

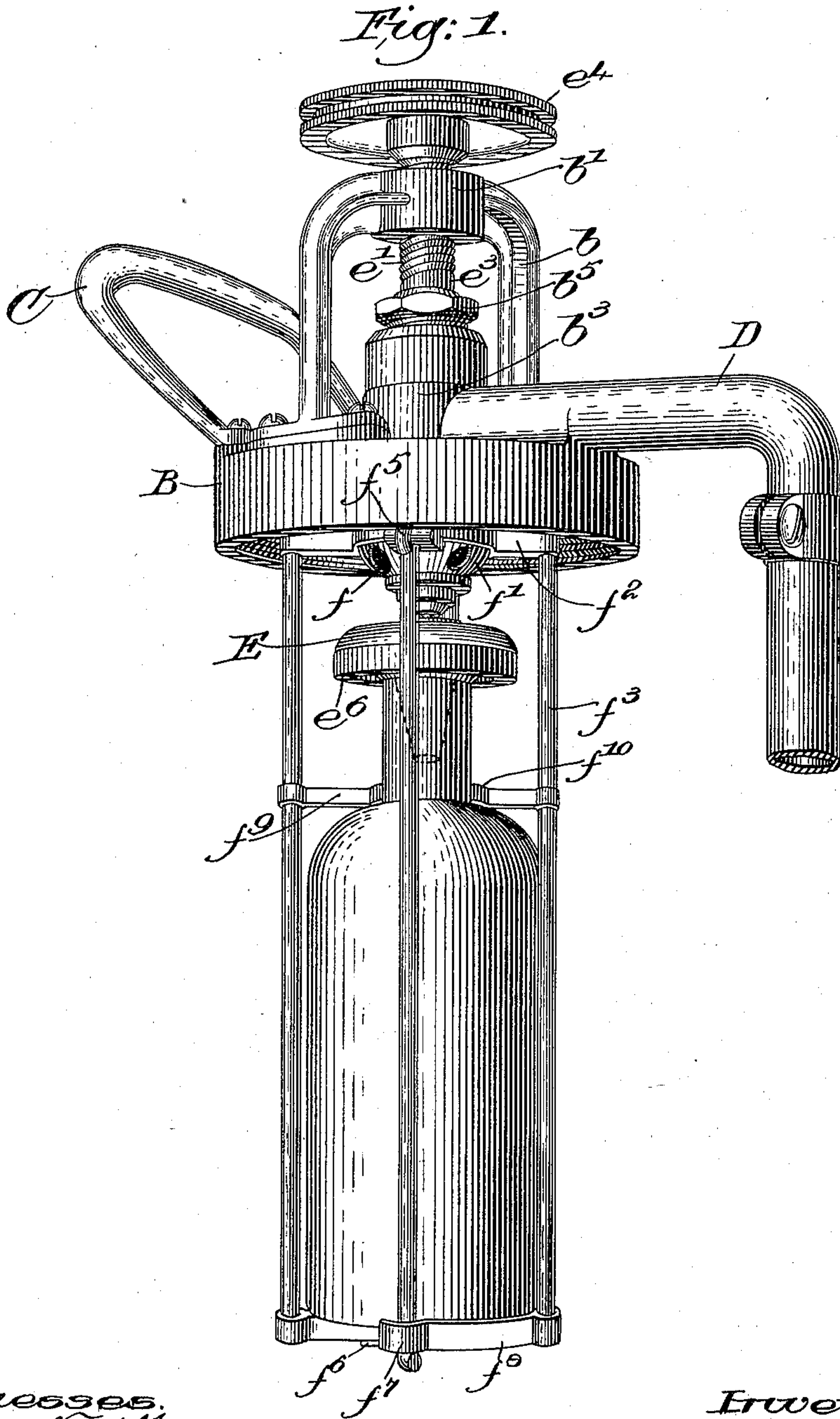
(No Model.)

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J. B. THOMAS.
CHEMICAL FIRE EXTINGUISHER.

No. 598,826.

Patented Feb. 8, 1898.



Witnesses.
Edward H. Allen
A. C. Harmon.

Inventor.
Jesse B. Thomas.
by Crosby & Sugony
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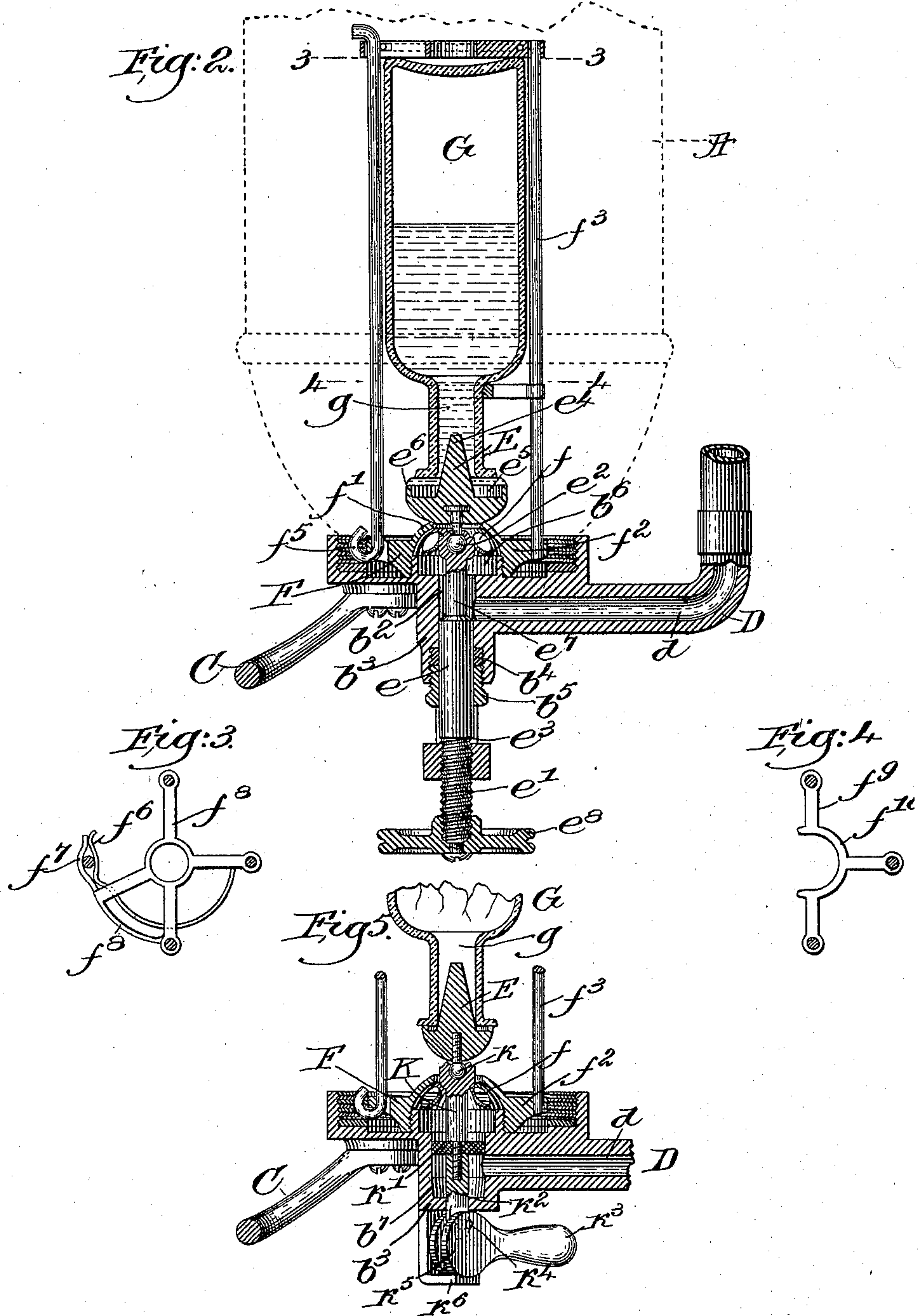
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UNITED STATES PATENT OFFICE.

JESSE B. THOMAS, OF BOSTON, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO
ALFRED J. KNIGHT, OF SAME PLACE.

CHEMICAL FIRE-EXTINGUISHER.

SPECIFICATION forming part of Letters Patent No. 598,826, dated February 8, 1898.

Application filed February 23, 1897. Serial No. 624,507. (No model.)

To all whom it may concern:

Be it known that I, JESSE B. THOMAS, of Boston, in the county of Suffolk and State of Massachusetts, have invented an Improvement in Chemical Fire-Extinguishers, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

My invention relates to improvements in chemical fire-extinguishers, being particularly adapted to the kind disclosed in United States Patent No. 537,421, dated April 9, 1895. One objection to certain devices of this kind heretofore has been that the threaded parts and valve connections which were required have been subject to corrosion at all times by the splashing up or other accidental contact of the contained fluids against the said moving parts, so that it has resulted that when it became necessary in an emergency to use the extinguisher these valve connections and threaded parts would be found to be corroded immovably together, rendering the apparatus entirely useless at the very time it was needed. A further objection has been that when the apparatus was inverted the contents of the acid-containing bottle would at once begin to discharge with considerable rapidity and would so continue until the contents were discharged unless the apparatus in the meantime was reversed into its right-side-up position. To the end, therefore, of obviating these objections I have invented the apparatus hereinafter described and claimed, reference being had to the accompanying drawings, illustrative of one embodiment of my invention.

In the drawings, Figure 1 is a perspective view showing the preferred embodiment of my improved fire-extinguishing apparatus, the inclosing canister being removed for the sake of clearness to show the contained parts. Fig. 2 is a vertical sectional detail thereof, showing the apparatus in inverted working position. Fig. 3 is a horizontal section of the bottom of the cage, taken on line 3 3, Fig. 2. Fig. 4 is a similar horizontal view taken on the line 4 4, Fig. 2. Fig. 5 is a fragmentary sec-

tional detail similar to Fig. 2, showing certain modifications to be hereinafter referred to.

The canister A, (see Fig. 2,) the cap B, and handle C, Fig. 1, are substantially the same as shown in the aforesaid patent.

According to my present invention I mount on the upper side of the cap a bracket *b*, shown as centrally provided with a threaded enlargement *b'*, in which is mounted a valve-stem *e*, having threaded engagement at its upper end *e'* with the threaded enlargement *b'* and preferably limited in its outward movement by a shoulder *e³*. This valve-stem passes through a perforation or main passage *b²*, provided in a projection or hub *b³* on the upper side of the cap B, packing *b⁴* and a packing-gland *b⁵* being provided in the upper portion of the hub *b³*.

On the under side of the cap B, I secure a spider or hanger F, herein shown as removably mounted on a threaded annulus *b⁶* and having a plurality of openings *f* in its hollow shell-like depending portion, in order to permit ready flow of the chemical solution when the apparatus is in operation. The lower portion *f'* of this hanger constitutes a seat for a valve stopper or closure E for the acid-chamber of lead or other suitable material. This closure constitutes a very important feature of my invention and is shown as mounted on the lower end of the valve-stem, being connected thereto by a universal joint, (shown as a ball-and-socket joint *e²*,) whereby the valve is at liberty to tip in any direction when it is held by the valve-stem away from its seat *f'*.

The closure E has a depending conical stem or centering-pin *e⁴* and an annular chamber *e⁵* at its lower side inclosed by a depending lip or hood *e⁶*, herein shown as adapted to fit around the flange of the bottle-neck *g*, the bottle-neck being preferably ground to form a tight joint with said valve when closed.

The provision of a valve-stopper having the lip or hood as described is of peculiar and very great advantage in my invention, as will more fully appear hereinafter.

The valve-stem is cut away at *e⁷* in its lower portion and provided at its outer end with an operative hand-wheel *e⁸*.

An outlet or discharge pipe D has its passage d connected with the passage b^2 at a point below the enlargement of the valve-stem when the latter is in its outermost position, as shown in Fig. 2.

From the above description it will be evident that when the parts are in the position shown in Fig. 2 the sulfuric acid or other chemical contained in the bottle or acid-chamber G is permitted to flow into union with the bicarbonate-of-soda solution or other chemical contained in the canister A, surrounding the bottle, and the gas generated thereby will force the chemical mixture through the openings f of the hanger into the main passage b^2 and out through the discharge-pipe D.

The hanger F is provided with a plurality of arms f^2 , (shown as four,) in which are mounted rods or supports f^3 to constitute a cage, and one of these rods f^4 is pivoted at one end, herein shown as its upper end f^5 , to swing outwardly for the purpose of permitting the bottle to be inserted within the cage, the opposite or lower end of the rod f^4 being normally secured by means of a spring-clip f^6 against a pocket f^7 , formed in the projecting end of a bottom piece f^8 , the latter serving also to maintain the various rods of the cage in their proper relative positions, as shown in Fig. 3.

Adjacent the lower portion of the bottle-neck I provide a spider f^9 , secured at its extremities to the rods of the cage, as shown in Fig. 4, and provided with an inclosure f^{10} to receive and support the bottle-neck and hold the bottle in proper position when secured within the cage.

While I have herein described the preferred embodiment of my invention, yet I do not wish to be restricted in any way to the details thereof, inasmuch as various modifications and changes may be resorted to within the spirit and scope of my invention.

In Fig. 5 I have shown the stopper E provided with a screw-socket, by means of which it is mounted on a threaded end k of a valve-stem K, the latter being provided with a packing k' , movable therewith past the outlet-opening d , the valve-stem being shown as formed in upper and lower separable portions, screwed together at k^2 , as one means of securing the packing properly in position, although any other means may be employed. At its upper end the valve-stem is provided with operating means in the form of a lever k^3 , eccentrically connected at k^4 with the valve-stem and having its hub k^5 operating at one side against an arm or shoulder k^6 , extending upwardly from the cap and overhanging said hub, and at its other side against the projection b^3 of the cap. The latter on its inner side is made slightly conical at its upper portion b^7 , in order to make an absolutely tight joint with the packing k' when the apparatus is in action and the chemicals are being forced through the passage d .

It is to be noted that the valve-stem, both e and K, extends through the end of the canister and has its retracting-bearing removed from all possible contact with the chemicals, being entirely outside the canister, the threads e' bearing in a yoke or bracket b and the hub k^5 bearing on the arm and cap, these bearings and the operating hand-wheel e^8 and lever k^3 being exposed to the air and being also protected by packing below them, so that it is absolutely impossible that any chemicals should spurt out around the hand of the operator or should get at the bearings to corrode them fast.

The operation of my improved apparatus is as follows: The canister A is charged with the proper amount of bicarbonate of soda and water to make an alkaline solution, and the acid-chamber G is similarly charged with sulfuric acid. Referring to the preferred embodiment of my invention, as shown particularly in Figs. 1 and 2, the closure or valve-stopper E is then shut down by means of the hand-wheel e^8 , so as to tightly seal the bottle and prevent any accidental discharge of its contents by the upsetting or agitation of the apparatus. In tightening the stopper or closure it accommodates itself to the particular shape or location of the bottle-neck by reason of the centering-pin e^4 and the swivel-joint e^2 , so that if the bottle-neck should happen to be slightly to one side the stopper will be forced into position properly notwithstanding, and if the bottle should be slightly shorter than usual the stopper is made to fit tightly simply by screwing the valve-stem down farther than usual, and in the modified form shown in Fig. 5 the same adjustability is secured by rotating the stopper E one way or the other on its threaded connection k .

When it is desired to use the apparatus, the closure or capillary device E is moved out of closing engagement with the mouth of the bottle to substantially the position shown in Fig. 2, and the apparatus is inverted. A remarkable result now takes place, for although an open passage for the outflow of the acid is apparently provided, yet the acid does not rush precipitately into the alkaline solution, but its flow is gradual, charging the solution evenly from the first to almost the last of the operation, the flow of acid being automatically regulated by my apparatus. If no alkaline solution were present, the acid would simply fill the chamber e^5 of the stopper and practically seal itself in the position indicated in dotted lines in Fig. 2, due to the retaining-hood e^6 . The presence, however, of the surrounding alkaline solution at once enables the edges, as it were, of the suspended acid that are in contact with the said alkaline solution to generate gas, the capillarity between the stopper and bottle preventing uncontrolled outflow of the acid, the stopper, as herein shown, constituting a trap or seal varying according to the adjustment of the stop-

per, so that my apparatus makes it possible to regulate the supply of acid precisely proportional to the outflow of the mixture, and also makes it possible to keep the gas-pressure under control—that is to say, the supply is continually and evenly recharged as the discharge takes place, carrying the stream evenly from the first to the last both with the same propelling power and extinguishing power to the end.

In apparatus where the acid-containing bottle is broken or the acid-supply is suddenly introduced in great volume into the alkaline solution there is an effect in the nature of an explosion, a heavy pressure being generated suddenly, which gradually dies away, reducing the efficiency and value of the chemicals; and it also results that under this enormous pressure the chemicals are forced out before proper chemical action has taken place, so that the soda goes out as soda and the acid goes out as acid, not only, therefore, being inefficient for the purpose intended, but being dangerous and damaging to the operator and to the material operated upon.

By my invention, the parts being as shown in Fig. 2, the chemical action may be stopped at once simply by reversing the apparatus into right-side-up position, in which position the gas would simply blow off through the outlet *d* and the remaining soda solution would settle to the bottom of the canister and the remaining acid to the bottom of the bottle. A simple inversion of the extinguisher again will at once set up the chemical action and start the apparatus in readiness to extinguish a fire, so that the apparatus when the valve is opened may be stopped and started at will by the simple tipping thereof into right-side-up or inverted position.

When the fire has been extinguished and the apparatus is to be put away, the hand-wheel *e*⁸ is simply screwed down, thereby at once closing the bottle permanently and at the same time cutting off the discharge-outlet *d*, so that if thereafter the apparatus should accidentally get tipped over neither the acid nor the soda solution could escape to do any damage.

In the modified construction shown in Fig. 5 the general operation is similar to that already described in connection with my preferred form of apparatus, the operation of the eccentric handle or operating member *k*³ simultaneously opening or closing the bottle and the outlet-passage *d* and the supply of acid being definitely regulated by the position of the hooded stopper *E* relatively to the mouth of the bottle, this position being determined not only by the position of the operating member, but also by the position of the stopper on its threaded connection *k*.

When it is desired to remove the bottle and insert another, the lower end of the pivoted rod *f*⁴ is slipped out from its clamping-jaws *f*⁶ *f*⁷ and the bottle is removed, another one

being inserted, and the rod being replaced, as shown in Fig. 1.

Many changes in form, proportion, and arrangement of parts and various substitutions of mechanical equivalents may be resorted to without departing from my invention.

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

1. A chemical fire-extinguisher, having an alkaline-supply, and an acid-chamber, provided with an outlet and a closure therefor, and means to limit the opening movement of said closure within the capillary distance thereof from said outlet, substantially as described.

2. In a chemical fire-extinguisher, an alkaline-supply, an acid-chamber, having an outlet for the outflow of the acid into the alkali, and a capillary device at said outlet, for producing capillary action in the said outflowing at said outlet, substantially as described.

3. In a chemical fire-extinguisher, the combination with the acid-chamber having an opening, of a recess, formed by a depending hood beyond the opening of said chamber, and adapted upon inversion of said chamber to be filled with liquid, said hood when the extinguisher is in inverted position being within capillary distance from said opening to constitute a capillary seal to retard and regulate the flow of the acid from said chamber, substantially as described.

4. In a chemical fire-extinguisher, the combination with the acid-chamber having an opening, of a recess, formed by a depending hood beyond the opening of said chamber, and adapted upon inversion of said chamber to be filled with liquid to constitute a liquid seal to retard and regulate the flow of the acid from said chamber, and means to adjust said hood toward and from said opening, substantially as described.

5. In a chemical fire-extinguisher, the combination with an acid-chamber and its outlet, of a closure for the latter, having a hood depending toward said outlet, an operating member for said closure, the said closure being pivoted to its operating member to accommodate itself to the position of said outlet, and a fixed seat to receive said closure when in opened position, substantially as described.

6. In a chemical fire-extinguisher, the combination with an acid-chamber, and a discharge-outlet, of a longitudinally-movable stem, means to operate it, an enlargement carried by said stem to close said outlet, and a closure for said acid-chamber operated by said stem, said closure having a depending hood to cooperate with the outlet of said acid-chamber, substantially as described.

7. In a chemical fire-extinguisher, a cage adapted to hold an acid-receptacle, said cage comprising longitudinal wires, one of said wires being hinged at one end of the cage

closing one side, and pivoted thereto at the opposite end, and a spring-clamp partly encircling said cage transversely thereof to engage the free end of said hinged wire, substantially as described.

8. In a chemical fire-extinguisher, a canister, an acid-chamber therein, a discharge-outlet at the end of said canister, a valve-stem extending through said end of the canister past said outlet for opening and closing the same, said stem having operating means and a retracting-bearing outside of said can-

ister, away from contact with the chemicals, and a closure for said acid-chamber pivoted on the inner end of said stem, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JESSE B. THOMAS.

Witnesses:

GEO. H. MAXWELL,
GEO. W. GREGORY.