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I. HERZBRUN ET AL

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SAFETY SHOWER BATH SPRAY HEAD

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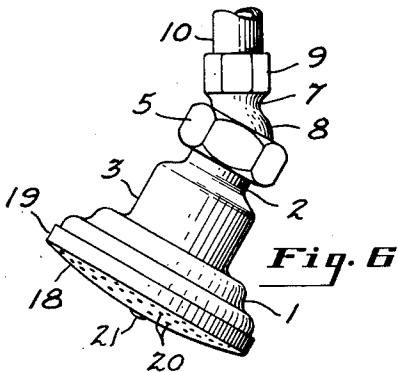
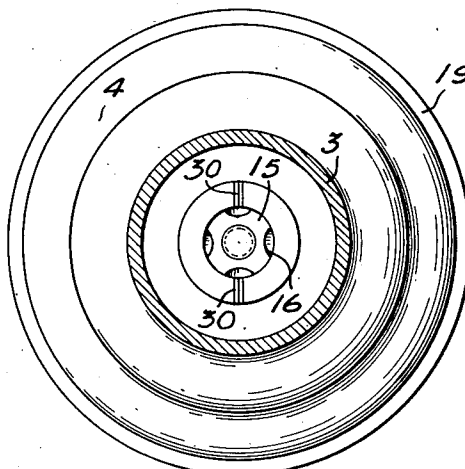
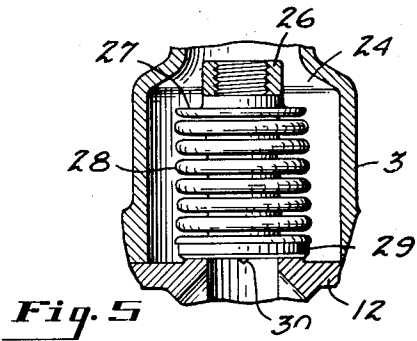
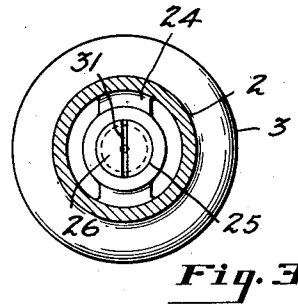
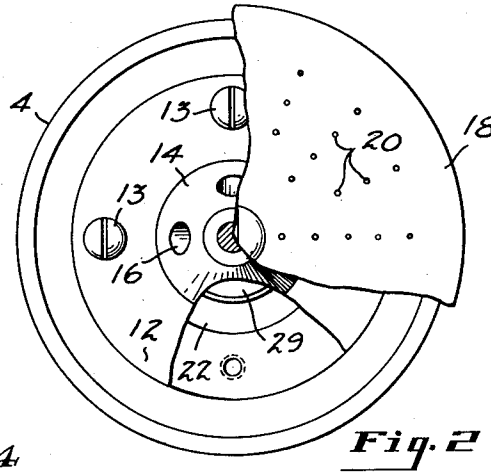
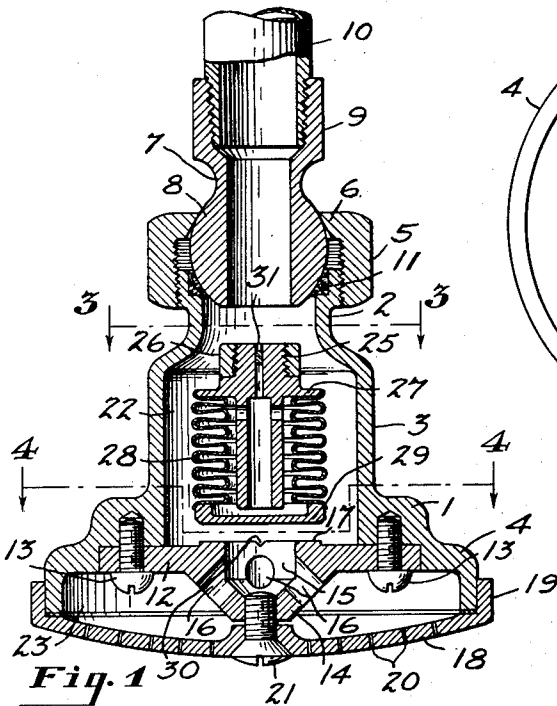


Fig. 4 INVENTORS  
Isadore Herzbrun  
Charles F. Schultis  
BY Frank S. Greene/  
ATTORNEY

## UNITED STATES PATENT OFFICE

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## SAFETY SHOWER BATH SPRAY HEAD

Isadore Herzbrun and Charles F. Schultis,  
Cleveland, Ohio

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3 Claims. (Cl. 236—93)

This invention relates to a spray head particularly for shower baths, and has for its object to provide an automatically controlled head which prevents a spray of scalding hot water by means of a thermally controlled valve which acts to cut off the spray when the water in the spray head approaches a scalding temperature, the spray head being provided with means for discharging water trapped in the head so as to quickly restart the spray after the hot and cold water supply have been properly regulated to deliver water to the spray head at a temperature below a scalding temperature.

A further object is to provide a safety spray head which is simple in construction, which can be manufactured at small cost, and which is easy to keep in repair.

With the above and other objects in view the invention may be said to comprise the safety spray head as illustrated in the accompanying drawing hereinafter described and particularly set forth in the appended claims, together with such variations and modifications thereof as will be apparent to one skilled in the art to which the invention appertains.

Reference should be had to the accompanying drawing forming a part of this specification, in which:

Figure 1 is an axial section through a spray head embodying the invention;

Fig. 2 is an end view of the spray head looking toward the discharge end thereof, a portion of the spray plate being broken away to show the partition member within the head;

Fig. 3 is a section taken on the line indicated at 3—3 in Fig. 1;

Fig. 4 is a section taken on the line indicated at 4—4 in Fig. 1;

Fig. 5 is a fragmentary sectional view showing the thermally controlled valve in closed position;

Fig. 6 is a side elevation of the spray head.

As illustrated in the accompanying drawing, the spray head of the present invention has a body portion 1 which may be in the form of a hollow casting and which is provided with a reduced inner end portion 2 which is externally threaded, a cylindrical intermediate portion 3 of somewhat greater diameter than the end portion 2 and a flaring outer end portion 4, which, at its outer end, is of considerably greater diameter than the intermediate portion 3. The threaded inner end of the head is adapted to receive a coupling member 5 which screws onto the end 2 of the head and which is provided with an inwardly projecting flange 6 at its outer end. The coupling mem-

ber 5 serves to detachably and pivotally connect the spray head to a tubular fitting 7 which has a ball shaped outer end 8 and an internally threaded inner end 9 which is adapted to screw upon the end of a water pipe 10. When the head is placed on the fitting 7 the ball end 8 is clamped between the flange 6 of the coupling 5 and a packing ring 11 fitting within the reduced portion 2 of the head, the coupling permitting universal movement of the head with respect to the fitting 7.

At the outer end of the cylindrical portion 3 of the head, there is a transverse partition plate 12 which is detachably secured to the internal shoulder at the outer end of the cylindrical portion 3 by means of screws 13. The partition plate 12 has a central depressed portion 14 in which there is an axial opening 15 which communicates through lateral passages 16 to the exterior of the partition plate. On the inner face thereof the partition plate is provided with a raised annular valve seat 17 around the central circular opening 15. The flaring outer end 4 of the spray head is closed by a plate 18 which has a marginal flange 19 which fits over the marginal edge of the flared portion 4. The plate 18 is provided with closely spaced jet apertures 20 and may be secured in place by any suitable means such as a screw 21 which secures the plate 18 at its center to the depressed portion 14 of the partition plate 12. The partition plate 12 divides the head into an inner chamber 22 and an outer chamber 23, the opening 15 and lateral passages 16 being of sufficient area to permit the free flow of water from the chamber 22 into the chamber 23 so that when the water is turned on a pressure will be created within the chamber 23 sufficient to force the water in jets through the small apertures 20 in the plate 18.

Adjacent the inner end 2 of the head there is a cross member 24 which may be cast integral with body 1. This cross member is provided with a central threaded opening 25 which receives a threaded projection 26 carried by a head 27 to which is attached the inner end of a thermally responsive bellows 28 which is sealed at its outer end by a head 29 which forms a valve engageable with the seat 17. The thermally responsive bellows 28 tends to expand and lengthen upon application of heat, causing the head 29 to move outwardly toward the valve seat 17. The bellows 28 is so regulated that when the temperature of the water within the chamber 2 approaches a scalding heat, head 29 will be forced into engagement with the seat 17, closing the opening 15 through which water is discharged into the

outer chamber 23. The chamber 22 exteriorly of the bellows 28 has a relatively small volume capacity, but it would, nevertheless, take considerable time for water trapped in the chamber 22 to cool sufficiently to permit opening of the valve after it is once closed. It is an important object of the present invention to provide means whereby, upon proper regulation of the hot and cold water valve, the water in the chamber 22 will be quickly replaced by water at lower temperature which will cause the valve 29 to open.

To permit quick displacement of the hot water in the chamber 22, a by-pass is provided for permitting a flow of water from the chamber 22 to the chamber 23, when the valve 29 is closed, at a rate which is slow enough so that a jet creating pressure will not be built up in the chamber 23, but fast enough so that hot water within the chamber 22 can be quickly replaced with water at lower temperature upon proper adjustment of the hot and cold water valves. This by-pass may be formed as illustrated herein by providing one or more notches 30 radially across the annular valve seat 17. The cross-sectional area of the notches will be sufficient to permit fairly rapid replacement of water in the chamber 22 but will be less than the combined area of the jet apertures 20 so that pressure will not be built up in the chamber 23 sufficient to form a spray. Water thus leaking through the by-pass into the chamber 23 will pass through the jet apertures 20 and dribble from the lower edge of the spray plate but will not form a spray.

The bellows 28 preferably operates with a partial vacuum so that, should the bellows 28 be damaged, breaking of the vacuum within the bellows will cause the bellows to expand and close the valve 28 so that it will be necessary to replace the bellows before the spray can be operated.

To remove the bellows it is simply necessary to remove the plates 12 and 18, detach the head from the fitting 7 and unscrew the head 27 from the cross member 24. To facilitate the mounting and removal of the thermally responsive bellows, the projection 26 is preferably provided with a diametrical screw driver groove 31, so that the head 27 can be quickly and easily screwed into or out of the cross member 24.

It will be apparent that the present invention provides a spray head for shower baths which will prevent injury to bathers by scalding water and which will permit the spray to be quickly resumed after the hot and cold water valves are properly adjusted.

Furthermore, it will be apparent that very little water is wasted after the hot and cold water valves have been adjusted to deliver water at a proper temperature to the spray head.

Furthermore, it is to be understood that the particular form of apparatus shown and described, and the particular procedure set forth, are presented for purposes of explanation and illustration and that various modifications of said apparatus and procedure can be made without departing from my invention as defined in the appended claims.

What we claim is:

1. A safety shower bath spray head having an open inner end for connection to a water pipe and an enlarged outer end provided with jet apertures, a transverse partition within the head dividing the head into inner and outer chambers, said partition having an opening through which water normally flows freely to the outer cham-

ber and a valve seat on its inner face around the opening, a movable valve member within the inner chamber having a face engageable with said seat, and thermally controlled actuating means for said valve member which is responsive to changes in temperature within the inner chamber and which operates to move the valve member into engagement with the seat when the temperature of the water passing through the head approaches a scalding temperature and to hold the valve in open position when the temperature of the water is safely below the scalding temperature, said valve member and seat being formed to provide a transverse passage across the seat to said opening for restricted flow of water from the inner chamber to the outer chamber when the valve member is in closed position, the passage forming portions of the valve and seat being washed by the water flowing between the sealing faces when the valve member is out of contact with the seat, the flow, when the valve is closed, being insufficient to build up a jet creating pressure in the outer chamber but serving to quickly discharge hot water trapped in the inner chamber, whereby the valve will be reopened and the spray resumed within a short interval of time after proper adjustment of the hot and cold water supply.

2. A safety shower bath spray head having an open inner end for connection to a water pipe and an enlarged outer end provided with jet apertures, a transverse partition within the head dividing the head into inner and outer chambers, said partition having an opening through which water normally flows freely to the outer chamber and a valve seat on its inner face around the opening, said seat having one or more grooves extending across the same, a thermally responsive bellows in said inner chamber having a head, the outer face of which conforms to the seat, said head being normally held in open position by said bellows and being moved by the bellows into engagement with the seat when the water in said chamber approaches a scalding temperature, whereby flow of water to the outer chamber is restricted to the passages formed between the head and grooved seat, the cross sectional area of the passages so formed being such that the flow of water therethrough is not sufficient to build up a jet creating pressure in the outer chamber but rapid enough to quickly discharge hot water trapped in said inner chamber, whereby the spray will be resumed within a short interval of time after proper regulation of the hot and cold water supply.

3. A safety shower bath spray head having an enlarged outer end and an open inner end for attachment to a water pipe, said head having an annular internal shoulder spaced from its outer end, a partition plate secured to said shoulder, said partition plate having a centrally disposed outwardly projecting chambered portion, said chambered portion having a single central opening to the inner face of the plate and lateral openings to the outer side thereof, said partition member having a seat on its inner face around said opening, a spray plate provided with jet openings covering the outer end of said head and secured to the central projecting portion of the partition plate, a valve member within the head inwardly of the partition plate mounted for movement into and out of engagement with said seat, said valve member and seat being formed to permit a restricted flow of water between the

valve member and seat when the valve member is in closed position, and thermally controlled actuating means for said valve member which is responsive to the temperature within the head in-  
5 wardly of the partition member and which operates to move the valve member into engagement with the seat when the temperature of the water passing through the head approaches a scalding temperature and to hold the valve in open position when the temperature of the water is safely below the scalding temperature.

ISADORE HERZBRUN.  
CHARLES F. SCHULTIS.