

July 13, 1943.

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2,324,170

SPRINKLER HEAD

Filed July 17, 1940

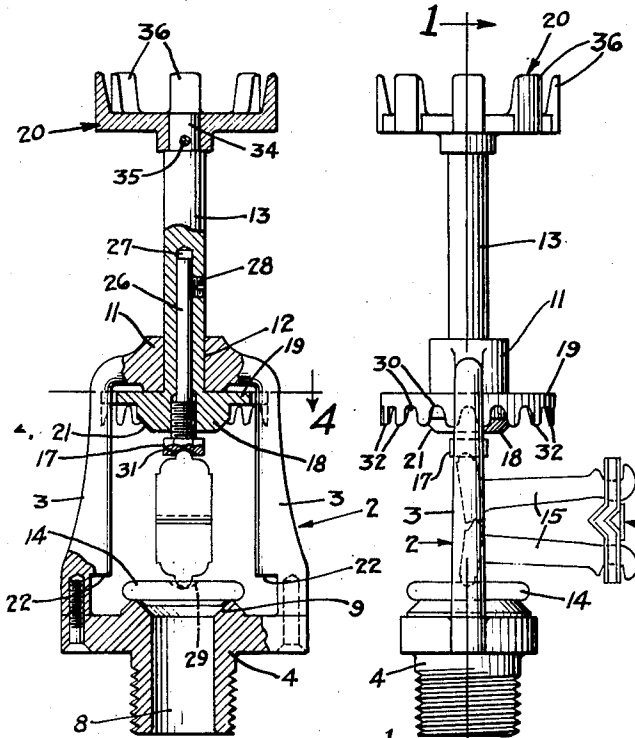


FIG. 1

FIG. 2

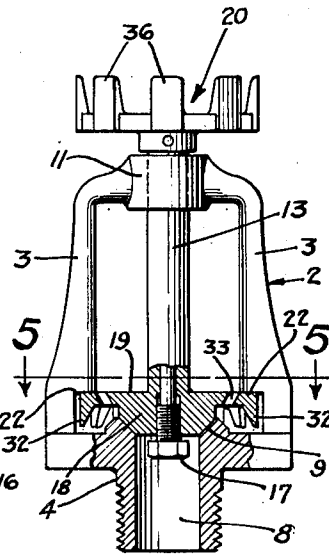


FIG. 3

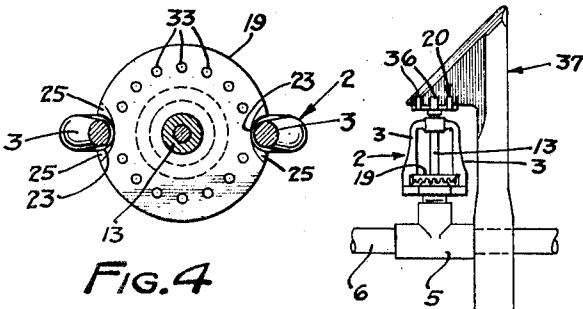


FIG. 4

FIG. 5

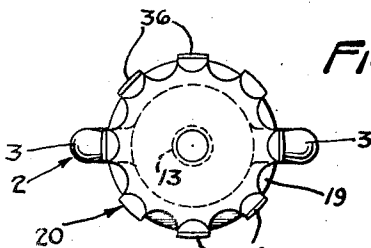


FIG. 6

FIG. 7

FIG. 8

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2,324,170

SPRINKLER HEAD

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Application July 17, 1940, Serial No. 346,016

2 Claims. (Cl. 169—39)

This invention relates to new and useful im-
provements in sprinkler heads such as are used
in automatic sprinkling systems to distribute
water from the pipes of the system in the event
of a fire.

It is well known among firemen and others
skilled in the art of fighting fires in buildings,
that by far greater damage is often caused by
water discharging from open sprinkler heads,
after a fire has been subdued, or partially ex-
tinguished, than by the fire itself, because of
the inability to shut off certain sprinkler heads which
may no longer be required to distribute water.
As a protection against damage caused by fires,
most public buildings, and many others, must
be equipped with automatic sprinkling systems.
These systems usually comprise a plurality of
sprinkler heads mounted on water supply pipes,
and each head has a closure plug or cap normally
retained in closed position by a fusible link or
element, to prevent discharge of water from the
sprinkler head under normal conditions. These
fusible links or elements, as is well known, are
made from metal which melts at a comparatively
low temperature, whereby should a fire develop,
and one or more of said fusible elements be sub-
jected to abnormal heat, such elements will melt
and thereby automatically release the closure
plugs or caps of their respective sprinkler heads,
whereupon said heads are opened to distribute
water from the supply pipe. When ordinary
sprinkler heads are used in the system, which
are not equipped with means for shutting them
off independently of the main supply pipe, water
may continue to discharge from the open
sprinkler heads until the supply of water to the
supply pipe is shut off.

To prevent unnecessary damage by water, as a
result of continued sprinkling of water from open
sprinkler heads, after a fire has been subdued,
firemen or fire fighters are sometimes equipped
with separate devices adapted to be manually
applied to open sprinkler heads to temporarily
interrupt the flow of water therefrom, until the
supply of water to the supply pipe may subse-
quently be shut off. These devices, usually in
the form of tongs, are more or less cumbersome
and inconvenient to carry around. They are also
rather difficult to apply, because the sprinkler
heads are usually disposed adjacent to a ceiling,
whereby the firemen or person applying the de-
vice to the open sprinkler head must mount a
ladder. As a result, much unnecessary flooding
of property may sometimes follow after a
sprinkler head has been set into operation before

it can be shut off. It may also happen that a
sprinkler head will accidentally open when there
is no fire, as a result of the fusible link giving
way, or not having been properly applied to the
usual closure plug or cap of the sprinkler head,
in which case it is imperative that the flow of
water from the open head be shut off as quickly
as possible to prevent serious water damage to
surrounding property. It is therefore highly de-
sirable that means be provided in the construc-
tion of a sprinkler head whereby unnecessary
flow of water therefrom may be quickly and con-
veniently shut off, when the occasion arises.

Various attempts have heretofore been made
to develop a sprinkler head having means em-
bodied therein for independently shutting off un-
necessary flow of water therefrom without shut-
ting off the supply of water to the supply pipe
upon which the sprinkler head is mounted, but
to the best of my knowledge, none of these de-
vices have proven commercially practical. As a
result, in sprinkler heads now commonly used in
commercial automatic sprinkler systems, no pro-
vision whatsoever is made for shutting off un-
necessary water flow therefrom, except by the
manual insertion of a closure plug in the head,
or the application of a temporary closing device
or tong, as hereinbefore referred to, which is in-
convenient and time consuming, and may there-
fore be of little value.

The novel sprinkler head disclosed in the pres-
ent application, is the result of considerable ex-
perimental and development work in devices of
this general character, in an attempt to provide
a sprinkler head which will be commercially
practical and efficient, and has means embodied
therein whereby unnecessary flow of water there-
from may be quickly and conveniently shut off
independently of other sprinkler heads, and
which means is simple and convenient to operate,
and is so constructed that it may readily and
quickly be operated to close the sprinkler head
by applying a conventional firemen's ceiling hook,
or other device thereto, by a person standing on
the floor, regardless of whether the particular
sprinkler head is mounted in upright or inverted
position.

It is therefore an object of the present inven-
tion to provide a simple and inexpensive sprinkler
head for automatic sprinkling systems, embody-
ing all of the features desired in such devices, and
which will meet the requirements of the usual
fire underwriters' laboratory.

Other more specific objects of the invention
reside in the provision of a supplemental valve or

closure cap carried directly on the sprinkler head and adapted to be moved into closing engagement with the usual valve seat of the sprinkler head by axial movement of a stem slidably carried by the frame of the sprinkler head, and to one end of which the supplemental valve is secured; in the means provided for locking the supplemental valve in closed position; in the means provided on the stem adapted to be engaged by a conventional ceiling hook or other device to facilitate moving the supplemental valve into closing engagement with said seat by a person standing on the floor; and in the provision of a sprinkler head which may be substituted for sprinkler heads of ordinary construction.

Other objects of the invention will appear from the following description and accompanying drawing and will be pointed out in the annexed claims.

In the accompanying drawing there has been disclosed a structure designed to carry out the various objects of the invention, but it is to be understood that the invention is not confined to the exact features shown as various changes may be made within the scope of the claims which follow.

In the drawing:

Figure 1 is a vertical sectional view substantially on the line 1—1 of Figure 2, showing the parts positioned to retain the usual closure plug or cap on the seat of the sprinkler head;

Figure 2 is a side view of Figure 1;

Figure 3 is a view similar to Figure 1, but showing the supplemental valve locked in position on the valve seat;

Figure 4 is a sectional plan view on the line 4—4 of Figure 1, showing the supplemental valve in unlocked position;

Figure 5 is a sectional plan view on the line 5—5 of Figure 3, showing the supplemental valve in locked position;

Figure 6 is a view on a smaller scale showing a conventional ceiling hook applied to an upright sprinkler head;

Figure 7 is a view similar to Figure 6, showing a ceiling hook applied to an inverted sprinkler head; and

Figure 8 is a plan view of Figure 1, showing the shape of the operating member provided at the upper end of the valve stem.

The novel sprinkler head herein disclosed is shown comprising a frame, generally designated by the numeral 2, and comprising side members 3 having their lower ends secured to a suitable hub 4, shown exteriorly threaded, as is customary in devices of this character for securing it in position in the usual fitting 5 of the water supply pipe 6, shown in Figures 6 and 7. The hub 4 has a bore 8 provided at its upper end with an annular seat 9, as best shown in Figures 1 and 3. The upper ends of the side frame members 3—3 are secured to a relatively smaller hub 11 having a bore 12 therein which serves as a guide for a suitable stem 13, mounted for sliding movement in the bore or guide 12.

In conventional sprinkler heads, a suitable closure plug or cap 14 is positioned on the seat 9 of the hub 4, to close the upper end of the bore 8, the lower end of which is in direct communication with the interior of the supply pipe 6, as is well known. A pair of toggle arms 15 of well known construction, cooperate with a fusible link 16 to secure the cap 14 in its closed position, as shown in Figures 1 and 2. The upper toggle arm 15 is shown engaged with the head of an

adjusting screw 17, whereby when the toggle arms are engaged with the closure plug 14 and screw 17 and are operatively connected together by the fusible link 16, the plug 14 will be retained in leak-proof engagement with the valve seat 9.

An important feature of the present invention resides in the means provided for closing the opening 8 in the sprinkler head to shut off unnecessary water flow from the sprinkler head, after a fire has been subdued or extinguished. The means provided for thus shutting off unnecessary water flow from the sprinkler head is shown comprising a supplemental closure member or valve head 18 shown formed on the lower face of a disk-like water sprinkling head 19, secured to the lower end of the stem 13, as best shown in Figure 1. The valve head 18 has a conical face 21 adapted to engage the valve seat 9, as shown in Figure 3, when the stem is moved downwardly from the position shown in Figure 1 to that shown in Figure 3, whereby the valve head 18 will shut off the flow of water from the bore 8 of the sprinkler head.

Means is provided for locking the supplemental valve 18 in closed position, as shown in Figure 3, whereby it may remain in such position until the supply of water to the supply pipe 6 has been shut off, to permit insertion of a new closure plug 14 in the sprinkler head, as shown in Figure 1.

The means provided for thus locking the supplemental valve 18 in closed position, is shown comprising a pair of oppositely disposed shoulders 22 provided on the inner sides of the side frame members 3—3 adjacent to the valve seat 9. The disk-like member 19 is provided with oppositely disposed peripheral notches 23 adapted to receive the frame members 3—3 to prevent relative rotation of the supplemental valve 18, when in the position shown in Figures 1 and 2. The upper surfaces of the corners 24 of the notches 23 are preferably beveled off, as indicated at 25 to guide the disk under the shoulders 22, as will readily be understood by reference to Figure 3. The shoulders 22 are so spaced from the valve seat 9 that when the supplemental valve 18 is moved into engagement with the valve seat 9, as shown in Figure 3, the marginal edge of the disk 19 may be moved into locking engagement with the shoulders 22 by a slight rotation thereof, thereby to lock the supplemental valve in closed position.

The adjusting screw 17 is shown received in threaded engagement with the valve head 18 and preferably has a stem 26 extending upwardly into a bore 27 provided in the valve stem 13. A small lock screw 28 is shown received in threaded engagement with the valve stem 13 and is adapted to engage the stem 26 of the adjusting screw 17 thereby to lock said screw in adjusted position, as will readily be understood by reference to Figure 1. If desired, other means such as a pin, may be used for securing the adjusting screw in adjusted position. The closure plug 14 has a small recess 29 in its upper surface adapted to receive a projection provided on the lower toggle arm 15. A similar recess 31 is provided in the bottom face of the head of the adjusting screw 17 to receive the corresponding projection provided on the upper toggle arm 15. When a toggle device of the type shown in Figure 2, is used for retaining the closure plug or cap in closed position, means are usually provided for varying the spacing between the top of the closure cap 14 and the head of the adjusting screw 17, so that when the fusible link 16 is engaged with the ends

of the toggle arms 15, the valve plug or closure 14 will be firmly engaged with the seat 9 to prevent water or air leakage.

The disk-like head 19 is shown provided with a plurality of depending projections 32 equally spaced apart around the circumference thereof, whereby a corresponding number of inverted recesses 30 are provided between said projections. When the plug or cap 14 is released from its seat as a result of the fusible link 16 melting or giving way, a solid stream of water is directed against the head of the adjusting screw 17 from the bore 8 of the sprinkler head and thence impinges against the lower face of the disk-like head 19, whereby the water is projected outwardly through the gaps or recesses 30 of said head, in the form of an umbrella-like spray. To further intensify the spray, a plurality of suitable apertures 33 are provided in the disk-like head 19, through which a portion of the water passes. Thus, by means of the recesses 30 and the apertures 33 in the head 19, the water is sprayed over a relatively large circular area, with sufficient effectiveness to extinguish an ordinary fire.

To manipulate the supplemental valve 18, a suitable operating handle or member, generally designated by the numeral 20, is secured to the upper end of the valve stem 13. In the drawing I have shown the stem 13 provided with a reduced end portion 34 adapted to be received in a bore provided in the operating member 20. A suitable pin 35 is shown securing the member 20 to the valve stem, as will readily be understood by reference to Figure 1. The periphery of the head 20 is preferably notched, as shown in Figure 8, and has a plurality of spaced apart projections or lugs 36, whereby the head 20 may readily be engaged by a conventional ceiling hook 37, by a person standing on the floor, as shown in Figure 6. When a ceiling hook is thus engaged with the operating member 20, the supplemental valve 18 may conveniently be moved into closing engagement with the seat 9 and locked in such position by a slight rotary movement of the member 20, by proper manipulation of the ceiling hook 37.

In some installations, the sprinkler heads may be secured to the water supply pipe 6 in inverted position. When thus positioned, the member 20 of the valve stem may be engaged by the ceiling hook 37, as shown in Figure 7. It will thus be seen that the novel sprinkler head herein shown may readily be operated to shut off unnecessary flow of water therefrom by simply moving the supplemental valve 18 into engagement with the seat 9, and slightly rotating the valve stem 13 to bring the disk-like head 19 into locking engagement with the shoulders 22 of the side frame members 3—3 of the head. In some instances, it may be found more convenient to manually grasp the member 20, when it is found necessary to move the supplemental valve into engagement with the seat 9 to shut off the water.

The novel sprinkler head herein disclosed is very simple and inexpensive in construction and may be used interchangeably with conventional sprinkler heads. It is also designed to be used

in connection with conventional toggle devices of the type shown in Figure 2. It may be mounted in either upright or inverted position, as shown in Figures 6 and 7, and will function equally well in either position. By shaping the operating member 20 as shown in the drawing, the stem may be conveniently operated to lock the supplemental valve 18 to the seat 9 or release it therefrom, by simply engaging the member 20 with a suitable instrument, such as a conventional ceiling hook.

While the preferred embodiment of the invention has been disclosed, it is to be understood that minor changes in the details of construction, combination and arrangement of co-operating elements may be resorted to within the scope of what is claimed, without departing from the spirit of the invention.

I claim:

1. A sprinkler head comprising a frame, including spaced side members, a hub at one end of the frame provided with a fluid passage, a seat at the inner end of said hub within the frame, a guide at the opposite end of said frame, a stem slidable in said guide, a water-spreading disk secured to one end of said stem within the frame, said disk having notches in its periphery adapted to receive the side members of the frame to prevent rotation of the disk, a supplemental valve carried by the disk and adapted to be moved into engagement with said seat by axial movement of the stem, oppositely disposed shoulders on the side frame members adjacent to the valve seat adapted to be engaged by said disk, when the supplemental valve is engaged with said seat and the stem is partially rotated in the frame, thereby to secure the supplemental valve in position on the valve seat, and an operating member secured to said stem to facilitate manipulation thereof.

2. A sprinkler head comprising a frame including spaced side members, a hub at the lower end of the frame provided with a fluid passage, a seat at the upper end of said hub, a guide at the upper end of the frame, a stem slidable in said guide, a water-spreading disk secured to one end of said stem within the frame, a supplemental valve carried by the disk and adapted to be moved into engagement with said seat by axial movement of the stem, thereby to shut off unnecessary flow from the sprinkler head, cooperating means on the disk and said side frame members for preventing relative rotation of the disk in the frame, when the supplemental valve is out of engagement with said seat, abutment shoulders on said side frame members adapted to be engaged by said disk, when the supplemental valve is positioned on the valve seat and the disk is partially rotated in the frame by manipulation of the valve stem, and an operating member secured to the upper end of the stem, exteriorly of the frame, and having a plurality of projections thereon whereby said head may readily be engaged by a conventional ceiling hook to facilitate operating the valve stem on a sprinkler positioned adjacent to a ceiling.

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