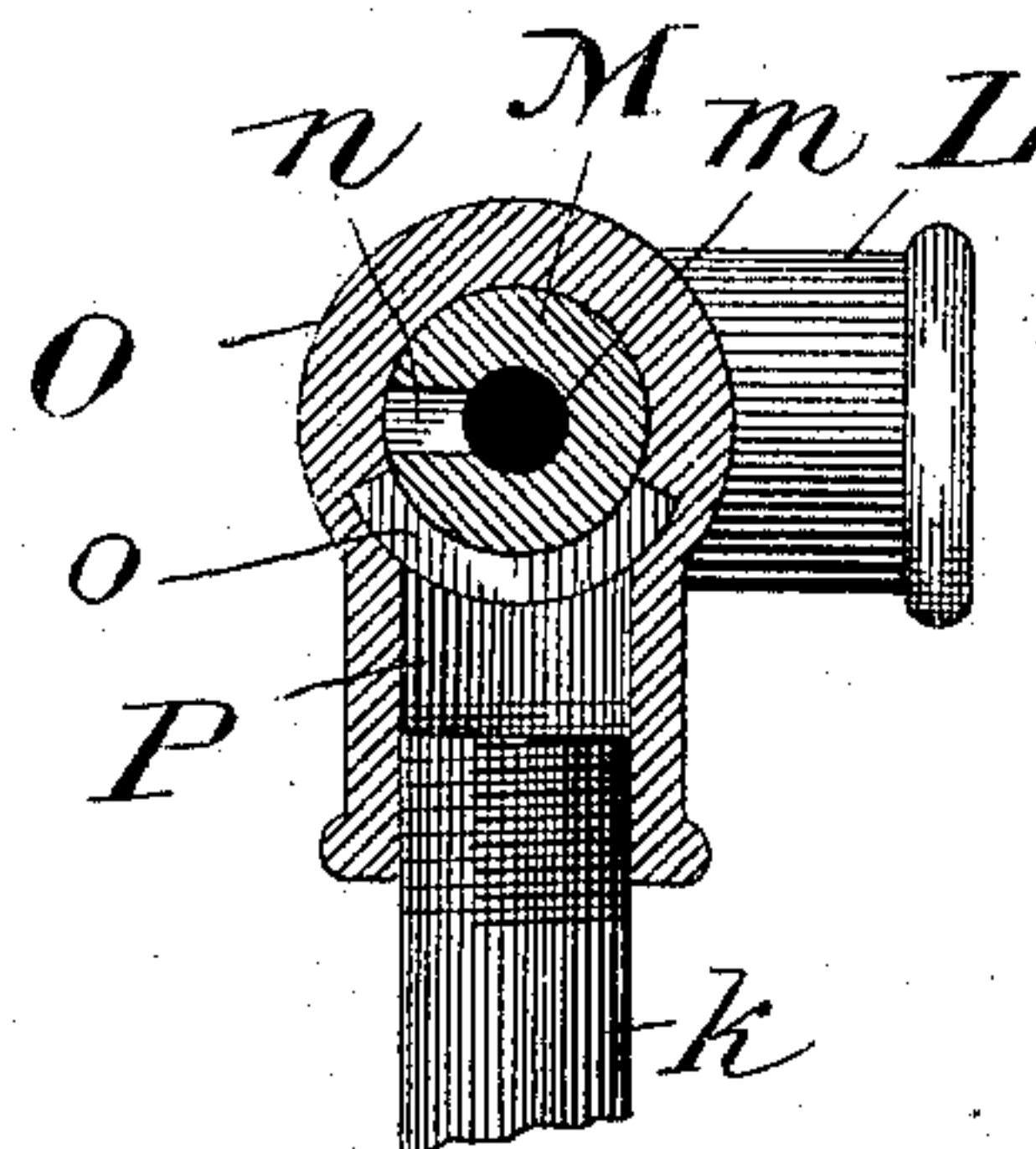


Fig. 4

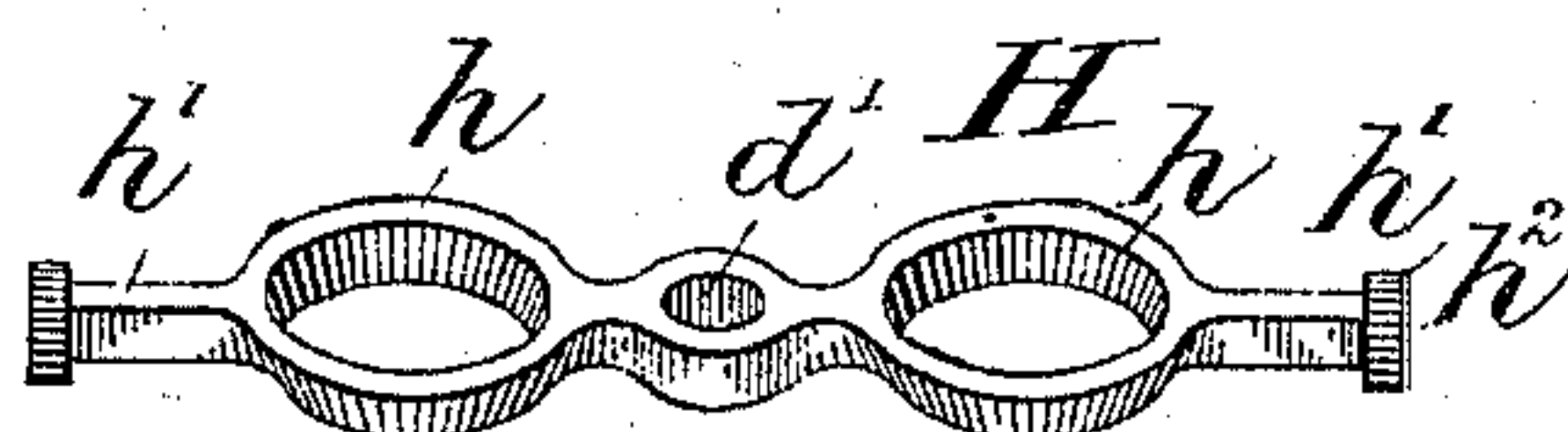


Fig. 3

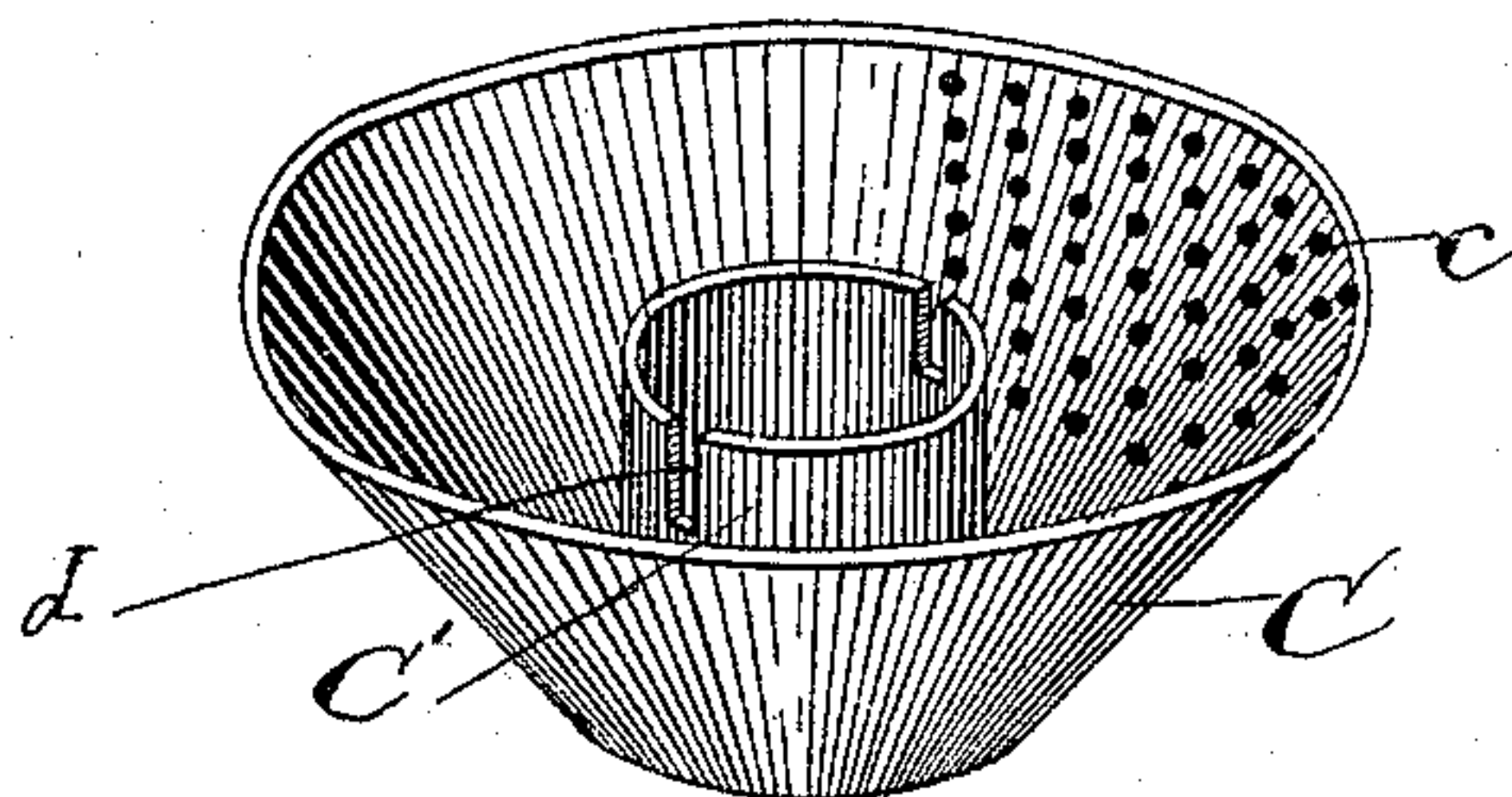


Fig. 2

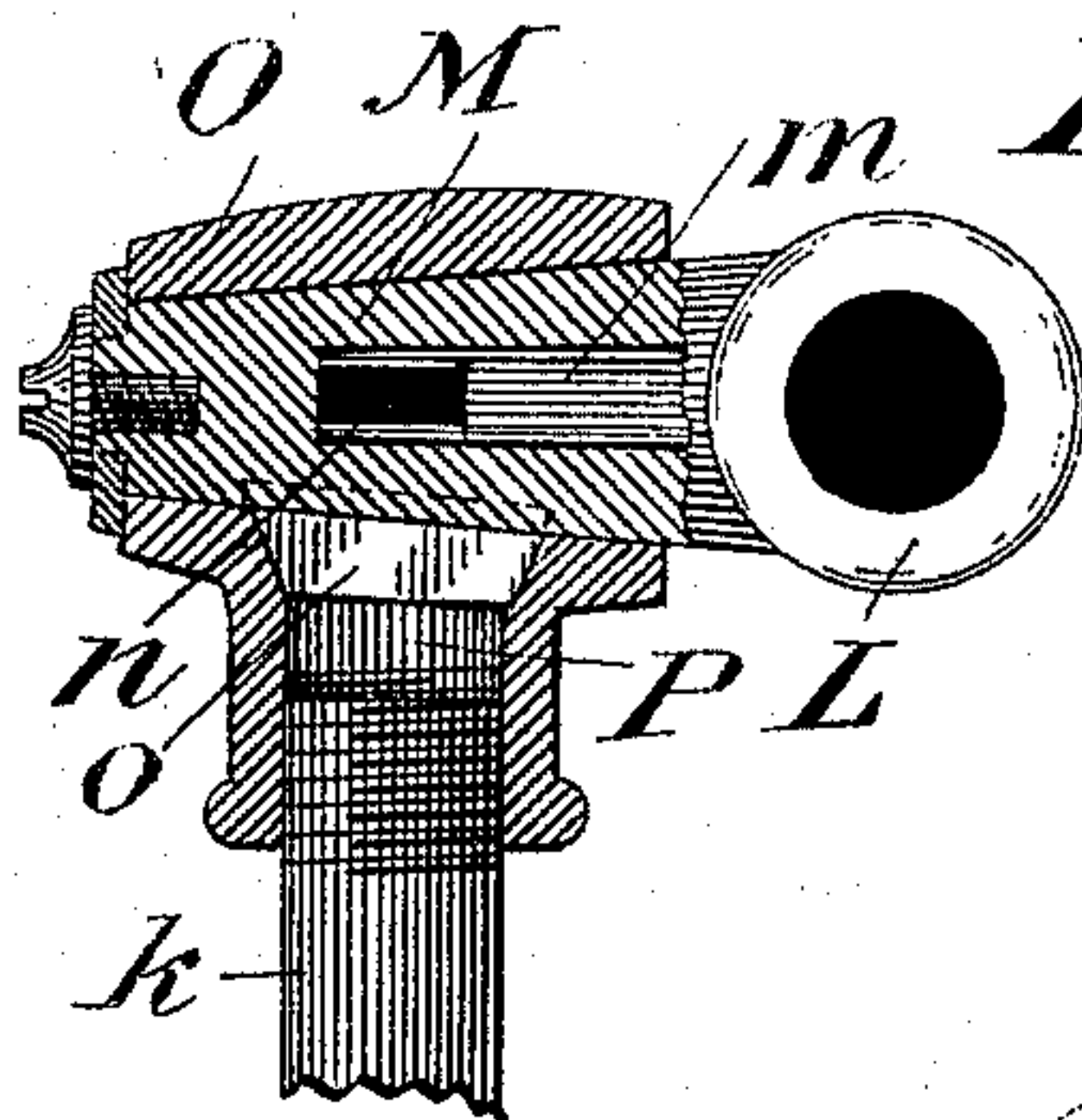


Fig. 5

Witnesses.

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# UNITED STATES PATENT OFFICE.

JAMES HENRY BYRNE, OF TORONTO, CANADA, ASSIGNOR OF ONE-HALF TO  
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## HAND FIRE-EXTINGUISHER.

SPECIFICATION forming part of Letters Patent No. 540,231, dated June 4, 1895.

Application filed February 1, 1895. Serial No. 536,985. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES HENRY BYRNE, of the city of Toronto, in the county of York and Province of Ontario, Canada, have invented a certain new and useful Hand Fire-Extinguisher, of which the following is a specification.

The object of the invention is to provide a hand fire extinguisher so constructed as to prevent any loss of chemicals during the generation of the gas, as well as any liability to loss of the gas not taken up by the water, and which is capable of throwing a stream of gas-charged water over a wide range, when inverted, and while retaining an approximately vertical position, and it consists, essentially, of two cylinders, one located within the other, the smaller one designed to contain a liquid and having its neck closed by a breakable seal and being of such size as to leave a space between the two cylinders, a cone-shaped shelf (a section of which is perforated) applied to the ends of the two cylinders so as to form a third chamber to retain the carbonate of soda or other carbonate in position, breakable balls or vessels for containing acid, means for breaking the breakable balls and the breakable seal so as to admit the liquid to the third chamber when the extinguisher is inverted, and to liberate the acid so as to combine with the carbonate, and a swivel-cock located in the outer cylinder outside the third chamber opposite to the perforated section thereof, and which is adapted to shut off the gas-charged liquid when the nozzle is turned parallel to the major axis of the cylinder and to turn it on when turned at an angle thereto, substantially as hereinafter more particularly described.

Figure 1 is a vertical section of the hand fire-extinguisher. Fig. 2 is a perspective detail of the diaphragm which forms the wall of the third chamber. Fig. 3 is a detail of the saddle for holding the breakable balls. Fig. 4 is a section through the swivel-cock. Fig. 5 is another section at right angles to the section shown in Fig. 4.

Like letters of reference indicate corresponding parts in the various figures.

In Fig. 1—A, is the outer cylinder which is preferably shaped as indicated and made of metal.

B, is an inner cylinder which is preferably of glass and has a short neck B', and which is placed within the outer cylinder A, so as to form a chamber S, without the inner cylinder.

Q, is the cover of the outer cylinder which is preferably dome-shaped and which may be soldered or otherwise secured to the cylinder A, when the inner cylinder is in place. It of course forms a part of the outer cylinder.

R, is a screw-cap which covers the hole in the dome-shaped cover Q. This screw cap is provided with a hole through which the plunger rod E, projects.

b, is a ring or ledge at the bottom of the outer cylinder, which preserves the inner cylinder in place within the outer one.

C, is a shelf or diaphragm, the shape of which is more particularly shown in Fig. 2, and which rests on the top of the inner cylinder B. Its top may be soldered, or otherwise secured to the upper part of the cylinder A.

I, is a breakable seal, which is centrally located and is in the neck B' of the inner cylinder B. It rests on the flange i, and may be further held in place by plaster of paris, or otherwise.

The diaphragm C, with the breakable seal I, and the cover Q, of the inner cylinder forms a third chamber D, in which are placed the carbonate of soda or other carbonates, as well as the acids contained in the breakable balls G, hereinafter referred to.

c, shows perforations in the diaphragm C.

E, is a plunger rod, which passes, as already mentioned, through the screw cap R, and is provided with the head e, and a break bar F. This break bar F, is sufficiently close to the breakable balls G, as to hold them and the saddle H, in place in the slot d, when the hand fire extinguisher is inverted or turned upside down. The plunger rod E, also fits sufficiently close within the hole in the screw cap R, as to enable the break bar F, to perform this office.

H, is a saddle for the breakable balls, the details of which are shown in Fig. 3, in which h, are cups to carry the breakable balls G.

h', shows arms which are adapted to rest in the slot d, formed in the neck C'. (See Fig. 2.)

h'', shows heads formed on the arms h', to



prevent lateral motion and displacement of the saddle H, which is carried by the slotted neck C'; and d', is a central ring through which the plunger rod E, may pass so as to  
5 break the breakable seal I

J, is the liquid which is sealed in the inner cylinder B, and may be water or water-charged with brine or other compound, as may be desired.

10 K, is a swivel cock which is specially adapted for use in this hand fire extinguisher so as to admit of a large range over which the gas-charged water may be discharged. It is situated in the upper part of the outer cylinder A, when in its normal position, as indicated in Fig. 1, and is outside of the third chamber D, and immediately opposite to the perforations c, formed in the wall thereof. It is located here outside of the chamber in  
20 which the gas is first formed and is opposite to the perforations c, in order to avoid any undue escape of chemicals before combination or of gas before it has been taken up by the water or has reached the position when  
25 the hand fire extinguisher is inverted in order to exert a pressure to expel the gas-charged water from the nozzle of the swivel cock when directed on the fire. The details of this swivel cock are shown in Figs. 4 and 5, in  
30 which L, is the discharge branch, and M, is an elbow formed thereon and at right angles thereto. This elbow is preferably of a conical form, and has a central opening m, for the water.

35 n, is a water outlet at right angles to the central opening m, and is situated about half way down on the cone-shaped elbow M.

O, is a swivel joint which fits over the cone-shaped elbow M, and is adapted to rotate  
40 thereon. From it is cut out a chamber o, which chamber is designed to give a greater range for the discharge of the liquid by the swivel cock K.

P, is a water chamber formed integral with  
45 the swivel joint O, and communicates directly with the chamber o, in the swivel joint O.

k, is a nozzle which is screwed within the water chamber P.

In Figs. 1 and 4, the swivel cock K, is shown  
50 in a position when the water is turned off. When the swivel cock K, is moved in the direction of the arrow head, and as soon as the water outlet n, comes opposite to one end of the chamber o, cut out of the swivel joint, the  
55 water immediately commences to discharge from the nozzle k, and it continues so to discharge until the nozzle has been so turned around that the other end of the chamber o passes the mouth of the water outlet n. This  
60 obviously gives a wide range for the water either in an upward or downward direction, while at the same time the hand fire extinguisher is kept in a vertical position.

The mode of operation of my device is as  
65 follows: The plunger rod E, being pushed or forced down by a blow on the head e, breaks the breakable balls G, in which is contained

the acid, and at the same time the end of the plunger rod breaks the breakable seal I. The fire extinguisher then being inverted or  
70 turned upside down, the liquid J, passes through and commingles with the acid and carbonate which are mixed in the third chamber D. Carbonic acid gas is immediately liberated in large quantities of gas and gas  
75 charged water escapes through the perforations c, in the wall of the diaphragm C, fills the chamber S, and circulates round so as to enter the discharge branch L, of the swivel cock K. At the same time the gas and gas-  
80 charged water rises in the cylinder B. The pressure of the free gas on the top of the gas-charged water, when the hand fire extinguisher is in this inverted position, creates a pressure downward so as to expel the gas-  
85 charged water with great force when the nozzle is turned on in the direction, as indicated by the arrow-head.

By my improved hand fire extinguisher, all possibility of escape of chemicals or of gas  
90 before it has become completely taken up by the water and before it has fulfilled its office of driving out from the hand fire extinguisher the gas-charged water, is obviated and no matter in what position my hand fire  
95 extinguisher may be held from the vertical, it is practically impossible that any free gas should escape from the nozzle, until all the liquid is discharged.

The form of swivel cock and my improvement therein are specially designed to obtain  
100 a wide range, as already stated, for the discharge of water over any fire without moving the hand fire extinguisher from its approximately vertical position.

What I claim as my invention is—

1. In a hand fire extinguisher, the combination with two cylinders forming two chambers, of a partly perforated diaphragm forming a third chamber, a breakable seal closing  
110 one of said chambers and breakable balls or vessels contained in one of said chambers, means for breaking the balls and seal, and a valve, substantially as described and for the purpose specified.

2. In a hand fire extinguisher, the combination with two cylinders located one within the other, and forming two chambers, of a partly perforated diaphragm forming a third chamber, a breakable seal closing one of the  
120 chambers, and breakable balls, means for breaking the balls and seal, and a valve located in the outer cylinder opposite to the perforated part of the diaphragm and outside the third chamber, substantially as described  
125 and for the purpose specified.

3. In a hand fire extinguisher, the combination with two cylinders one located within the other so as to form a chamber surrounding the inner cylinder; of a breakable seal  
130 closing the neck of the inner cylinder; a cone-shaped shelf or diaphragm, a portion of which is perforated, applied to the ends of the two cylinders, so as to form a third chamber to



retain the carbonate; breakable balls or vessels for containing acid; a breakable seal centrally located in the neck of the inner cylinder; means for breaking the breakable balls and breakable seal so as to admit liquid to the third chamber when the extinguisher is inverted and to liberate the acid which combines with the carbonate; and a swivel cock located in the outer cylinder outside the third chamber and opposite to the perforated wall thereof, and which is adapted to shut off the gas charged liquid when the nozzle is turned parallel to the major axis of the cylinder and to turn it on when turned at an angle thereto, substantially as described and for the purpose specified.

4. In a hand fire extinguisher, the combination of the outer cylinder A and inner cylinder B forming two chambers, a third chamber D having perforations *c* in the wall thereof, slotted neck C' in one of said chambers, saddle H resting in said neck, breakable seal I closing the entrance to one of said chambers, valve K, a plunger rod E, and a break-bar F, substantially as described and for the purpose specified.

5. In a hand fire extinguisher, the combination of the outer cylinder A and inner cylinder B forming two chambers, diaphragm C, containing perforations *c*, the slotted neck C' in one of said chambers, the saddle H, comprising cups *h*, for breakable balls G, said saddle having arms *h'* adapted to rest in the slotted neck C', ring *d'* in said saddle H and heads *h''*, substantially as described and for the purpose specified.

6. In a hand fire extinguisher, the combination of the outer cylinder A and inner cylinder B forming two chambers, a screw cap R, forming a cover to the outer cylinder, diaphragm C forming a third chamber and having perforations *c*, slotted neck C' in said third chamber, saddle H supported thereby and forming a support for breakable vessels, breakable seal I sealing the inner vessel, plunger E, and break bar F, substantially as described and for the purpose specified.

7. In a hand fire extinguisher, the combination of the inner and outer cylinders forming two chambers; third chamber D, containing perforations *c*, and closed by cap R, and breakable seal I, located in the neck B', of the inner cylinder B, a breakable vessel in one of said chambers, means for breaking said vessel and said seal I, and the swivel cock K, located in the outer cylinder A, immediately without the third chamber D, and opposite to the perforations *c*, substantially as described and for the purpose specified.

8. A hand fire extinguisher, comprising the following elements: outer cylinder A closed by a screw cap R and having a ledge *b*, inner cylinder B resting on said ledge *b* and having a neck B', a perforated diaphragm C provided with a neck *c'* having slots *d*, saddle H resting in said slots, breakable balls supported by said saddle, a breakable seal closing the inner cylinder B, a plunger rod E having a break bar F, and a valve comprising a discharge branch L, elbow M, central opening *m*, water outlet *n*, swivel joint O, chamber *o*, water chamber P, and nozzle *k*, substantially as described and for the purpose specified.

Toronto, January 26, 1895.

JAMES HENRY BYRNE.

In presence of—

A. M. NEFF,

W. E. CLENDANIEL.