

(No Model.)

C. B. CHACE.
FIRE EXTINGUISHER.

No. 264,242.

Patented Sept. 12, 1882.

Fig. 1

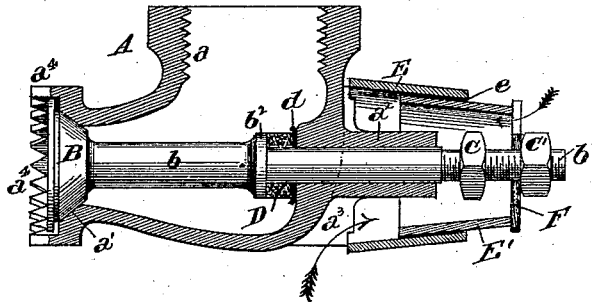


Fig. 2

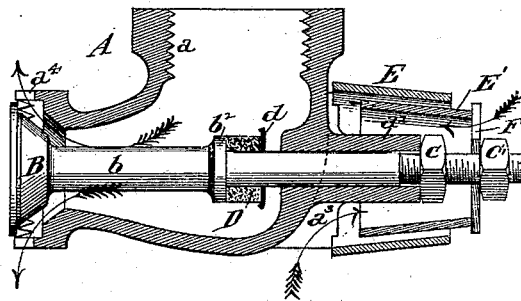


Fig. 3

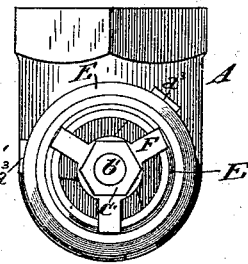


Fig. 4

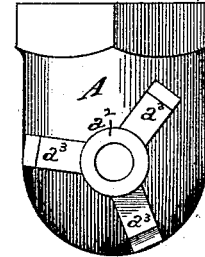


Fig. 5

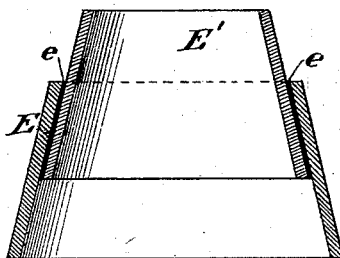
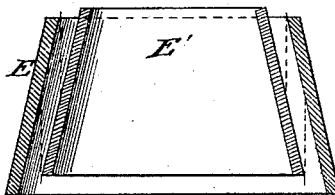


Fig. 6



Attest

Edgar J. Cross,
C. W. Withenbury,

Inventor

Chas B Chace
By John W. Hill
Attorney

UNITED STATES PATENT OFFICE.

CHARLES B. CHACE, OF CINCINNATI, OHIO, ASSIGNOR TO WILLIAM J. BREED, OF SAME PLACE.

FIRE-EXTINGUISHER.

SPECIFICATION forming part of Letters Patent No. 264,242, dated September 12, 1882.

Application filed December 28, 1881. (No model.)

To all whom it may concern:

Be it known that I, CHARLES B. CHACE, of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Fire-Extinguishers, of which the following is a specification.

My invention is in the nature of an improvement upon that class of automatic fire plugs or extinguishers which contains a self-acting water-valve, a distributor to spray the effluent water on an incipient fire, and an abutment consisting essentially of suitable members united by a fusible alloy, which at ordinary temperature retains the water-valve on its seat against pressure, and at higher temperatures melts and permits the pressure of water on the valve to drive it from its seat and the water from the plug to be vented through the distributor onto the fire.

My invention consists principally in a novel construction of the abutment, whereby greater facility is had in releasing the water-valve from its seat when the fusible alloy melts; secondly, in a novel construction of the water-joint around the valve-stem, whereby leakage of water from the plug is avoided; and, thirdly, in a novel construction of the water-distributor, whereby the effluent water is divided into a spray and caused to act over a large space, all of which will be fully described hereinafter.

Devices for the automatic extinguishment of fire must be absolute in their action to be of any value; and to produce an abutment the action of which depends upon the softening of a fusible-alloy joint, which shall be certain, prompt, and complete in operation, is the principal object of this invention.

In my improved automatic fire plug or extinguisher the abutment consists of two hollow conical sleeves, one of which slides within and is attached to the other by a film of fusible alloy. When the two hollow cones are united by the fusible alloy to form the abutment to retain the water-valve on its seat against pressure, the lower edge of the larger cone rests upon suitable projections formed on the body of the plug and the upper edge of the smaller cone receives the pressure or pull of the water-valve. The cones are so constructed and arranged with relation to each other that all of the inner

and outer surfaces thereof (excepting so much as is embraced in the fusible joint) is exposed to the direct action of heat, and are so arranged with relation to the balance of the device as to be entirely removed from the cooling effect of the water, whether it be at rest or flowing.

In the accompanying drawings, Figure 1 is a sectional elevation of an automatic fire plug or extinguisher containing my improvements, with the water-valve closed. Fig. 2 is a similar view with the water-valve open. Fig. 3 is a plan on the axis of the valve-stem of the binding-nut, spider, cones, and body of the plug. Fig. 4 is a plan on the axis of the valve-stem of the body of the plug. Fig. 5 is a vertical section, on an enlarged scale, of the cones united together by the fusible alloy and in position to act as an abutment; and Fig. 6 is a similar view of the cones after the fusible-alloy joint has melted and the cones have separated under pressure of the water-valve.

Similar letters of reference indicate similar parts.

A is the plug or extinguisher body, provided with the customary thread, *a*, for attachment to a line of water-pipe, usually running under the ceiling of the room in which the plugs are used.

B is an outwardly-opening water-valve, closing against the seat *a'*, and provided with the stem *b*, the outer end of which, *b'*, is threaded and furnished with nuts C and C', one of which nuts, C, is used to limit the movement of the valve B, and the other, C', to draw the valve tightly to its seat against pressure and to ease the valve on its seat to test the plugs for efficiency without separating the cones, which, when united together by the fusible alloy, form the abutment to retain the water-valve B on its seat *a* against pressure.

*a*² is a neck formed on the body A of the plug, which serves as a guide to the valve-stem *b*.

*b*² is a shoulder formed on the valve-stem *b* to receive the thrust of the packing-ring D, which ring may be of rubber or any other suitable material, and acts, when the valve is closed on its seat, to prevent the leakage of water around the valve-stem *b b'* through the neck *a*².

d is a thin washer of tin-foil or any thin and

pliable metal, placed between the packing-ring D and inner end of the neck a^2 , to prevent the sticking of the ring D to the inner end of the neck a^2 during long continued inaction of the plug. Without this precautionary device the packing-ring D might stick on the inner end of the neck a^2 and aid to prevent the prompt opening of the water-valve when required. So long as the packing-ring D travels with the valve-stem b the frictional resistance to the opening of the valve B is very slight; but should the packing-ring D become attached to the neck a^2 in such a manner as to compel the valve in opening to draw the stem b through the packing-ring, the frictional resistance to the opening of the valve would be very great, sufficient possibly to defeat the operation of the plug. Tin-foil will not adhere readily to metal, and, if it should, would quickly be torn from either the end of the neck a^2 or packing-ring D under pressure from the water-valve B.

E and E' are the conical sleeves, united by the film of fusible alloy e , and forming an abutment or conical pillar to receive the pull of the valve B or stem b when under pressure. The lower edge of the cone E bears upon the radial-ribbed seats $a^3 a^3 a^3$, formed on the body A of the plug, which seats are disposed at the salient points of an equilateral triangle, and placed concentric with the valve-stem b . The upper edge of the cone E' receives the pull of the water-valve B through the three-winged open spider F, the nut C' resting upon and bearing against the spider. The natural elasticity of the spider F will compensate for differences in length of the valve-stem b while under pressure by variations in expansion and contraction of the valve-stem and body A of the plug.

By reference to Figs. 5 and 6 it will be observed that the angle of the cones E and E' is such that when the fusible joint e melts the separation of the surfaces is not, as in cylindrical sleeves, by sliding one upon the other, but by a rupture of the fusible-alloy joint, equivalent in effect to lifting one surface from the other, and that no partial separation can occur. Thus, when the fusible alloy e is at such a point of fusion as to permit of any motion at all of the cone E' in the cone E, the joint e will be completely ruptured by the water load on the valve B and the plug instantaneously and completely opened to vent water on the incipient fire.

I am aware that a patent was granted to Brown and Foscett, of New Haven, Connecticut, August 10, 1875, for an automatic fire plug or extinguisher which contained an abutment consisting of a cylindrical cap united by fusible alloy to a cylindrical standard, and provided with a strong spiral spring which, acting in conjunction with the water-pressure on the valve, forced the cylindrical cap off its bearing when the fusible-alloy joint had been softened sufficiently by the action of heat. I am also aware that the cylindrical valve-stem

of a fire-extinguisher has been secured within a cylindrical sleeve by means of an interposed layer of solder, this construction of fire-extinguisher being without a spring to act on the valve; but such features do not constitute my invention.

In my abutment, consisting of the two described cones E and E', united together by the film e of fusible alloy, no force is necessary to produce the prompt and complete separation of the parts E and E' excepting the pressure of water on the valve B. With cylindrical sleeves, when the fusible alloy softens under the influence of heat, the separation is had by sliding one surface on the other. With conical sleeves or pyramidal sleeves the separation of the two members, as E and E', is as the lifting of one surface from the other, as clearly shown in Fig. 6 of the drawings.

a^4 is an annulus, with serrated edge, surrounding the valve-seat a' of the plug-body A, within which annulus the valve B plays freely, the lift or motion of the valve B being controlled by the nut C, so as to fully uncover these serrated openings in the annulus a^4 , as shown in Fig. 2. It is obvious, however, from the drawings that by backing the nuts C and C' off the threaded stem b' the valve may be opened wider or removed entirely for the purpose of testing the plug and blowing out any sediment which may collect in the line of the water-pipe while otherwise in position for action.

Having described my invention, what I claim is—

1. An abutment consisting essentially of the hollow cones E and E', united together by the film of fusible alloy e , in combination with the self-acting valve B of an automatic fire plug or extinguisher, substantially as and for the purpose described.

2. The combination, in an automatic fire plug or extinguisher, of the hollow cones E and E' and fusible joint e with the valve B and its component stem $b b'$, nut C', and spider F, substantially as and for the purpose described.

3. The combination, in an automatic fire plug or extinguisher, of the abutment E, E', and e with the radial ribs $a^3 a^3 a^3$ and spider F, substantially as and for the purpose described.

4. The combination, in an automatic fire plug or extinguisher, of the valve-stem b , shoulder thereof, b^2 , packing-ring D, and thin metal washer d , substantially as and for the purpose described.

5. The combination, in an automatic fire plug or extinguisher, of the valve B and its component stem $b b'$, seat a' , serrated annulus a^4 , and nut C, substantially as and for the purpose described.

In testimony whereof I have signed my name to the foregoing specification in the presence of two subscribing witnesses.

CHARLES B. CHACE.

Witnesses:

EDGAR J. GROSS,
E. H. BONNIE.