ABSTRACT OF THE DISCLOSURE

A fire protection sprinkler system in which a plurality of fire extinguisher sprinkler heads are connected via fittings to a water distribution supply header. Each fitting includes an adjustable nipple which is slidable received within the body thereof for enabling an attached sprinkler head to be flush mounted to the later installed room ceiling. A rotational lock of the fitting nipple to the body prevents easing of the pressure seals from rotational tightening or loosening of the sprinkler head in its thread mount.

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a continuation-in-part of application Ser. No. 601,264 filed Nov. 10, 1966, entitled Sprinkler Head Fitting now abandoned.

BACKGROUND OF THE INVENTION

The field of art to which the invention pertains includes the art of Fire Extinguishers, Patent Office class 169 and in particular to fittings for the mounting of sprinkler heads in subclass 37.

In the usual prior art wet type sprinkler system for protection of a building from fire, sprinkler heads are installed at ceiling level and are connected by short vertical drop pipes to horizontally extending distribution pipes running between the ceiling and the next higher floor or the roof. Such a system is exemplified by Patent 2,291,818. During the erection of a building, the sprinkler system is customarily installed and tested before the ceiling is hung. When the ceiling is subsequently installed, it is sometimes found that the sprinkler heads are not at the correct height to be at the ultimate ceiling level. It is then necessary to disconnect the sprinkler heads and cut off drop pipes if too long or replace them by longer pipe lengths if they are too short. One such system permitting final adjustment of the head height is disclosed in Patent 3,194,316.

After the ceiling is in place, it should be appreciated that the fittings and joints of the system become increasingly inaccessible and obscured from view so that leak detection and servicing becomes increasingly difficult. Moreover, final or even subsequent placement or replacement of the sprinkler head, for whatever reason, frequently imposes a strain on the system joints and seals to produce leakage which because they are concealed by the ceiling go unnoticed until serious ceiling damage has occurred. Accordingly, it is desirable that the head fittings enable the system to withstand these adjustments in a manner to avoid the consequence of incurred leakage.

SUMMARY

The present invention relates to wet type fire protection systems and fittings therefor. More specifically, the invention relates to piping installations for building fire protection permitting final head height adjustment after ceiling placement and subsequent head servicing without imposing leakage causing strain on the system as is associated with prior art devices. Moreover, since a building requires a large number of sprinkler heads, it is necessary for such system fittings to be simple and inexpensive in order to be practicable for wide-spread use. Yet further, since the protection of the building from fire depends on the effectiveness and dependability of the sprinkler system, any fittings used in the system must be rugged and wholly reliable.

It is therefore an object of the present invention to provide a novel sprinkler system which permits quick and easy adjustment of the head heights after they have been installed.

It is a further object of the invention to provide novel head fittings for the sprinkler systems of the aforesaid object which resist consequent system leakage as a result of head servicing after the ceiling has been placed.

These and other objects of the invention are achieved in the system of the invention by means of a fitting which is axially adjustable to accommodate precise final placement at the ceiling. At the same time, the fitting provides a positive interlock against relative rotation of the parts whereby rotational strain subsequently imposed in prevented from incurring consequent loosening of the joints or seals thereat.

BRIEF DESCRIPTION OF THE DRAWINGS

FIGURE 1 is a sectional elevation through a sprinkler system illustrating a sprinkler head installed with a fitting in accordance herewith.

FIGURE 2 is a side elevation of the fitting with portions broken away and shown in axial section.

FIGURE 3 is a cross-section taken approximately on the line 3—3 in FIGURE 2, and

FIGURE 4 is a fragmentary view corresponding to a portion of FIGURE 2 but showing a modification.

In FIGURE 1, the system of the invention includes a plurality of sprinkler heads 1 each having a fusible or heat sensitive release element 2 shown mounted by a fitting 3 on a drop pipe 4 connected by an elbow 5, pipe section 6, elbow 7 and pipe section 8 to a water main supply line 9. The sprinkler heads are located just below the ceiling of the building indicated as panel 10 having a hole or cut-out 11 to accommodate the connection of the sprinkler head to the supply system. The hole 11 is covered by an escutcheon plate 12.

In FIGURES 2 and 3, the fitting 3 is shown as comprising a tubular body portion 15, a sleeve or nipple 16 which is longitudinally movable but non-rotatably retained in the body, a gasket 17 for effecting a fluid-tight seal and for holding the nipple in selected position relative to the body, and a follower 18 for applying pressure to the gasket.

The body portion 15 is of generally tubular configuration and may conveniently be made as a molding or casting. At its upper end, the wall of the body is thickened as indicated at 21 and is internally threaded as indicated at 22 to receive the threaded end of the drop pipe 4. The threads 22 and the interengaging threads of the drop pipe 4 are preferably tapered so as to provide a tightly wedged connection when the fitting is screwed onto the drop pipe. Near its lower end, the body portion 15 of the fitting 3 is provided with an annular restriction 23 which is spaced a short distance from the end of the body so as to provide a recess 24 to receive the annular gasket 17. It will be seen that the gasket recess is defined in part by a substantially cylindrical wall and in part by a tapered inner end wall inclined, for example, at an angle of about 45° to the longitudinal axis of the fitting.

Inside the body portion 15 of the fitting 3 there is provided a longitudinally extending track 26 for guiding the nipple 16 and preventing its rotation relative to the body 15. As illustrated in FIGURES 2 and 3, the track for guid-
ing the nipple is provided by diametrically opposite channels 26 in thickened side wall portions 27 of the body. At their upper ends, the channels 26 are closed by the thickened wall portion 21 as indicated at 28, while at their lower ends the channels 26 are closed by the annular re-

striction 23 as indicated at 29. While two channels 26 have been shown, it will be understood that there may be one or more as desired.

The nipple 16 is essentially tubular and is conveniently formed of tubing or pipe stock. The length of the nipple 16 is approximately equal to that of the body portion 15, and its diameter is approximately equal to the inside diam-

er of the restriction 23 of the body with just enough clearance to provide a sliding fit between the nipple and the body. At its outer or lower end, the nipple 16 is pro-

vided with threads 31 for receiving a threaded connecting portion of the sprinkler head 1. The threads 31 are shown as being internal and are preferably tapered to mate with tapered external threads on the sprinkler head.

At its inner end, the nipple 16 is provided with lateral projections or ears 32 which extend radially and closely fit into the longitudinal channels 26 provided on the inside of the body 15. The ears 32 are formed after insertion of the nipple into the body through the restric-

tion 23. This is conveniently done by providing the inner end of the nipple with circumferentially spaced cuts 33 to define the ear portions which are bent out laterally by a suitable tool inserted through the upper end of the body. The ears 32 of the nipple cooperate with the upper longitudinal channels 26 on the inside of the body to guide the nipple and to hold it against rotation relative to the body. This facilitates screwing the sprinkler head onto the nipple 16 after the fitting has been installed on the drop pipe 4 and prevents loosening of the follower nut 18 in the event the sprinkler head is later turned in a counter-clock-

wise direction to unscrew it from the nipple.

Moreover, the ears 32 are engageable with the lower ends 29 of the channels 26 so as to prevent separation of the nipple 16 from the body 15. This provides a unitary fit, the parts of which cannot become separated or lost during shipping, storing and handling. Moreover, when the sprinkler system has been installed and thereby avoids any material pressure loss in the system. The ears 32 of the nipple are also engageable with the inner ends 28 of the channels 26 to limit inward movement of the nipple so as to assure that the lower end of the nipple always projects beyond the follower 18 and is hence accessible for con-

nection of the sprinkler head.

The annular gasket 17 is of approximately trapezoidal cross-section with an inner tapered end conforming ap-

proximately to the tapered inner wall of the gasket recess. The gasket is formed of suitable elastomer material such as natural or synthetic rubber compound having a durom-

er of the order of 65 to 80. The gasket 17 extends axially outwardly beyond the threaded end portion of the body 15 and the projecting outer end portion of the gasket is capped by a metal retainer cup 35 having a radial flange portion engaging the outer end face of the gasket, and an approximately cylindrical skirt portion embracing the gasket peripherally.

The follower 18 has an end portion 36 which engages the flanged portion of the retainer cup 35 and a skirt portion 37 which is internally threaded to screw onto the threaded end portion 25 of the body 15. The mating thread of the follower 18 and body are preferably cylin-


drical as distinct from tapers. The follower 18 is finished by providing a gasket in an axial direction causes it to increase in radial thickness so as to press tightly against the nipple and the surrounding portions of the gasket recess of the body. This provides a fluid-tight seal between the body and nipple and also grips the nipple tightly so as to hold it in selected position longitudinally of the body 15. The retainer 35 confines the outer end portion of the gasket 17 to prevent it from expanding into the space beyond the outer end of the body portion.

When installing the system in accordance with the pres-

ent invention, the piping of the sprinkler system including main supply lines, such as line 9, branch pipes such as 6 and 8, and drop pipes is then removed from the gasket recess. Fittings 3 are screwed onto the lower ends of drop pipes 4 and suitable pipe plugs (not shown) are screwed into the threaded lower ends 31 of the nipples 16.

The sprinkler system is then tested for fluid tightness. The ceiling contractor will then install the ceiling and, as he approaches the location of a sprinkler fitting, he or the sprinkler contractor will loosen the follower nut 18 and adjust the nipple 16 vertically so that its lower end is flush with the ceiling level. The follower nut 18 is then tightened to hold the nipple in the desired position. A hole is cut in the ceiling panel to clear the follower nut and the panel is then installed. That being done, the drops 4, the gasket 17 and the escutcheon plate 12 and sprinkler head 1 are installed. During this operation the engagement of the ears 32 of the nipple with the channels 26 provided inside the body holds the nipple against rotation in the body. The fitting is preferably of such length as to permit a vertical adjustment of the nipple of about four inches. This has been found adequate to compensate for variation in ceil-

ing height.

If a fitting requires adjustment after installation of the ceiling, a suitable wrench is inserted through the hole 11 in the ceiling panel to loosen the follower 18 sufficiently to permit vertical movement of the nipple 16 relative to the body 15. It has been found that with threaded ears 32 of the nipple 16 with the drop pipe 4 and with inter-

generating cylindrical threads on the lower end of the body and on the follower nut 18, the follower can be loosened without unscrewing the fitting from the drop pipe.

In FIGURE 4 there is shown a different arrangement of the gasket and follower. An end portion 40 of the body 15 beyond the restriction 23 is of larger internal diameter than the restriction to provide an annular gasket recess 42 having internal threads 41 extending part-way from the lower end of the body 15. The rod 32 of the nipple is so engaged that the


gasket 17 is compressed into the gasket recess and is provided at its outer end with a re-

tainer cup 43. An annular col 44 may, if desired, be imbedded in the gasket at its inner end. An externally threaded follower 45 is screwed into the internally threaded end portion of the body and is provided with an outwardly extending wrench engaging portion 46. It will be seen that when the follower is screwed into the body it applies pressure to the gasket 42, so as to grip the nipple 16 and provide a fluid-tight seal between the nipple and body. The construction shown in FIGURE 4 is advantageous in that with a gasket having an axial length materially greater than its radial thickness—for example approximately four times as great—and with the construc-


tion shown, it is possible to achieve a high gasket pressure assuring permanent fluid tightness and also holding the nipple very securely against lengthwise displacement.

While preferred embodiments of the invention have been illustrated in the drawings and particularly described, it will be understood that the invention is in no way limited to these embodiments and that modifications may be made within the ambit of the annexed claims.

The embodiment of the invention in which an exclu-

sive property or privilege is claimed is defined as follows:

1. A fitting for a building fire protection system to con-

nect a sprinkler head at the underside of a room ceiling
3,451,483

to a water supply pipe in which water is to be maintained under continuous pressure above the room ceiling, said fitting comprising:
(a) a tubular body having means at a first end for connection of said body to the water supply pipe and having a longitudinally extending track, molded or cast integral with said body;
(b) means defining an annular gasket recess at the opposite second end of said tubular body;
(c) an annular gasket is said recess;
(d) a tubular nipple having an inner end slidably received onto the second end of said body and an outer end portion projecting beyond said second end of said body, said nipple having fitting means at its outer end for attachment of a sprinkler head and being movable longitudinally of said body to position an attached sprinkler head at a selected position relative to the underside of a room ceiling;
(e) an annular follower for applying pressure to said gasket, said follower being actuable to compress said gasket to secure said nipple in selected position and provide a fluid-tight seal between said body and nipple; and
(f) a projection tab means on said nipple at its inner end slidably cooperating with said track to interlock said nipple against rotation relative to said body and to limit longitudinal movement of said nipple to prevent its separation from said body.

2. A fitting according to claim 1 in which said track and inner end of said tubular body are interior of said body.

3. A fitting according to claim 2, in which said longitudinally extending track comprises diametrically opposite channels in said tubular body and said projection tab means comprises laterally projecting portions on the inner end of said nipple slidably engaging in said channels to hold said nipple from rotation relative to said body, said channels having closed ends engageable by said laterally projecting portions to prevent separation of said nipple from said body.

4. A fitting according to claim 2, in which said means for connecting said tubular body to said supply pipe comprises tapered threads adapted to engage tapered threads on said supply pipe to provide a tight wedged connection and in which said second end of said body and said follower have interengaging cylindrical threads for moving said follower axially relative to said body to apply pressure to said gasket by rotation of said follower in a selected direction, whereby said follower is rotatable in the opposite direction to relieve pressure on said gasket without unscrewing said body from said supply pipe.

5. A fitting according to claim 2, in which said means defining said gasket recess comprises an annular restriction in said body near its said opposite end, said restriction cooperating with said projection tab means at the inner end of said nipple to prevent separation of said nipple from said body with said restriction fitting said nipple relatively close to restrict flow of fluid between said nipple and restriction in event of removal or loosening of said gasket and follower.

6. A fitting according to claim 2, in which said projection tab means for limiting longitudinal movement of said nipple also limits inward movement of said nipple relative to the gasket to assure that the outer end of said nipple always projects beyond said follower.

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