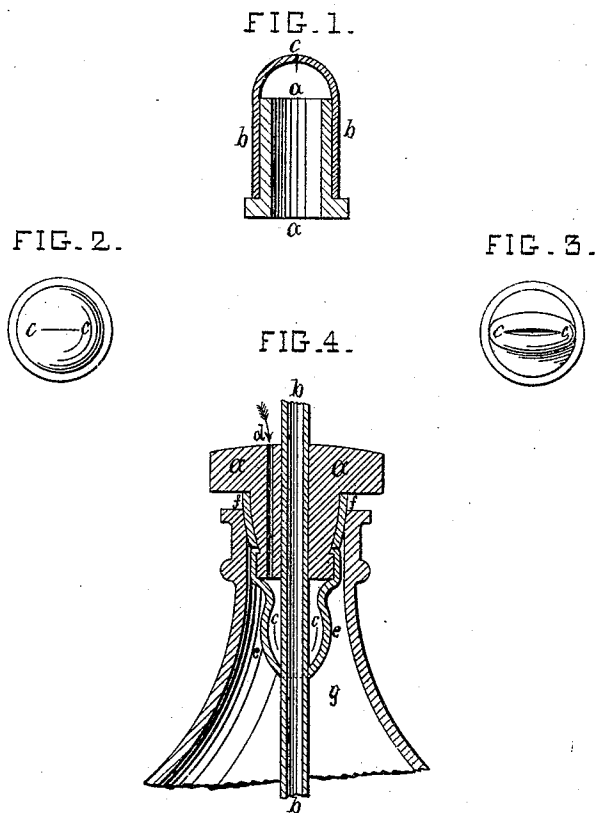


A. M. & H. KNAPP.
NURSING BOTTLE VALVES.

No. 179,204.

Patented June 27, 1876.



WITNESSES.

Frank W. Shattuck
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ALBERT M. KNAPP AND HORACE KNAPP, OF PROVIDENCE, RHODE ISLAND.

IMPROVEMENT IN NURSING-BOTTLE VALVES.

Specification forming part of Letters Patent No. **179,204**, dated June 27, 1876; application filed March 20, 1876.

To all whom it may concern:

Be it known that we, ALBERT M. KNAPP and HORACE KNAPP, both of Providence, State of Rhode Island, have invented certain Improvements in Air and Liquid Valves, of which the following is a specification:

The nature of our improvement consists in constructing an air or a liquid valve by the use of a soft elastic rubber tube cap, bulb, or ball, upon the end or sides of which are cut fine lineal divisions. When suction is applied upon the exterior surface, or pressure upon the interior, air or liquids will be drawn or forced through the fine divisions, but cannot be forced back through the divisions to the interior.

A device thus constructed, and properly supported upon its interior surface, will perform the office of an air or a liquid valve in a more perfect, and simple manner than other valves in common use upon vacuum-cups, air-pumps, nursing-bottles, soft-rubber bulb, syringes, or atomizers.

Valves made of oiled silk and bladder are less durable, are more difficult to adjust, are very liable to get out of repair, often stick down, and require extra care in order to prevent leakage.

The improved valve will not leak, cannot stick down, cannot be easily disarranged, is simple in its construction, perfect and convenient in its adaptation.

Used as an air-valve over the vent, in vented nursing-bottles, it regulates atmospheric pressure upon the contents of the bottle, and also prevents leakage through the vent. Used upon a nursing-bottle in connection with Knapp's patent soft-rubber nipple (patented September 14, 1875) there can be no leakage either through the vent or through the tube or nipple. Such an application does not interfere with nursing, and is very convenient, since a bottle full of milk can be carried among clothing, &c., in any position without spilling, or will not soil an infant's dress or covering when in the act of nursing.

Figure 1 in the accompanying drawings shows a sectional view of a certain form of the improved valve.

a a is an internal support to the sides of the rubber cap *b b*. *c c* shows a lineal division of the rubber cap *b b*. The support *a a* is a hollow cylinder of larger dimensions than its rubber covering, in order that said cap will stretch tightly over and be retained in position.

Fig. 2 shows the condition of a lineal division in the rubber valve before suction or internal pressure is exerted upon it. Fig. 3 shows the effect of pressure or suction upon the same. Fig. 4 shows the arrangement of the improved valve upon vented nursing-bottles.

e e is the valve partially supported by the stopper *a a*, and partially by the tube *b b*. *c c* are the lineal openings in the side of the rubber. *d* shows the air-vent passing through the stopper *a a*. Said vent *d* affords the only entrance of air to the interior of the nursing-bottle when the stopper is properly inserted in the bottle. Suction applied at the end of the tube *b b* without the bottle causes air to pass through the vent *d*, as indicated by the arrow, to the interior of the valve *e e* when pressure is exerted by the air upon the cuts *c c*, opening them and restoring the equilibrium. *f f* is a piece of rubber tubing forming part of the stopper *a a*. *g* is a partial section of a bottle.

We claim as our invention, and desire to secure by Letters Patent—

The soft-rubber cap, with the lineal divisions *c c* placed in connection with the cork or stopper *a a*, and the vent *d* surrounding the tube *b b*, as shown in Fig. 4 of accompanying drawing, used in connection with nursing-bottles, as herein described, and for the purpose set forth.

ALBERT M. KNAPP.
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Witnesses:

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