

PATENT SPECIFICATION (11)

1 350 991

1 350 991

(21) Application No. 27544/71 (22) Filed 11 June 1971

(23) Complete Specification filed 7 June 1972

(44) Complete Specification published 24 April 1974

(51) International Classification A62C 37/12

(52) Index at acceptance

A5A 14E2 14E5

(72) Inventors ROGER COASBY and ROBIN BATHER

(54) SPRINKLER HEAD



(71) We, GEORGE ANGUS & COMPANY LIMITED, of Angus House, 152—158 Westgate Road, City and County of Newcastle-upon-Tyne, an English Company, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to automatic sprinkler heads for fire fighting installations of the type, hereinafter termed the type specified, comprising a nozzle, and a valve normally held in position to close the nozzle by a temperature sensitive component which releases the valve, when subjected to a high temperature, to permit of flow of water under pressure through the nozzle from an external source.

In such a sprinkler head a seal is necessary to prevent leakage of water past the valve under normal circumstances. According to one prior proposal the seal is provided by a sealing ring of thermoplastic material fitted in the bore of the nozzle and surrounding a stem on the valve, the ring being partly split to form two annular lips which are respectively urged by the water pressure in the nozzle against the wall of the bore in the nozzle and against the stem.

The invention provides an automatic sprinkler head of the above-specified type, wherein the valve has an upper face which abuts against the outer end of the bore in the nozzle and the bore contains a cup shaped sealing plug, which is constituted by a one-piece moulding of resilient material and is retained in the bore by the valve with its peripheral wall in sealing engagement with the wall of the bore. Preferably the sealing plug is made of silicone rubber.

One embodiment of sprinkler head according to the invention is illustrated in the accompanying drawings, in which:—

Fig. 1 is a side elevation of the sprinkler head, showing it in its normal closed position,

Fig. 2 is a section on the line III—III in Fig. 1, and

Fig. 3 is a view similar to Fig. 2, showing the sprinkler head after exposure to heat.

The sprinkler head illustrated includes a nozzle 10, having an external screw thread 11 for attachment to a water supply pipe (not shown) from which the sprinkler head is suspended and to which, in use, water under pressure is supplied from above. The nozzle 10 has a convergent/divergent bore, in the divergent portion of which is disposed a cup shaped sealing plug 12 which in its unassembled state is parallel sided. The sealing plug 12 is preferably made of silicone type rubber which has good ageing and non-stiction properties and is largely unaffected by water, air, atmospheric conditions and heat. The sealing plug 12 is retained within the bore of the nozzle 10 by the flat upper face of a valve 13, which is prevented from entering the bore since it has a larger diameter than the bore and thus cannot misplace or overload the sealing plug. The valve 13 is located centrally by a spring washer 14, the periphery of which engages a recess 15 in the nozzle. A tapering portion 16 of a frangible temperature-sensitive ampoule 17 extends into a recess 18 in the valve 13, which is held against its seat 19 by the ampoule 17, the lower end of which bears against a boss 20 in a yoke 21 attached to the nozzle 10. The boss 20 is provided with radially arranged vanes 22 which break up the water issuing from the sprinkler into a uniform spray.

The sprinkler is normally held closed until a heat source actuates the ampoule 17. As shown in Fig. 3, collapse of the ampoule 17 allows the spring washer 14 and the water pressure combined to eject the valve 13 and the sealing plug 12 clear of the nozzle 10. Water then issues from the nozzle 10 on to the boss 20 and vanes 22 and thence to the risk area.

When the sealing plug 12 is inserted into the bore of the nozzle 10 its peripheral wall

is deflected inwards as shown in Fig. 2 to form a sealing surface. Its natural resiliency will maintain the contact at this point throughout the life of the sprinkler. When water pressure is applied to the bore of the nozzle 10 the sealing plug 12 is forced further against the inside of the bore thus increasing the sealing effect. It has been found that this seal is efficient at low and high pressures and is unaffected by vacuum pressures which may occur in sprinkler systems under certain conditions. No external force is required to achieve a seal beyond the load normally required to hold the ampoule 17 and the valve 13 in position.

In order to achieve an efficient seal combined with the lowest possible seal (blow-out) pressure an inclusive contact angle of 30° between the bore of the nozzle and the peripheral wall of the sealing plug 12 has been found to give satisfactory results.

The above described mechanism is easy to assemble and an effective seal is achieved with a low mechanical loading on the fragile ampoule 17. Particularly when the sealing plug 12 is made of silicone rubber, the tendency of the sprinkler head to leak is reduced to a minimum.

If desired the temperature sensitive component can be constituted by a solder link or

a chemical pellet instead of by a frangible ampoule.

WHAT WE CLAIM IS:—

1. An automatic sprinkler head of the type specified, wherein the valve has an upper face which abuts against the outer end of the bore in the nozzle and the bore contains a cup shaped sealing plug, which is constituted by a one-piece moulding of resilient material and is retained in the bore by the valve with its peripheral wall in sealing engagement with the wall of the bore. 35
2. A sprinkler as claimed in claim 1, in which the sealing plug is made of silicone rubber. 40
3. A sprinkler as claimed in claim 1 or claim 2, in which the nozzle has a convergent/divergent bore and the peripheral wall of the sealing plug makes sealing engagement with the divergent portion of the bore. 45
4. A sprinkler head as claimed in claim 1, substantially as described herein with reference to the accompanying drawings. 50

BREWER & SON,
Chartered Patent Agents,
5—9 Quality Court,
Chancery Lane,
London, WC2A 1HT.

is deflected inwards as shown in Fig. 2 to form a sealing surface. Its natural resiliency will maintain the contact at this point throughout the life of the sprinkler. When water pressure is applied to the bore of the nozzle 10 the sealing plug 12 is forced further against the inside of the bore thus increasing the sealing effect. It has been found that this seal is efficient at low and high pressures and is unaffected by vacuum pressures which may occur in sprinkler systems under certain conditions. No external force is required to achieve a seal beyond the load normally required to hold the ampoule 17 and the valve 13 in position.

In order to achieve an efficient seal combined with the lowest possible seal (blow-out) pressure an inclusive contact angle of 30° between the bore of the nozzle and the peripheral wall of the sealing plug 12 has been found to give satisfactory results.

The above described mechanism is easy to assemble and an effective seal is achieved with a low mechanical loading on the fragile ampoule 17. Particularly when the sealing plug 12 is made of silicone rubber, the tendency of the sprinkler head to leak is reduced to a minimum.

If desired the temperature sensitive component can be constituted by a solder link or

a chemical pellet instead of by a frangible ampoule.

WHAT WE CLAIM IS:—

1. An automatic sprinkler head of the type specified, wherein the valve has an upper face which abuts against the outer end of the bore in the nozzle and the bore contains a cup shaped sealing plug, which is constituted by a one-piece moulding of resilient material and is retained in the bore by the valve with its peripheral wall in sealing engagement with the wall of the bore.

2. A sprinkler as claimed in claim 1, in which the sealing plug is made of silicone rubber.

3. A sprinkler as claimed in claim 1 or claim 2, in which the nozzle has a convergent/divergent bore and the peripheral wall of the sealing plug makes sealing engagement with the divergent portion of the bore.

4. A sprinkler head as claimed in claim 1, substantially as described herein with reference to the accompanying drawings.

BREWER & SON,
Chartered Patent Agents,
5—9 Quality Court,
Chancery Lane,
London, WC2A 1HT.

Printed for Her Majesty's Stationery Office by Burgess & Son (Abingdon) Ltd.—1974.
Published at The Patent Office, 25 Southampton Buildings, London WC2A 1AY
from which copies may be obtained.



* C L M S *