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FIRE EXTINGUISHING APPARATUS.

APPLICATION FILED FEB. 28, 1918.

1,293,853.

Patented Feb. 11, 1919.

Fig. 1.

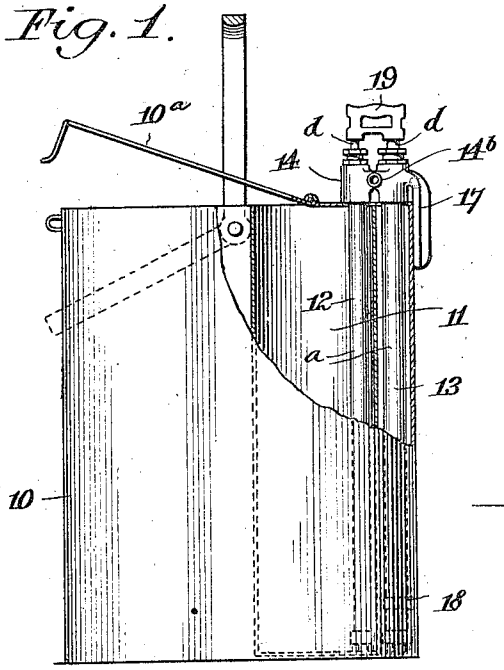



Fig. 3.

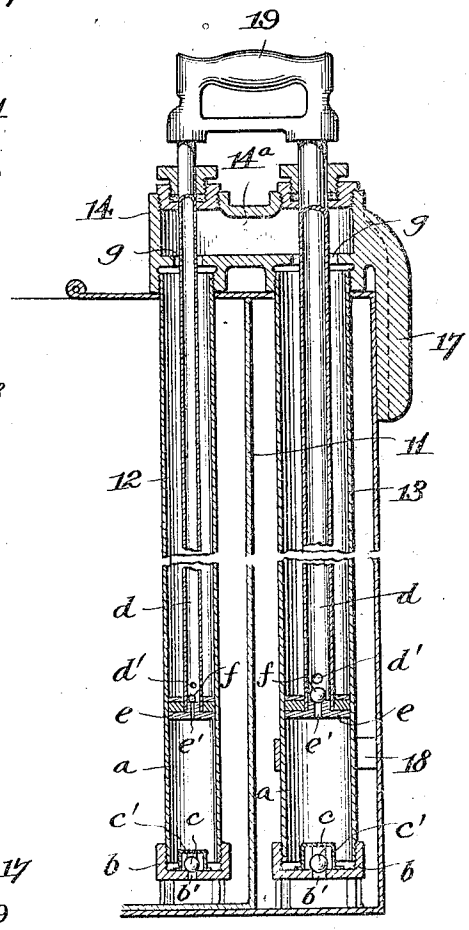
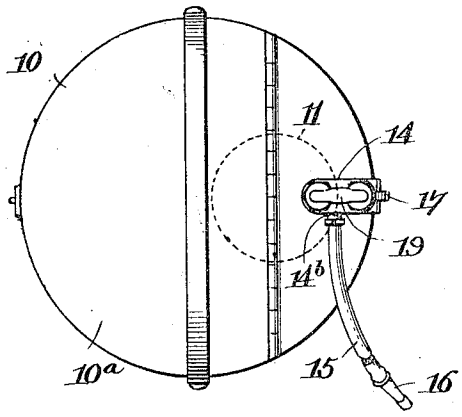



Fig. 2.




Inventor,

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By his Attorneys,

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# UNITED STATES PATENT OFFICE.

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## FIRE-EXTINGUISHING APPARATUS.

1,293,853. Specification of Letters Patent. Patented Feb. 11, 1919.

Application filed February 28, 1918. Serial No. 219,599.

*To all whom it may concern:*

Be it known that I, CHARLES H. MEIGS, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented new and useful Improvements in Fire-Extinguishing Apparatus, of which the following is a specification.

This invention relates to improvements in fire-extinguishing apparatus, pertaining more particularly to apparatus adapted to operate under foam-extinguishing principles.

The present invention is designed more particularly for the production of a simple and efficient apparatus capable of utilizing charges larger in amount than those generally employed under existing hand extinguishing operation, while at the same time providing for a construction which can be readily transported manually and which is normally in condition for service operation. In addition, the apparatus is of a character which can be readily recharged.

To these and other ends, the nature of which will be readily understood as the invention is hereinafter disclosed, said invention consists in the improved construction and combination of parts hereinafter fully described, illustrated in the accompanying drawings, and more particularly pointed out in the appended claims.

In the accompanying drawings, in which similar reference characters indicate similar parts in each of the views:

Figure 1 is a view partly in side elevation and partly in section showing a preferred embodiment of the present invention.

Fig. 2 is a top plan view of the same.

Fig. 3 is an enlarged sectional fragmentary view showing more particularly the general structure and arrangement of parts.

As in existing apparatus operating under foam-extinguishing principles, the extinguishing medium is provided by two solutions which are normally separated and are brought into commixing relation at the time when the foam is to be produced, the several solutions being generally of acid and soda content, one or both of the solutions carrying an element which is active in the production of the foam. Suitable formulas for fire-extinguishing compositions for the purpose are indicated in the patent to Walker, No. 1,161,090, although the strength of the solutions may vary from the particular percentages indicated in this patent, this variation being particularly possible in connection with the present invention where provision is made to take care of conditions arising where the acid solution is of a higher strength than that indicated in the said patent.

In the present invention, in which the structure is more or less of the self-contained type, the soda solution is contained in an outer receptacle 10, the acid solution being contained in an inner container 11, the latter being located within receptacle 10, receptacle 10 preferably carrying a two-part cover $10^a$, the two parts being hingedly connected at a suitable point at the top, thus providing a permanent cover portion and a swinging cover portion hinged to the fixed cover part. Obviously, the cover arrangement may be varied from that shown to meet the particular form in which the invention is to be embodied.

Both the receptacle and container are of the open-top type and the solution contents carried by each is normally free from pressure, the cover structure being designed mainly to restrict deterioration and evaporation of the contents while the apparatus is inactive, it being understood that the invention is designed to produce an apparatus which is prepared in advance of the time of use, being more in a nature of a prepared apparatus ready for use when such use is necessary.

Container 11 may be permanently secured within receptacle 10 as by riveting of the respective bottoms, and at any desired point therein, although this is not essential, since it is possible to employ a loose container having a vertical length substantially equal to the internal length of receptacle 10, this being possible especially where the cover is of the general type indicated in the present drawings, it being possible to shift the inner container to a position beneath the hinge line of the cover and thus hold the container from material endwise movement, the container being held against material shifting by the particular form of pumping structure or instrumentality employed and which is presently described. In such case,

the container may be positioned off-center relative to the receptacle, this being more or less immaterial so long as the location will permit of ready feeding of the soda solution to the pumping leg which is adapted to draw from this solution. Obviously, where the container is of this particular type, the particular location of the pumping legs may determine the relative location of this inner container; and this may be true even where the container is secured in position.

The solutions are removed from the receptacle and container by the use of a pumping instrumentality formed with two legs 12 and 13 depending from a body portion 14, the latter having a chamber $14^a$ into which the solutions are drawn and within which they are brought into commixing relation, body portion 14 having an opening $14^b$ which forms the outlet from this mixing chamber. The outlet is adapted to receive one end of a hose connection 15 of suitable length, the free end of which may carry a nozzle 16.

The body portion is normally located above the cover and is therefore exposed, legs 12 and 13 extending through the cover to a point adjacent the bottoms of the receptacle and container, the body portion preferably resting on the cover, thereby controlling the depth to which the legs may extend within the receptacle and container. Body portion 14 may carry a steadying device 17 which contacts with the exterior of the receptacle, and a strap or clip 18 may be provided within the receptacle for restricting movements of the legs when the pump is in position.

Any suitable form of pump structure may be employed, that shown in connection with the legs, being in the form of an outer tubular member *a* secured at its upper end to the body portion and having a cap *b* at its lower end, said cap having an opening *b'* controlled by a suitable ball *c* mounted in a cage *c'*, the ball forming a valve to control opening *b'* during the pumping operation. The pump piston structure is shown as in the form of a tubular member *d*—forming a stem—which extends lengthwise within member *a* and passes through the mixing chamber, the outer end of member *d* projecting above the body portion and being connected to a handle 19. Member *d* carries a member *e* having an opening *e'* controlled by a ball *f*. Suitable packing is provided to form a piston structure.

The leg structures are substantial duplicates, each practically constituting a pumping unit, the units preferably, although not essentially, differing as to effective cross-sectional areas, the diameters of leg 13 being larger than those of leg 12. Where this difference is present, a greater amount of solution will be drawn into leg 13 during handle manipulation than is drawn into leg 12. Therefore by properly proportioning the strength of the solutions, the desired proportions of the extinguishing compound will be obtainable within the mixing chamber.

As will be understood, reciprocation of handle 19 serves to draw the respective solutions into the space between member *e* and cap *b*, this solution then being passed through opening *e'* into the interior of members *d* from which the solutions pass out through opening *d'* in member *d* into the space between members *d* and *a* above the piston, the solutions then passing through openings *g* in the body portion into the mixing chamber, the respective openings *g* being properly proportioned in order to accommodate for the differences in amounts which are being moved by the piston movements.

As will be understood, the solutions are maintained substantially separate until they pass through the respective openings *g*, both solutions being discharged into this mixing chamber where commixing takes place and the foam is generated, this latter being forced—through the pumping action and through the action of the pressure produced by the mixing action itself—out through the hose section to the point of use. The hose section is of medium length and inasmuch as the entire apparatus is capable of being rapidly carried about, it will be understood that the time elapsing from the start of the mixing action to the actual discharge of the foam from the nozzle is short, so that the life of the bubble formation is not materially reduced, this latter being an important factor owing to the fact that the maximum life of the bubbles is comparatively short.

Obviously, the handle can be manipulated entirely under the control of the operator who is readily able to determine the necessary speed to produce efficient results through noting the character of the bubble formation being discharged as well as by the resistance which may be afforded by back pressure when an attempt is made to operate at an excessive speed. Hence it is possible to practically take care of the peculiar effects which are present by reason of the expansion action which takes place during the formation of the bubbles, the operator being able to "feel" the resistance, and thus being able to restrict damage to the bubble formation such as might be produced by attempting to force discharge through the development of excessive pressure within the mixing chamber. This manual operation and the ability to "feel" the effects, enables a more satisfactory general result to be obtained, than where a fixed pressure is employed or possibly where dependence is

placed alone on the pressure developed by the commixing action, since a skilled operator is able, through manipulation of the handle, to deliver only the amount of solutions needed and to keep the necessary amount of solution in the mixing chamber to provide for the proper expansion effect and practical development of uniform pressure within the comparatively small mixing chamber, thus enabling the discharge of the foam formation without deteriorating effects which might be present when attempting to force the foam through the restricted hose conduit under an excessive pressure.

A structure of this general type capable of carrying five or six gallons of solutions can be readily handled and carried about. As this amount of solutions will provide an "aqueous blanket" of a considerable area, it will be understood that the structure is one which is adapted for use under general conditions and can be quickly placed into operation.

As will be understood, the particular arrangement is such as will take care of the peculiar conditions which are inherent in the production and delivery of the foam formation, conditions which differ very materially from those present in the formation of the usual acid and soda chemical compound or in other chemical extinguishing mediums. Only the necessary amount of separate solutions is brought into commixing relation and commixture results in the formation of a multiplicity of bubbles of comparatively short life, and the most effective results of the formation are had when the bubbles are delivered to the point of use as soon as possible after the formation and free from material deterioration. Deterioration may also result from excessive pressure in attempting to force delivery, either through breaking down of the bubble formation due to such pressure or excessive friction between the bubbles and the conduit and nozzle. These are difficulties which do not arise where the chemical extinguishing medium does not provide the foam formation.

Obviously, the receptacle and container may be of relative sizes as to permit solutions of equal strength in which case the legs of the pump are preferably of equal cross-sectional area. And while I have shown a particular form of pump unit structure, it will be understood that the showing of the specific pump structure is more or less illustrative, and other forms of structure may be employed if desired.

While I have herein shown and described a preferred embodiment of the present invention, it will be understood that changes and modifications therein may be found desirable or necessary in meeting the various exigencies of use or individual preferences, and I desire to be understood as reserving the right to make any and all such changes or modifications as may be found desirable or essential, in so far as the same may fall within the spirit and scope of the invention as expressed in the accompanying claims when construed broadly.

Having thus described my invention, what I claim as new, is:

1. In fire-extinguishing apparatus of the character described and in combination, inner and outer receptacles adapted to normally carry the component solutions of the extinguishing medium separate and free from pressure, and a pumping instrumentality having a hollow body portion and independent legs depending from the body portion, said body portion constituting a mixing chamber for the solutions and having a discharge outlet, said legs extending into the respective receptacles and each comprising a pumping unit discharging into the mixing chamber and operative to raise the solution of the receptacle into which it extends to said chamber, and means connecting said units to permit manual manipulation thereof in unison.

2. In fire-extinguishing apparatus of the character described and in combination, inner and outer receptacles adapted to normally carry the component solutions of the extinguishing medium separate and free from pressure, and a pumping instrumentality having a hollow body portion and independent legs depending from the body portion, said body portion constituting a mixing chamber for the solutions and having a discharge outlet, said legs extending into the respective receptacles and each comprising a pumping unit discharging into the mixing chamber and operative to raise the solution of the receptacle into which it extends to said chamber, and means connecting said units to permit manual manipulation thereof in unison, said units differing in effective cross-sectional area to provide concurrent delivery of solutions to the chamber in proportionate amounts.

3. In fire-extinguishing apparatus of the character described and in combination, inner and outer receptacles adapted to normally carry the component solutions of the extinguishing medium separate and free from pressure, and a pumping instrumentality having a hollow body portion and independent legs depending from the body portion, said body portion constituting a mixing chamber for the solutions and having a discharge outlet, said legs extending into the respective receptacles and each comprising a pumping unit discharging into the mixing chamber and operative to raise the solution of the receptacle into which it extends to said chamber, and means connecting said units to permit manual manipulation thereof

in unison, said body portion carrying a steadying element permanently exposed on the exterior of the outer receptacle.

4. In fire-extinguishing apparatus of the character described and in combination, an outer receptacle having a two-part cover with the parts hingedly connected, an inner receptacle having an open-top and normally underlying the hinge connection, said receptacle being adapted to carry the component solutions of the extinguishing medium separate and free from pressure, and a pumping instrumentality having a hollow body portion mounted above one of said cover parts and having independent legs depending from the body portion through said cover and into the respective receptacles, said body portion constituting a mixing chamber for the solutions and having a discharge outlet, said legs each comprising a pumping unit discharging into the mixing chamber and operative to raise the solution of the receptacle into which it extends to said chamber, each unit including a reciprocating piston-like element having its stem extending through said chamber and projecting above the body portion, and a handle connecting the projecting portions of said stems, whereby manual manipulation of the handle to reciprocate the stems will provide delivery of individual solutions concurrently to the mixing chamber.

5. In fire-extinguishing apparatus of the character described and in combination, an outer receptacle having a two-part cover with the parts hingedly connected, an inner receptacle having an open-top and normally underlying the hinge connection, said receptacles being adapted to carry the component solutions of the extinguishing medium separate and free from pressure, and a pumping instrumentality having a hollow body portion mounted above one of said cover parts and having independent legs depending from the body portion through said cover and into the respective receptacles, said body portion constituting a mixing chamber for the solutions and having a discharge outlet, said legs each comprising a pumping unit discharging into the mixing chamber and operative to raise the solution of the receptacle into which it extends to said chamber, each unit including a reciprocating piston-like element having its stem extending through said chamber and projecting above the body portion, and a handle connecting the projecting portions of said stems, whereby manual manipulation of the handle to reciprocate the stems will provide delivery of individual solutions concurrently to the mixing chamber, said units differing from each other in effective cross-sectional area to provide concurrent delivery of the solutions in definite proportioned amounts.

6. In fire-extinguishing apparatus of the character described and in combination, adjacent receptacles of different volumes adapted to normally carry the component solutions of a foam-producing fire-extinguishing medium separate and free from pressure, and an associated pumping instrumentality having a hollow body portion and independent legs depending from the body portion, said body portion constituting a mixing chamber for the solutions and having a discharge outlet, said legs extending into the respective receptacles and each constituting a pumping unit discharging into the mixing chamber and operating to raise the solution of the receptacle into which it extends to said chamber, said units differing in effective cross-sectional area, the unit of smaller area entering the receptacle of lesser volume, and means connecting said units to permit manual manipulation thereof in unison whereby properly proportionate amounts of the two solutions are concurrently delivered into the mixing chamber.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

CHARLES H. MEIGS.

Witnesses:
E. JANAWAY,
F. D. OGDEN.