(No Model.) 2 Sheets—Sheet 1.

# H. A. MANSFIELD.

## FIRE EXTINGUISHER.

No. 557,411. Patented Mar. 31, 1896.

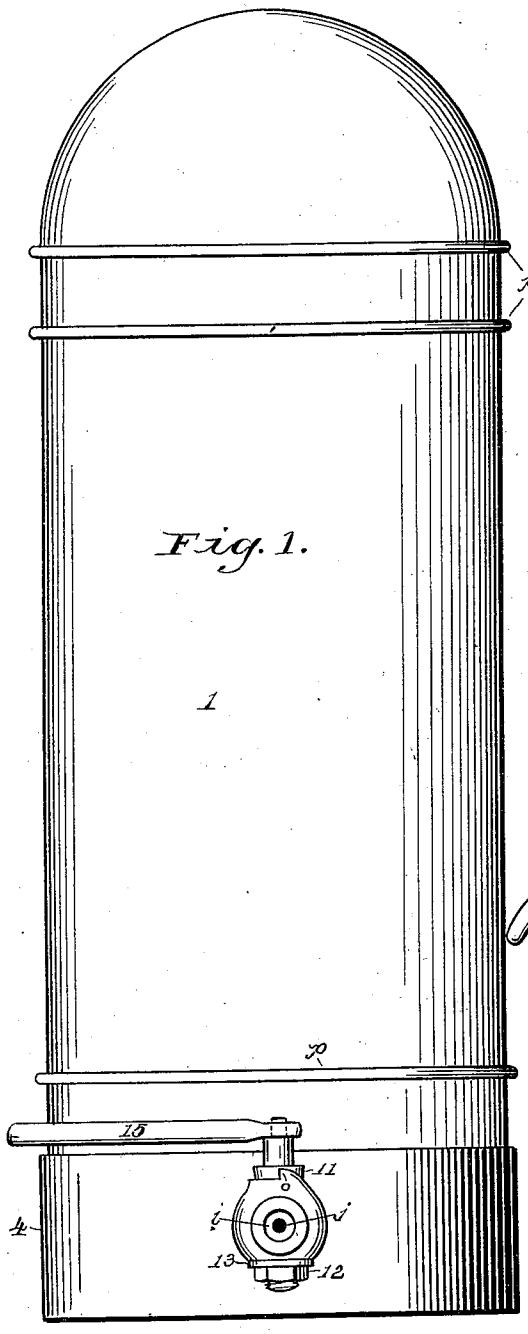


Fig. 1.

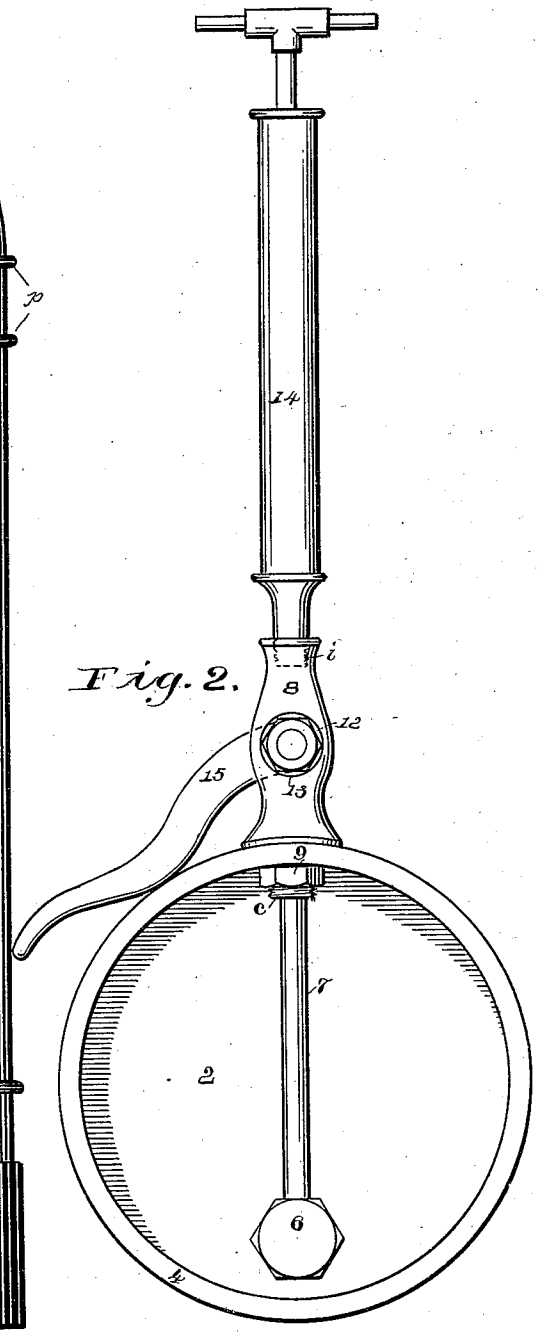


Fig. 2.

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(No Model.) 2 Sheets—Sheet 2.

# H. A. MANSFIELD.

## FIRE EXTINGUISHER.

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Fig. 4.

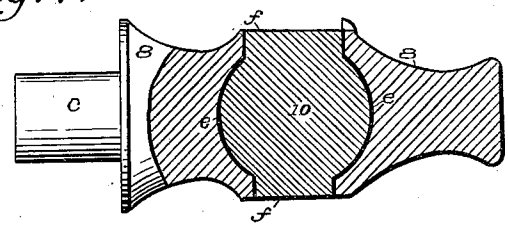



Fig. 5.

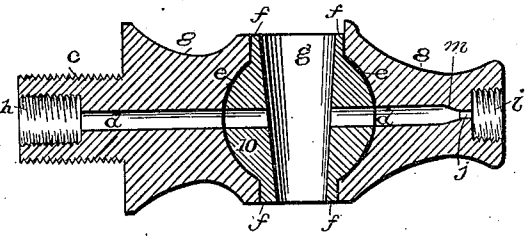



Fig. 3.

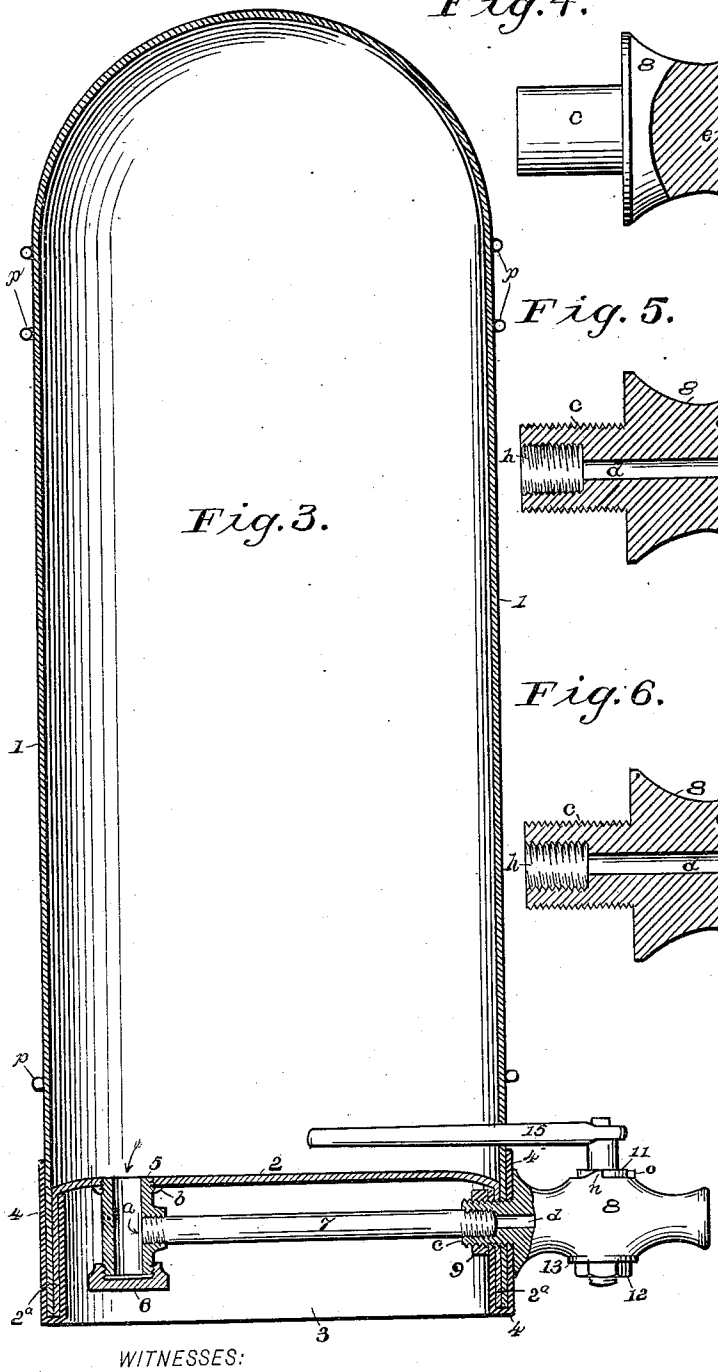
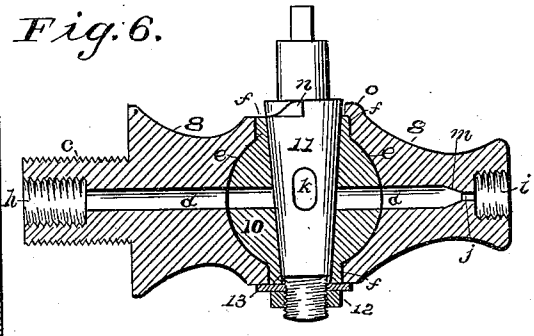



Fig. 6.

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# UNITED STATES PATENT OFFICE.

HENRY A. MANSFIELD, OF NEW YORK, N. Y., ASSIGNOR TO THE BRIDGEPORT FIRE EXTINGUISHER COMPANY, OF DANBURY, CONNECTICUT.

## FIRE-EXTINGUISHER.

SPECIFICATION forming part of Letters Patent No. 557,411, dated March 31, 1896.

Application filed April 10, 1894. Serial No. 507,041. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY A. MANSFIELD, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Fire-Extinguishers, of which the following is a specification.

My invention relates to fire-extinguishers, and has for its object to provide a vessel or reservoir which shall be absolutely fluid, gas, and air tight, in which no opening or joint appears, except a small discharge-nipple located in the bottom of the reservoir and projecting below the same, having a small horizontally-arranged tube connecting said nipple with the discharge-nozzle attached to the skirt of the reservoir, which nozzle and connection are entirely outside of the same.

It further consists in providing a soft-metal seat for the plug of the nozzle, so that a tight joint will always be maintained, and to so construct such seat that no leakage can take place.

To enable others to understand my invention, reference is had to the accompanying drawings, in which—

Figure 1 represents a front elevation of a shell whose sides and dome are made of one piece of drawn metal. Fig. 2 is a view showing the manner of compressing the air in the reservoir. Fig. 3 is a central sectional side elevation of the shell or reservoir, showing the manner of attaching the bottom and skirt, also sectional view of the filling and discharging nipple in said bottom, and broken view of the discharge-nozzle screwed into the skirt of the reservoir, and the conduit-tube connecting such nozzle with the nipple. Fig. 4 is a detail view, partly in section, of the nozzle in the first steps of its manufacture. Fig. 5 is a detail longitudinal central sectional view of the nozzle with the plug removed. Fig. 6 is a view similar to Fig. 5 with the addition of the plug or key.

Its construction and operation are as follows:

1 represents the shell or reservoir and this, it is absolutely necessary, should be made of drawn metal—*i. e.*, formed in this shape by being drawn through a die large enough for the purpose. It is not enough that this shell be made simply of one piece of metal—as sheet-iron, steel, or cast-iron, glass, or any other known metal or substance that has not been drawn through a die—as this operation will effectually close the pores so as to prevent the escape of compressed air within the reservoir. Compressed air being one of the most difficult of all substances to retain for any length of time, no metal has yet been found sufficiently non-porous to prevent its escape. This, however, I have only successfully accomplished by selecting metal possessing great ductility, like copper, and drawing it through a die in the form of a shell, as shown. This drawing process solidifies the metal by closing all the pores, so that it will stand a strain of several hundred pounds without loss or diminution of the internal pressure.

The bottom 2, Fig. 3, should in practice be more crowning than shown, so as to resist more effectually the internal pressure. This bottom I prefer to draw or cup out, so that the sides $2^a$ thereof shall have a prolonged bearing on the inner wall of the reservoir, as shown. This arrangement will carry said bottom up far enough to form the open chamber 3 at the lower end of the extinguisher, the purpose of which will presently be explained.

4 is a U-shaped sheet-metal ring adapted to receive the end $2^a$ of the cup-shaped bottom 2 firmly embracing the inner walls of this cup and the outer surface of the shell or reservoir 1, in which position it is further secured by soldering or brazing.

The nipple 5, having the small passage-way *a*, is firmly screwed into the bottom 2 and close to the rear part of the reservoir, the ring of solder *b* effectually preventing any escape of fluid or air around the threaded connection. This nipple serves a threefold purpose, viz: as an aperture through which the liquid is admitted to the interior of the reservoir, means whereby connection is had with the discharge-nozzle outside of the reservoir, and by its position enabling all the liquid in the reservoir to be discharged through the nozzle.

6 is a removable cap on the end of said nipple.

7 is a horizontally-arranged tube or conduit-pipe, one end of which is screwed into the

nipple 5 and the other end into the threaded end *c* of the nozzle 8. A threaded hole is formed through the skirt of the reservoir, which skirt consists of the U-shaped ring 4, end of the reservoir 1, and sides $2^a$ of the cup-shaped bottom 2, into which is firmly screwed said threaded end *c* of the nozzle, and it is further secured by the nut 9. The internal bore of the tube 7 is about one-quarter of an inch in diameter, which corresponds to the size of the passage-way *d* of the nozzle. (See also Figs. 5 and 6.) This outside arrangement of the nipple, conduit-tube, and nozzle enables them to be easily removed when obstructed with sediment and cleaned without defacing or otherwise injuring the outer surface of the shell reservoir.

Formerly it has been the custom to tap a hole in the side wall and near the bottom of the reservoir, which made it necessary to solder the nozzle firmly thereto to prevent leakage, and when its passage-way was obstructed by the sediment incidental to all extinguishers or the nozzle became injured by accident or from whatever cause made it necessary to remove the nozzle, the solder had to be melted off, which operation destroyed the Japan finish, nickel, or polish on the exterior of the shell, so that it was cheaper to throw away the extinguisher than to incur the expense incidental thereto. Locating the nozzle, as shown, in the skirt of the extinguisher and having all of its connections upon the outside where they can be readily removed and replaced without defacing the shell is of great advantage. When, therefore, the tube 7, Fig. 3, nipple 5, or nozzle 8 becomes clogged with sediment, or the nozzle becomes damaged, the nut 9 is simply loosened and the nozzle unscrewed, which operation will also unscrew the tube 7, when the parts can readily be cleaned or replaced, as the case may require.

A serious drawback to the use of fire-extinguishers of this class is the difficulty experienced in keeping the nozzle fluid-tight, as the pressure of the compressed air or gas would force the liquid by an ordinary hard plug and its ground seat. Therefore, no such plug and seat have yet been found that could be freely opened and closed and long remain tight under these conditions. This result I have successfully accomplished by the use of a soft-metal seat, of Babbitt tin or other like substance, combined with a taper plug or key sufficiently hard to be forced into the softer metal of the seat, and, notwithstanding inequalities exist in the plug, the softer metal by conforming thereto will make a tight seat; but this advantage gained is of no account unless the inferior metal composing the soft seat is firmly and closely united to the harder metal of the nozzle.

In Fig. 4 is shown one of the stages in the construction of the nozzle I use in my extinguisher, in which is first formed the large spherical chamber *e*, whose walls are finished so as to take a coating of solder or other like substance. Then the said chamber is filled with molten metal for the soft seat 10, the cooling of which will cause it to shrink away from the walls of the chamber and thus leave a space for the escape of liquid under pressure. To counteract this, after the seat has become cooled, a metal like bismuth or other similar substance that will melt at a lower temperature than the babbitt of the seat, or metal of the same kind that was used in the tinning or coating the walls of the chamber, is poured over the babbitt seat and flowing between the two metals will effectually seal them together, making a solid joint that cannot otherwise be secured. The soft-metal seat 10 is allowed to overflow the said chamber and fill the annular openings in the top and bottom of the body of the nozzle to form the neck portions *f*, and thereby produce a more extended bearing-surface for the plug or key. The taper hole *g*, Fig. 5, for the plug 11, Fig. 6, is then formed through the seat 10, and also the channel-way *d* at right angles thereto.

The threaded hole *h* in the threaded extension *c* is for the threaded end of the pipe or tube 7, before mentioned, while the interior threaded hole *i* in the front end of the nozzle is intended to receive the threaded end of an air-pump presently to be described. The hole *j*, which opens communication between the threaded seat *i* and the channel-way *d*, is considerably smaller in diameter than such channel-way, so as to make the labor of filling, especially with a small force-pump, the reservoir with air much less. Besides, this narrow opening will so contract the outgoing stream that it will be thrown with greater force. To assist in this latter purpose I prefer to gradually taper the end of the channel-way *d* to the size of the outlet *j*, as shown at *m*.

The plug 11 is provided with the elongated hole *k*, which always coincides with the channel-way *d* regardless of the changed vertical position of said plug. Nut 12 and washer 13 are mounted on the lower end of the plug, as provided in such cases, for the purpose of setting, adjusting, and taking up the wear.

To charge the reservoir the cap 6 is removed from the nipple and the interior partially filled with a suitable fire-extinguishing liquid. Then the reservoir is laid upon its side, as shown in Fig. 2, and the air-pump 14 attached to the nozzle, the handle 15 raised to open the port of the nozzle and sufficient air forced into the reservoir to furnish the pressure required. When, therefore, the extinguisher is placed in an upright position, as shown in Figs. 1 and 3, the compressed air will be in the upper part or dome, which, containing no seams or joints and being drawn metal, as before mentioned, it will remain for an indefinite length of time without suffering any diminution of pressure. There is a decided advantage to be gained in forcing the air through the nozzle, as described, as otherwise a spe-

cial aperture would be required for that purpose, making one more joint to guard against; besides, with the extinguisher lying on its side, Fig. 2, and between the feet of the operator, gives him both hands for manipulating the air-pump.

The machine is operated by simply opening the nozzle 8, through the medium of the handle 15, whereupon the fluid is driven out with great force and the reservoir partially or fully exhausted, the position of the discharge-nozzle 8, conduit 7, and nipple 5 with respect to the reservoir being such that all of the contents may be expelled.

To insure an instantaneous opening of the nozzle, the lug *n* is formed on the plug 11 to engage with the projection *o* on the body portion of the nozzle, which will bring the hole *k* in line with channel or port *d*.

*p* are wire rings encircling the outer surface of the shell 1 and soldered thereto, and serve simply as means to prevent the carrying-strap placed about the can from slipping.

From the foregoing description it will be seen that my peculiar construction embraces all the advantages that a fire-extinguisher should possess, it being cheaply and easily refilled, as a pump accompanies each extinguisher, and, being perfectly air-tight, is always ready for use. This latter feature is of the utmost importance when one considers the liability in the majority of cases for fire-extinguishers to be set one side and forgotten until the very moment that they are wanted, and then to realize that they have deteriorated in pressure to such an extent as to render them useless.

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

1. A fire-extinguisher, consisting of a seamless metal shell forming the top and side walls thereof, substantially as shown, a bottom sealing the lower end and placed far enough within the shell so that the lower side walls of said shell will form a skirt inclosing an open chamber, a filling and discharging nipple attached to said bottom and projecting downward within said chamber, a discharging-nozzle projecting through said skirt, a conduit-pipe connecting said nipple and nozzle outside the reservoir, as set forth.

2. In a fire-extinguisher, the seamless shell 1 having closed bottom 2, receiving and discharging nipple 5 projecting below said bottom and protected by a skirt formed by the projecting sides of said shell, discharge-nozzle 8 attached to said skirt, as shown, conduit-tube 7 connecting said nipple and nozzle, and outside the reservoir said nozzle provided with the soft-metal seat 10 constructed and attached thereto as described and set forth, hard plug 11 engaging therewith will make a tight joint so as to prevent the escape of liquid from the reservoir, as set forth.

3. In a fire-extinguisher, of the character described of a nozzle constructed with a view to prevent the leaking of the contents of said extinguisher, through said nozzle, consisting of the body 8 having enlarged chambers *e* formed therein, a tinning coat on the walls of said chamber, soft-metal seat 10 within said chamber, combined with a metal that will fuse at a lower temperature than either the seat 10 or the tinning metal spread over the walls of said chamber, so as to effectually seal such seat and tinning substance together, for the purpose as described and set forth.

Signed at Bridgeport, in the county of Fairfield and State of Connecticut, this 3d day of April, A. D. 1894.

HENRY A. MANSFIELD.

Witnesses:
LEWIS F. PELTON,
GEO. D. PHILLIPS.