Dec. 12, 1950 A. C. ROWLEY 2,534,066

SPRINKLER HEAD AND MOUNTING THEREFOR

Filed Nov. 30, 1949

FIG. 1.

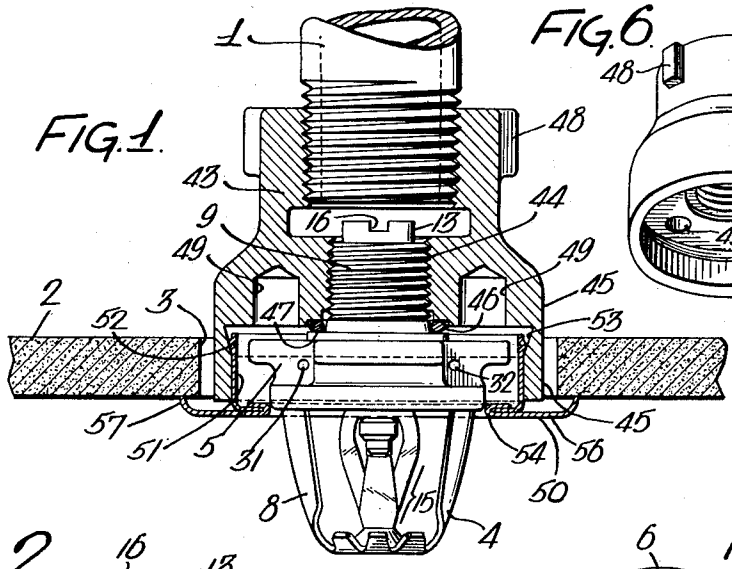



FIG. 6.

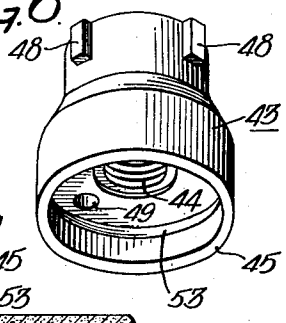



FIG. 2.

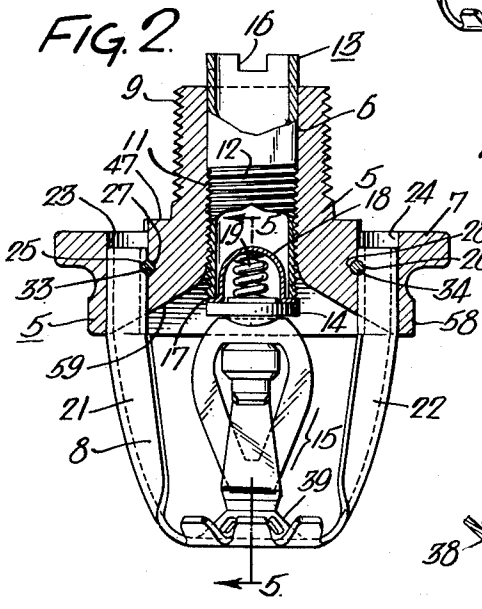



FIG. 5.

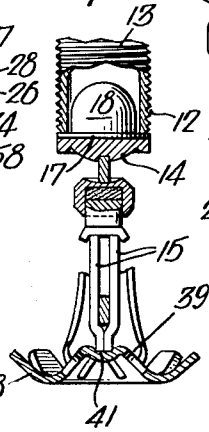



FIG. 3.

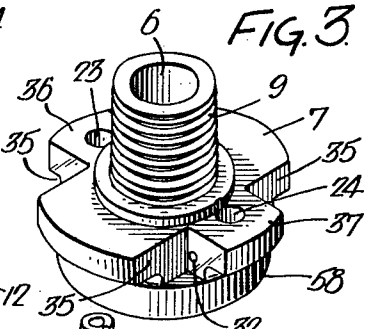



FIG. 4.

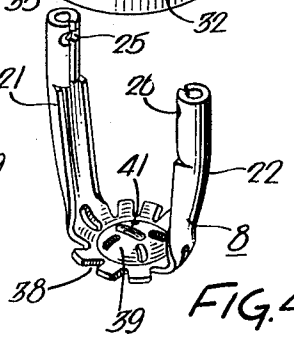
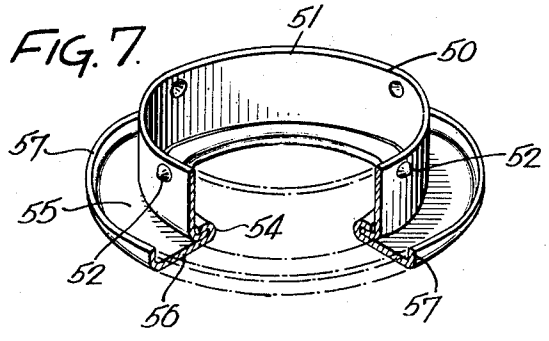



FIG. 7.




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## SPRINKLER HEAD AND MOUNTING THEREFOR

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19 Claims. (Cl. 169—38)

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This invention relates to an improved sprinkler head for automatic sprinkler systems and to an improved mounting for said head.

A principal object of the invention is to provide a sprinkler head assembly, inclusive of the mounting elements, which affords a minimum projection of the head below the ceiling level so as to render the fixture relatively unobtrusive.

To this end the invention contemplates provision of a sprinkler head of relatively small axial dimensions together with a recessed mounting which provides for insetting the head with respect to the ceiling surface.

Another object of the invention is to provide a sprinkler head of the type including an adjustable closure-retaining element and a heat responsive closure-releasing strut element wherein the said elements are assembled in relatively simple and fool-proof manner.

Still another object is to provide a sprinkler head wherein the adjustable closure-retaining element constitutes also the seat for the sprinkler head closure element.

A further object is to provide a sprinkler head of the character set forth in the preceding paragraph, wherein, after final adjustment of the closure-retaining element into the operative position, the means for adjusting the element, which constitutes an original part of the latter, is removed so as to preclude subsequent unauthorized readjustments.

A still further object of the invention is to provide a sprinkler head assembly which is relatively tamper-proof in that the closure-retaining and heat-responsive elements are positively locked in place and further in that the retaining element occupies an inaccessible position when the sprinkler head is mounted in the sprinkler system.

The invention resides further in certain structural details hereinafter described and illustrated in the attached drawings, wherein:

Fig. 1 is a vertical elevational and partial sectional view of a sprinkler head construction and mounted in accordance with the invention;

Fig. 2 is a vertical sectional view of the sprinkler head;

Fig. 3 is a view in perspective of one of the elements of the sprinkler head;

Fig. 4 is a view in perspecive of another of the functional elements of the head;

Fig. 5 is a sectional view on the line 5—5, Fig. 2;

Fig. 6 is a view in perspective of one of the mounting elements, and;

Fig. 7 is a view in perspective of another element of the assembly, a portion of which is cut away to more clearly illustrate the structural form of this element.

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With reference to the drawings, the numeral 1 indicates the terminal end of a branch pipe of a sprinkler system. 2 is a portion of a ceiling structure which, as illustrated, lies below the end of the pipe 1 and which is provided with an opening 3 within which a sprinkler head, operatively connected to the pipe 1 and designated generally by the reference numeral 4, is established. The sprinkler head, as best shown in Figs. 2 to 4 inclusive, comprises the usual body member 5 of tubular form, said member having a central bore 6 and a radial flange 7 in which is secured a U-shaped yoke 8, said body member and yoke constituting the frame of the said head. The upper cylindrical end 9 of the frame is threaded externally for a purpose hereinafter set forth. The bore 7 is threaded internally at the lower end thereof, as indicated at 11, for reception of the lower threaded end 12 of a sleeve 13 which fits within the bore as shown. As hereinafter set forth, the sleeve 13 forms the discharge end or nozzle through which, under certain conditions, water is discharged from the system. Normally the lower end of this sleeve or nozzle 13 is closed by a disc 14 which is held to its seat against the end of the sleeve by a heat-responsive strut assembly 15, this strut being confined under compression between the closure disc 14 and the lower end of the yoke 8. The strut assembly 15 is placed under compression between the yoke and the closure disc by turning the sleeve 13 downwardly in the bore 6, by means, for example, of a suitable wrench applied to a wrench receiving recess 16 in the upper end of the sleeve. It will be noted that a gasket 17 of copper or other suitable material is inserted between the closure disc 14 and the end of the sleeve 13 and that this gasket in the present instance is constituted by an out-turned flange at the lower end of an inverted cup-shaped element 18. This element forms a housing for a spring 19 which is held under compression between the top of the cup and the inner surface of the disc 14. Upon release of the strut assembly 15, the spring will function to force the closure element 14 away from the lower end of the nozzle sleeve 13 with explosive action to aid in clearing the elements from the mouth of the nozzle.

The yoke 8 is formed, as shown in Fig. 4, of sheet metal, the arms 21 and 22 of the yoke having cylindrical upper end portions which are adapted to fit in cylindrical openings 23 and 24 in the flange 7 of the body member 5. As illustrated, each of the cylindrical terminal portions

is provided at its inner side with a transverse recess, 25 and 26 respectively, which in assembly, registers with a corresponding semi-cylindrical recess, 27 and 28 respectively, in the wall of the associated socket 23 or 24 as the case may be. The recesses 27 and 28 are formed by holes 31 and 32 drilled in the flange 7, these holes providing for insertion of pins 33 and 34 which anchor the yoke 8 in the member 5 in an obvious manner and as clearly illustrated in Fig. 2. As shown in Fig. 3, the flange 7 is recessed at 35, to form wrench receiving sockets and these recesses define the sides of arms 36 and 37 at opposite sides respectively of the flange in which the sockets 23 and 24 are formed and through which the holes 31 and 32 pass from one side to the other.

The yoke 8 at its lower end is formed with a spreader 38 of conventional design, the central portion of this spreader being more or less conical in shape, as indicated at 39 in Fig. 2, and having at its top a recess 41 which forms a seating socket for the lower end of the strut assembly 15 as shown in Fig. 5. It will be apparent that in assembly the spreader 38 is in alignment with the discharge nozzle or sleeve 13 so that water discharged through that member will be directed against the upper surface of the spreader and will be distributed more or less uniformly over the area surrounding the sprinkler head.

Threaded onto the lower end of the pipe 1 is a bell-shaped fitting 43, this fitting being provided with a reduced threaded bore 44 which, in assembly, receives the threaded upper end of the frame 5 of the sprinkler head, as best shown in Fig. 1. The sides of the bell 43 extend downwardly around and below the lower end of the bore 44 and into the opening 3 in the ceiling structure 2 and through said opening in the present instances to a point slightly below the ceiling level. This depending apron 45 thus embraces the upper portion of the sprinkler head. A gasket 46 inserted between a shoulder 47 on the frame 5 at the base of the threaded stem 9 and a confronting surface of the fitting 43 at the lower end of the bore 44 seals the joint between the sprinkler head and the said fitting. The fitting may be threaded onto the pipe 1 by a suitable wrench applied either to projecting lugs 48 at the upper end of the fitting or in sockets 49 in the underside which extend upwardly into the wall of the bore 44. As previously set forth, the sprinkler head may be threaded into place in the fitting 43 by a suitable wrench applied to the recesses 35 of the flange portion 7 of the frame 5.

When installed as described above, a substantial portion of the sprinkler head, in excess in the present instance of 50% of its axial length, will occupy the inset recess in the ceiling formed within the bell-shaped fitting 43, and the yoke 8 being of relatively small axial dimensions will project to a minimum extent below the ceiling level.

The space between the sides of the fitting 43 and the sides of the ceiling opening 3 are effectively closed by means of an annular fitting 50 of the character shown in Fig. 7. This fitting comprises an upwardly extending cylindrical flange 51 having pressed-out bosses 52 near the upper edge thereof. This flange 51 fits neatly within the lower end of the bell 45 of the fitting 43, and the bosses 52 enter a beveled recess 53 in the inner wall of the flange to thereby frictionally retain the fitting 50 in place. The fitting also comprises an internal flange 54 at the lower end



of the cylinder 51 and an outwardly extending flange 55 which jointly form the bottom transverse surface 56 of the fitting. The outer edge of the flange 55 is turned up as indicated at 57 for engagement with the under surface of the ceiling structure 2 as shown in Fig. 1. The inner periphery of the internal flange 54 lies in close proximity to the wall 58 of the frame 5 of the sprinkler head and thereby effectively conceals the upper portion of the frame which occupies the interior of the bell 45. As shown in Fig. 2, the under surface of the frame 5 of the sprinkler head is recessed as indicated at 59 so that the upper portion of the strut 15, the closure disc 14 and the lower end of the nozzle sleeve 13 are inset well above the lower surface of the ceiling structure in a non-obtrusive position.

It is to be noted particularly that in the aforedescribed assembly the closure and closure-retaining elements are brought into operative relation by adjustment of the nozzle element 13, and that this element 13 includes as a part thereof the seat which receives the closure disc 14 and against which the disc is normally forcibly retained by reaction of the strut assembly 15 with the fixed structure of the frame. By this device the sprinkler head is rendered substantially tamper proof, insofar as any readjustment of the adjustable closure-retaining element is concerned, since the sleeve 13 is entirely inaccessible for effective adjustment when the frame has been connected in the sprinkler system.

In order to preclude readjustment under any conditions of the sleeve 13 after adjustment thereof to a final setting in the assembly operation, the sleeve may be and preferably is tinned so that after adjustment to operative position head may be applied to sweat the solder and to thereby secure the sleeve in place. As a still further precaution, the sleeve may be made sufficiently long to afford a substantial projection thereof beyond the upper end of the frame, as shown in Fig. 2, after the sleeve has been adjusted to the operative position. After such adjustment the projecting end of the sleeve, which contains the tool socket 16, may be removed by suitable means, so that, preferably, the outer end of the remaining portion of the sleeve will lie flush with the end surface of the frame. Under these circumstances, the sleeve is highly inaccessible for adjustment before as well as after attachment of the sprinkler head in the system.

It will be apparent that the assembly is subject to change in detail without departure from the principles of the invention as defined in the appended claims.

I claim:

1. In a sprinkler head assembly, the combination with a self-contained sprinkler head unit comprising a frame having an externally threaded tubular stem at the upper end thereof, of a hollow bell-shaped fitting having at its upper end means for attaching the fitting in depending position in the sprinkler system, and having in the interior thereof and remote from the normally open lower end of the fitting a threaded bore for reception of the threaded stem of said frame, the upper portion of the sprinkler head being thereby embraced within the confines of said fitting.

2. A sprinkler head assembly according to claim 1 wherein the means for attaching the fitting in the sprinkler system consists of a threaded bore for reception of a correspondingly threaded pipe end.

3. A sprinkler head assembly according to claim 2 wherein the threaded bores of the said fitting are in axial alignment.

4. A sprinkler head assembly according to claim 1 wherein the said frame includes a transverse flange at the lower end of said stem, a yoke depending from said flange, and a spreader element supported by the yoke in alignment with the bore of said stem, and wherein further the said stem and flange are substantially entirely embraced within the confines of the fitting.

5. A sprinkler head assembly according to claim 4 wherein the under side of the flange of the frame is recessed so that the lower end of the bore of said stem is inset upwardly from the lower edge of the flange.

6. A sprinkler head assembly according to claim 5 wherein a closure disc is provided for the lower end of the stem bore together with a heat-responsive strut the opposite ends of which are seated in pressure engagement with the confronting faces of the closure disc and of the lower end of the said yoke respectively.

7. A sprinkler head assembly according to claim 6 wherein an annular element is detachably mounted at the lower end of the fitting to close the space between the peripheral surface of the frame flange and the adjoining wall of the fitting.

8. A sprinkler head assembly according to claim 6 wherein the annular element comprises an outward radial flange extending beyond the outer periphery of the lower end of the fitting.

9. A sprinkler head assembly according to claim 1 wherein the upper end of the fitting is provided with an internally threaded bore for reception of a correspondingly threaded pipe end as the means for attaching the fitting in the sprinkler system, and wherein further the fitting is provided with wrench sockets accessible through the lower open end of the fitting for effecting said attachment.

10. A sprinkler head assembly according to claim 1 wherein the said frame is provided with wrench sockets accessible through the lower end of the fitting.

11. In a sprinkler head, a frame comprising a tubular externally- and internally-threaded stem, a sleeve threaded into the stem and defining a discharge passage, a closure element for the inner end of said sleeve, said frame including a strut-supporting yoke extending beyond the said inner end of the sleeve, and a heat-responsive strut confined under pressure between the yoke and the closure element and retaining the closure element on its seat at the end of the sleeve, said threaded sleeve being adjustable axially in the stem so as to place the strut under pressure between the confining elements.

12. A sprinkler head according to claim 11 including a cup-shaped gasket confined in the inner end of the sleeve between the sleeve and the closure element, and spring confined under compression within the cup and between the cup and the closure element.



13. A sprinkler head for automatic sprinkler systems, said head comprising a frame having a tubular body portion and means for attaching one end of the said body portion in the system, a nozzle element mounted in the tubular body portion for connection with said system and means for adjusting the nozzle axially of said tubular portion, a closure element seated at the end of and normally sealing the nozzle, and a heat-responsive release element confined under pressure between the closure element and a fixed part of the frame.

14. A sprinkler head according to claim 13 wherein the said nozzle element consists of a sleeve threaded into one end of the tubular portion of the frame and having a tool-receiving socket to provide for turning the sleeve forcibly against the said heat-responsive element.

15. A sprinkler head according to claim 14 wherein the sleeve is of such length that the socketed end thereof projects beyond the tubular portion of the frame when the sleeve is in closure-retaining position, thereby providing for removal of the socketed end portion.

16. A sprinkler head according to claim 15 wherein the sleeve is secured by solder in operative position in the frame.

17. A sprinkler head according to claim 13 wherein the tubular portion of the frame is externally threaded for connection in the said system, and wherein further the said nozzle element consists of a sleeve threaded into the interior of said tubular portion.

18. A sprinkler head according to claim 17 wherein the nozzle element is substantially confined within the said tubular portion so as to be effectively inaccessible for tampering when the said head is connected in the system.

19. A sprinkler head according to claim 18 wherein the nozzle element is secured in place within the stem by solder.

ARTHUR C. ROWLEY.


## REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

| Number | Name | Date |
|---|---|---|
| 2,076,483 | Rowley | Apr. 6, 1937 |
| 2,165,477 | Griffith | July 11, 1939 |
| 2,389,331 | Tyden | Nov. 20, 1945 |
| 2,389,332 | Tyden | Nov. 20, 1945 |
| 2,389,333 | Tyden | Nov. 20, 1945 |
| 2,389,334 | Tyden | Nov. 20, 1945 |