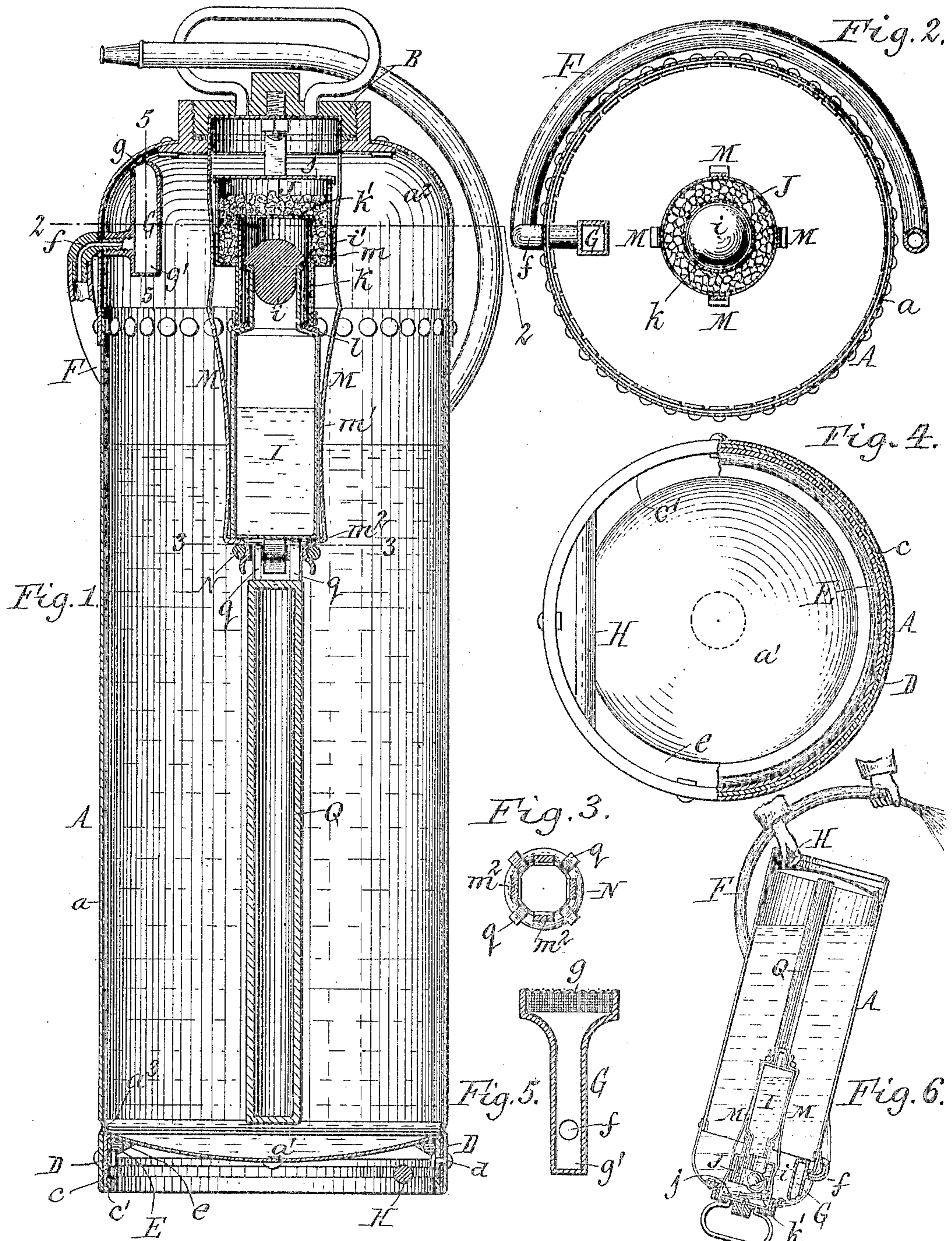


B. KELLOGG.
FIRE EXTINGUISHER.
APPLICATION FILED FEB. 6, 1902.

2 SHEETS—SHEET 1.



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FIRE-EXTINGUISHER.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, BENJAMIN KELLOGG, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented new and useful Improvements in Fire-Extinguishers, of which the following is a specification.

This invention relates more particularly to a portable fire-extinguisher which becomes operative upon being inverted and which contains an acid-bottle the contents of which combines with the fire-extinguishing liquid for producing the pressure whereby the fire-extinguishing fluid is expelled from the reservoir.

The objects of this invention are to provide simple and convenient means for holding the acid-bottle and the parts resting thereon in place, to provide means for neutralizing the acid before it can escape from the extinguisher, to provide means for preventing the cylinder or shell from bursting when its liquid contents become frozen, to provide improved means for insuring the discharge of the entire contents of the shell, and to provide means for effectually preventing the bottom of the cylinder from bursting.

In the accompanying drawings, consisting of two sheets, Figure 1 is a sectional elevation of one form of fire-extinguisher embodying my improvements. Figs. 2 and 3 are horizontal sections thereof in lines 2 2 and 3 3, Fig. 1. Fig. 4 is a bottom plan view, partly in section, of the reservoir or shell. Fig. 5 is a vertical section, on an enlarged scale, in line 5 5, Fig. 1. Fig. 6 is a sectional elevation on a reduced scale, showing the extinguisher inverted into its operative position. Fig. 7 is a sectional elevation showing another form of fire-extinguisher embodying my invention. Fig. 8 is a horizontal section thereof in line 8 8, Fig. 7.

Like letters of reference refer to like parts in the several figures.

Referring to the construction shown in Figs. 1 to 6, A represents the tank or reservoir of the extinguisher which is adapted to contain the fire-extinguishing liquid, such as bicarbonate of soda and water, and which consists of a cylindrical shell or body a , having a closed bottom a' and a dome-shaped top a^2 . The latter is provided with the usual central opening a , which is normally closed by a screw cap or plug B.

Upon mixing the acid with the extinguishing liquid when the extinguisher is in use the reservoir is subject to great internal pressure which is liable to blow out or collapse the bottom thereof. In order to prevent such an occurrence, the bottom of the reservoir is constructed and held in place as follows:

As shown in the drawings, the bottom a' is dished outwardly and bears with its margin against an internal bead a^3 in the reservoir-body and is provided with a marginal outwardly-projecting flange c , which fits against the inner side of the body. The lower edge of the latter is turned upwardly against the inner side of the bottom flange, as shown at c' , so as to form a smooth finish at the lower end of the body and also a seat for supporting the bottom.

D represents an annular retaining band or flat strip which engages with the inner side of the bottom flange c , close to the bottom, and d are rivets which pass through the band D, flange c , and the adjacent lower part of the shell for securing these parts together.

E represents a ring of round wire which is seated in the annular channel between the marginal part of the bottom and the band D and which is secured therein by soldering, as shown at e . After the bottom and its marginal reinforcement are in place the several parts are sweated with solder to produce a water-tight joint between the body and the bottom.

Heretofore the bottom was only secured by means of its flange to the body of the reservoir, leaving those parts of the bottom within the flange wholly unsupported. When a bottom secured to the body in this manner is subjected to excessive internal pressure, the same is liable to bulge outwardly and the marginal flange of the bottom to roll or creep on the body, thereby causing the bottom to blow out or burst and destroy the utility of the extinguisher.

In the present construction of the bottom-fastening the bottom is supported around its marginal part a considerable distance inwardly from its flange and the marginal part of the bottom is thickened and stiffened, whereby the tendency of the bottom to begin rolling or creeping on the body is prevented and injury to the bottom is avoided. The building up or thickening of the marginal part of the bottom by means of the band D and ring

E is very cheap and convenient, because these parts can be applied readily to the bottom and securely united therewith by solder, so that the same when completed form practically an integral part of the bottom.

f represents the outlet-nipple for the extinguisher liquid, which extends through the side of the dome at a short distance from the top thereof. To the outer end of this nipple is attached the delivery hose or tube F.

G represents a discharge-head connected between its ends with the inner end of the nipple *f*. This head has preferably the form of the letter T, the wide upper end of which terminates close to the top of the dome and is provided with an inlet-opening covered by a screen *g*, while its lower end terminates below the nipple and forms a trap or pocket *g'* in this part of the discharge-head.

Upon inverting the extinguisher for use the liquid therein is discharged through the screen, head, nipple, and delivery-tube, while the solid precipitated particles are separated by the screen from the liquid and retained in the extinguisher.

By widening the inlet of the head a comparatively large screen-surface may be employed and restriction of the discharge-conduit is avoided.

When transporting or jarring the extinguisher, the liquid therein is liable to splash over the head and enter the same through the screen thereof. Any liquid which may be delivered from the reservoir into the head in this manner drips or collects in the trap or pocket *g'* in the lower end thereof, where the same dries or evaporates and the powder or crystal contained in the liquid is deposited in this pocket. By thus collecting the drippings or splashes of extinguisher liquid in a pocket on one side of the discharge-conduit the same is prevented from drying or crystallizing in the discharge-conduit and clogging the same, thereby avoiding explosion of the extinguisher, which is liable to result if the extinguisher is inverted for use and pressure is generated therein while the discharge-conduit is clogged.

H represents the handle which is arranged on the lower end of the extinguisher and by which the same is supported in an inverted position for use. This handle preferably consists of a cross-bar secured at its end to the lower portion of the body and the flange of the bottom. In order to drain the entire contents of the reservoir when the extinguisher is in use, the same must be held in an inclined or oblique position, so that that portion of the reservoir adjacent to the inlet of the discharge-head is arranged lowermost. For the purpose of enabling the extinguisher to assume this position without requiring the use of both hands of the operator, the handle is located on that side of the lower end of the extinguisher which is diagonally opposite the

inlet end of the discharge-conduit. By this relative arrangement of the discharge-head inlet and the handle the extinguisher when held by the handle with one hand of the operator will hang by gravity in the proper inclined position for bringing the inlet of the discharge-head and the adjacent part of the reservoir lowermost, thereby leaving the other hand of the operator free to manipulate the delivery-nozzle, as shown in Fig. 6, and permitting the utilization of the entire liquid contents of the reservoir for extinguishing a fire.

The pressure for expelling the extinguisher liquid from the reservoir is produced by mixing sulfuric or other acid contained in a bottle or receptacle I with the extinguishing liquid. This bottle is arranged centrally in the upper part of the reservoir and has its upwardly-projecting neck normally closed by a lead plug or stopper *i*, which fits loosely in the neck and is provided with an annular shoulder *i'*, whereby the same rests on the upper end of the neck.

J represents a cup or receptacle arranged above the acid-bottle and adapted to contain a dry chemical, such as bicarbonate of soda, for neutralizing the acid as it escapes from the bottle. This cup has its top closed loosely by a cover *j*, having a marginal flange fitting around the cup. Extending vertically through the bottom of the cup is a sealing-tube *k*, which projects upwardly into the central part of the cup. The upper end of the sealing-tube is closed by a cover *k'*, which has an annular flange fitting loosely around the tube. The lower end of the sealing-tube projects downwardly from the bottom of the cup and rests on the shoulder of the bottle, between the neck and body thereof. A packing *l*, of rubber or similar material, is interposed between the lower edge of the sealing-tube and the shoulder of the bottle in order to form a tight joint between the same.

M represents a plurality of supporting or clamping arms which depend from the under side of the reservoir-cover and which together form a cage for supporting the acid-bottle and soda-cup. These arms preferably consist of two pairs arranged equidistant around the bottle and cup, each pair being formed out of a single piece of flat spring metal and connected at their upper ends to the under side of the reservoir-cover. Each clamping-arm is provided with upper and lower inwardly-deflected or bent portions *m m'*, which bear, respectively, against the side of the soda-cup and acid-bottle, and the lower end of each arm is provided with an inwardly-projecting hook *m''*, forming a shoulder upon which the lower end of the acid-bottle is supported. The several hanger-arms are clamped against the sides of the acid-bottle and soda-cup by a coupling-ring N, which is applied to the hooks of the arms below the bottle.

For the purpose of charging the fire-extinguisher a charge of sulfuric or other acid is placed in the bottle, and the latter is closed by the stopper. The soda-cup, after receiving a charge of acid-neutralizing material, such as bicarbonate of soda, between the covers *j* and *k'*, is placed with the sealing-tube on the bottle. After the bottle and cup have been thus charged and stacked the same are introduced from below into the upper part of the cage or supporting-arms, so that a sufficient part of the arms projects below the bottle to permit the same to be sprung together for engaging the coupling-ring with the hooks thereof. After the ring has been applied to the arms the bottle, together with the soda-cup, is lowered with its bottom on the shoulders formed by the hooks, whereby the arms are spread and the hooks are prevented from being detached from the coupling-ring. By this means the bottle serves to lock the coupling-ring on the hooks of the clamping-arms and necessitates raising the bottle before the arms can be sprung inwardly to release the ring. After the reservoir has been charged about three-fourths full of extinguishing liquid, such as bicarbonate of soda and water, the acid-bottle and soda-cup are introduced into the same and held in place by fastening the cover carrying the same to the reservoir. The fire-extinguisher is retained in an upright position, with the acid-bottle and soda-cup at the top, until the same is required for use. While in this position the upper end of the sealing-tube is closed by the cover *k'*, and its lower end is closed by resting on the packing of the acid-bottle, thereby forming a secondary seal for the acid-bottle in addition to the primary seal formed by the stopper. The primary and secondary seals thus form a double seal between the acid-bottle and the reservoir, whereby the acid is effectually prevented from absorbing moisture from the extinguishing liquid, because either one or both of these seals is likely to be operative, thereby permitting the use of a chemically-pure acid, which is not apt to freeze when the extinguisher is exposed to a freezing temperature. By preventing the acid from absorbing moisture the same will not increase in bulk or volume nor become weakened, so that the acid when mixed with the extinguishing liquid acts promptly and produces a powerful pressure for effectually expelling the liquid from the reservoir upon the fire for extinguishing the same.

Owing to the great absorbing capacity of chemically-pure acid, the bottle is made so large that the charge of acid fills the same about one-half, which permits the acid to absorb the maximum amount of moisture and increase its volume accordingly without overflowing the bottle in the event of both seals becoming defective.

If the extinguisher is shaken violently by

careless handling when not intended for use, the stopper is prevented from being shaken off from the bottle by the sealing-tube, which serves as a guard to confine the stopper in place on the bottle. Any acid which may be splashed past the stopper upon handling the extinguisher carelessly is confined within the sealing-tube and prevented from escaping to the soda-cup or the reservoir, whereby partial deterioration of the charge of extinguishing liquid is avoided.

Upon inverting the extinguisher for use in case of fire the extinguishing liquid fills the upper end of the reservoir and the lead stopper drops from the bottle and opens the sealing-tube cover *k'*, thereby permitting the acid to pass from the bottle into the cup and attack the soda therein. A light pressure is generated by the mixture of acid and dry soda, which forces the cover *j* from the cup, thereby permitting the acid to commingle with the soda-water solution in the reservoir and generate a heavy pressure for forcibly discharging the liquid contents of the reservoir.

By bringing the acid together with dry soda and neutralizing the same before discharging the same into the soda solution the pressure generated rises gradually to the maximum, thereby avoiding sudden strain upon the extinguisher, which would be the case if the pressure rose rapidly.

The acid upon issuing from the bottle is partially neutralized by mixing with the soda in the cup and further neutralized by mixing with the soda solution before reaching the discharge-conduit, thereby preventing any free acid from being discharged from the extinguisher and avoiding injury to the articles upon which the extinguishing liquid is delivered.

As shown in Figs. 7 and 8, the dry-soda cup may be omitted, and the neutralization of the acid may be effected solely by mixing the same with the soda fire-extinguishing liquid in the reservoir. In this construction a cap or tube *O* is placed over the stopper and neck of the acid-bottle and rests at its lower edge on the bottle-shoulder, a packing being interposed, as in the construction shown in Fig. 1. This cap is held in place by weighting the top thereof, as shown at *o'*, and also by engaging the upper inwardly-bent parts *m* of the spring-arms with the sides of the cap. The cap is provided with a guide-pin *p*, which projects downwardly from the top thereof into a central socket *p'* in the top of the stopper, thereby forming together with the cap a guide which prevents displacement of the stopper on the bottle upon shaking the extinguisher. The stopper resting on the neck of the bottle and the cap resting on the shoulder of the bottle form a double seal between the reservoir and the bottle which effectually prevents the acid from absorbing any moisture from the extinguishing liquid. This double seal also

prevents any acid from reaching the extinguishing liquid when the extinguisher is shaken violently and the acid is caused to splash.

5 In the normal inoperative position of the extinguisher the top of the cap is separated a short distance from the stopper, as shown in Fig. 7. Upon inverting the extinguisher for use the stopper drops upon the top of the cap
10 and shifts the same away from the shoulder of the bottle. This causes the acid which runs downwardly out of the bottle to be directed upwardly between the cap and bottle and mingle with the soda fire-extinguishing liquid.
15 The cap thus serves to intercept the acid as it issues from the bottle and reverses the direction of its flow, whereby the acid is prevented from flowing directly from the bottle to the discharge of the extinguisher and is compelled
20 to first become mixed with the soda solution, thereby neutralizing and rendering the same harmless before issuing from the reservoir.

When the extinguishing liquid freezes into solid ice by exposure of the extinguisher to
25 very low temperature, the shell or body of the reservoir is apt to burst by the expansion of the ice while the same thaws out, thereby destroying the extinguisher. In order to avoid bursting of the body when the ice thaws
30 out, a compressible body or relief member Q is placed in the extinguishing liquid. This relief member preferably consists of a short piece of lead pipe which is hermetically sealed and suspended in a vertical position in the center of the extinguishing-liquid space by means
35 of hooks or hangers *q*, arranged on the upper end of the pipe and engaging with the coupling-ring of the arms which hold the acid-bottle and soda-cup. The lead pipe and
40 the air confined in the same form a yielding body or cushion which is contracted when the liquid contents of the reservoir freezes and expands, thereby relieving the shell from undue strain and preventing bursting of the
45 same.

I claim as my invention—

1. In a fire-extinguisher, the combination of a reservoir, an acid-bottle supported therein, a stopper seated loosely in the mouth of
50 said bottle, and a movable cap which is seated at its lower edge on the bottle and forms a chamber around said stopper and mouth from which the liquid in the reservoir is effectually excluded while the extinguisher is not in use,
55 substantially as set forth.

2. In a fire-extinguisher, the combination of a reservoir, an acid-bottle supported there-

in, a stopper applied to the bottle, and a soda-receptacle surmounting the bottle and communicating therewith and having a cover, substantially as set forth. 60

3. In a fire-extinguisher, the combination of a reservoir, an acid-bottle supported therein, a stopper applied to the bottle, a soda-cup having a cover, and a sealing-tube extending
65 from the mouth of the bottle into the soda-cup, substantially as set forth.

4. In a fire-extinguisher, the combination of a reservoir and an acid-bottle supported therein, a stopper applied to the bottle, a soda-cup arranged above the bottle and having a cover, a sealing-tube inclosing the stopper and having its lower end resting on the bottle while its upper end opens into the soda-cup, and a cover applied to the upper end of
75 the sealing-tube, substantially as set forth.

5. In a fire-extinguisher, the combination of a reservoir, an acid-bottle arranged therein, supporting-arms carried by the reservoir and embracing the bottle, each arm having a
80 hook at its lower end which extends underneath the bottle, and a coupling-ring engaging with the hooks of said arms, substantially as set forth.

6. In a fire-extinguisher, the combination
85 of a reservoir, an acid-bottle arranged therein, a soda-cup arranged above the bottle, and supporting-arms carried by the reservoir and embracing the soda-cup and the acid-bottle, substantially as set forth. 90

7. In a fire-extinguisher, the combination of a reservoir, an acid-bottle arranged therein, a soda-cup arranged above the bottle, supporting-arms carried by the reservoir and arranged around the soda-cup and the acid-bottle, each arm having inwardly-deflected portions which bear against the outer sides of
95 said cup and bottle, and a coupling which connects said arms, substantially as set forth.

8. In a fire-extinguisher, the combination
100 of a reservoir, an acid-bottle arranged in the reservoir supporting-arms carried by the reservoir and arranged around said bottle, a coupling-ring connecting the arms below the bottle, and a flexible relief-tube arranged in the
105 reservoir and provided at its upper end with hooks or hangers which engage with said ring, substantially as set forth.

Witness my hand this 31st day of January, 1902.

BENJAMIN KELLOGG.

Witnesses:

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