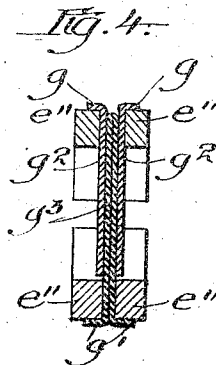
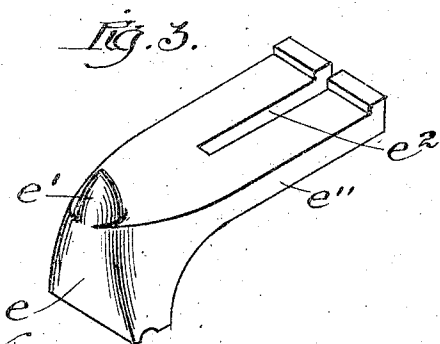
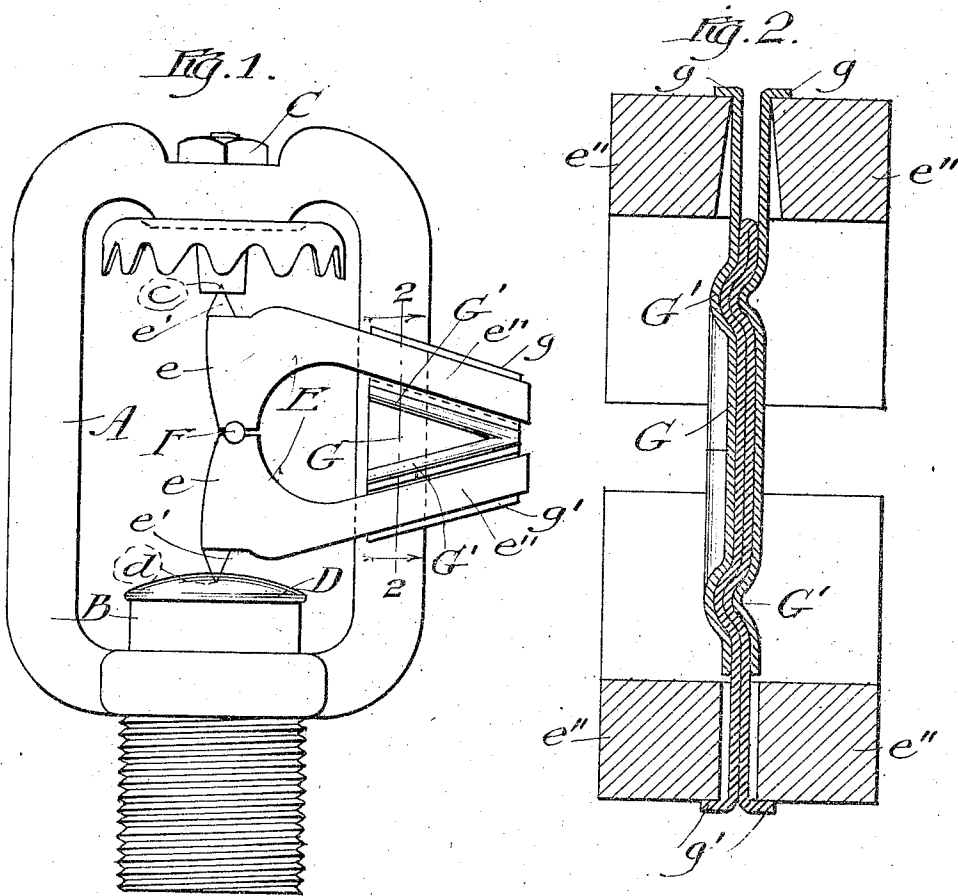


M. ANDREWS.
 AUTOMATIC FIRE EXTINGUISHER.
 APPLICATION FILED JUNE 22, 1909.

971,814.

Patented Oct. 4, 1910.



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UNITED STATES PATENT OFFICE.

MARTIN ANDREWS, OF CHICAGO, ILLINOIS.

AUTOMATIC FIRE-EXTINGUISHER.

971,814.

Specification of Letters Patent.

Patented Oct. 4, 1910.

Application filed June 22, 1909. Serial No. 503,760.

To all whom it may concern:

Be it known that I, MARTIN ANDREWS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Automatic Fire-Extinguishers, of which the following is a specification.

The present invention relates to a sprinkler head which belongs to what is known as the strut class of sprinklers and the distinctive characteristic of which is a strut proper made up of two posts the remote ends of which bear against the cap or valve and the yoke, or a tightening screw or other device carried thereby, respectively while their adjacent ends bear against each other, either immediately, through the medium of a roller or other third part interposed between them or immediately (directly) but whether the bearing be mediate or immediate, said bearing is slightly offset, or to one side of the straight line passing from the points of contact of the remote ends of the posts with the cap or valve and yoke, respectively, after the manner of a toggle. Sprinklers of this class are well known to those skilled in the art.

The invention relates more particularly to a sprinkler belonging to the above-described class, of that type in which arms extend laterally from the parts on toggle members and are normally held in such positions relatively to each other as to prevent the toggle from buckling, until the sprinkler is subjected to a predetermined abnormal temperature, whereupon a solder joint, by which the arms are held in normal positions under normal temperatures, fuses and allows the arms to move asunder and permit the toggle to buckle, thereby releasing the cap or valve. Each of the posts or toggle members and its laterally projecting arm constitutes what is known in the art as a bent lever and these bent levers are the distinctive characteristics of this bent lever type of the strut or toggle class of sprinklers. In a bent lever sprinkler the points of contact between the remote ends of the posts or toggle members and the cap or valve and the yoke, respectively, constitute the fulcrum about which the bent levers turn and it is in the hereinafter described novel relative arrangement of the active or working points or surfaces of the bent levers that the present invention consists; in part, the object of this part of the invention being to evenly and uniformly distribute the

strains upon the solder joint of a composite tie-plate by which the lever arms are connected and held in normal positions, so that the strains upon said solder joint and the strains put upon those surfaces of the tie-plate upon which the lever arms bear shall, throughout the contacting surfaces of the tie-plates and lever arms, be perpendicular, or substantially perpendicular to the radii of the fulcrum of the bent levers.

The invention relates, in part also, to the construction of the tie-plate whereby the sliding of any of the surfaces of the tie-plate upon any of the surfaces of the lever arms, when the solder joint of the tie-plate is fused and the lever arms are moving asunder, is entirely prevented.

Other objects of the invention are, to provide an improved sprinkler of such construction that under normal conditions the valve-holding device shall have great holding powers, while, at the same time, the solder joint of the tie-plate shall be highly sensitive and quickly responsive to a predetermined abnormal temperature and all of the displaceable parts of the valve holding device be so constructed that upon the fusing of the solder joint of the tie-plate, all of said displaceable parts shall fly asunder quickly and with absolute certainty.

Other novel features in which the invention consists, in part, and their objects will appear hereinafter.

In the accompanying drawing which is made a part of this specification: Figure 1 is a side elevation of a sprinkler embodying the invention in its preferred form. Fig. 2 is a view showing the lever arms and tie-plate in section on the line 2-2, Fig. 1. Fig. 3 is a perspective of one of the bent levers. Fig. 4 is a view similar to Fig. 2 showing a slight modification of the tie-plate.

All of the several figures of the drawing are on a scale of 2" to 1", excepting Fig. 2 which is on a scale of 6 to 1.

The yoke or frame A of the sprinkler may be of any desired construction the one shown in the drawing being somewhat conventionalized. A nozzle B is carried by the lower side of the yoke and extends slightly into the open space bounded by the four sides of the yoke for the discharge of water. The opposite side of the yoke has a threaded opening through which passes a tension screw C, the lower portion of which projects into the open space of the yoke and is provided with

a socket or concavity c , which affords a bearing upon which one of the bent levers of the valve-holding device fulcrums in customary manner. The inner end of the nozzle, B, is fashioned to form a seat for a cap or valve, D, the top side of which is provided with a socket or concavity, d , which affords a bearing upon which the other of the bent levers of the valve-holding device fulcrums. It may here be stated that the details in the construction of these parts form no part of the present invention, and they may be varied at will without departing from the spirit and essence of the invention.

The valve-holding device comprises a pair of bent levers, E, and a composite tie-plate G, each of these parts being constructed and all of them arranged relatively to each other and to the fulcrum of the bent levers in the manner now to be described. Each of the bent levers, E, has a part, e , which is the equivalent of a post and these posts are arranged in approximate alinement between the sockets or bearings, c and d , upon which the bent levers fulcrum, respectively. The remote ends of the posts e preferably terminate in conical portions, e' , the apexes of which are rounded off so as to fit the correspondingly shaped bearings or sockets c and d and permit relative rotation of the parts about the common axis of bearings or sockets and the conical extremities of the remote ends of the posts. The adjacent ends of the posts bear against each other at a point offset from or slightly to one side of the common axis aforesaid, after the manner of a toggle, of which the posts form members. As shown in the drawing, the adjacent ends of the posts or toggle members are provided with rounded grooves or sockets in which a roller F fits. Each of the bent levers E has also an arm e'' , which projects laterally from the side of the post, and these arms are so shaped that their active or working surfaces are parallel or substantially parallel with radii of the fulcrum of the bent levers—in fact said active or working surfaces preferably lie directly in the planes of said radii as shown in Fig. 1. The lever arms converge toward their outer ends, following the directions of said radii and are connected by a composite tie-plate G having active or working faces which bear against the active or working faces of the lever arms e'' , which, as before stated follow converging radii of the fulcrum of the bent levers. The active or working surfaces of the tie-plate are on flanges g and g' which project from opposite sides of the tie-plate perpendicularly to the general plane of the main body thereof, and follow the converging active or working faces of the lever arms. Each of the lever arms has a centrally located, longitudinal slot e^2 , as shown more clearly on Fig. 3 which extends quite from the outer end of the arm

inward, and the main body of the tie-plate passes through these slots so that the flanges g and g' may lie flat against the converging outer surfaces of the lever arms. The composite tie-plate is made up of three overlapping sheet metal parts g^2 , g^2 and g^3 . Each of the parts g^2 consists of a sheet metal (preferably copper) plate of a single thickness which plates carry the flanges g , and these plates g^2 pass through the longitudinal slot of one of the lever arms and at its edge opposite the flange g terminates a short distance from but without contacting with or entering the longitudinal slot of the other lever arm. The intermediate part g^3 is two ply and is made of a sheet metal plate bent upon itself upon a line parallel with the flanges g , the edges of the two plies, opposite the bend, having the oppositely presented flanges g' . The bent or folded edge of the two ply part g^3 may extend any desired distance into or through the slot e^2 in the adjacent lever arm as shown in Fig. 4 or it may terminate upon a line inside of said arm as shown in Fig. 2 and indicated by a dotted line in Fig. 1. In any event the parts g^2 are out of contact with one of the lever arms and the part g^3 is out of contact with the other of said lever arms, so that when the solder joint which normally holds the component parts of the tie plate together fuses there will be no sliding of one part upon the other. The sheet metal plates of which the composite tie-plate is made up may be perfectly flat as shown in Fig. 4, or they may have nested corrugations, G' , as shown in Figs. 1 and 2 and these corrugations may be of any desired shape in cross section. As shown in the drawing they are of rounded cross section, they are related to each other in the form of a V and they are parallel with the working faces of the lever-arms e'' and so far as this feature of the invention is concerned, it is limited to this parallelism of the corrugations and the working faces of the lever-arms, the object being to cause all of the strains upon the corrugations to fall at right angles to them, thus avoiding any twisting or shearing effect.

The invention having been originally designed and being particularly adapted for sprinkler heads, this embodiment of it has been selected for illustrating and describing it for the purposes of this application but it will be understood by those skilled in the art that some of its features are equally applicable to other fire extinguishing apparatus in which two parts are to be held asunder under normal atmospheric conditions, by a holding device which gives way and releases said parts when subjected to a supernormal temperature.

What I claim as new and desire to secure by Letters Patent is:

1. In an automatic fire extinguishing appa-

ratus, the combination with two parts to be
 held asunder, of a holding device, said hold-
 ing device having a pair of bent levers, and
 a tie-plate for holding them in normal po-
 5 sitions, each of said bent levers comprising
 a post or toggle-member and a lever-arm
 projecting laterally therefrom, the adjacent
 ends of the posts or toggle-members bearing
 against each other while their remote ends
 10 are fulcrumed to the aforesaid parts to be
 held asunder, respectively, the lever-arms
 and tie-plate having engaging surfaces ly-
 ing in planes parallel or substantially paral-
 15 lel with the radii of the fulcrum of the bent
 levers.

2. A sprinkler for automatic fire extin-
 guishers, having a yoke, a nozzle, a cap or
 valve adapted to the nozzle, and a valve
 holding device, the said valve holding device
 20 having, in combination, a pair of bent le-
 vers and a tie-plate for holding them in
 normal positions, each of said bent levers
 comprising a post or toggle-member, the ad-
 25 jacent ends of which posts or toggle-mem-
 bers bear against each other while their re-
 mote ends are fulcrumed to the cap or valve
 and the yoke, respectively, and each of said
 bent levers having also a lever-arm project-
 ing laterally from its post or toggle-mem-
 30 ber, said lever-arms and tie-plate having
 active or working surfaces engaging each
 other and lying in planes parallel or sub-
 stantially parallel with the radii of the ful-
 35 cra of the bent levers.

3. In an automatic fire extinguishing ap-
 paratus the combination with two parts to
 be held asunder, of a holding device, said
 holding device having a pair of bent levers
 and a tie-plate, each of said bent levers hav-

ing a post or toggle-member the adjacent
 40 ends of which posts or toggle-members bear
 against each other while their remote ends
 are fulcrumed to the aforesaid parts to be
 held asunder, respectively, each of said bent
 levers having also a lever-arm projecting
 45 laterally from its post or toggle-member and
 slotted longitudinally, said lever-arms hav-
 ing active or working surfaces which are
 parallel or substantially parallel with planes
 of the radii of the fulcrum of the bent levers
 50 and said tie-plate occupying the longitudi-
 nal slots of the lever-arms and having active
 working surfaces which contact directly
 with the active or working surfaces of the
 lever-arms.

4. A sprinkler for automatic fire extin-
 55 guishers having a valve holding device com-
 prising, in combination, a pair of bent le-
 vers, each of said bent levers having a post
 or toggle-member and an arm projecting
 60 laterally therefrom, and a composite tie-
 plate made up of a plurality of overlapping
 sheet metal plates secured together by solder,
 the lever-arms having active or working
 65 surfaces which lie in planes parallel or sub-
 stantially parallel with the planes of the
 radii of the fulcrum of the bent levers and
 said tie-plate having active or working sur-
 faces engaging the active or working sur-
 70 faces of the lever-arms, the plates of which
 said tie-plate is composed being provided
 with nesting or interengaging flutes or cor-
 rugations which are parallel with the work-
 ing surfaces aforesaid.

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