July 19, 1966 H. BURBIG 3,261,355

AERATED EYE CUP WITH AIR STORAGE VESSEL

Filed March 11, 1964

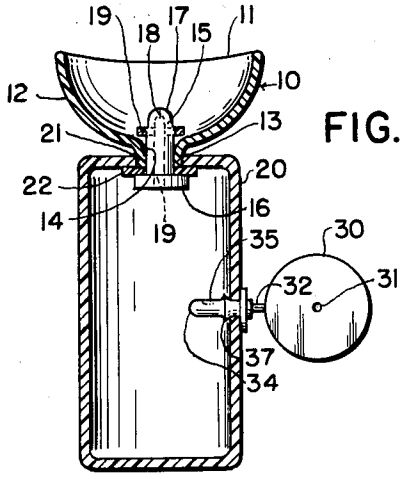



FIG. 1

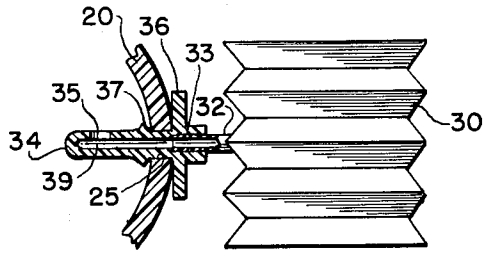



FIG. 2

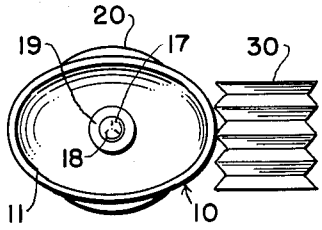



FIG. 3

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United States Patent Office 3,261,355 Patented July 19, 1966



# 3,261,355
# AERATED EYE CUP WITH AIR STORAGE VESSEL

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Filed Mar. 11, 1964, Ser. No. 350,979
2 Claims. (Cl. 128—249)

This invention relates to improvements in aerated eye cups in which the liquid within the eye cup is adapted to be continuously aerated so that the eye can be washed with liquids which can be agitated by air and which contain minute air bubbles.

The idea of agitating the liquid in an eye cup with air so that it is not necessary to throw the head back to cause the liquid to bathe the eye, is not new. The idea is disclosed, for example in Sager's Patent No. 1,900,201, Watrous' U.S. Patent No. 2,524,720 and De Felice's U.S. Patent No. 2,818,068. The present invention involves a different construction by which air is fed to the eye cup in a uniform and continuous manner and in which the rate of feed of air to the eye cup can be fairly well controlled by the operator.

Among the objects of the invention therefore is to provide an improved aerated eye cup constructed so as to feed air to the eye cup in a continuous and uniform manner.

The objects of the invention are attained by providing an eye cup with valve means for supplying air projecting into it, a means for providing air under pressure, and an air pressure chamber between the eye cup and the air-pressure-supplying-means. The means for providing air pressure is connected by a one way valve to the air pressure chamber and the valve projecting into the eye cup is a one way valve with its inlet end connected to the pressure chamber. The valve means projecting into the eye cup is constructed and arranged to have a smaller capacity for passing air than the valve of the air pressure supplying means to the chamber, so that air pressure can be built up in the chamber. This latter effect can be obtained in various ways. Where both valves are constructed in the same way, for example, the outlet openings of the eye cup valve can be smaller and/or fewer in number than the outlet openings in the air-pressure-providing valve or where elastomeric, one-way valves are employed, the valve in the eye cup can be made of thicker or stiffer material than that attached to the pressure supply means.

Other and more detailed objects and advantages of the present invention will become apparent from the following specification and appended claims when taken in connection with the accompanying drawings, in which:

FIG. 1 is a cross-sectional view in side elevation of an aerated eye cup made according to the invention.

FIG. 2 is an enlarged detail view of the air pressure device of FIG. 1 taken from above the same.

FIG. 3 is a top plan view of the device.

The device of the invention comprises the eye cup **10**, the pressure vessel **20** and the pressure supplying means **30**. The eye cup **10** has the conventional smooth top rim portion **11**, the bowl portion **12** and includes a short tubular portion **13** including an opening **14** at the lower end adapted to fit snugly into the opening **21** of the pressure vessel **20**. Extending upwardly from the interior of the vessel **20**, through the opening **14**, is the one way valve means **15** comprising a lower flange portion **16**, and an upper bulbous portion **17**, which contains one or more slits **18**. Passageway **19** extends from the flanged end **16** up to the interior edges of slots **18**. The valve **15** is held in position and in turn holds the cup **10** in position by means of washer **22**. The flange end **16** and washer



**22** are preferably of such a size that they can be forced through opening **21** of vessel **20**.

The cup **10** may be constructed of metal or plastic material, while the valve **15** is constructed of flexible or elastomeric plastic material so that said valve **15** is one way, in the sense that liquid or air does not pass from the outside through said slots **18** while air under pressure applied through the passageway **19** can escape through said slots **18**.

The pressure vessel **20** may be constructed of glass, metal, stiff plastic or flexible plastic material. When several of the parts including the vessel **20** are constructed of plastic material, a more secure connection can be obtained by ultrasonic or similar frictional welding techniques or by heat and pressure. An additional washer **22** may be inserted between flange **16** and the edges of opening **21** of vessel **20**.

The pressure supplying means **30** is shown as a small plastic bellows having an opening **31** at one or both ends which the fingers close in the act of applying pressure to the same. When said bellows **30** is collapsed with said opening **31** closed, the compressed air from inside the bellows is forced through tube **32**. Other conventional types of pressure means, such as syringes, bulbs, etc., may be substituted for the bellows **30**. The tube **32** from bellows **30** extends into a valve means **33** comprising a passageway extending from the outside up to the bulb end **34**. The bulb end **34** contains one or more slits **35** connecting to said passage **39**. The valve member **33** contains an outer flange portion **36** and preferably includes a ridge portion **37** which can be forced through the opening **25** of vessel **20**.

As indicated above, the size and number of slits **35** in valve **33** is somewhat greater than the size and number of slits **18** in valve **15** and preferably this difference is substantial so that the valve **33** is constructed to deliver substantially greater amounts of air per unit of time than valve **15**. This permits one to store adequate amounts of air under pressure in vessel **20** so that the flow of air from valve **15** lasts for a considerable time without interruption. In devices where a pressure supplying air bulb is connected directly to an eye cup, the flow of air to the latter is interrupted each time pressure on the bulb is released and the amount of air pressure that can be supplied is limited since, when the bulb is released and allowed to expand, the pressure inside the same is never greater than the surrounding atmospheric pressure. With the device of the present invention, the air pressure in vessel **20** can be maintained above atmospheric pressure for as long a period as desired and pressure can be built up in said chamber **20** by operating bellows **30**, until the degree of agitation desired is obtained in the eye cup **10** and this amount of agitation can be maintained as long as desired by continuing to operate bellows **30**.

The features and principles underlying the invention described above in connection with specific exemplifications will suggest to those skilled in the art many other modifications thereof. It is accordingly desired that the appended claims shall not be limited to any specific feature or details thereof.

I claim:

**1.** An eye bathing device of the type supplying air agitation to the bathing liquid, the improved construction comprising in combination,

an eye cup, an air pressure supplying means and an air pressure vessel between the eye cup and the pressure supplying means,

means connecting said air pressure supplying means to the pressure vessel comprising a first one way

valve constructed and arranged to feed air into said air pressure vessel but not out of said vessel,

means connecting said air pressure vessel to said eye cup comprising a second one way valve constructed and arranged to feed air to an internal portion of said eye cup but not into said pressure vessel,

the capacity of said first one way valve to feed air per unit of time being greater than the capacity of said second one way valve whereby pressure may be stored in said pressure vessel.

2. The eye bathing device as claimed in claim 1 in which said air pressure supplying means is a bellows device.



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