

No. 615,262.

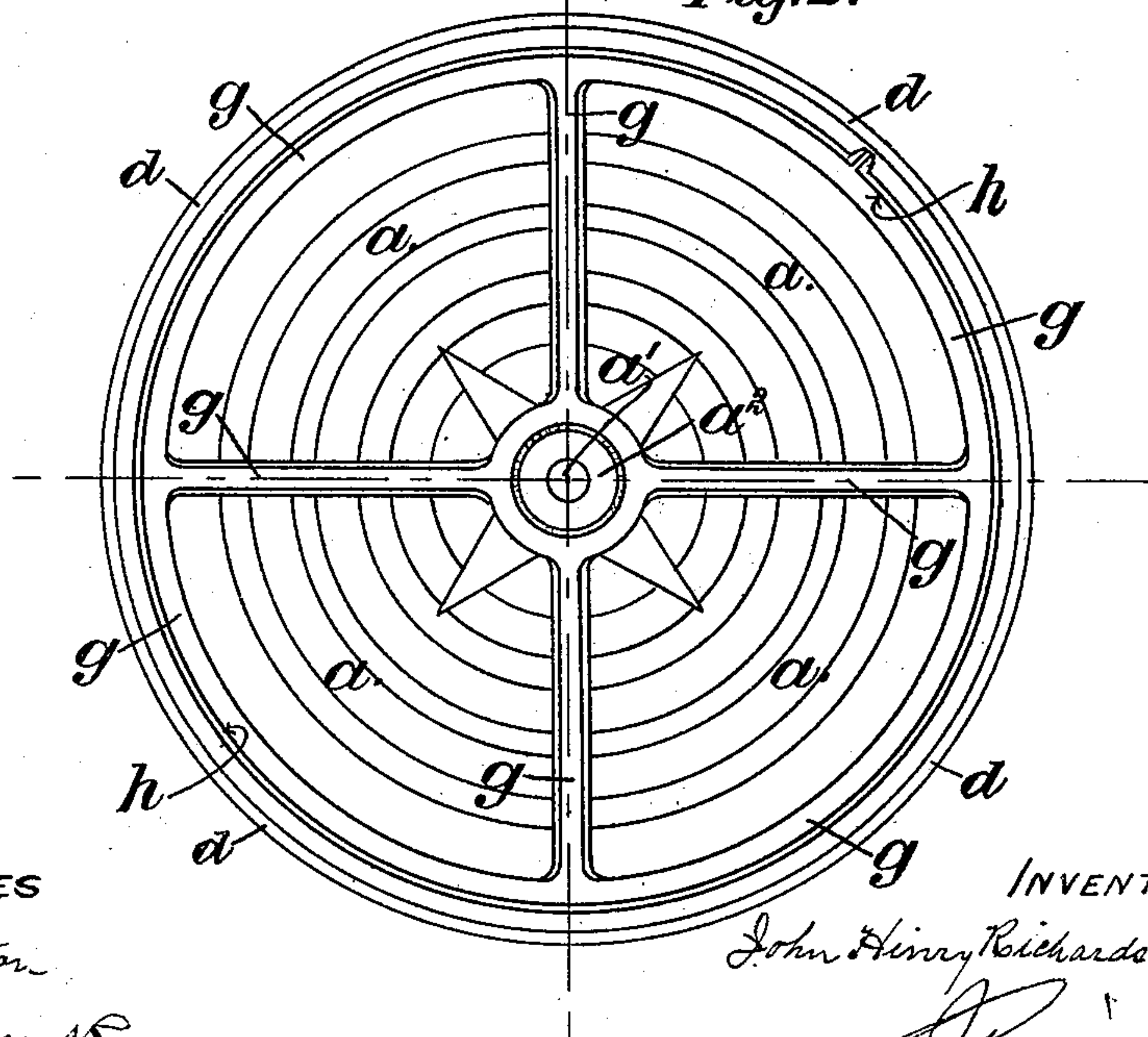
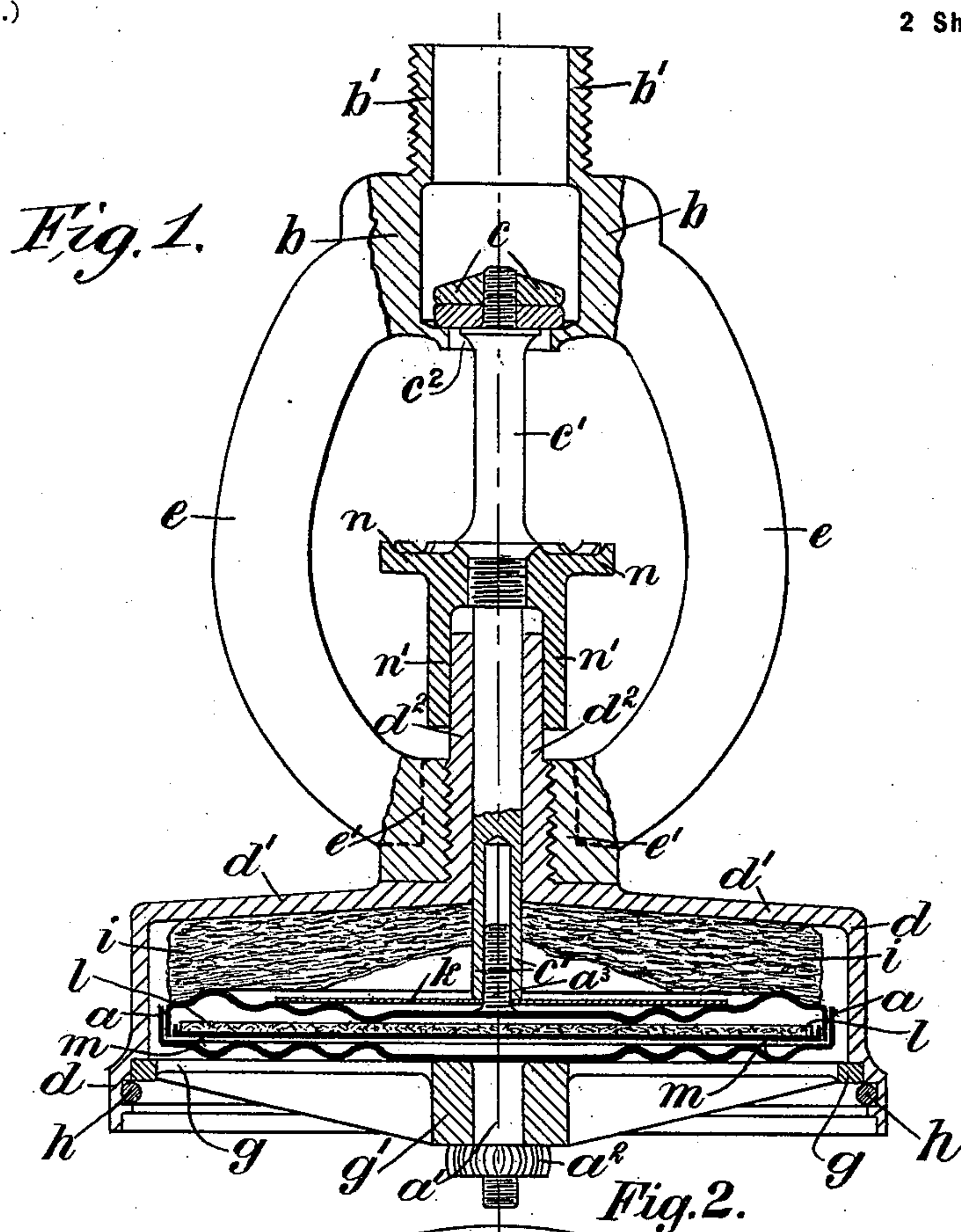
Patented Dec. 6, 1898.

J. H. R. DINSMORE.
FIRE EXTINGUISHING SPRINKLER.

(Application filed Nov. 13, 1897.)

(No Model.)

2 Sheets—Sheet 1.



WITNESSES

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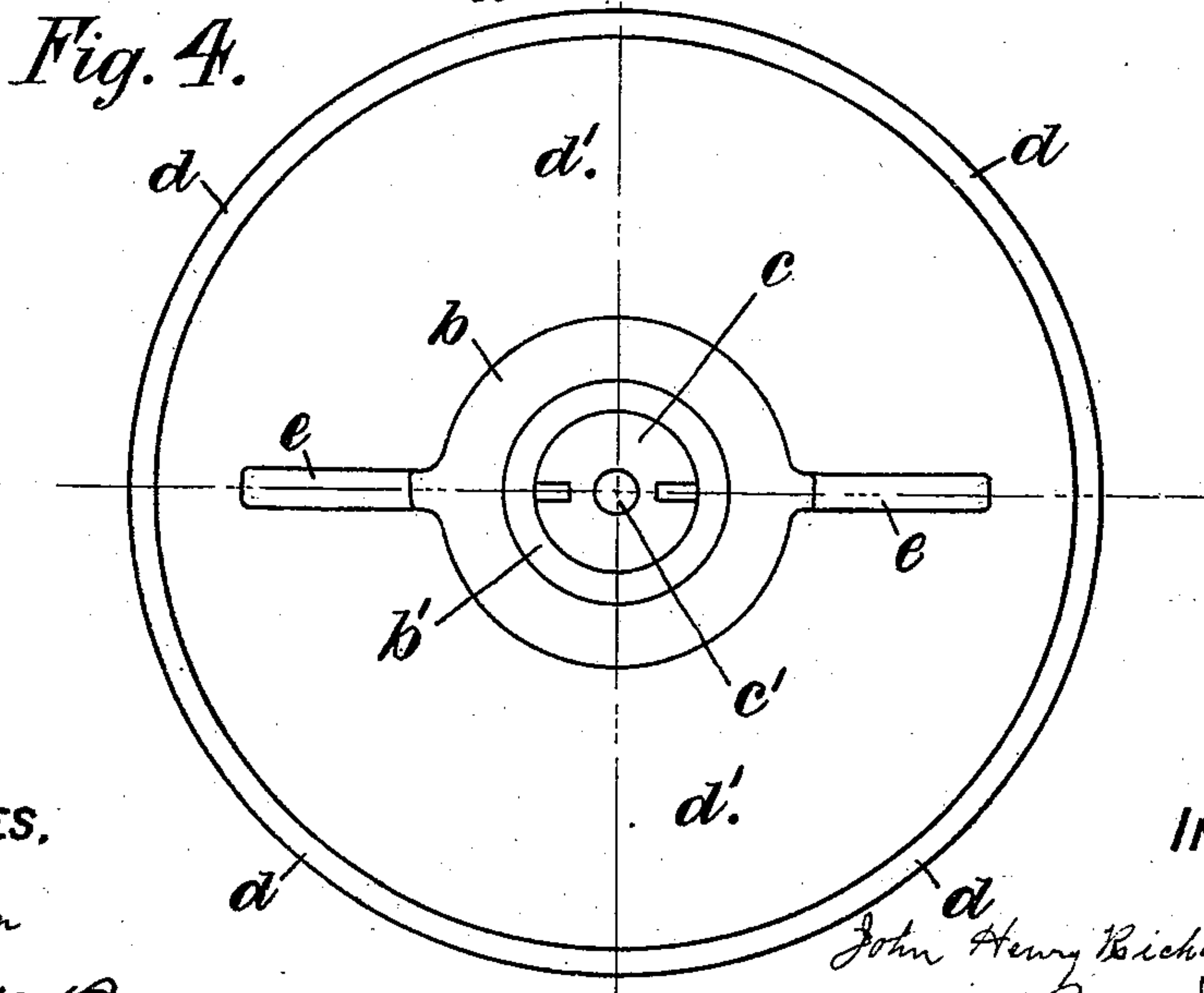
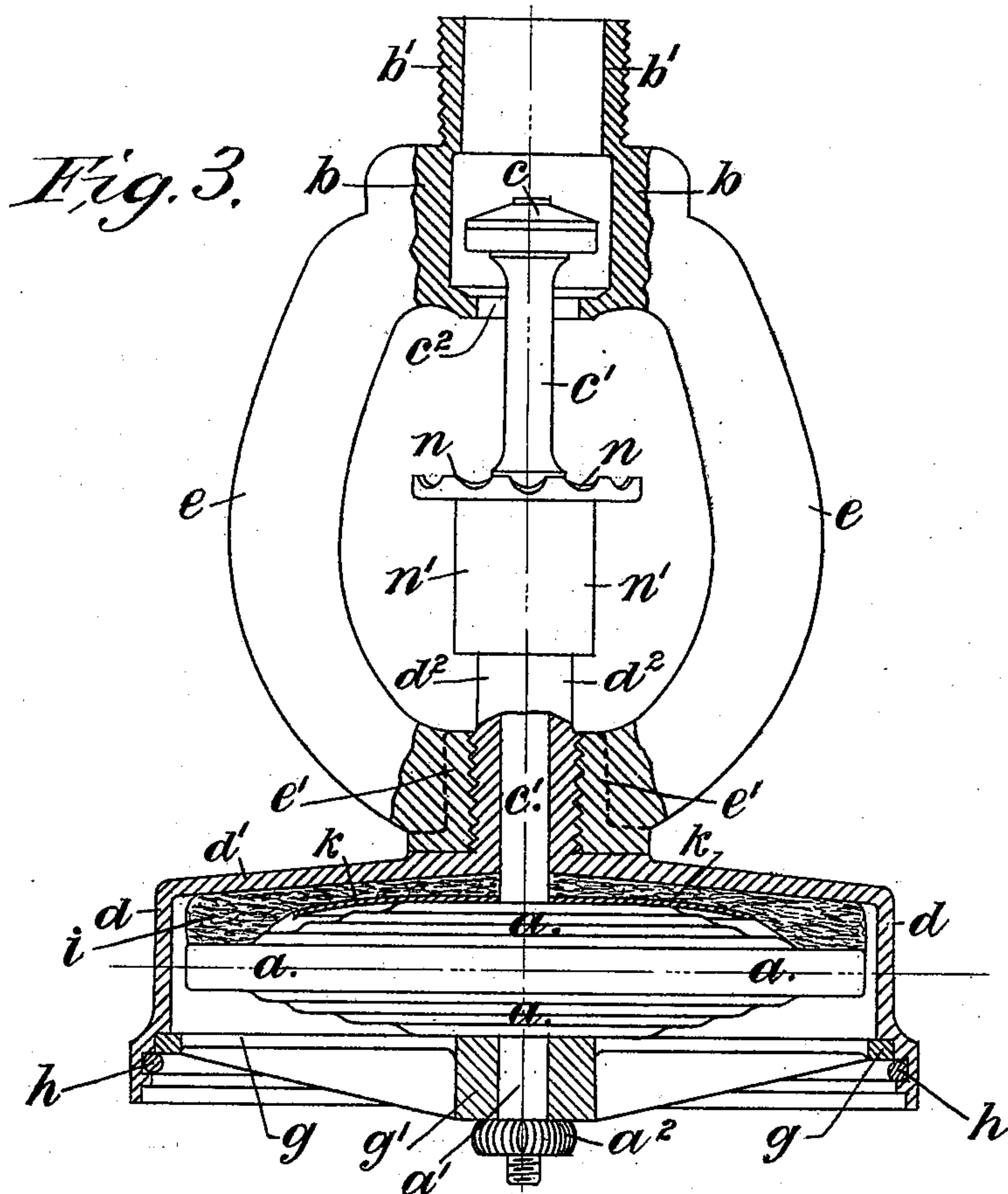
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UNITED STATES PATENT OFFICE.

JOHN H. R. DINSMORE, OF LIVERPOOL, ENGLAND, ASSIGNOR TO WILLIAM HENRY DAVIES, OF MANCHESTER, AND JOHN EDWARD LEES, OF ROMILEY, ENGLAND.

FIRE-EXTINGUISHING SPRINKLER.

SPECIFICATION forming part of Letters Patent No. 615,262, dated December 6, 1898.

Application filed November 13, 1897. Serial No. 658,416. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. R. DINSMORE, engineer, a subject of the Queen of Great Britain and Ireland, residing at Liverpool, England, have invented certain new and useful Improvements in Fire-Extinguishing Sprinklers, of which the following is a specification.

The class of fire-extinguishing apparatus to which this invention relates is that of the automatic-sprinkler type which is fixed at different points at or near the ceiling or roof of a room or building and is adapted to be automatically set in action and discharge water into such room or space when the temperature of the room at the part where it or they is or are disposed reaches a certain point and the particular kind of this class of automatic extinguishing apparatus to which this invention has special reference is that having an expansible and contractile diaphragmatic chamber and in which the vaporization and expansion of a volatile fluid when the heat around such device reaches a given point causes the device to extend and open a valve and water to be supplied and distributed.

Drawings accompanying this specification illustrate the improved automatic fire-extinguishing apparatus.

In the drawings, Figure 1 is a sectional elevation in the normal position of rest. Fig. 2 is a view showing the under side of the device or apparatus. Fig. 3 is a sectional elevation showing the apparatus in its open and active position, and Fig. 4 is a plan.

Referring to the drawings, *a* is a corrugated diaphragmatic disk device consisting of upper and lower corrugated disks.

b is a valve-casing, and *c* a valve in it, the valve being rigidly connected with and operated by the device *a* through the valve-stem *c'*.

b' is the neck of the valve-case, by which the apparatus is fastened to the pressure water-service pipe.

d is a case around the outside of the device *a*, by which such device is supported and to which it is attached, and this case is carried up over the upper side, forming a roof at *d'* to the device and inclosing it above.

e are arms by which the case *d* is carried

from the valve-body *b* and which are formed thereon, and on the lower end of which is formed a ring *e'*, the inside of which is threaded and screws over the threaded neck *d''*, formed on the case-roof *d'*. Through this neck *d''* the valve-stem *c'* passes and is guided by it. The lower diaphragm of the device *a* is supported from the case *d* by an open ring-frame *g*, the central part *g'* of which is bored, and through the hole a pin *a'* on the lower diaphragm passes and is secured by a nut *a''*, which holds the diaphragm device down on the frame *g*. The frame *g* is held in position in a suitable seat in the case *d* by the spring-wire *h*, which fits in an annular groove in the case, as shown, under the frame, such ring being split at *h'* and sprung into position.

Between the diaphragm device *a* and the roof *d'* a pad or wad *i*, of felt or other suitable bad conductor of heat, is provided. This has the effect of preventing the device *a* being cooled too much and too rapidly by the cooling of the roof *d'*, due to the falling of water upon it when the apparatus is in action. On the upper side of the device *a* there is a strengthening-disk *k*, which distributes pressure and prevents undue strain coming upon parts of the device *a*.

Within the device *a* there is a porous or absorbent sheet of material *l* and a plate *m*, on which this material rests, and this porous material is charged with a small quantity of volatile liquid of any known suitable kind which will evaporate at the temperature desired—say from 95° to 120° Fahrenheit.

The valve-stem *c'* screws over a threaded stud *a''* on the upper diaphragm of the device *a*, as shown, and has upon it between the device and the valve *c* a spraying or distributing device *n*, by which water is broken up and sprayed and distributed up and all around as required, and this device *n* has an annular portion *n'* on its under side which fits over the guide-neck *d''* and prevents water getting down between the valve-stem *c'* and the guide onto the device below and cooling it.

The valve *c* in the case shown has a face of vulcanized fiber, leather, or the like bearing upon an internal valve-seat, and the open-

ing c^2 of the valve is between the stem c' and the seat.

The use and operation of the apparatus are as follows: The apparatus is placed in buildings, rooms, or spaces—say, in the usual or commonly-adopted positions—and when quiescent the parts will take the position shown—namely, the diaphragmatic device a will be collapsed and the valve c upon its seat, with the pressure of water keeping it close down on its seat and tight. Then when a fire takes place the heat resulting from it reaches the open under side of the device a and acts upon the volatile hydrocarbon liquid held in the absorbent material l therein, and it becomes vaporized at the temperature desired. The effect of this is that pressure is created in the device a , and it becomes distended in the manner shown in Fig. 3, and the valve c is thereby raised from its seat and opened, whereupon the water under pressure rushes downward and striking the sprayer n is distributed by it and sprayed about in all directions. Some of this water in falling downward falls upon the roof d' , but it is prevented from acting upon the device a —that is to say, while the temperature of this roof can be cooled by the water falling upon it the temperature of the device a is not affected by it, as the non-conductor material i prevents this, and thus the temperature of the device and its contents is unaffected by the water, and so the device a will be kept distended and the valve will be kept open in spite of the falling water, and then when the fire is extinguished the valve will remain open by this means several minutes—say from three minutes upward—and to get this afterflow and distribution of water in a self-stopping sprinkler it is found necessary to protect the expanding and contracting device from cooling effect from above in the manner described.

When the fire is extinguished, the vapor of the volatile spirit in a condenses and is absorbed by the pad i , which is held in the tray m , and the diaphragms of the device collapse, and thereby bring down the valve c again onto its seat, and so stops or cuts off the flow of water.

What is claimed in respect of the herein-described invention is—

1. In an automatic self-stopping fire-extinguishing apparatus, a diaphragmatic device and covering-case, a valve-spindle passing up through a neck on said case, a water distributing or spreading disk device n , on which the water strikes, and a part n' below on n , which prevents water from passing down onto the diaphragm device.

2. In combination with the covering-case $d d'$ having the downwardly-extending flange, the ring-frame g fitting in the lower part of said cover-case, the separable diaphragm having its lower part resting on the ring-frame g , the upper supporting-frame, the valve therein and the stem extending from the diaphragm to the valve with means for holding the ring-frame in place.

3. In combination with covering-case $d d'$ having the depending flange, the two-part diaphragm, the valve connected therewith, the ring-frame at the lower end of the covering-case having a boss receiving the stem of the lower part of the diaphragm and the spring-ring for supporting the ring-frame in place, substantially as described.

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

JOHN H. R. DINSMORE.

Witnesses:

ERNEST R. ROYSTON,
JOHN H. WALKER.