W. ESTY.

AUTOMATIC STATIONARY FIRE EXTINGUISHER.

APPLICATION FILED MAR. 7, 1908.

931,190. Patented Aug. 17, 1909.

Fig. 1.

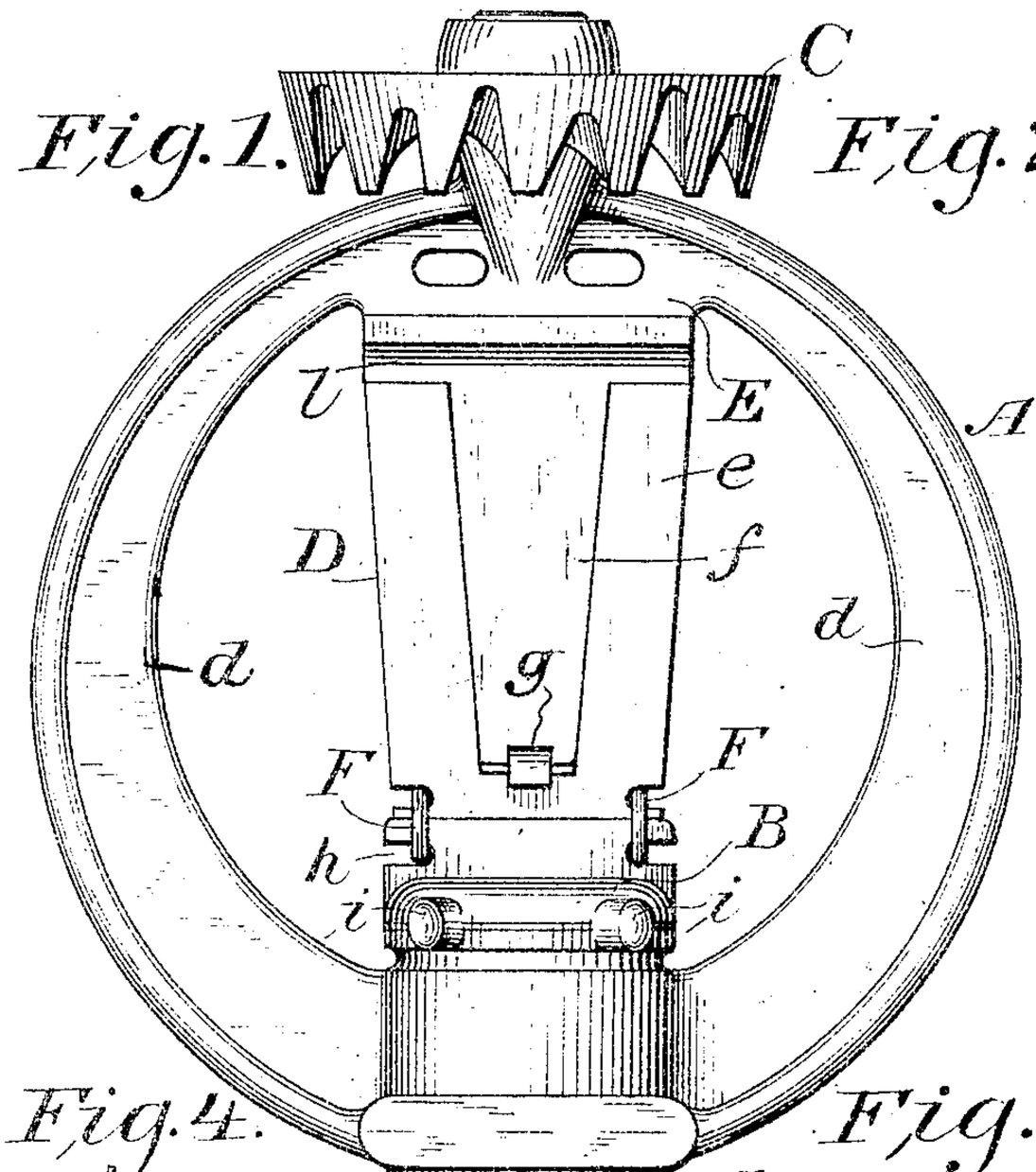


Fig. 2.

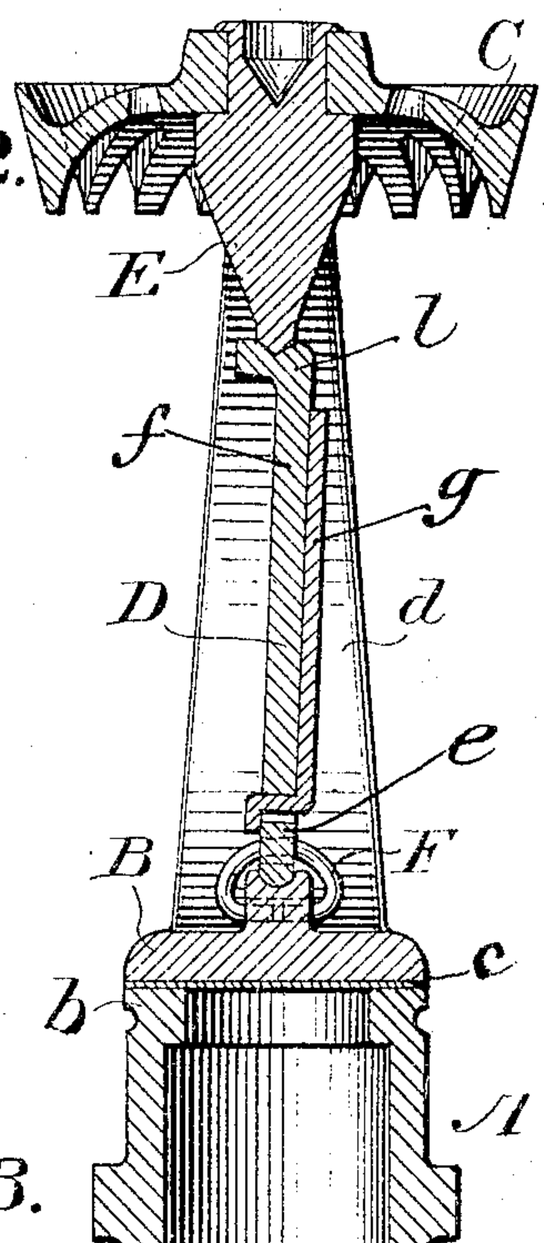


Fig. 4.

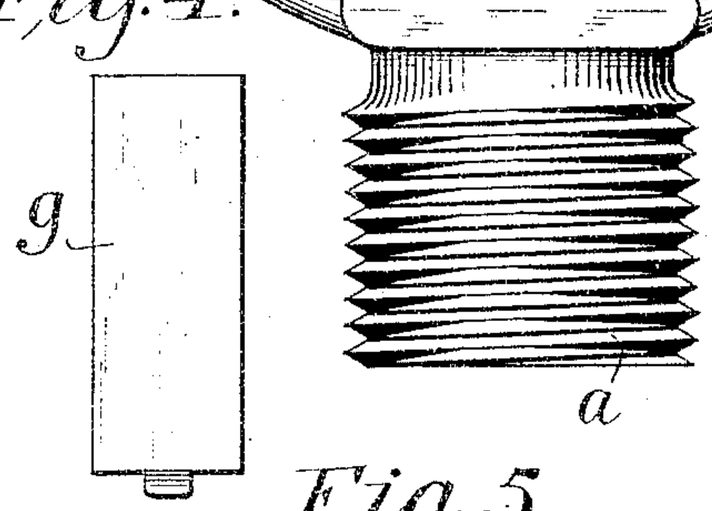


Fig. 3.

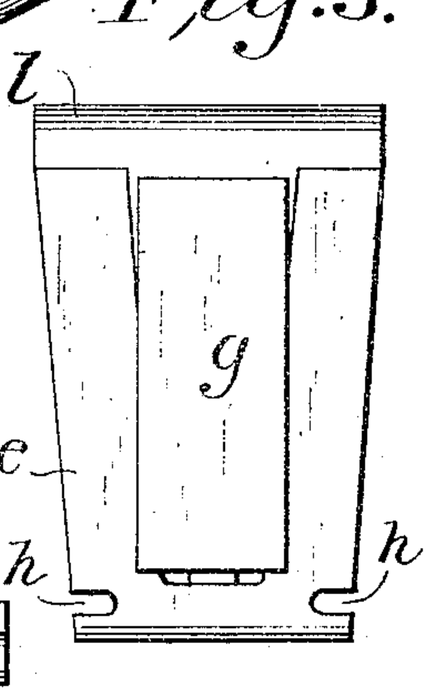


Fig. 5.

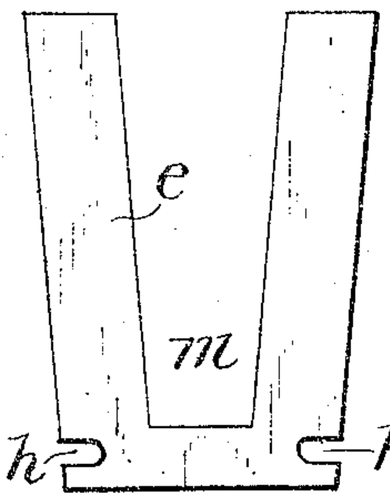


Fig. 6.

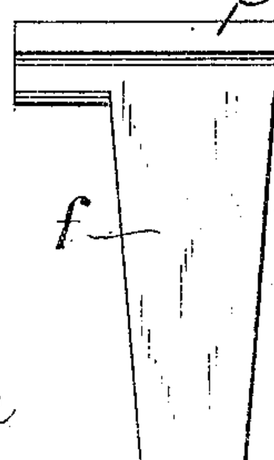


Fig. 7.

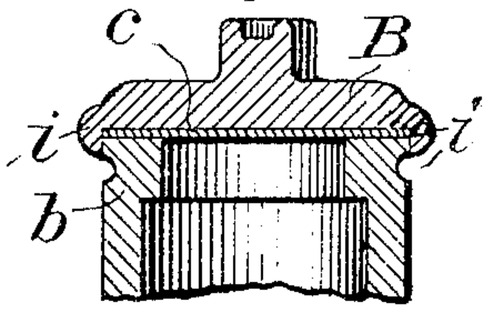
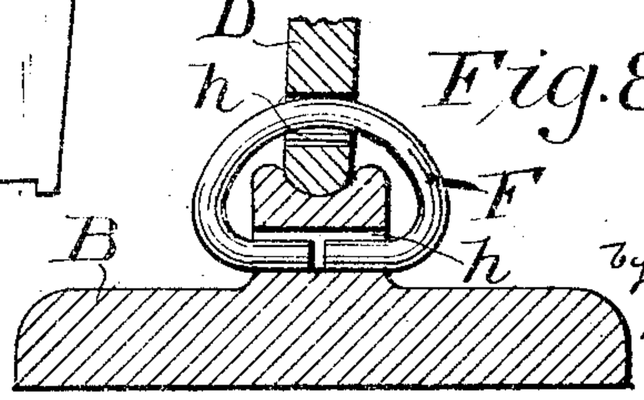


Fig. 8.



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his Attorney

UNITED STATES PATENT OFFICE.

WILLIAM ESTY, OF LACONIA, NEW HAMPSHIRE, ASSIGNOR TO ESTY SPRINKLER COMPANY, OF LACONIA, NEW HAMPSHIRE, A CORPORATION OF NEW HAMPSHIRE.

AUTOMATIC STATIONARY FIRE-EXTINGUISHER.

No. 931,190. Specification of Letters Patent. Patented Aug. 17, 1909.

Application filed March 7, 1908. Serial No. 419,815.

To all whom it may concern:

Be it known that I, WILLIAM ESTY, of Laconia, in the county of Belknap and State of New Hampshire, have invented certain new and useful Improvements in Automatic-Stationary Fire-Extinguishers, of which the following is a specification.

The present invention consists in improvements in that class of automatic fire extinguishers which are employed in factories and other buildings for the purpose of automatically flooding the same with water in case of the outbreak of a fire, and relates to the sprinkler head.

The improvements relate both to the sprinkler head frame and to the collapsible strut employed to normally hold the valve open.

The improvements are illustrated in the accompanying drawings, in which—

Figure 1 is a front view of a sprinkler head embodying the present improvements; Fig. 2 is a vertical section; Fig. 3 a face view of the strut detached, looking at the opposite face from that shown in Fig. 1; Figs. 4, 5 and 6 are detail views of the different parts of which the strut is composed; Fig. 7 is a detail sectional view of the valve and nozzle; Fig. 8 is a detail section showing the connection between the strut and the valve.

The improved sprinkler is composed of a frame A; a separable valve B; a distributer C; and a separable strut D interposed between the valve and a resisting abutment E carried by the frame A.

The frame A has a threaded boss *a* by means of which it may be attached to the water-supply, and this boss is hollow to furnish a water passage which terminates at the nozzle *b*. The nozzle is normally closed by the valve B, a mica packing *c* being introduced between the nozzle and the valve to lessen the liability of the valve corroding and sticking to the edge of the nozzle.

The distributer C is shown as rigidly connected to the frame A.

The abutment E, between which and the valve the strut D is interposed, is integral with the frame A, instead of being adjustably secured thereto as has been the common practice.

It is highly important in automatic sprinklers of this character that there should be a uniform load or stress on the strut or other collapsible releasing device employed. The strut or releasing device is held together by low-test solder which has comparatively little strength, and it is very essential that no greater load than is necessary to hold the valve tight to its seat under normal conditions be imposed upon the collapsible strut. If the strut is overstrained, the sprinkler is liable to open prematurely, causing water damage; while if insufficient pressure be normally imposed upon the strut, it will not suffice to prevent leakage of the valve. In case an adjustable abutment is employed for the strut, it is extremely difficult to secure uniformity. In accordance with the present improvement a non-adjustable or rigid abutment is carried by the sprinkler frame so that there is always a uniform distance between the abutment and the valve. By the employment of proper tools and jigs this distance can be made absolutely uniform as well as the length of the strut. Hence, when the strut is in place, as shown in Figs. 1 and 2 of the drawings, it is manifest that uniform conditions are secured. In order to get the strut into place, and at the same time to provide a uniform normal pressure on the strut, the sides *d* of the frame are made yielding. The frame is an integral structure, in so far as the nozzle, sides, and abutment are concerned, but the sides *d* can yield to compressive pressure. When thus compressed together, the sides *d* are sufficiently elongated to so far separate the abutment and valve that a strut can be inserted between them. Then, when the compressive pressure is relieved, the abutment seats upon the strut and forces the strut against the valve with a uniform and predetermined pressure. The strut or other releasing device is held with yielding pressure against the seated valve by the resilient arms of the frame. The frame is made of any suitable stiff composition material sufficiently resilient to allow it to be sprung so that the strut can be inserted. Hence, the sprinkler heads, as thus made, are substantially uniform and alike so that there is a normally uniform spring-pressure upon the different struts of different sprinkler heads. In case of the outbreak of a fire and the collapsing of the fusibly united strut, the spring pressure upon the strut, due to the resiliency of the frame, assists in the early disintegration of the strut and the throwing out of its members away from the sprinkler head so as to furnish an unobstructed path for the water

from the nozzle to the distributer which scatters the water over the place to be protected.

The strut is composed of three different parts, namely, a body member *e;* a lever member *l*, and a multiplying lever *g*, shown separately in Figs. 5, 6 and 4, respectively. In general respects the strut is like that set forth in Letters Patent of the United States No. 744,057, granted to the present applicant on November 7, 1903. As in said patent, the body member is slotted having a central open mouthed slot *m;* and the lever member *l*, has a tongue *f*, which enters and occupies said slot, so that the main portion of the lever member lies in the same plane as the body member *e*. In the present construction the multiplying lever *g* overlies the lever member *l* lengthwise and partly covers the longitudinal joints between the slot margins of the body member *e* and the tongue *f*, of the lever member *l* so as to afford more surface to receive the solder without interfering with the direct action of the heat upon the solder. The upper edge of the lever member *l* is grooved, as shown in Fig. 2, so as to fit the lower edge of the abutment E; and likewise the upper edge of the valve B is grooved to receive the lower edge of the body member *e*, as shown in Figs. 2 and 6. This prevents any accidental slipping of the strut out of place, and as shown in Fig. 2, the strain between the valve and the abutment is at a slight angle to the length of the strut so as to create a constant tendency to disrupt the strut, said tendency being resisted by the fusible solder which unites the several parts of the strut. The action of the strut in resisting this strain and in disintegrating on application of heat is similar to that of the strut set forth in the aforesaid Patent No. 744,057.

In case a sprinkler head is installed for a long time before it is called upon to perform its protective office, the valves are liable to become stuck in place through corrosion and accumulation of dirt, as is fully set forth in Letters Patent of the United States No. 720,013, granted February 10, 1903, to the present applicant; and it is important as there explained to provide means for jerking the valve from its seat, and a reaction spring is provided in that patent for the purpose. The present invention includes an improved reaction spring arrangement for this purpose. As shown in Figs. 1, 2 and 6 of the drawings, there are two reaction springs F, F, each of which is connected both to the body member *e* of the strut and to the valve B by means of the slotted openings *h*. When the strut has been put into place, these reaction springs are put under tension by suitable tools and are inserted into place. On being released from the inserting pressure, the reaction springs expand and tend to separate the strut from the valve, this tendency being resisted by the abutment E. Hence, the reaction springs are under tension when the valve is closed. When, however, the strut collapses through heat, these reaction springs expand still farther and tend to jerk the valve from its seat.

It is important that the valve should be held on the nozzle against lateral displacement and in such a way as to present a minimum corrosive surface. To this end the valve is provided with a plurality of depending lugs *i*, shown in Figs. 1 and 7, which extend down so as to embrace the nozzle *b* and hence to prevent lateral displacement of the valve. At the same time these lugs occupy only a portion of the periphery of the valve so that only a small surface area of contact is left between the metal of the valve and the metal of the nozzle. Hence, the effects of corrosion are reduced to a minimum consistent with the prevention of lateral slipping. As shown in the drawings the valve and nozzles are circular, and there are four of these retaining lugs, two at each side of the valve. The two at one side of the valve are shown in Fig. 1, and there are two corresponding lugs (not shown) on the other side of the valve, the presence of such lugs not shown in Fig. 1, being indicated in Fig. 7.

The improved resilient frame will withstand a pressure of 600 pounds to the square inch in the system, and will permit the valve to open if the pressure increases to 650 pounds.

I claim as my invention:

1. An automatic sprinkler having, in combination, an integral frame comprising a valve seat and an abutment connected together by resilient arms, a valve, and a releasing device interposed between said valve and said abutment, grooved connections being employed between the releasing device and the valve and abutment, and the releasing device being held with yielding pressure against the valve by said resilient arms.

2. An automatic sprinkler having, in combination, a sprinkler head having a valve seat and a rigid abutment with resilient arms connecting the same, said seat abutment and arms being integral, a valve on said valve seat, and a fusible strut between said valve and said abutment which is held with yielding pressure against the valve by said resilient arms.

3. An automatic sprinkler having, in combination, a sprinkler head having a valve seat and a rigid abutment with resilient arms connecting the same, said seat abutment and arms being integral, a valve on said valve seat, and a releasing device, between said valve and said abutment which is held with yielding pressure against the valve by said resilient arms.

4. An automatic sprinkler having, in combination, a frame having a valve seat and an abutment connected together by resilient arms, a valve, and a releasing device interposed between said valve and said abutment, grooved connections being employed between the releasing device and the valve and abutment, and the releasing device being held with yielding pressure against the valve by said resilient arms.

5. An automatic sprinkler having, in combination, a sprinkler head having a valve seat and an abutment with resilient arms connecting the same, a valve on said valve seat, and a fusible strut between said valve and said abutment which is held with yielding pressure against the valve by said resilient arms.

6. An automatic sprinkler having, in combination, a sprinkler head having a valve seat and an abutment with resilient arms connecting the same, a valve on said valve seat, and a releasing device between said valve and said abutment which is held with yielding pressure against the valve by said resilient arms.

7. An automatic sprinkler having, in combination, a frame having an abutment and a valve seat, a valve, a strut interposed between said abutment and valve and bearing directly on the valve, and a plurality of reaction springs connecting the valve and the strut which are under tension when the valve is held closed.

8. An automatic sprinkler having, in combination, a frame having an abutment and a valve seat, a valve, a strut interposed between said abutment and valve and bearing directly on the valve, and a reaction spring connecting the valve and the strut which is under tension when the valve is held closed.

9. An automatic sprinkler having, in combination, a valve, a releasing device therefor, and a reaction spring fitting in apertures in said valve and releasing device, respectively, said reaction spring being under tension when the valve is held closed.

10. An automatic sprinkler having a strut composed of a slotted body member, a lever member having a tongue entering said slot, and a multiplying lever united together by fusible solder, said multiplying lever overlying the said lever member lengthwise and overlapping the joints between the slot margins of said body member and the tongue of the lever member.

11. An automatic sprinkler having a strut composed of a slotted body member, a lever member having a tongue entering said slot, and a multiplying lever united together by fusible solder, said multiplying lever overlapping the joints between the slot margins of said body member and the tongue of the lever member.

12. An automatic sprinkler having a strut composed of a body member, a lever member lying in the same plane as the body member, and a multiplying lever united together by fusible solder; said multiplying lever overlying the said lever member lengthwise and overlapping the joint between said body member and lever member.

13. An automatic sprinkler having a strut composed of a body member, a lever member lying in the same plane as the body member, and a multiplying lever united together by fusible solder; said multiplying lever overlapping the joint between said body member and the lever member.

14. An automatic sprinkler having, in combination, a nozzle, a valve, and laterally projecting lugs depending below the seating face of the valve and cooperating with said nozzle to prevent lateral displacement of the valve.

15. An automatic sprinkler having, in combination, a nozzle, a valve, and lugs cooperating with said valve and nozzle to prevent lateral displacement of the valve.

In witness whereof, I have hereunto signed my name in the presence of two subscribing witnesses.

WILLIAM ESTY.

Witnesses:

GEORGE W. SHERWELL,

FRED A. PHELPS.