

[54] BREAST PUMP

[76] Inventor: Patricia B. Davisson, 15 Summit Rd., Wellesley, Mass. 02181

[22] Filed: Feb. 13, 1973

[21] Appl. No.: 332,062

[52] U.S. Cl. 128/281

[51] Int. Cl. A61m 1/06

[58] Field of Search 128/280-282, 128/299-301

[56] References Cited

UNITED STATES PATENTS

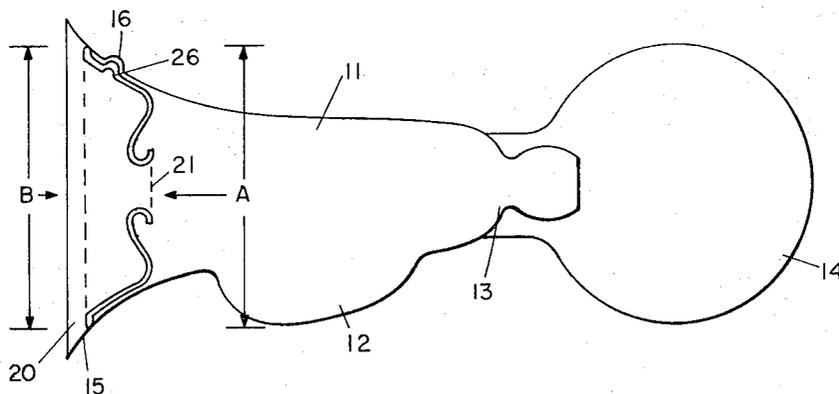
897,289	9/1908	Howell.....	128/281
940,454	11/1909	Fowler.....	128/281
1,101,973	6/1914	Tatum.....	128/281
2,542,505	2/1951	Gascoigne.....	128/281

Primary Examiner—Charles F. Rosenbaum
Attorney, Agent, or Firm—Susan M. Cooke

[57] ABSTRACT

A breast pump is disclosed for use in stimulating lactation, particularly of the female human breast. The pump is equipped with a hollow chamber having a breast receiving opening adapted to engage at least the nipple area and means for pressurizing and depressurizing said chamber when in engagement with the breast. The chamber's breast receiving opening is fitted with a diaphragm having an aperture large enough for only the nipple area to extend through, said diaphragm being comprised of elastic material capable of vibrating back and forth in response to the pressurization and depressurization of the chamber when said diaphragm is in engagement with the breast.

7 Claims, 3 Drawing Figures



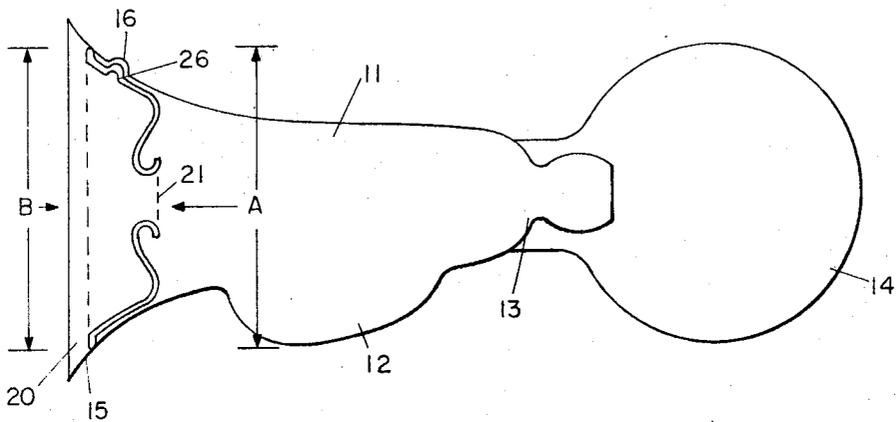


FIG. 1

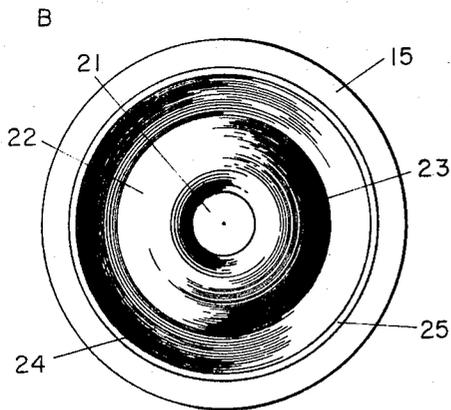


FIG. 2

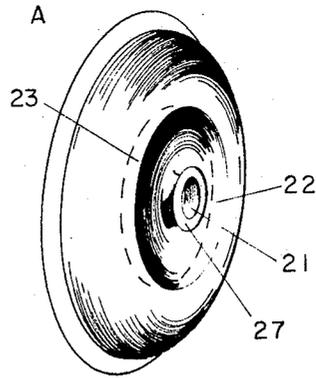


FIG. 3

BREAST PUMP**BACKGROUND OF THE INVENTION****1. Field of the Invention**

The present invention is concerned with apparatus adapted to stimulate lactation, particularly of the female human breast.

2. Description of the Prior Art

Artificial evacuation of milk from the lactating breast is generally accomplished by means of a breast pump. The simplest pumps include a trumpet shaped cone fitting upon the breast in an essentially airtight manner and pumping means such as a rubber bulb at the apex of the cone which is repeatedly squeezed and released. The resultant pressure and suction maintained upon the breast stimulates lactation, but only with painful distention of the breast as it is sucked into the cone.

This painful distention does not normally occur when nursing a baby. To better imitate the sucking action of a nursing baby, far more elaborate devices than that described above have been proposed and patented. For example, the breast pump in U.S. Pat. No. 2,542,505 includes a multichambered cone operated by a vacuum pump and a pneumatic pulsator such as a cow milking machine. The double walled, trumpet shaped cone is divided into three sections which apply suction or pressure to the breast. The section where suction is applied comprises the area within the cone's inner wall. The other two sections which exert pressure upon the breast form two concentric chambers located between the inner and outer walls. These chambers are separated by an oval shaped rubber partition, one chamber being situated around the flaring base rim and one within the cone proper. The inner wall of the cone covering these chambers, which is formed of a flexible material such as rubber, ends in a tube extending through the cone apex. This tube is connected to a vacuum pump. The two concentric chambers between the cone walls are connected to a pulsator which alternately pressurizes and evacuates them. When the cone is fitted upon the breast the flexible inner wall transmits their pulsations to the nipple and surrounding area. During evacuation of the inner pulse chamber, suction is applied to the breast through the rubber tube.

While such a breast pump may more closely approximate the sucking action of a nursing baby, it is both expensive and complicated in design and operation. Not only is a multichambered cone necessary to exert suction and pressure simultaneously, but such operating equipment as a vacuum pump and a mechanical pulsator are also required in carrying out this invention.

One object of this invention is therefore to provide a breast pump that is both simple and economical in design and easy to operate.

Another object is to provide a breast pump which closely simulates the sucking action of a nursing baby.

A further and most important object is to provide a breast pump designed to substantially eliminate painful breast distention.

SUMMARY OF THE INVENTION

In the present invention a hollow chamber is provided with an opening to engage at least the nipple area of the breast in an essentially airtight manner. The chamber is equipped with pumping means for pressurizing and depressurizing the chamber during operation

and its breast receiving opening is fitted with a diaphragm having an aperture large enough for essentially only the nipple area to extend through. This diaphragm is comprised of an elastic material capable of vibrating back and forth in response to changes in chamber pressure.

These changes in chamber pressure which stimulate lactation are thus transmitted to the breast via oscillations in the diaphragm wall. But the wall and the size of its aperture at the same time prevents the breast from being sucked into the chamber so that painful distention is essentially eliminated during lactation.

Furthermore, this membrane not only helps to support the breast during lactation, but its oscillations also press and suck upon the area surrounding the nipple as is done by a nursing baby.

Rather than a multichambered device with a complicated pumping system, all that is necessary is a single chamber which may be pressurized and depressurized by means as simple as a rubber bulb.

BRIEF DESCRIPTION OF THE DRAWINGS

For a fuller understanding of the nature and objects of the invention, reference should be made to the following detailed description taken in conjunction with the drawings wherein:

FIG. 1 is a cross sectional view of a preferred embodiment of the present invention.

FIG. 2 is a frontal view of a preferred embodiment of the present invention.

FIG. 3 is a transverse view of the diaphragm wall utilized in a preferred embodiment of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

A practical embodiment of this invention as illustrated in FIG. 1 comprises a generally trumpet shaped hollow cone, 11, of rigid plastic or other suitable material equipped with a milk reservoir, 12, projecting along the side. The cone apex, 13, is provided with a small opening and is molded to fit closely within a rubber bulb, 14, which is squeezed and released to pressurize and depressurize the cone chamber when the latter is placed upon the breast in an essentially airtight manner. The flaring open base of the cone, 15, is fitted with a diaphragm, 20, of an elastic material such as rubber which flexes in and out in response to the suction or pressure within the cone chamber. The diaphragm wall is equipped with a centrally disposed aperture, 21, large enough to admit only the nipple area when the cone is fitted upon the breast.

As seen in FIG. 1, the diaphragm wall encircling this aperture may form a generally sigmoid shaped curve in cross section. As explained below, such a shape is most advantageous in protecting against breast distention. To assure that the diaphragm remains firmly engaged during operation, it may be equipped with a projecting rim, 26, fitting into a corresponding groove, 16, provided within the opening of the cone base. If the rim and groove are omitted from the wall and side of the cone adjacent to the milk reservoir, then this portion of the diaphragm can be withdrawn to empty out the reservoir without completely disengaging the wall from the cone.

A frontal view of the pump's breast receiving opening is shown in FIG. 2. As seen at B from the breast receiv-

ing side of the diaphragm, the central aperture through which the nipple extends is preferably encircled by a raised crown, 22, of wall material to firmly engage the area surrounding the nipple and provide surface area for reproducing the size, shape and action of a nursing baby's mouth. Beyond the recessed area located around the crown's outer edge, 23, the diaphragm wall again slopes up, 24, to conform to the shape of the flaring cone base before flattening out to form the outer margin, 25.

When cone 11 is fitted upon the breast with the nipple area extending through aperture 21 and bulb 14 is squeezed, pressure within the cone chamber forces out inwardly curving wall portion 23. This tends to flatten out part of the curved diaphragm wall, thus forcing the central aperture to tighten its grasp upon the nipple area. When bulb 14 is released, suction within the cone chamber now draws in the elastic diaphragm at crown 22, again tightening the aperture's hold upon the nipple and preventing the breast from being sucked into the cone most effectively.

A transverse view of the diaphragm membrane without a chamber engaging rim is illustrated in FIG. 3 as seen from its opposite side, A. To further ensure against distention resulting from suction of the breast into the pump chamber, diaphragm aperture 21 may be surrounded by a nipple guide, 27. This ring of elastic material extends into the cone chamber from the elevated crown on the opposite breast receiving side of the wall. It may then flatten out to form a lip around its rim on side A. Because this entire ring of material can act to retain the nipple, such a nipple guide would be included in an especially preferred embodiment of this invention. Furthermore, this extension from crown 22 also provides more surface area for massaging and squeezing the breast in the manner of a nursing baby.

Although a rubber bulb is depicted as the pumping means in the accompanying drawing, other pumping devices may of course be employed. For example, an electric pump such as that available from the de Vibliss Company may be utilized, a small cone being outfitted with that portion of the diaphragm shown within the dotted line in FIG. 3, including recess 23 and all parts of the membrane therein. Alternative methods of storing the milk are also contemplated, as by draining the milk out of the pump chamber via a tube to a bottle.

Since other changes may be made in the above apparatus without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

What is claimed is:

1. Apparatus for stimulating lactation which comprises, in combination:

- a. a hollow chamber having an opening adapted to engage at least the nipple area of the breast in an essentially airtight manner;
- b. means for alternately pressurizing and depressurizing said chamber when in engagement with the breast; and
- c. a diaphragm fitted to said chamber opening, said diaphragm being comprised of elastic material capable of vibrating back and forth in response to the pressurization and depressurization of said chamber when in engagement with the breast and said diaphragm having an aperture large enough to admit essentially only the nipple area of the breast, which aperture is encircled by an elevated crown of diaphragm material on the breast engaging side of said diaphragm, said crown flattening out as it is drawn into said chamber during chamber depressurization so as to decrease the size of said diaphragm aperture and thereby tighten said aperture's hold upon the nipple.

2. The apparatus of claim 1 wherein said hollow chamber is generally conically shaped with a breast engaging opening at the cone base and is provided with pumping means for pressurizing and depressurizing said chamber at the cone apex, and said diaphragm possesses a centrally disposed aperture encircled by a ring of diaphragm material extending into said chamber from the elevated crown on the breast engaging side of said diaphragm.

3. The apparatus of claim 2 wherein said hollow chamber is a generally trumpet shaped cone and said diaphragm fits within the base opening of said cone chamber, the elevated crown of said diaphragm being encircled by a recessed area of diaphragm material on the breast engaging side of said diaphragm.

4. The apparatus of claim 3 wherein an electrically driven pumping means is employed.

5. The apparatus of claim 3 wherein said recessed area of diaphragm material on the breast engaging side of said diaphragm is encircled by an upwardly flaring lip of diaphragm material substantially conforming to the shape of and recessed within the breast engaging opening of said cone chamber.

6. The apparatus of claim 5 wherein a projection along one side of said cone chamber is provided to serve as a milk reservoir and the pumping means comprises a rubber bulb fitted over the cone chamber apex, which bulb can be operated by being manually squeezed and released.

7. The apparatus of claim 6 wherein said diaphragm includes a projecting rim located near and substantially encircling said diaphragm's outer margin, said rim fitting into a corresponding groove within the breast engaging opening of said cone chamber.

* * * * *