Feb. 20, 1951 E. H. BERNHARDT 2,542,619

BREAST FORM

Filed May 7, 1949

Fig. 1.

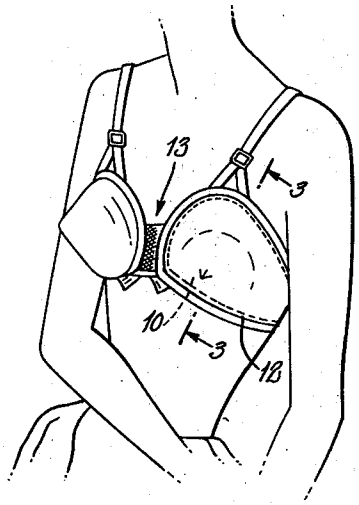


Fig. 2.

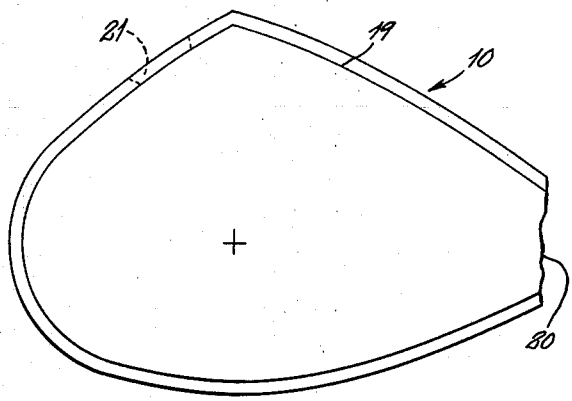


Fig. 3.

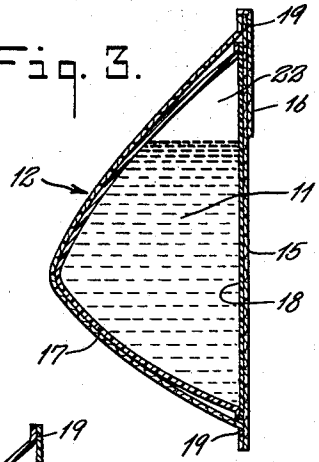


Fig. 4.

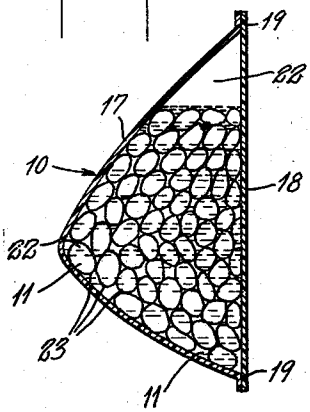


Fig. 5.

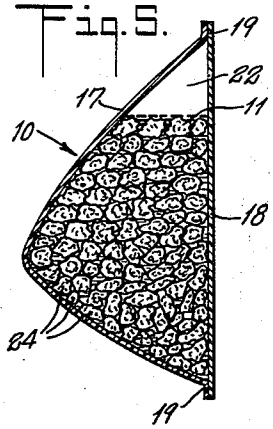
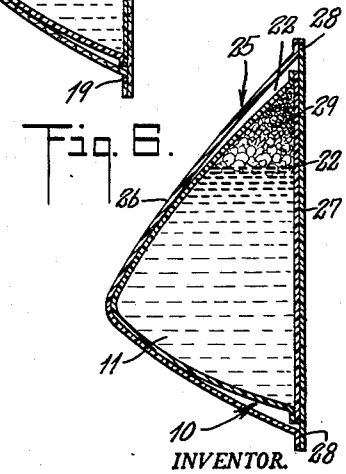


Fig. 6.



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BREAST FORM

Ella H. Bernhardt, New York, N. Y.

Application May 7, 1949, Serial No. 91,967

36 Claims. (Cl. 2—267)

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The present invention relates to prosthetic devices and more particularly to a conformable breast form containing a quantity of a liquid or a conformable gel. This application is a continuation-in-part of my co-pending application Serial No. 28,563, filed May 22, 1948.

The breast forms are especially designed for use as a breast form after a surgical operation. In such cases the figure of the person often presents an unpleasing appearance and the form is worn to maintain the normal figure or outline of the bust. In other instances, the forms are worn by women with small underdeveloped breasts in order to improve their figures.

It is important that the form be conformable to the shape of the breast or remainder of the breast of the wearer and of proper weight so that it may be worn for long periods of time without discomfort. Further, the form should be so constructed that it constantly and automatically conforms to the remaining breast in shape and appearance, as that breast is affected by the position assumed by the wearer.

Heretofore, some forms have been made of wire reinforced padding, others have been made of flexible fabric stuffed with a filling such as hair, feathers or cotton, still others have been molded of sponge rubber, in addition, air filled sacs and distendible sacs inflated with water have been used. These devices all have a relatively fixed shape, and a relatively constant volume, or are rather inconformable and do not realistically reproduce the change in shape and the movement of a normal breast. Some of the prior devices have been generally satisfactory for use when the wearer is in a standing position and not in motion. However, when the wearer assumes a sitting or prone position, or takes part in exercise, the movement of the prior art appliances are often unnatural and uncomfortable inasmuch as these appliances do not duplicate the changing shape of the remaining breast. The unnatural and uncomfortable position of the appliance is especially noticeable in women of middle age who make up the greater percentage of those with surgicaly removed breasts. The apparent waist portion of an average person shortens about one to two inches when the person is seated. The apparent shortening is more pronounced in patients with faulty posture such as is frequently assumed post-operatively. The full slanting diaphragm and often large abdomen pushes the usual appliance still higher when the person is seated. To counteract this movement, straps engaging with the corset or girdle are often used to pull the appliance downwardly. The strain set up by such straps not only causes discomfort at the shoulders but actually seriously interferes with the circulation of shoulder and arm and because of the recent operation often produces congestion. Moreover, in many cases, the prior appliances have been difficult or impossible to clean or renovate and when so cleaned often lose their original shape and present an unsightly appearance.

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The present invention aims to overcome the foregoing difficulties and disadvantages by providing a form which is more natural in appearance and readily conforms to the shape of the natural bust regardless of the movements of the wearer, and that requires no special harness to wear.

Another object of the invention is to provide a form which is sanitary, and which may be washed easily and repeatedly without adversely affecting its wearability.

These objects are accomplished by providing a conformable cell, at least partially filled with a liquid, or a conformable gel, and a gas. The cell is adapted to be carried in the unmodified cup of an ordinary brassière, or in a brassière cup provided with a retainer, or in the ordinary type of form-fitting bathing suit, so that in use, the cell is conformed to the shape and volume of the available space between the brassière, and the breast or the remainder of the breast, so as to produce the desired appearance. By reason of the filling material, and the amount used, the cell is not distended or fixed in shape but automatically assumes the shape and contour of the normal breast regardless of the position or movement of the wearer.

In another construction the liquid filling material includes a foaming agent, so that under normal bodily movements, no appreciable sound caused by a movement of the contents may be detected.

In another construction of the form, it is enclosed in an outer protecting envelope so as to prevent a sudden escape of the liquid in the event of a puncture or rupture of the retaining cell and the filling material includes an agent that coagulates upon evaporation, thus this cell is substantially self-sealing.

In another construction of the invention, a cellular structure is provided within the retaining cell so as to impede the movement of the liquid and thus to cause the form to more nearly simulate the normal movements of the natural breast.

In still another construction of the invention the cell is partially filled with a conformable gel, and a gas under atmospheric pressure, or merely partially filled with a conformable gel. This construction will not leak liquid if punctured, and in addition makes no audible sound when moved.

My breast form is advantageous in that it readily conforms to the shape of the brassière with which it is used or worn, regardless of its style, whether uplifted, pointed, rounded or pendulous, thus the wearer may use a brassière of the same style as worn before the breast removal and be assured that the outer clothing will fit without alterations. My breast form's mobility and softness to touch as well as its improved appearance are important improvements over prior appliances. Further, the form has smooth and flowing characteristics and therefore readily conforms to the shape of the cavity left by the breast removal, and accordingly the appliance may be worn soon after an operation while tissues are still sensitive. Moreover, the breast form because of its smooth and flowing characteristics protects the sensitive area and prevents friction thereon from the movement of the arms or clothing. The form quickly assumes the body temperature and is more comfortable to the wearer as it radiates heat and feels cooler than many of the prior appliances. As its weight is approximately that of the normal breast, no straps or other means are needed to hold it in position and its weight has a compensating effect in helping to overcome unequal shoulder carriage, which is a frequent result of a major mastectomy. The correct weight of the breast form reestablishes body balance. After a major mastectomy, a lack of such balance results in physical instability which often causes mental instabilities and phobias in patients, such as fear of falling when descending stairs, and fear of walking on wet streets.

Other objects and advantages of the invention will be apparent from the following description and from the accompanying drawings which show, by way of example, embodiments of the invention.

In the drawings:

Fig. 1 is a perspective view of a breast form worn with a brassière and shown in position on a female figure, the conformable cell being positioned in a pocket in the brassière and outlined in dotted lines.

Fig. 2 is a partial plan view of the cell.

Fig. 3 is a cross sectional view of the cell and brassière taken substantially along the line 3—3 of Fig. 1.

Fig. 4 is a view corresponding to Fig. 3 of a modified form of the cell showing a cellular structure within the cell formed of a plurality of small cells in liquid.

Fig. 5 is a view corresponding to Fig. 3 of a modified form of the cell showing a cellular structure within the cell formed of a plurality of pieces of a sponge-like material in liquid.

Fig. 6 is a view corresponding to Fig. 3 of a modified form of the cell showing a protective envelope enclosing the cell, the cell being filled with a preferred liquid.

Referring to the drawings, in Fig. 1 the conformable cell 10, indicated in dotted lines, is located in the brassière cup 12 of brassière 13 adapted to support and conform said cell, the assembly being worn on the female form as shown.

The brassière 13 may be of any suitable form and is preferably of the same type or shape as worn by the wearer before the mastectomy.

As shown in Fig. 3 the brassière cup 12 is provided with a cell retainer 15 which may be a piece of soft textile material sewn along the sides and bottom of the inside of the brassière cup. A flap 16 is provided to cover the opening at the top of the brassière cup.

As can best be understood by a comparison of Figs. 2 and 4, the cell 10 has a front wall 17 and a back wall 18, formed from a water impervious flexible sheet material, the peripheries of the walls are joined together and sealed along the line 19. Alternately, the cell may be molded in one piece. The front wall 17 is convex-concave in shape so as to more easily conform to the brassière cup. The rear wall 18 is generally flat though it may also be convex-concave if worn as a breast form over underdeveloped breasts, or may be concave-convex if meant to fill a particularly large cavity resulting from a major operation.

In Fig. 2, end 20 of the cell, shown as broken away, may be extended or modified as necessary to fit along the axillary side of the wearer to fill a surgical cavity which may extend in that direction.

As shown in Fig. 2, an unsealed portion 21 of the cell 10 is provided as a means of placing the contents in the cell. After this operation, this portion 21 is sealed.

As shown in Fig. 3 the cell 10 is at least partially filled with a conformable filler 11, which may be a liquid or a conformable gel, and gas 22 at atmospheric pressure.

Another embodiment of my invention is as shown in Fig. 4, in which the cell, constructed as above described, is at least partially filled with a plurality of small cells 23 of preferably ellipsoidal shape. Each of the cells 23 is at least partially filled with conformable filler 11 which may be a liquid or a conformable gel, and a gas 22 at atmospheric pressure.

Surrounding the cells 23 is filler 11, which is a liquid, to provide lubrication and other desirable qualities as will later appear. The cell 10 is thus partially filled with the cells 23, and liquid filler 11 and gas 22 at atmospheric pressure.

Another embodiment of my invention is as shown in Fig. 5, in which the cell constructed as above described, is partially filled with a plurality of bits of flexible cellular material 24, such as cut rubber sponge, and a quantity of liquid filler 11 and gas 22 at atmospheric pressure.

Another embodiment of my invention is as shown in Fig. 6. The conformable cell 10 is enclosed in a flexible envelope 25, composed of a front wall 26, and a rear wall 27, made of a flexible fluid impervious material, the front and rear walls being joined at their respective peripheries and sealed along the line 28. Alternately the envelope may be molded in one piece. The envelope 25 contains cell 10 plus a small quantity of gas 22 at atmospheric pressure. The envelope 25 may also contain a quantity of a highly water absorbent powder, such as bentonite (not shown). Note that in Fig. 6, the liquid filler 11 and gas 22 contained in cell 10, is shown in a foaming condition 29. A conformable gel may also be used to fill cell 10.

It is of course apparent that the embodiment shown in Figs. 3, 4 and 5, may be combined with the outer envelope shown in Fig. 6, and as described above.

The walls of the cells, both small and large, and the envelope described above, as in Fig. 6, are made of a flexible sheet material that is impervious to the passage of water or air. My preferred material is a flexible sheet of the material known as "Vinylite." This material is a highly plasticized copolymer of vinyl chloride and vinyl acetate resin, and has the advantages of being cheaper and more flame resistant than rubber, is flexible at body temperature, and is resistant to the action of body perspiration. I have found that use of Vinylite sheet stock twelve thousandths of an inch (0.012") thick results in a cell that is strong and durable, and commercially satisfactory.

The walls of the cell are joined together by cementing, or if the material is "Vinylite," by sealing the edges together by the so-called "electronic" sealing method which makes use of high frequency currents to accomplish the heat sealing.

The contents of the cell are composed of gas at atmospheric pressure, and a filler which may be a liquid or a conformable gel. Where, hereinafter in the claims or the specification the words "conformable filler" are used, it is intended to mean both a liquid and a conformable gel. These materials are incompressible, as distinguished from materials like sponge rubber, and substantially inexpansible as distinguished from gases. My preferred liquid is water, to which I may add a foaming agent and a sealing agent. When less than all of a cell is filled with a liquid, the liquid sloshes about and makes audible sounds when the cell is moved. Thus a foaming agent, which reduces these sounds to substantial inaudibility, overcomes the great disadvantage of a flexible cell partially filled with a liquid. The advantages of incorporating a sealing agent, in case of a puncture or corrosion or rotting of the cell walls, is obvious. Other liquids which may be used are; oils, emulsions of oil and water, soap mixtures, thickened oils, suspensions and emulsions in oil and water, silicon liquids such as Dow-Corning DC 200 silicon fluid (a heat-stable, organo-silicon oxide polymer), and liquid latex.

I have found that the material known as "Vinylseal" adhesive W–125, which is a water-soluble plastic resin, containing minimum solids of about 50% by weight, of which 1.5% by weight is monomeric vinyl acetate, and having a viscosity exceeding 3000 centipoises, a pH of 4.5 to 5.0 and a weight of 9.25 lbs. per gallon at 60° F., and which is sold as an adhesive, also has the property of foaming when mixed with water and agitated. This mixture will also coagulate on evaporation, and when contained in the cell, the cell being punctured, the mixture will function to seal the puncture. The self sealing effect is particularly good when the cell is in a second envelope (as shown in Fig. 6). When the double cell is punctured, very little liquid escapes completely, as most of it spreads in a thin film between the walls, and quickly forms a sealing clot.

Equal parts of the above water-soluble resin and water, mixed together, produces a liquid having the desired viscosity and weight, it being important that the weight per unit volume of the cell, as worn (this volume generally being less than the unconfined volume of the cell) be approximately equal to the weight per unit volume of human tissue that is to be replaced, or duplicated. This mixture is maintained in a foamed condition by the normal movements of the wearer of the form, and will seal satisfactorily. Variations of the above proportions of water and "Vinylseal" adhesive W–125, may be used depending on the viscosity, foaming characteristics, and sealing qualities desired.

An amount of liquid or conformable gel filler is used that will approximate the weight of tissue that has been removed. An amount of gas at atmospheric pressure, preferably air, is also allowed in the cell before sealing, this amount of air is necessary so that the liquid mixtures may foam and also to produce a cell that can change in volume under pressure, and that will reproduce a volume under pressure corresponding to the volume of tissue lacking.

In order to achieve a comfortable, conformable cell, the possible total volume of the cell is generally not entirely utilized. This is simply accomplished by pressing a portion of the walls of the cell together after the conformable filler has been put in the cell, and during the final sealing step. The amount of conformable filler generally should not fill the available space, some space being left for air. The cell is sealed with the entrapped liquid or conformable gel and air generally filling only a portion of the total possible volume of the cell.

As an example, in my manufacture of cells for certain prosthetic uses, not requiring special individual fitting, I have found that it is necessary to provide a complete range of sizes for both left and right breasts. Of course, each size breast is different in weight and shape from the other. The cells all have flat back walls, the wall material being conformable enough to fill in around uneven scar tissue formations over the chest, and at the axillary region.

However, I have found that in manufacturing all these ready-made forms that the proportions of gas and conformable filler are about the same. I generally fill each cell 60% full (of its possible total volume) with conformable filler, and leave approximately 10% to 15% of the cell volume as dead space. The remainder of the possible volume of the cell, i. e., between 25% and 30% is filled with air at about atmospheric pressure.

In my manufacture of cells for cosmetic purposes, the cells are different in shape and weight than the aforementioned cells.

As shown in my examples in Figs. 3 and 6, a conformable gel may be used to partially fill the cell 11. The conformable gel is used as above described for the use of liquid. A suitable conformable gel material is the product known as "Bouncing Putty" grade 9991—1 manufactured by the General Electric Company. Said "Bouncing Putty" may be modified with oil, greasy substances, or substances containing methyl groups to increase the rate of flow. A single cell structure, partially filled with this material, is quiet in use and will not leak. Another suitable gel is a starch and water paste, mixed with a suitable preservative.

As shown in my example in Fig. 4, the small cells 23 may be partially filled with conformable gel in place of liquid, while the cell 11 is partially filled with liquid.

By reason of the plurality of cells shown in Fig 4, or the cellular material shown in Fig 5, contained in the retaining cell, a somewhat more gradual change in the shape of the retaining cell occurs as the wearer assumes dif-

ferent positions. These cells thus very closely approximate the shape changes of the normal breast.

Having thus described my invention, I claim:

1. A breast form comprising a conformable retaining cell, a conformable, incompressible, inexpansible filler and a gas at approximately atmospheric pressure in said cell, the combined volumes of said filled and gas at least partially filling the cell.

2. A breast form comprising a conformable retaining cell, a conformable incompressible filler and a gas at approximately atmospheric pressure in said cell, the combined volumes of said filler and gas at least partially filling the cell, and the weight per unit volume of said gas and filler approximately equalling the weight per unit volume of human tissue.

3. A breast form comprising a conformable retaining cell, a liquid and a gas at approximately atmospheric pressure in said cell, the combined volumes at least partially filling said cell.

4. The breast form of claim 1, wherein said filler is a liquid adapted to coagulate upon evaporation.

5. The breast form of claim 4 enclosed in a flexible envelope impervious to fluids whereby the cell will seal itself when punctured.

6. A breast form comprising a conformable retaining cell, a foaming liquid adapted to coagulate upon evaporation and a gas at approximately atmospheric pressure in said cell, the combined volumes at least partially filling said cell.

7. The breast form of claim 1, wherein said filler is a conformable gel.

8. A breast form comprising a conformable retaining cell, a plurality of pieces of sponge-like material, and a liquid, and a gas at approximately atmospheric pressure in said cell, the combined volumes at least partially filling said cell.

9. The breast form of claim 8 wherein the liquid is a foaming liquid adapted to coagulate upon evaporation and said cell is enclosed in a flexible envelope impervious to fluids.

10. A breast form comprising a conformable retaining cell, a plurality of smaller cells in said cell, a conformable filler and a gas at approximately atmospheric pressure at least partially filling the smaller cells, said smaller cells and a liquid and a gas at approximately atmospheric pressure at least partially filling the remaining volume in the retaining cell.

11. The breast form of claim 10 wherein the conformable filler and the liquid is a foaming liquid adapted to coagulate upon evaporation.

12. The breast form of claim 2 enclosed in a flexible envelope impervious to fluids.

13. A breast form comprising a conformable retaining cell, a mixture of water, a water solvent resin adapted to foam upon agitation and to coagulate upon evaporation, and a gas at approximately atmospheric pressure in said cell, the combined volumes at least partially filling said cell.

14. A breast form having front and rear walls formed from a flexible sheet of resin comprising the plasticized copolymers of vinyl chloride and vinyl acetate, a mixture of water, a water solvent resin adapted to foam upon agitation and to coagulate upon evaporation, and a gas at approximately atmospheric pressure in said cell, the combined volumes at least partially filling said cell.

15. The breast form of claim 14 enclosed in an envelope having front and rear walls formed from a flexible sheet of resin comprising the plasticized copolymers of vinyl chloride and vinyl acetate.

16. A breast form comprising a conformable retaining cell, said cell having front and rear walls formed of flexible sheet "Vinylite," a mixture of water, "Vinylseal" Adhesive W—125, and a gas at approximately atmospheric pressure in said cell, the combined volumes at least partially filling said cell.

17. The breast form of claim 16 in which the proportions of water and "Vinylseal" adhesive W—125, are approximately equal to each other.

18. A breast form comprising a conformable retaining cell, a conformable filler and a gas at approximately atmospheric pressure in said cell, the combined volumes of said filler and gas at least partially filling the cell, said cell being enclosed in a flexible envelope impervious to fluids, and a highly liquid-absorbent material contained within said envelope and without said cell.

19. In combination with a brassière, a flexible retaining cell, and a foaming fluid at least partially filling the cell, the brassière conforming the flexible cell to the desired shape.

20. In combination with a brassière, a flexible retaining cell, fluid at least partially filling the cell, and an envelope impervious to the fluid, the envelope enclosing the cell, the brassière conforming the envelope and the fluid filled cell to the desired shape.

21. In combination with a brassière having a pocket therein, a flexible retaining cell, and a foaming fluid at least partially filling the cell, the pocket supporting the fluid filled cell and the brassière conforming it to the desired shape.

22. In combination with a brassière, a flexible retaining cell, a cellular structure within the fluid retaining cell, and fluid at least partially filling the cell and filling and surrounding the cellular structure, the retaining cell conformed to the desired shape by the brassière.

23. In combination with a brassière, a flexible retaining cell, a cellular structure within the fluid retaining cell, fluid at least partially filling the cell and filling and surrounding the cellular structure, and an envelope impervious to the fluid enclosed in the fluid retaining cell, the retaining cell and the envelope conformed to the desired shape by the brassière.

24. In combination with a brassière, a flexible retaining cell, a plurality of smaller cells, fluid at least partially filling the smaller cells, the smaller cells enclosed within the retaining cell, and fluid at least partially filling the remaining space in the retaining cell, the retaining cell conformed to the desired shape by the brassière.

25. In combination with a brassière, a flexible retaining cell, a plurality of smaller cells, fluid at least partially filling the smaller cells, the smaller cells enclosed within the retaining cell, fluid at least partially filling the remaining space in the retaining cell, and an envelope impervious to the fluid enclosed in the fluid retaining cell, the retaining cell and the envelope conformed to the desired shape by the brassière.

26. An artificial breast form comprising a flexible retaining cell and a foaming fluid at least partially filling the cell.

27. An artificial breast form comprising a flexible retaining cell, fluid at least partially filling

the cell, and an envelope impervious to liquid and completely enclosing the fluid cell.

28. An artificial breast form comprising a flexible retaining cell, a cellular structure within the cell, and substantially incompressible fluid at least partially filling the retaining cell and filling and surrounding the cellular structure.

29. An artificial breast form comprising a flexible retaining cell, a cellular structure within the cell, fluid at least partially filling the retaining cell and filling and surrounding the cellular structure, and an envelope impervious to the fluid enclosed in the fluid retaining cell.

30. An artificial breast form comprising a flexible retaining cell, a plurality of smaller cells, a substantially incompressible fluid at least partially filling the smaller cells, the smaller cells enclosed within the retaining cell, and fluid at least partially filling the remaining space in the retaining cell.

31. An artificial breast form comprising a flexible retaining cell, a plurality of smaller cells, fluid at least partially filling the smaller cells, the smaller cells enclosed within the retaining cell, fluid at least partially filling the remaining space in the retaining cell, and an envelope imperious to the fluid enclosed in the fluid retaining cell.

32. A breast form comprising a liquid impervious cell of flexible material, a conformable liquid filler and a gas at approximately atmospheric pressure within said cell, said filler being substantially noiseless when agitated by normal body motions, the said filler occupying a major portion of the volume of said cell and the combined volume of said filler and gas being less than the total possible volume of said cell, and a flexible envelope of material impervious to said filler fitting loosely around said cell whereby upon accidental rupture of said cell, the leaked portions of said filler are retained within said envelope.

33. A breast form comprising a liquid impervious cell of flexible material, a conformable liquid filler and a gas at approximately atmospheric pressure within said cell, said filler being substantially noiseless when agitated by normal body motions, the volume of said filler being approximately 60% of the total possible volume of said cell and the volume of said gas being approximately 30% of said total possible volume, and a flexible envelope of material impervious to said filler fitting loosely around said cell whereby upon accidental rupture of said cell, the leaked portions of said filler are retained within said envelope.

34. A breast form comprising a liquid impervious cell of flexible material, a conformable liquid filler and a gas at approximately atmospheric pressure within said cell, said filler being substantially noiseless when agitated by normal body motions, the combined volumes of said filler and gas being less than the total possible volume of said cell, the combined weight per unit of their total volume of said gas and filler approximately equalling the weight per unit volume of human tissue, and a flexible envelope of material impervious to said filler fitting loosely around said cell whereby upon accidental rupture of said cell, the leaked portions of said filler are retained within said envelope.

35. A breast form comprising a liquid impervious cell of flexible material, a conformable liquid filler and a gas at approximately atmospheric pressure with said cell, said filler being substantially noiseless when agitated by normal body motions, the volume of said filler being approximately 60% of the total possible volume of said cell and said gas being approximately 30% of said total possible volume, the combined weight per unit of their total volume of said gas and filler approximately equalling the weight per unit volume of human tissue, and a flexible envelope of material impervious to said filler fitting loosely around said cell whereby upon accidental rupture of said cell, the leaked portions of said filler are retained within said envelope.

36. An artificial breast form comprising a flexible retaining cell and a conformable gel at least partially filling said cell, said gel comprising Bouncing Putty.

ELLA H. BERNHARDT.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
326,915	Morehouse	Sept. 22, 1889
599,180	Harrison	Feb. 15, 1898
861,115	Harrison	July 23, 1907
1,721,739	Kennedy	July 23, 1929
2,108,205	Martin	Feb. 15, 1938
2,345,649	Zimmerman et al.	Apr. 4, 1949

FOREIGN PATENTS

Number	Country	Date
7,338	Great Britain	May 20, 1887