

No. 854,614.

PATENTED MAY 21, 1907.

J. B. THOMAS.  
CHEMICAL FIRE EXTINGUISHER.  
APPLICATION FILED DEC. 8, 1905.

Fig. 1.

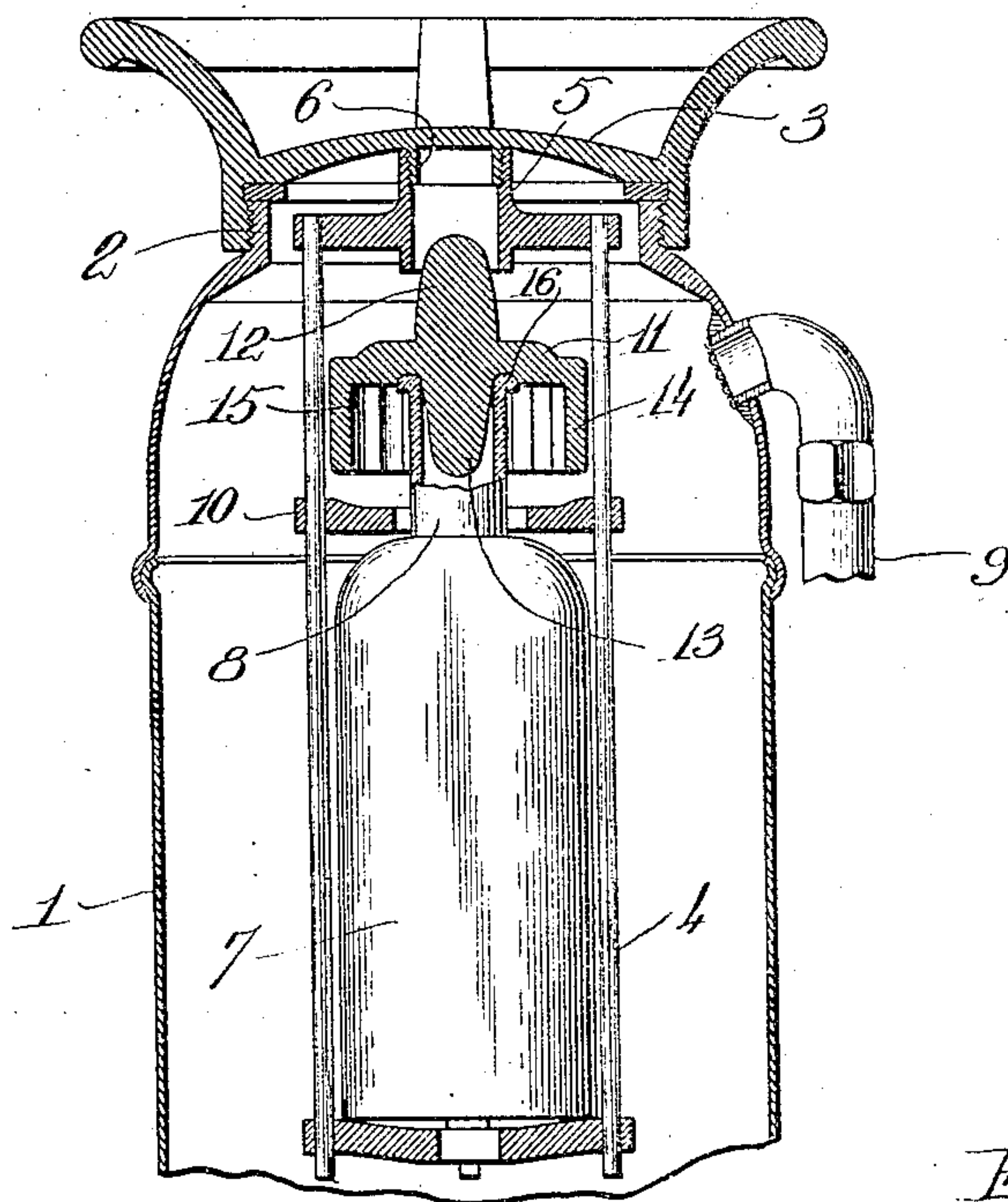


Fig. 3.

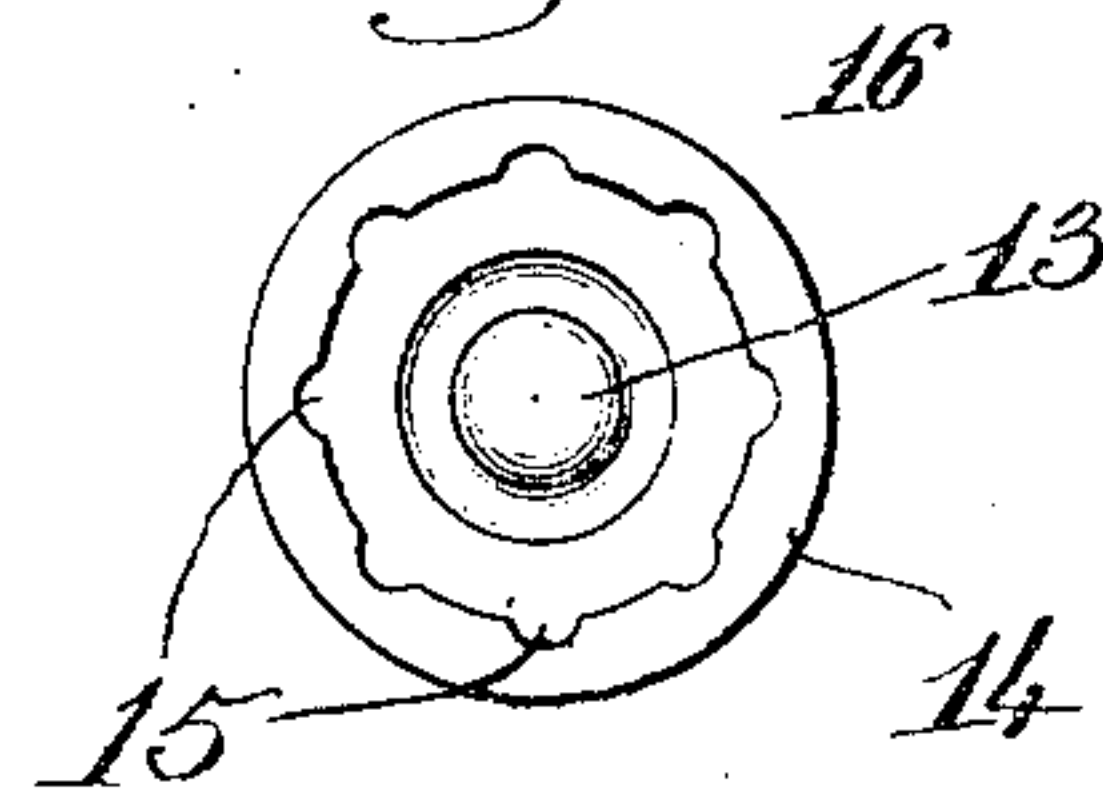
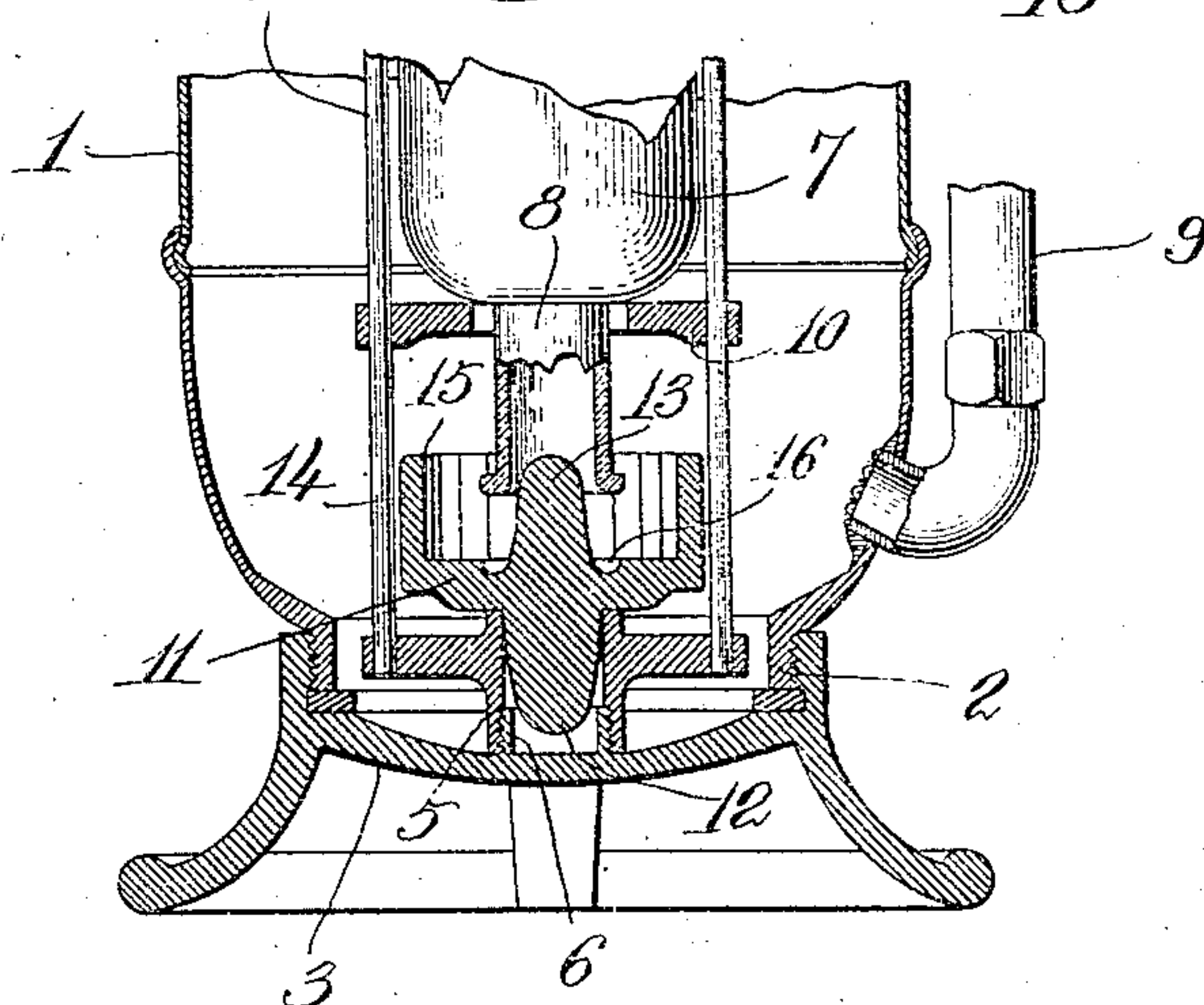


Fig. 2.



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# UNITED STATES PATENT OFFICE.

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## CHEMICAL FIRE-EXTINGUISHER.

No. 854,614.

Specification of Letters Patent.

Patented May 21, 1907.

Application filed December 8, 1905. Serial No. 290,914.

*To all whom it may concern:*

Be it known that I, JESSE B. THOMAS, a citizen of the United States, and a resident of Boston, county of Suffolk, 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.  
This invention relates to chemical fire-extinguishers of the type in which a main receiver contains an alkaline solution, such as carbonate of soda and water, and an acid receptacle held within the main receiver and containing sulfuric acid or other equivalent acid, whereby when the extinguisher is inverted for use carbonic acid gas is generated for the extinguishing of fire. An extinguisher of this type is shown in United States Patent No. 598,826 granted to me February 8, 1898, the acid receptacle being provided with a gravity closure which operated to regulate the flow of the acid, the object being to prevent the sudden outflow of the acid before it could properly combine with the alkaline solution.

The acid receptacle is conveniently and usually a glass bottle having an elongated outlet neck, suspended within the receiver in a suitable cage or holder, and in practice it is found that the bottles vary to a very considerable extent, both in length and in the diameter of the neck, so that many have to be discarded as of improper size to co-operate properly with the gravity closure. The latter has a limited opening movement when the extinguisher is inverted, and if the bottle is too long the outflow of acid will be throttled and retarded too much, while if the bottle is too short the flow will be too rapid. Again, if the neck is large it may fit so closely within the relatively shallow lip of the closure as to prevent a sufficient flow of the acid to enable the proper neutralization by the alkaline solution.

It is well known that the more perfect the chemical reaction, whereby all of the discharged acid is neutralized before leaving the extinguisher, the greater will be the extinguishing power and the less the danger of burning or damaging person, clothing, or other objects by contact with raw or only partly neutralized acid.

My present invention has for one of its objects the construction of the gravity closure in such manner that when it drops away from the mouth of the acid receptacle it at once becomes a receiver and distributor of the acid, the latter being so gradually mixed with the alkaline solution that not more than about one-eighth of a fluid ounce of the acid can come in contact with the solution at any one instant during operation. I thereby provide for a gradual rise in pressure within the extinguisher, and effectually prevent any sudden explosive action. The maximum pressure is reduced very materially, and the acid flow is so regulated as not only to increase the total amount of gas generated but also to charge the stream evenly and to its full carrying capacity from the first to the last of the operation, so that the maximum of gas is conveyed to the fire.

Another object of my invention is to so construct the closure that it can be used with acid bottles of varying length without substantially changing the mixing action when the extinguisher is in use, bottles varying nearly one-half inch in length being provided for by the closure without any adjustment. As the outlet necks of the acid bottles vary in diameter the closure is so constructed to admit of very considerable variation in such diameter, even should the neck have a wide annular flange at its mouth, as is often the case.

The closure in accordance with my invention, comprises a circular body portion having a deep peripheral lip, so deep that when in use it will form a mixing cup for the acid and the alkaline solution irrespective of the length of the acid bottle. This closure is provided with a projection on the lip side, to enter loosely the outlet neck of the bottle, the lip depending around the neck when the extinguisher is not in use. When inverted for use the closure drops away from the bottle neck a limited distance, permitting the acid in desired quantity to flow into the cup-like receiver formed by the then upturned lip, which always surrounds the neck. The projection serves to guide or direct the closure into closing position when the extinguisher is again turned to upright position, and a second, oppositely extended projection is provided to externally guide the closure, as will be explained. So far as the two



projections are concerned they are not novel *per se*, as they are shown and described in United States Patent No. 537,421, granted April 9, 1895 to myself and another.

5 Other novel features of my invention will be fully described in the subjoined specification and particularly pointed out in the following claims.

10 Figure 1 is a partial sectional view of the upper portion of a chemical fire-extinguisher of the class referred to hereinbefore, showing the main receiver and the acid bottle, with a gravity closure embodying one form of my invention shown in section in closing position; Fig. 2 is a similar view but showing the extinguisher inverted for use, the gravity closure being open to permit the discharge of the acid, and Fig. 3 is an underside view of the closure shown in Figs. 1 and 2.

20 The main receiver or canister 1, having a threaded neck 2 and constituting the filling opening, the cap or cover 3 screwed onto the neck, the cage or holder 4, shown as depending from the cap and connected therewith by a tubular hub 5 screwed onto a boss 6 on the cover, the acid receptacle or bottle 7 having an elongated outlet neck 8, detachably held in the cage, and the discharge tube 9, may be and are all of substantially well known construction in this type of chemical fire-extinguisher and operate in usual manner. A suitable yoke-portion 10 on the cage embraces the neck of the acid receptacle, and limits longitudinal movement thereof upon inversion of the extinguisher, as is usual.

35 In the present embodiment of my invention the closure or stopper for the acid receptacle consists of a circular body portion 11 having central and oppositely extended projections 12, 13, the former extending loosely into the tubular guide formed by the hub 5, see Fig. 1, while the projection 13 extends loosely into the neck of the acid receptacle. A deep peripheral lip 14 is formed on the body of the closure at the side thereof, from which the projection 13 extends, the lip being shown as substantially equal in depth to the length of said projection. In its inner wall the lip is shaped to present longitudinal channels, or ducts 15, and an annular recess 16 is formed in the body 11 concentric with the projection 13, and referring to Fig. 1 it will be seen that the flanged mouth of the outlet neck 8 is seated in this recess 16, while the deep lip 14 extends a very considerable distance below the mouth of the outlet. To charge the extinguisher the cover or cap 3 is removed, with the cage and acid receptacle, and the alkaline solution is poured in to the receiver 1 to the proper height. The bottle or receptacle 7 is removed from the cage and filled with the acid, and the closure having been applied to said receptacle the two are replaced in the cage, first introducing the

projection 12 into the tubular guide 5. Upon 65 replacement of the cover the apparatus is ready for use, which is effected by mere inversion of the extinguisher, as shown in Fig. 2. When such inversion is accomplished the closure falls away, by gravity, from the 70 mouth of the outlet neck, such opening movement being limited by the end of the guide 5, and the acid can then flow out of the annular space between the neck and the projection 13, into the deep cup or receiver 75 formed by the now-upturned lip 14. This flow, however, is gradual, and in small quantities, and the alkaline solution thoroughly combines with the acid, with generation of gas, so that the discharge is effected, carrying an even stream through the outlet tube 9. Inasmuch as the flow of acid is thus regulated the extinguisher can be stopped and started a number of times with the same charge, the operation being resumed with 85 uniformity and regularity whenever desired.

Should the outlet neck be longer or shorter the operation will be the same, for in each case the closure lip is of sufficient depth to form the receiver in which the acid and alkaline contents of the extinguisher combine, so that a variation of nearly one-half in length of acid receptacle will be provided for. Should the neck have an unusually wide flange at its mouth, or the diameter of the neck be quite large, then the channels or ducts 15 will act to bring the acid and alkaline contents together in proper proportions. Without such channels a very large neck or very wide flange thereon would act to throttle and unduly retard the desired chemical reaction. Ordinarily the open end of the outlet neck will seat with reasonable closeness in the recess 16, and thereby form a tighter closure for the acid receptacle when the extinguisher is not in use, and in the case of a very long bottle the recess presents a clearance through which the acid can flow when the extinguisher is inverted.

Owing to constant changes of temperature 110 there is a species of "sweating" process going on all the time within an extinguisher when not in use, and there is an accumulation of condensed moisture on the closure. When a sufficient body of moisture accumulates 115 thereon it runs off, following the walls of the lip 14 and drops back into the solution, doing no damage, as the lower edge of the lip is so far below the mouth of the outlet neck 8 that there is absolutely no possibility of the condensate creeping up the inner wall of the lip to the outlet and thence into the receptacle 7. If this condensate should enter the receptacle it would in time fill it and the contents would overflow, weakening the strength of the acid 125 and reducing the efficiency of the extinguisher.

By the construction of the closure herein



shown and described I am enabled to use acid bottles varying materially in size without necessitating any adjustment of parts, thereby simplifying the structure, the closure being self-adapting or self-adjusting to such variations, while in other respects the efficiency of the extinguisher is increased as a whole, as has been explained.

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

1. In a chemical fire-extinguisher, the combination with a main receiver and an acid receptacle therein, of a gravity-closure for said receptacle provided with a deep lip to surround the mouth of the receptacle, longitudinal channels in the inner wall of the lip, and means to limit the opening movement of the closure when the extinguisher is inverted for use.

2. In a chemical fire-extinguisher, an acid receptacle having an elongated outlet neck, combined with a gravity closure having a deep lip to surround the neck, channels in the inner wall of said lip, and means to limit the opening movement of the closure when the extinguisher is in use, to always main-

tain the mouth of the outlet neck inclosed within the lip of the closure.

3. In a chemical fire-extinguisher of the class described, in combination, an acid receptacle having an outlet neck, a gravity closure therefor having an annular, internal, recess to normally receive the end of the neck, a deep peripheral lip on the closure, having longitudinal channels in its inner wall, and means to guide and limit opening movement of the closure when the extinguisher is in use.

4. A gravity-closure for acid receptacles of chemical fire-extinguishers, said closure having oppositely extended projections one of which is adapted to enter the outlet of the acid receptacle, and a deep annular lip surrounding said projection and having longitudinal channels in its inner wall, as and for the purpose described.

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

JESSE B. THOMAS.

Witnesses:

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ELIZABETH R. MORRISON.