

J. E. ROSS.
EYE BATH.
APPLICATION FILED JULY 2, 1913.

1,121,667.

Patented Dec. 22, 1914.

Fig. 1.

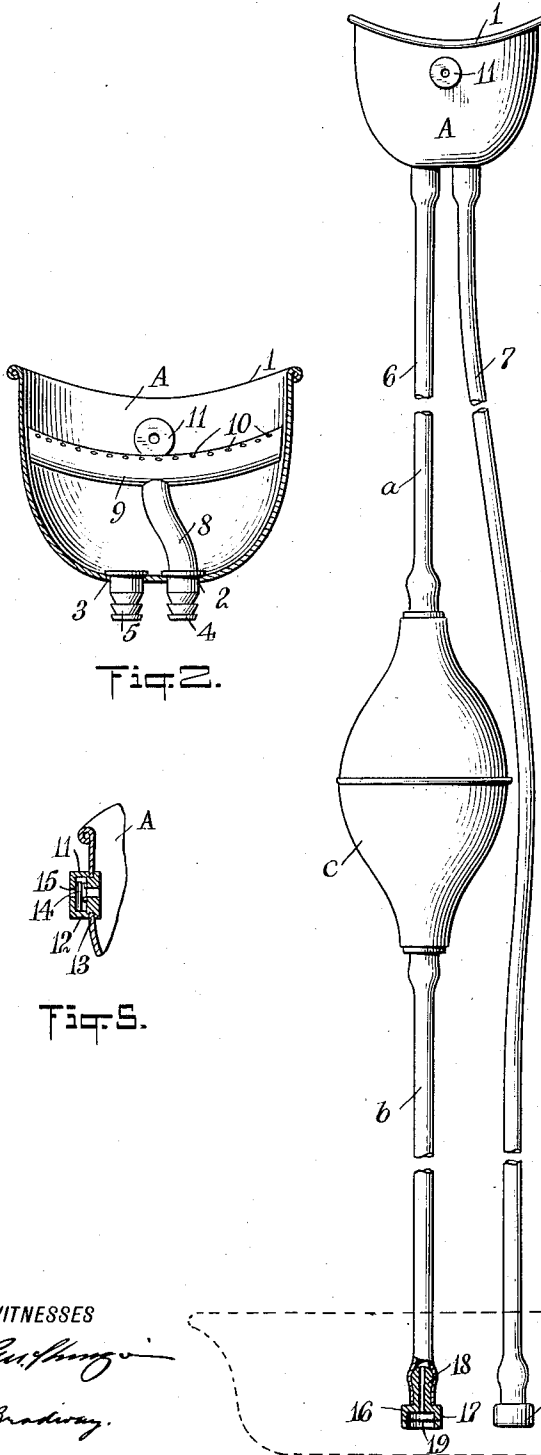


Fig. 2.

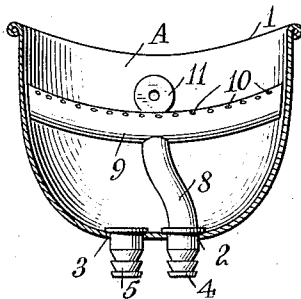


Fig. 3.

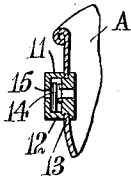
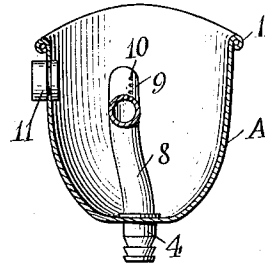


Fig. 5.



Fig. 4.

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EYE-BATH.

1,121,667.

Specification of Letters Patent.

Patented Dec. 22, 1914.

Application filed July 2, 1913. Serial No. 776,943.

To all whom it may concern:

Be it known that I, JUSTIN E. ROSS, a citizen of the United States, and a resident of Springfield, in the county of Greene and State of Missouri, have invented a new and Improved Eye-Bath, of which the following is a full, clear, and exact description.

This invention relates to eye baths of that type consisting of an eye cup combined with means for applying water or other liquid to the eye in the treatment of ocular affections.

The general objects of the invention are to improve devices of the character referred to so as to be more efficacious, reliable in operation, comparatively inexpensive to manufacture and so designed as not to become readily deranged.

Another object of the invention is the provision of an eye bath device including means for discharging water under pressure and in the form of sprays against the eye, whereby the hydrotherapeutic action of the water is made use of in the treatment of certain diseases of the eye.

Another object is the employment of a drainage means whereby the water can flow back from the cup to the source of supply so as to be used over again by the bulb or suction device which forces the water from the source of supply to the cup.

Another object is the employment of an air valve in the cup whereby air is free to enter the latter so that the water will drain out of the cup without creating a vacuum with its consequent injurious suction on the eye.

An additional object is to provide a pair of tubes which are attached to the cup, one for supplying the treating liquid and the other for drainage, both tubes having weights on their lower ends for submergence in the source of liquid, the weight on the supply tube being provided with a screen to exclude solid particles from entering the device from the water.

With these objects in view, and others as will appear as the description proceeds, the invention comprises various novel features of construction and arrangement of parts which will be more fully described hereinafter and set forth with particularity in the claims appended hereto.

In the accompanying drawing, which illustrates one embodiment of the invention,

and wherein similar reference characters are employed to designate corresponding parts throughout the several views, Figure 1 is a side view of the device with portions of the supply and drainage tubes broken away; Fig. 2 is an enlarged sectional view taken longitudinally of the cup; Fig. 3 is a transverse sectional view of the cup; Fig. 4 is a bottom view of the combined weight and screen for the inlet end of the supply tube; and Fig. 5 is a detail view of the air valve of the eye cup.

Referring to the drawing, A designates an eye cup which may be made of metal or any other suitable material and so shaped at its brim 1 that the cup can be firmly applied to the eye to be treated without danger of water leaking out of the cup and running down the face. In the bottom of the cup are openings 2 and 3 in which are fitted nipples 4 and 5 respectively for connection with the supply and drainage conduits 6 and 7. The nipple 4 has a hollow extension or stem 8 which carries on its upper extremity a spray head 9 which is in the form of an arcuate tube extending longitudinally of the cup and having fine perforations 10 arranged in a row or any other suitable manner so that water can be sprayed on the eye. The apertures 10 discharge downwardly at an angle so that the water will strike the closed upper eyelid slightly above its margin, the water being caught by the cup A and discharged out of the nipple 5 and drain conduit 7. Arranged in the portion of the cup A which will be disposed at the top when the cup is applied to the eye is an air valve 11 so constructed as to admit air to the cup, whereby the water is permitted to drain freely from the latter without creating a vacuum. This valve 11 may be of any suitable construction but, as shown in Fig. 5, consists of a casing 12 fitted in an opening 13 in the top side of the cup and in the chamber of this casing is a disk 14 or equivalent means which is adapted to uncover the port 15 and admit air to the cup.

The supply conduit 6 consists of two sections *a* and *b* of rubber or other tubing of any suitable construction, and between the sections *a* and *b* is a pumping device in the form of a rubber bulb *c* having the usual suction and outlet valve, for instance, not shown. The lower end of the section *b* is adapted to be placed in a basin or other

receptacle B shown by dotted lines, Fig. 1, and water is sucked up through the section *b* of the conduit 6 by the expansion of the bulb *c* after the latter has been compressed. The water thus sucked into the bulb is, upon the next compression of the latter, forced upwardly through the section *a* and through the spray head 9, whereby the water is sprayed against the eye to be treated. To hold the lower end of the supply conduit 6 submerged in the source of water B, the lower extremity of the section *b* is provided with a combined weight and screen 16 which is formed with a hollow annular body 17 and a nipple 18 over which latter the tubular member *b* is applied, and in the annular body portion 17 is a piece of wire netting 19, as shown in Fig. 4, so that solid particles cannot be sucked into the device. A weight 20 similar to the device 16 with the exception of the screen 19 is applied to the lower end of the drainage conduit 7, which may also be a piece of flexible rubber or other tubing. The conduits 6 and 7 are substantially of the same length so that while the cup is applied to the eye the lower ends of the conduits will be in the same source of water B, so that the water after being sprayed on the eye can be drained back to the source and be used over again.

This instrument is intended to be operated over closed eyelids only and never on the exposed globe of the eye. The valve is adapted to work in conjunction with the spray to prevent the jets of water from entering the fissure of the closed lids for the following reason: Should a vacuum form because of the water flowing out of the return tube, the eyelids would be sucked in and their margins partially everted so that the water at the succeeding injection would enter beneath the lids and cause irritation of the lining membrane or conjunctiva. It is not the direct effect, but the indirect effect of the valve that is necessary to the proper working of this instrument. The direct effect is to prevent vacuum formation in the cup, the indirect effect by preventing vacuum formation is to prevent the eversion of the eyelids, which would allow water to enter beneath them and cause irritation. The inflow of water under normal operating conditions is such that it is greater than the outflow until the eye cup becomes full, when the inflow and outflow become equal for a moment, and then the inflow ceasing, the outflow alone is operative. The perforations in the transverse member are placed slightly below the median line of the transverse tube and directed downward, so that the jets of water therefrom will have a downward direction, striking the closed upper eyelid at an angle slightly above its margin, thereby producing a frictional, massaging effect essential to the purpose of

this instrument. These perforations are purposely arranged in a horizontal row, and so located in the tube below its median longitudinal plane, and directed downward, as to cause the jets to impinge on a sharply limited area of the lid (a frequent seat of inflammatory diseases of the lids) and not broadcast over the eye. The particular area of the lid, for the treatment of which this construction was largely kept in view, is that portion of the upper lid $\frac{1}{4}$ inch wide along its free margin and extending from internal to external canthus. This area is the site of marginal or ciliary blepharitis, an inflammatory disease of the lids. Another advantage obtained by directing the jets of water downward at an angle and causing them to glance off the lid, is to cause a whirling motion in the accumulated water in the cup, thereby retarding its outflow and so causing the cup to become full of water. It is essential that the cup become full, or nearly full of water in order that a sufficient volume may come in contact with the entire area of the lids to produce the desired cooling effect when treating extensive inflammatory diseases of the lids. Because of this particular construction of the spraying device, this jetting, frictional and cooling effect is obtained. The longitudinal curvature of the transverse perforated tube (approximately that of the eye) is essential so that the perforations near the end of the tube will be the same distance from the lids as the perforations at the middle, so that the jets of water issuing therefrom will strike the lid at the same downward angle as the jets at the center of the tube, and not at different angles as they would were the tube straight, because the perforations at the ends of a straight tube would be farther from the eye. By the use of a hand bulb in this construction intermittent injections are obtained which have a more stimulating effect than when the water flows continuously, and thus contributes to the salutary effect of the instrument. By this particular arrangement of elements an operative cycle is obtained that produces hydrotherapeutic effects not obtainable with any similar instrument. The cycle begins with the spray impinging on the closed lid. At this period the cup is empty and the spray strikes the lid with considerable force producing the beneficial, stimulating effects of water when sprayed under pressure. Immediately after the beginning of the spray the cup begins to fill with water and this accumulated water takes on a rotary motion owing to the direction of the jets, and this rotary motion prevents the rapid outflow of the water so that the cup becomes full or nearly full of a whirling volume of water that bathes and cools the lids over their entire extent. The hand bulb that in-

jects the water now being empty the inflow ceases and the water drains from the cup ending the cycle. The cup being empty is now ready for a new injection.

5 From the foregoing description taken in connection with the accompanying drawings, the advantages of the construction and method of operation and of the device shown will be readily understood by those skilled in the art to which the invention ap-
10 pertains, and while I have described the principle of operation, together with the device which I now consider to be the best embodiment thereof, I desire to have it
15 understood that the device shown is merely illustrative, and that such changes may be made when desired as are within the scope of the appended claims.

20 Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. An eye bath comprising a cup, a tubular spraying element disposed within the cup and extending from one side thereof to
25 the other and approximately parallel with the front side of the cup, said element having spaced apertures so arranged as to direct sprays of liquid against the margin of the closed eyelid, means for supplying liquid
30 to the middle of the said element, and means

for draining off the liquid from the cup while treating the eye.

2. An eye bath comprising an approximately elliptical cup, a curved tubular element approximately of the same curvature 35 as the curvature of the closed eye lid extending longitudinally of the cup and having apertures for spraying liquid downwardly at an angle to the margin of the closed upper eyelid, means for supplying 40 liquid to the said element, a drainage device for conducting liquid away from the cup, and an air valve arranged in the top side of the cup.

3. An eye bath comprising a cup, a hori- 45 zontal tube curved parallel with the eye lid and having a plurality of jet apertures discharging downwardly and forwardly whereby the jets strike the lower margin of the upper closed eye lid and glancing off pro- 50 duce a rotary motion of the liquid collected in the cup.

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

JUSTIN E. ROSS.

Witnesses:

JOHN L. YOUNG,
F. GUY EVANS.