

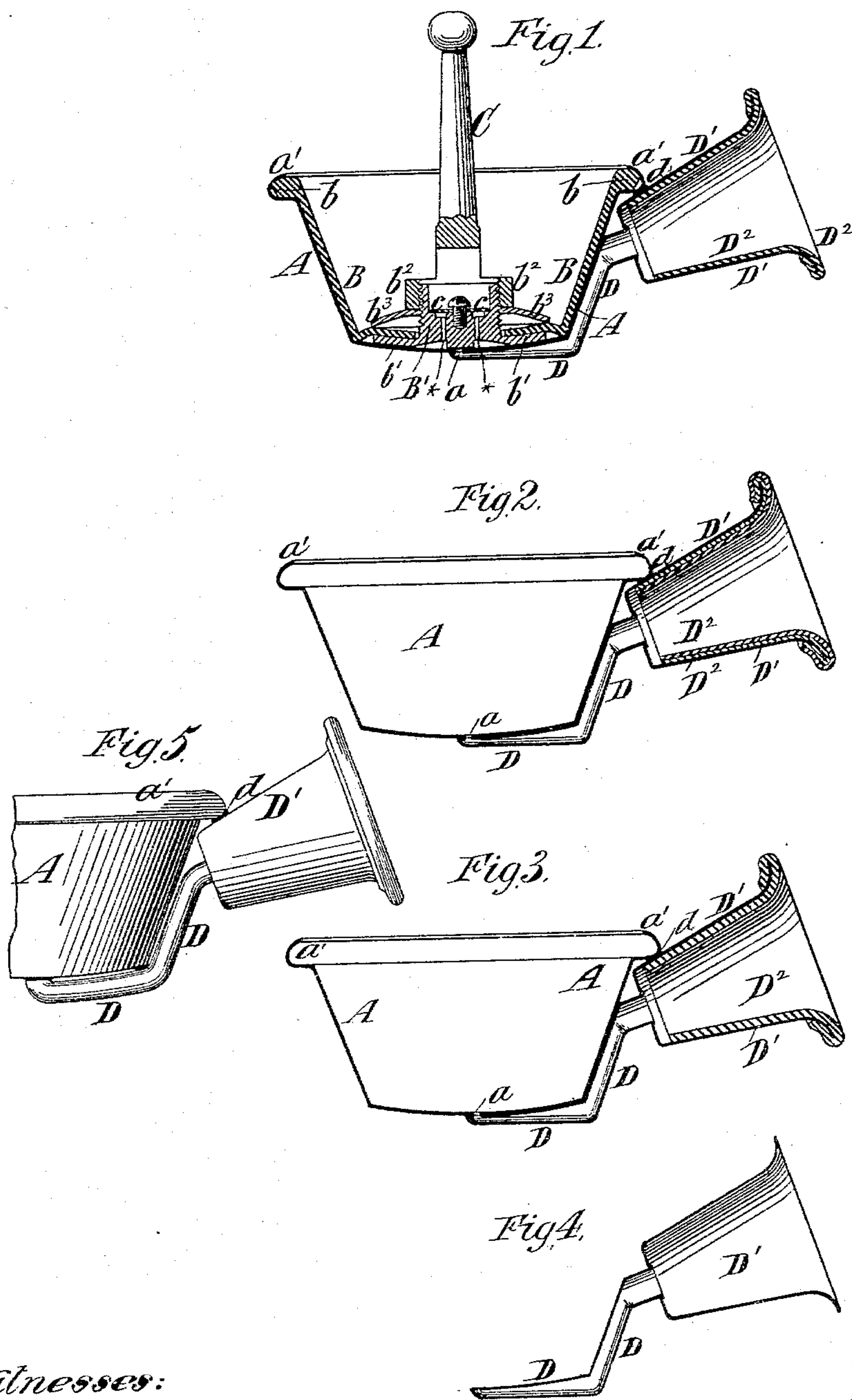
(No Model.)

A. A. DURAND.

BREAST PUMP.

No. 331,952.

Patented Dec. 8, 1885.



Witnesses:

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UNITED STATES PATENT OFFICE.

ALBERT A. DURAND, OF NEW YORK, N. Y.

BREAST-PUMP.

SPECIFICATION forming part of Letters Patent No. 331,952, dated December 8, 1885.

Application filed April 27, 1885. Serial No. 163,497. (No model.)

To all whom it may concern:

Be it known that I, ALBERT A. DURAND, of the city and county of New York, in the State of New York, have invented a certain
5 new and useful Improvement in Breast-Pumps, of which the following is a specification.

My invention relates to those breast-pumps which consist of a pump chamber or cup and a diaphragm fitted therein and having
10 projecting from it a stem or rod, which may be swung from side to side or canted to produce the operative movement of the diaphragm, the chamber or cup having connected with it a
15 tube or passage provided at the outer end with a nipple-socket.

One important object of my invention is to provide for adapting the nipple-socket to different-sized nipples, and thereby avoid any
20 distention of the nipple, which is caused if the socket applied thereto, is too large and which is extremely painful.

To this end my invention consists in the combination, with a pump chamber or cup and its diaphragm, of a nipple-socket connected
25 therewith, and a lining piece or thimble of flexible material provided in said socket and made of a size and shape to conform to and fit against the interior of the nipple-socket throughout the length of the lining-piece.
30 These lining-pieces may be of various thicknesses, according to the reduction of size in the socket required, and they may be removable, so that lining-pieces of different thicknesses may be introduced, or so that they may be
35 placed one inside the other within the nipple-socket.

The invention also consists in the combination, with a pump chamber or cup and its diaphragm, of an inlet-tube attached to the
40 exterior of the chamber or cup and extending along the bottom thereof to the inlet-opening, a nipple-socket rigidly connected with the outer end of said tube, and a connection between said nipple-socket and the outer or
45 open end of the pump chamber or cup, whereby I produce a simple and strong apparatus wherein the pump chamber or cup, the inlet-tube, and the nipple-socket are connected to form one integral structure.

50 In the accompanying drawings, Figure 1 represents a sectional elevation of a breast-

pump embodying my invention, the nipple-socket being represented as provided with a single lining-piece. Fig. 2 represents a similar section of a pump chamber or cup and a
55 taper nipple-socket, said nipple-socket having two lining-pieces inserted therein. Fig. 3 represents a section similar to Fig. 2, the nipple-socket being provided with a single lining-piece thicker than that shown in the other figures. Fig. 4 represents a section of an inlet-tube
60 and nipple-socket alone. Fig. 5 shows nipple-socket and tube attached to the pump.

Similar letters of reference designate corresponding parts in the several figures. 65

A designates the pump chamber or cup, which may be advantageously made of sheet metal, and which has at its bottom an inlet opening or perforation, *a*, through which liquid
70 may enter it. To the pump chamber or cup is fitted a flexible diaphragm, B, of india-rubber or other suitable material, having an outwardly-extending bead, *b*, at its upper edge, over which the edge portion of the cup A is turned inward, as shown at *a'*, thereby securing
75 the diaphragm in place.

B' designates the center piece or body secured to the diaphragm. It has an outwardly-projecting flange, *b'*, which underlies the diaphragm, and a screw-threaded shank or neck, 80 upon which is secured a nut, *b*². A washer, *b*³, is placed below this nut, and by tightening the nut the diaphragm B may be clamped between the flange *b'* and the washer *b*³.

In the center piece or body, B', are holes or 85 openings * for the passage of fluid, and which are closed at their upper ends by a valve, *c*, of any suitable construction. The nut *b*² has formed integral with it a handle or stem, C, which may be swung or oscillated from side to
90 side, and the canting action thereby produced will lift the diaphragm in order to produce an exhaustive action, and will then depress or collapse the diaphragm in order that the milk may be discharged through the perforations *
95 and valve *c*.

D designates an inlet pipe or tube, which is of angular form, so as to fit the bottom of the pump chamber or cup A and side thereof a
100 considerable distance above the bottom, and which communicates with the central inlet-opening, *a*, and with the outer end of the tube

D is rigidly connected, by solder or otherwise, a nipple-socket, D', thereby forming a tube and socket in one integral structure, and for the sake of greater security the nipple-socket is connected by solder or otherwise at *d* with the pump chamber or cup A. The nipple-socket D' should be of a size large enough to receive the largest nipple, and I have represented it as provided with a lining piece or
 10 thimble, D², which is to be made of india-rubber or other flexible material. One or more of the lining-pieces D² provide for adapting the nipple-socket to receive nipples of different sizes, and this graduation in size may be
 15 obtained by providing lining-pieces of different thickness, any one of which may be placed in the nipple-socket D', or a nest of lining-pieces adapted to fit one within the other, and providing for varying the size by replacing or
 20 removing one or more of them from the nipple-socket.

In Fig. 1 I have represented a lining-piece, D², of medium thickness. In Fig. 2 I have represented two lining-pieces of medium thickness placed one inside the other, and both inserted into the nipple-socket D', and in Fig. 3 I have represented a single lining-piece, D², of greater thickness. These lining-pieces, being made of flexible material, are thus adapted to
 30 readily conform to shape of the nipple, and when by them the nipple-socket is made of proper size to receive a particular nipple the exhaust action will be produced only on the end of the nipple, and will not cause painful
 35 distention thereof.

The connection of the lining-pieces with the nipple-socket may be made in any suitable manner. I have here represented the nipple-socket as flared outward at its outer edge, and
 40 the lining-piece D² is extended outward over such flared portion, and turned backward and inward to cover the outer side thereof adjacent to the edge. This method of attaching the lining-pieces gives a soft and finished edge
 45 to a metal nipple-socket, and is therefore very desirable.

In Figs. 1 to 4, inclusive, I have shown the tube D as approximately L-shaped, with its side which is adjacent to the chamber or cup
 50 A flattened and soldered thereto throughout its length. In lieu of such specially-shaped tube, a simple round tube, D, soldered or tacked to the chamber only at the inlet-opening and at the lower corner, as shown in Fig. 5, may
 55 be substituted.

I am aware that the nipple socket or cup of a breast-pump has been provided with a rubber cushion consisting of a diaphragm sprung over the outer edge of the cup and having at
 60 its center an inwardly-projecting tubular

socket to receive the nipple; but in this construction the tubular flexible socket is entirely out of contact with the interior of the rigid cup, and does not conform in shape to and fit against the interior of said rigid cup. In my
 65 construction the flexible lining piece throughout its whole length conforms in shape to and fits against the interior of the rigid nipple-socket, and is supported and held against distention by the rigid nipple-socket; hence when
 70 the pump is applied to the breast there is no distention of the lining-piece and nipple, and no painful effect on the person using the pump.

I am also aware that in order to secure a flexible connection between a rigid nipple-cup
 75 and the portion of the pump which rests against the breast adjacent to the nipple it has been proposed to stretch a tubular piece of flexible india-rubber over the open end of the nipple-cup and to have the outer end of such tubular
 80 piece of india-rubber turned outward over a ring of metal through which it passes. In this construction the ring of metal gives form to the outer end of the tubular piece of india-rubber, and the india-rubber forms a flexible
 85 connection between the said ring and the rigid nipple-cup. In this construction the india-rubber does not conform in size or shape to the interior of the ring or the rigid nipple-cup, and is not supported by them throughout
 90 its length. I do not desire to include such a combination of parts in my invention.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a breast-pump, the combination, with
 95 a pump chamber or cup and its diaphragm, of a nipple-socket made of rigid material and connected with the inlet-opening of said chamber or cup, and a reducing lining-piece of flexible material, provided in the nipple-socket to
 100 adapt it to the size of a nipple, the lining-piece being of a size and shape to conform to and fit against the interior of the nipple-socket throughout the length of the lining-piece, substantially as and for the purpose herein de-
 105 scribed.

2. The combination, with the pump chamber or cup and its diaphragm, of an inlet-tube and nipple-socket forming one integral structure, said inlet-tube being secured to the ex-
 110 terior of the pump chamber or cup and extending along the bottom thereof to the inlet-opening, and the nipple-socket being connected directly with the outer or open end of the pump chamber or cup, substantially as and for
 115 the purpose herein described.

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Witnesses:

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