

Description

BACKGROUND OF THE INVENTION

FIELD OF THE INVENTION

This invention relates to a sprinkler head, and more particularly to what is called a frame type sprinkler head for spraying water to extinguish a fire when a fire and the like break out, according to the preamble of claim 1.

DESCRIPTION OF THE PRIOR ART

Fig. 6 shows an example of such a sprinkler head which uses what is called a glass valve as a heat sensitive part, similar to the disclosure of US-A-2.085.987.

In this conventional sprinkler head, the top of a glass valve 21 is made to fit into an exit 5 of a sprinkler head body 1 and the bottom of the glass valve 21 is pressed and fixed in the sprinkler head body 1 by screwing an impress screw 24 through a valve seat 25.

When a fire and the like break out, a liquid 23 expands with heat and the glass valve 21 is broken. Hence, the exit 5 is released and water is sprayed from the exit 5.

However, in the above conventional sprinkler head, since the glass valve 21 is made to fit directly into the exit of the sprinkler head body 1 as a plug 4 and the sprinkler head is maintained to be blocked by pressuring the glass valve 21 by tightening the impress screw 24, it needs to secure the constant strength by giving the heat sensitive part 21 to the thickness of itself in a degree. However, if the sprinkler head 21 is formed in such a way, since the heat sensitivity of the heat sensitive part 21 is reduced remarkably, the operation time is delayed and water cannot be sprayed properly when a fire and the like break out.

GB-A-2.155.328 discloses a fire protection sprinkler head including a latch for retaining a valve closure in stand-by position until a thermally responsive element releases the latch at a preset temperature to thereby release the closure to allow flow of fire-retarding fluid. The latch includes a catch in the form of a lip extending radially inwardly from the sprinkler body, a radially inwardly biased spring detent and relatively separable detent restraining elements. However, there is no sensitive part to be broken by extension of liquid.

The object to be solved by the present invention resides in the improvement of the heat-sensitivity of the heat-sensitive part so that the operation time of the sprinkler head is reduced. This object is obtained with a sprinkler head according to the preamble of claim 1 by the characterizing

features thereof. Further advantageous embodiments are defined in the subclaims.

In the above described sprinkler head, when the screw 22 is screwed, the retainer 11 is pressured and extended by the flange 13 through the heat sensitive part 21 and the lower clamp 12. Consequently, the retainer 11 is linked and held between the inboard concave 16 and flanges 12b and 13b mounted on the frame 3 of the sprinkler head 1. Then the exit 5 of the sprinkler head body 1 is blocked by the plug 4.

However, when the screw 22 is screwed, the lower clamp 13 is pressured upwardly through the heat sensitive part 21 as described above. Since the elastic retainer 11 is mounted between flanges 12b and 13b of clamps 12 and 13, the tightening power of the screw 22 is absorbed and reduced by the extension of the retainer 11. As a result, the direct tightening power of the screw 22 is not added to the heat sensitive part 21. Hence, the thickness of the heat sensitive part 21 can be reduced and the sensitivity of the heat sensitive part can be improved.

Also, when a fire breaks out, the liquid 23 in the heat sensitive part 21 is expanded by heat and the heat sensitive part 21 is broken. Since the lower clamp 13 is lowered and the retainer 11 is shrunk inboard, the connection condition the upper clamp 12 with the inboard concave 16 of the frame 3 is released. Then since the upper clamp 12 is lowered and the plug 4 is released and removed from the exit 5 of the sprinkler head body 1, water can be sprayed from the exit 5.

BRIEF DESCRIPTION OF THE DRAWINGS

The manner in which the foregoing and other objects of this invention are accomplished will become apparent from the accompanying specification and the drawings, wherein:

Fig. 1 is a sectional view of a sprinkler head according to an example of this invention;

Fig. 2 is an enlarged detail view showing a spring which is under tension;

Fig. 3 is an enlarged detailed sectional view showing a retainer which is connected and maintained between an inboard concave and both clamps;

Fig. 4 is a sectional view showing an example of construction of the sprinkler head.

Fig. 5 is a sectional view showing water being sprayed.

Fig. 6 is a partially sectional front view showing an example of the conventional sprinkler head.

In the drawings, like references numerals represent like or corresponding parts.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENT

A preferred embodiment of this invention is described below with reference to the accompanying Figures.

In Fig. 1, a sprinkler head body 1 forms a water pass 2. A rough cylindrical frame is screwed in a lower peripheral edge of the body 1 with screws. A plug 4 seals an exit 5 which is formed at a lower section of the sprinkler head 1. The plug 4 has a hollow shape and a flange 6 at a peripheral edge of a lower section thereof. A spring 7 is made of plate screws coated with fluoroplastic and is mounted between a lower section 1a and an upper surface of the flange 6 of the plug 4 under a tension condition by having a certain pressure applied to it. As seen in Fig. 2, an internal circumference face of the spring 7 is fitted into a hollow groove 4a which is formed on an external circumference face of the plug 4. More than one curved deflector 8 is connected to the external circumference edge of the plug 4. A frictional freely guide 10 is connected to a guide ring 9 which is mounted on the sprinkler head body 1 downwardly. The deflectors 8 function as a guide when the plug 4 falls.

A retainer 11 is partially shaped like a cut ring, and its diameter can be deformed elastically. A couple of clamps 12 and 13 are used to mount and hold the retainer 11. A hole 12a is punched in the approximate center of the top surface of the upper clamp 12, and a projection 13a having a hole 13b is formed at the approximate center of the lower clamp 13. The retainer 11 is elastically fitted into the plug 4 through the hole 12a of the upper clamps 12. Tapers 14 and 15 are formed around the external peripheral edges of the flanges 12b and 13b of clamps 12 and 13, respectively. Each space between the tapers 14 and 15 narrows inboard in order that the retainer 11 can be held under a tension condition, as shown in Fig. 3. An inboard concave 16 is formed on the internal peripheral edge of the frame 3. A wall 17, which can be fitted and connected to the retainer 11 supported by clamps 12 and 13, is formed as seen in Fig. 3. Retained convexes 26a and 26b are vertically mounted on the wall side 17. The inside diameter of the inboard concave 16 is larger than the respective outside diameters of the clamps 12 and 13.

A connector railing 18 is elastically fitted into the holes 12c and 13c which are punched in the flanges 12b and 13b of the clamps 12 and 13. A hold plate 19, which has a female screw 20, is screwed at the approximate center of the top of the railing 18. A heat sensitive part 21 is called a glass valve. The top of the heat sensitive part 21 is fitted

into the lower clamp 13, and the bottom of the heat sensitive part 21 is pressured and held by a rock screw 22 screwed in the female screw 20 of the hold plate 19. Alcohol 23 is sealed in the glass body.

The application of this invention will now be described.

First, according to the following steps, the sprinkler head can be assembled easily. Clamps 12 and 13 are made to move up, and the retainer 11 is held between the taper faces 14 and 15 of the respective clamps 12 and 13. Then the heat sensitive part 21 is inserted into the hole in the bottom of the hold plate 19, and the top of the heat sensitive part 21 is fitted and inserted into clamps 12 and 13. The rock screw 22 is screwed into the female screw 20 of the hold plate 20.

The lower clamp 13 is pressured upwardly by means of the heat sensitive part 21, while the rock screw being tightened. However, since the elastic and transformable retainer 11 is mounted between the tapers 14 and 15, the tighten power of the rock screw 22 is not added to the heat sensitive part 21 directly and the power is absorbed and reduced by the extension movement of the retainer 11 along the tapers 14 and 15 and the retainer 11 itself. Accordingly, since the strength of the glass, which is formed of the heat sensitive part 21, needs not to be defined, and the thickness of the heat sensitive part can be reduced, the sensitivity of the heat sensitive part 21 to temperature can be improved.

On the other hand, the spring 7 is pressured at the flange 6 of the plug 4 upwardly by being screwed by the rock screw 22 and is held between the exit 5 and flange 6 of the sprinkler head 1 under a tension condition at a certain pressure. When the rock screw 22 is tightened into the female screw 19 so that approximately 60% pressure of the restitutive power of the spring 7 is applied, even if this condition is maintained for a long time, the elasticity of the spring 7 will not be reduced.

Next, when a fire and the like break out, the expansion of alcohol 23 breaks the glass of the heat sensitive part 21 and lowers the lower clamp 13. Then the retainer 11 is shrunk, and the connection condition with the wall 17 of the inboard concave 16 of the frame 3 is released. In consequence, clamps 12 and 13, and the hold plate 19 and the like fall to the lower part of the sprinkler head body 1. The plug 4 is released and lowered from the exit 5 by the elasticity of the spring 7, and the exit 5 is opened.

Since the plug 4 is equipped with the guide ring 9 having the guide 10 through the deflector 8, the guide 10 is guided by it rubbing against the external circumference face of the sprinkler head 1.

Accordingly, the plug 4 descends smoothly without vibration and the guide ring 9 is retained in the inboard concave 16. Thus the plug 4 stops descending.

Further, after water flowing from the exit 5 bumps against the top of the plug 4, water is dispersed in every direction and is sprayed so as to radiate as shown in Fig. 5.

It is to be noted that the concrete thickness of the glass, which is formed of the heat sensitive part, is not limited, and this thickness can be changed depending on the elasticity and the like of the retainer 11 as occasion demands.

The shape of elastic retainer 11 is not limited to that a part cut ring, and it can also have a complete ring shape.

Furthermore, in the above example of the embodiment of this invention, the spring comprises the plate screw coated with fluoroplastic, but the concrete composition is not limited to the same.

As described above, since the elastic retainer is mounted between clamps, the tightening power of a screw is absorbed and reduced by the extension of the retainer.

Accordingly, the tightening power of the screw is not added to the heat sensitive part. In the conventional sprinkler head, the heat sensitive part is directly pressured by the screw and the heat sensitive part is fitted into the exit of the sprinkler head as a plug.

As the result the thickness of the glass, which the heat sensitive part is formed of, can be reduced and the heat sensitivity of the heat sensitive part can be improved.

Claims

1. A sprinkler head comprising:
 - a body (1, 3) having an exit (5) formed therein, and
 - a heat-sensitive part (21), which is breakable by heat extension of a liquid (23) sealed inside, said heat-sensitive part (21) being mounted by means of a screw (22) pressed to block said exit (5),
 - characterized by
 - a couple of vertical clamps (12, 13) between a plug (4) and the heat sensitive part (21),
 - an elastic retainer (11) mounted between flanges (12b, 13b) of said clamps (12, 13) to block the exit (5) with said plug (4),
 - a hollow projection (13a) mounted on the lower clamp (13) so that a portion of said heat sensitive part (21) can be inserted, said projection (13a) being elastically fitted into a hole of said plug (4) through a hole mounted on the upper clamp (12),
 - a hold plate (19) having a female screw (20)

formed on the internal face thereof for insertion of said screw (22), said hold plate (19) being mounted on the top edge of a connector railing (18),

- said retainer (11) being pressured by said clamps (12, 13) against a side of the sprinkler head body (1), when the screw (22) is screwed, said sprinkler head body (1) being linked and held between an inboard concave (17) thereof and said flanges (12b, 13b).
2. A sprinkler head according to claim 1, wherein a spring (7) is mounted between a bottom (1a) of said sprinkler head body (1) and the plug (4) under a tension condition.
3. A sprinkler head according to claim 2, wherein the surface of said spring (7) is coated with fluoroplastic.
4. A sprinkler head according to claim 2, wherein said spring (7) is made of a plate spring.

Patentansprüche

1. Ein Sprinklerkopf, bestehend aus:
 - einem Gehäuse (1, 3) mit einem darin gebildeten Ausgang (5), und
 - einem hitzeempfindlichen Teil (21), welches durch Hitzeausdehnung einer darin versiegelten Flüssigkeit (23) brechbar ist, wobei das hitzeempfindliche Teil (21) mittels einer Schraube (22) gepreßt zur Verstopfung des Ausgangs (5) befestigt ist,
 - gekennzeichnet durch
 - ein Paar vertikaler Klemmbacken (12, 13) zwischen einem Stopfen (4) und dem hitzeempfindlichen Teil (21),
 - einem elastischen Haltering (11), welcher zwischen den Flanschen (12b, 13b) der Klemmbacken (12, 13) zur Verstopfung des Ausgangs (5) durch den Stopfen (4) befestigt ist,
 - einem hohlen Vorsprung (13a), welcher auf der unteren Klemmbacke (13) montiert ist, so daß ein Abschnitt des hitzesensitiven Teiles (21) eingeführt werden kann, wobei der Vorsprung (13a) elastisch in eine Öffnung des Stopfens (4) durch eine auf der oberen Klemmbacke (12) befestigte Öffnung eingepaßt ist,
 - eine Halteplatte (19) mit einer auf ihrer Innenfläche gebildeten Mutter (20) für das Einfügen einer Schraube (22), wobei die Halteplatte (19) auf dem oberen Rand eines Anschlußteiles (18) befestigt ist,
 - wobei der Haltering (11) durch die Klemmbacken (12, 13) gegen eine Seite des Sprinklerkopfgehäuses (1) gepreßt ist, wenn die Schraube (22) angezogen ist, wobei das Sprinkler-



Accordingly, the plug 4 descends smoothly without vibration and the guide ring 9 is retained in the inboard concave 16. Thus the plug 4 stops descending.

Further, after water flowing from the exit 5 bumps against the top of the plug 4, water is dispersed in every direction and is sprayed so as to radiate as shown in Fig. 5.

It is to be noted that the concrete thickness of the glass, which is formed of the heat sensitive part, is not limited, and this thickness can be changed depending on the elasticity and the like of the retainer 11 as occasion demands.

The shape of elastic retainer 11 is not limited to that a part cut ring, and it can also have a complete ring shape.

Furthermore, in the above example of the embodiment of this invention, the spring comprises the plate screw coated with fluoroplastic, but the concrete composition is not limited to the same.

As described above, since the elastic retainer is mounted between clamps, the tightening power of a screw is absorbed and reduced by the extension of the retainer.

Accordingly, the tightening power of the screw is not added to the heat sensitive part. In the conventional sprinkler head, the heat sensitive part is directly pressured by the screw and the heat sensitive part is fitted into the exit of the sprinkler head as a plug.

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a heat-sensitive part (21), which is breakable by heat extension of a liquid (23) sealed inside, said heat-sensitive part (21) being mounted by means of a screw (22) pressed to block said exit (5),
characterized by
a couple of vertical clamps (12, 13) between a plug (4) and the heat sensitive part (21),
an elastic retainer (11) mounted between flanges (12b, 13b) of said clamps (12, 13) to block the exit (5) with said plug (4),
a hollow projection (13a) mounted on the lower clamp (13) so that a portion of said heat sensitive part (21) can be inserted, said projection (13a) being elastically fitted into a hole of said plug (4) through a hole mounted on the upper clamp (12),
a hold plate (19) having a female screw (20)

formed on the internal face thereof for insertion of said screw (22), said hold plate (19) being mounted on the top edge of a connector railing (18),

said retainer (11) being pressured by said clamps (12, 13) against a side of the sprinkler head body (1), when the screw (22) is screwed, said sprinkler head body (1) being linked and held between an inboard concave (17) thereof and said flanges (12b, 13b).

2. A sprinkler head according to claim 1, wherein a spring (7) is mounted between a bottom (1a) of said sprinkler head body (1) and the plug (4) under a tension condition.
3. A sprinkler head according to claim 2, wherein the surface of said spring (7) is coated with fluoroplastic.
4. A sprinkler head according to claim 2, wherein said spring (7) is made of a plate spring.

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ein Paar vertikaler Klemmbacken (12, 13) zwischen einem Stopfen (4) und dem hitzeempfindlichen Teil (21),
einem elastischen Haltering (11), welcher zwischen den Flanschen (12b, 13b) der Klemmbacken (12, 13) zur Verstopfung des Ausgangs (5) durch den Stopfen (4) befestigt ist,
einem hohlen Vorsprung (13a), welcher auf der unteren Klemmbacke (13) montiert ist, so daß ein Abschnitt des hitzesensitiven Teiles (21) eingeführt werden kann, wobei der Vorsprung (13a) elastisch in eine Öffnung des Stopfens (4) durch eine auf der oberen Klemmbacke (12) befestigte Öffnung eingepaßt ist,
eine Halteplatte (19) mit einer auf ihrer Innenfläche gebildeten Mutter (20) für das Einfügen einer Schraube (22), wobei die Halteplatte (19) auf dem oberen Rand eines Anschlußteiles (18) befestigt ist, wobei der Haltering (11) durch die Klemmbacken (12, 13) gegen eine Seite des Sprinklerkopfgehäuses (1) gepreßt ist, wenn die Schraube (22) angezogen ist, wobei das Sprinkler-



kopfgehäuse (1) mit dem innenseitigen Konkavteil (17) desselben und den Flanschen (12b, 13b) verbunden und zwischen diesen gehalten ist.

2. Sprinklerkopf nach Anspruch 1, dadurch gekennzeichnet, daß eine Feder (7) zwischen dem Boden (1a) des Sprinklerkopfgehäuses (1) und dem Stopfen (4) unter einem Spannungszustand befestigt ist.

3. Sprinklerkopf nach Anspruch 2, dadurch gekennzeichnet, daß die Oberfläche der Feder (7) mit Fluorkunststoff beschichtet ist.

4. Sprinklerkopf nach Anspruch 2, dadurch gekennzeichnet, daß die Feder (7) aus einer Blattfeder hergestellt ist.

2. Gicleur d'incendie selon la revendication 1, dans lequel un ressort (7) est monté entre un siège (1a) dudit corps de gicleur d'incendie (1) et l'obturateur (4) en état de tension.

3. Gicleur d'incendie selon la revendication 2, dans lequel la surface dudit ressort (7) est recouverte de plastique fluoré.

4. Gicleur d'incendie selon la revendication 2, dans lequel ledit ressort (7) est constitué d'un ressort à lame.

Revendications

1. Gicleur d'incendie comportant :

un corps (1,3) ayant une sortie (5) formée en son intérieur, et un élément thermosensible (21), lequel est susceptible d'être cassé sous l'effet de la dilatation thermique d'un liquide (23) dont il est rempli hermétiquement;

ledit élément thermosensible (21) étant monté au moyen d'une vis (22) pressée pour bloquer ladite sortie (5),

caractérisé par:

une paire de pinces de serrage verticales (12,13) entre un obturateur (4) et l'élément thermosensible (21),

un élément de retenue élastique (11) monté entre des brides (12b, 13b) desdites pinces (12,13) afin d'obstruer la sortie (5) avec ledit obturateur (4),

une saillie creuse (13a) montée sur la pince

inférieure (13) de telle sorte qu'une partie dudit élément thermosensible (21) puisse être introduite, ladite saillie (13a) étant adaptée élastiquement dans un trou dudit obturateur (4) à travers un trou prévu sur ladite pince supérieure (13),

une plaque de maintien (19) comportant un taraudage (20) formé sur sa face intérieure, pour l'introduction de ladite vis (22), ladite plaque de maintien (19) étant montée sur le bord supérieur de queues d'assemblage (18),

ledit élément de retenue (11) étant comprimé par lesdites pinces (12,13) contre un côté du corps de gicleur d'incendie (1), lorsque la vis (22) est vissée, ledit corps de gicleur d'incendie (1) étant lié et tenu entre une concavité interne (17) de celui-ci et lesdites brides (12b, 13b).