Title: IMPROVEMENTS IN BREAST FEEDING

Abstract: A device is provided for assisting mothers to breast feed. The device comprises a pair of opposing pad assemblies (412a, 412b) mounted on the ends of respective arms (410a, 410b). The arms are connected together for relative articulation by a hinge pin (411). A ratchet mechanism (450a, 450b) holds the pad assemblies in spaced apart relation. In use, the device is applied to the breast with the pad assemblies gently squeezing it in the vicinity of the nipple to cause the nipple to stand out more prominently and thus make it easier for a baby to latch onto.
Improvements in breast feeding

This invention relates to devices for facilitating breast feeding.

A difficulty commonly experienced with breast feeding, particularly amongst first-time mothers, is in getting the baby properly latched on to the breast, i.e. with its mouth sufficiently well engaged on the nipple to be able to start feeding successfully. The problem is often exacerbated if the nipple does not naturally tend to protrude prominently from the breast.

The present invention aims to alleviate this problem and provides a hand-held device for facilitating breast feeding, comprising a pair of pressure pads, and movable mounting means for holding the pads in opposing relation.

With the device of the invention, the pressure pads can be used to apply a gentle squeezing action to the breast in the vicinity of the nipple to help the nipple to protrude more and thus make it easier to bring the baby's mouth into engagement with it. Ideally, the device will be designed so that once the baby has successfully latched onto the breast, the device can be removed from it without disturbing its feeding. Also, the device will preferably be designed to be adjustable so that the squeezing pressure that it applies to the breast can be tailored to suit each individual.
By way of example, various embodiments of the invention will now be described with reference to the accompanying drawings, in which:

Figures 1a, 1b and 1c show a form of device according to the invention in its open and closed conditions and from the side,

Figures 1d and 1e are details showing the spring and datum elements of the device of Figure 1,

Figure 2 is a detail showing the construction of the pad assembly for the device of Figure 1 and its manner of mounting.

Figure 3 shows a modified form of the device shown in Figure 1,

Figures 4a to 4c illustrate the manner of use of the device of Figure 1,

Figures 5a and 5b show an alternative form of device according to the invention in its open and closed conditions,

Figures 6a and 6b show another alternative form of device according to the invention in its open and closed conditions,
Figure 7 is a detail showing the holding mechanism for the device of Figure 6,

Figures 8a, 8b and 8c illustrate yet another alternative form of device according to the invention,

Figures 9a, 9b and 9c illustrate a yet further alternative form of device according to the invention, and

Figures 10a and 10b illustrate a still yet further alternative form of device according to the invention.

The form of device seen in Figures 1a, 1b and 1c comprises a pair of arms 10a, 10b that are pivotally connected in their mid region by a hinge pin 11. The arms 10a, 10b lie generally in a plane, with the axis of the hinge pin 11 lying normal to the plane, as seen in Figure 1c. At the end of each arm 10a, 10b, a respective pad assembly 12a, 12b is mounted. The pad assemblies 12a, 12b are mounted so that they face each other. The pad assemblies 12a, 12b are designed to apply a gentle squeezing pressure to a mother's breast and therefore have a suitably contoured contact surface faced with a suitably soft material. The arms 10a, 10b are conveniently made of plastics material.
The pad assemblies 12a, 12b here are biased towards each other by an expansion spring 13 that is connected between the two arms 10a, 10b in the vicinity of the hinge pin 11 (see Figure 1d). Alternative forms of spring, such as a tension spring, could equally well be used.

The device here has a mechanism 14 for limiting the extent to which the pad assemblies 12a, 12b can come together. This is a safety feature to prevent the possibility of over-squeezing a breast. The mechanism 14 is adjustable and takes the form of a snail cam 15 mounted on one of the arms 10b that is designed to come into contact with an extension piece 16 on the other arm 10a. The snail cam 15 can be rotated on its mounting pin 17 and adjustment of its rotational position alters the point at which it engages the extension piece 16 and hence determines the minimum separation between the pad assemblies 12a, 12b.

Each of the arms 10a, 10b further comprises an arcuate extension 18a, 18b in the region of the pad assemblies 12a, 12b. As seen in Figure 1e, the extensions 18a, 18b lie side by side. The function of these extensions 18a, 18b is to provide a datum reference point for the application of the device in use, and one of the pieces may be marked with a suitable indicator for this purpose.
As seen in Figure 2, each pad assembly 12 comprises a pad 19 mounted on a holder 20. The pad 19 is designed to come into contact with the breast and is therefore suitably contoured and of a soft material such as rubber or the like. Here, the pad 19 has a domed contour. Other contours such as curved, flat, cylindrical or convex may be used instead. The pad 19 is mounted onto the holder 20 via a spigot 21 rotatably received in a bore 22 and suitably held, e.g. with a snap fit. The opposing faces of the pad 18 and holder 19 are each formed with a series of radially extending ramped teeth 23. These teeth 23 are engagable and together act like a ratchet so that whilst relative rotation of the pad 19 and holder 20 is possible in one direction, it is prevented in the opposite direction. The purpose of this is to do with the manner of use of the device, as will be explained below.

The holder 20 is mounted onto the arm 10 here by means of a universal joint 24, conveniently in the form of a ball and socket design, snap fitted together. This manner of mounting allows the pad assembly 12 freedom to pivot relative to the arm 10 to a certain degree in any direction. This allows the possibility for the position of the pad assembly 12 to self-adjust when the device is applied to a breast in use for greater comfort. The arrangement also facilitates the pad and/or pad assembly being a readily replaceable item.

The device seen in Figure 3 is essentially like the device of Figure 1, but with some modifications. Here, the pad assemblies 212a, 212b are
mounted onto the arms 210a, 210b by means of pivot pins 250a, 250b. This means that the pad assemblies 212a, 212b still have freedom to pivot to a certain degree, but here only about one pivotal axis. The pivotal axes of the pins 250a, 250b here lie parallel to the axis of the hinge pin 211. However, they could of course be arranged to lie at a different angle and hence provide a different freedom of movement for the pad assemblies.

The device here has an adjustable limit stop mechanism to ensure a minimum separation between the pad assemblies 212a, 212b. The mechanism takes the form of a rod 215 mounted on one of the arms 210b that is designed to come into contact with a stop face 216 on the other arm 210a. The rod 215 is mounted on its arm 210b by means of a spring loaded clip 217. This allows the position of the rod 215 relative to the arm 210b to be adjusted, which hence determines the limit stop position for the other arm 210a.

In use, seen in Figures 4a to 4c, the first step is to apply the device in the correct position on a mother’s breast. This is done with the device held in a generally horizontal plane. The arms of the device are opened out to their fullest extent and the device is brought towards the breast (in the direction of arrow A in Figure 4a). The device is in position when the arcuate extensions (of the Figure 1 device) just come into contact with the nipple. At this point, the arms of the device are gently released, allowing the pad assemblies to engage the breast and apply a gentle squeezing action to it under the force of
the spring. The pad assemblies will be in a position to either side of the nipple at this stage and in the vicinity of it: the arcuate extensions having acted as a datum point for achieving this position (Figure 4b). The effect of gently squeezing the breast in this manner will be to make the nipple stand out more prominently.

The next step is to pivot the arms of the device from their generally horizontal plane and fold them back to rest on top of the breast in the direction of arrow B (Figure 4c). This gets the device out of the way and allows the mother a clear view of the nipple and the baby's mouth. The rotatable mounting of the pads enables this last step to be performed, and it will be noted that the one-way rotational capability of the pads ensures that the arms cannot fall back again once they have been pivoted out of the way.

With the device now in position, the mother has both hands free to manoeuvre the baby so that it can engage the now prominent nipple with its mouth.

The final step, once the baby has successfully latched onto the nipple and begun feeding, is to remove the device from the breast. This can be done simply by squeezing the free ends of the arms to move the two pad assemblies apart and thus allow them to release their grip on the breast. It will be noted that this can be done with one hand and without disturbing the feeding baby.
It will be noted that the device is well adapted for use by a mother herself. The initial application of the device to her breast is relatively straightforward and takes place in her full field of vision. The provision of a reference datum on the device makes it easier for the mother to ensure that she will apply the device in the best position on her breast to achieve the desired promotion of her nipple. The device is designed so that it can be operated using just one hand.

The squeezing force that the pad assemblies are able to exert in this form of device is determined by the strength of the spring and of course, different springs can be used in order to provide devices in a range of different strengths. Additionally, or alternatively, the device may incorporate a mechanism that allows the force exerted by the spring to be adjustable. The device can then be tailored to suit a range of different individuals.

An alternative form of device is seen in Figures 5a and 5b. The device again comprises a pair of opposed pad assemblies 312a, 312b with suitably contoured contact surfaces mounted on the ends of respective arms 310a, 310b for rotation in one direction only. In this form of device, the arms 310a, 310b do not articulate, but are formed integrally. They are nevertheless able to flex, due to the resilient nature of the material from which they are made, conveniently a suitable metal or plastics material. The pad assemblies 312a, 312b can be moved apart by squeezing together the top sections of the
arms 310a, 310b, as indicated by arrows P in Figure 5a. When released, the arms 310a, 310b return to their normal rest position, bringing the pad assemblies 312a, 312b towards each other, as seen in Figure 5b.

This form of device is able to be used in essentially the same manner as the Figure 1 device previously described. The device is able to deliver a gentle squeezing force through the pad assemblies 312a, 312b under the action of the spring resilience of the arm design.

The Figure 5 device also conveniently includes a safety feature in the form of an adjustable limit stop mechanism 314 to define a minimum possible gap between the pad assemblies 312a, 312b. The mechanism 314 takes the form of a snail cam 350 rotatably mounted on a pin 351 on one of the arms 310a. The cam 350 is designed to come into contact with the other arm 310b and rotating the cam enables the point at which this occurs to be adjusted, hence adjusting the minimum possible gap between the pads.

The form of device seen in Figures 6a and 6b is again similar to the devices described above in that it comprises a pair of opposed pad assemblies 412a, 412b with suitably contoured contact surfaces mounted on the ends of respective arms 410a, 410b for rotation in one direction only. The arms 410a, 410b are pivotally connected together by a hinge pin 411, but unlike the Figure 1 form of device, here the manner of articulation is like a
pair of scissors. Thus, the pad assemblies 412a, 412b are brought from their opened out position (Figure 6a) to their closed position (Figure 6b) by squeezing together the free ends of the arms 410a, 410b. The device is able to deliver a gentle squeezing force through the pad assemblies 412a, 412b, although here this will be powered by the user, rather than by spring force.

The device incorporates a mechanism for holding the pads 412a, 412b in their chosen position: this takes the form of interengaging arcuate tongues 450a, 450b on each respective arm 410a, 410b. As seen in Figure 6, the inside face of each tongue 450a, 450b is provided with ramped serrations so that they can move relative to one another in one direction i.e. to allow closing of the device, but not in the opposite direction, i.e. normally preventing opening out of the device. The arrangement allows the device to be used in much the same way as the devices described above, i.e. with the pad assemblies 412a, 412b being held in position applying a gentle squeezing action to a breast in the region of the nipple. To release the holding mechanism, the two tongues 450a, 450b are simply disengaged, allowing the arms 410a, 410b to be opened out. The device preferably incorporates a spring to assist this opening out movement. This form of device also incorporates a safety feature to prevent over-closing of the pads. Here, it is the tongues coming into contact with their opposite arms, as will be seen from Figure 7.
The device seen in Figures 8a, 8b and 8c is in the form of a wire frame of resiliently flexible material, such as spring steel. The frame has a pair of arms 510a, 510b, at the distal end of each of which is mounted a respective pad assembly 512a, 512b. The pad assemblies 512a, 512b, again with suitably contoured contact surfaces, face opposite one another and are arranged to be biased towards each other by the inherent springiness of the material of the frame and its configuration. A lug 514 on one of the arms 510a is designed to engage the other arm 510b in order to act as a limit stop on the convergence of the two arms. This controls the minimum separation between the two pad assemblies 512a, 512b.

The device is seen in its at-rest position in Figure 8a, with the arm 510b seated on the lug 514 under the action of spring bias. This is the operative condition of the device when it is in position on a breast and gently squeezing it to promote its nipple. To release the device from the breast (and also to apply it to a breast in the first instance), the arms 510a, 510b are sprung apart (against spring bias) by imparting a compressive force to the sections of the arms above the lug 514, as indicated by arrows F in Figure 8c.

The pad assemblies 512a, 512b in this device may be mounted on the arms 510a, 510b so as to be rotatable relative thereto, as in the embodiments described above, and the rotatability may be limited to one direction only, as in the embodiments described above. However, this is not
essential, as it might be possible to deploy the device in this embodiment from a position above the breast, thus obviating the need to rotate the arms out of the way after installation.

The device seen in Figures 9a, 9b and 9c is also in the form of a wire frame of resiliency flexible material, such as spring steel. Again, pad assemblies 612a, 612b with suitably contoured contact surfaces are mounted on the distal ends of arms 610a, 610b so as to face opposite one another. Here, the inherent springiness of the material of the frame and its configuration tends to move the arms 610a, 610b, and hence the pad assemblies 612a, 612b, away from each other. On one of the arms 610a, a link 650 is pivotally mounted. The link 650 has a loop which encircles the other arm 610b. This acts to limit the separation of the two arms 610a, 610b and by pivoting the link 650, the separation of the arms, and hence the distance between the two pad assemblies 612a, 612b can be adjusted. Pivoting the link 650 in the direction of arrow A in Figure 9a will cause the pad assemblies 612a, 612b to come together. Pivoting the link 650 in the direction of arrow B in Figure 9c will allow the pad assemblies 612a, 612b to move apart under spring bias. The link 650 may be provided with a grip 651 to facilitate its pivotal operation. The minimum separation between the pad assemblies 612a, 612b in this embodiment is controlled essentially by the configuration of the link 650 and the arm 610b that it engages.
The pad assemblies 612a, 612b in this embodiment may be rotatably mounted on their arms 610a, 610b, as in embodiments described above, and may be constrained to be able to rotate in only one direction. However, this is not necessarily essential as it might be possible to deploy this device from a position above the breast, thus obviating the need to be able to swing the arms out of the way after initial attachment of the device.

In the devices described above, the pad assemblies are conveniently mounted onto their arms so as to be readily detachable, for example for disposal (to be replaced with fresh pad assemblies, if supplied as disposable items) or for cleaning. Alternatively, it will be understood that the pad assemblies, with their suitably contoured contact surfaces, could be formed as an integral part of the device.

An example of a device in which the pad assemblies 712a, 712b are formed as integral parts of their respective arms 710a, 710b is seen in Figures 10a and 10b. The arms 710a, 710b in this example are relatively rigid and are articulatedly connected together by means of a torsion spring 713, arranged in similar manner to a traditional clothes peg. Each arm 710a, 710b is captured by a tag end 713a, 713b of the torsion spring 713, which acts to bias the arms towards their closed position. This is the position seen in Figure 10b. The torsion spring 713 provides a fulcrum about which the arms 710a, 710b can pivot. Thus, the arms 710a, 710b, and hence also the pad
assemblies 712a, 712b, can be pivoted to their open position, which is the position seen in Figure 10a, by squeezing together the opposite ends of the arms. This is illustrated by arrows A in Figure 10a. It will be noted that angled facets 750a, 750b on each of the arms 710a, 710b (seen best in Figure 10a) act together as an effective limit stop for ensuring a minimum separation between the pad assemblies 712a, 712b in their closed position.
Claims

1. A hand-held device for facilitating breast feeding, comprising a pair of pressure pads, and movable mounting means for holding the pads in opposing relation.

2. A device as claimed in claim 1 wherein the mounting means comprises arm elements that are movable by articulation.

3. A device as claimed in claim 1 or claim 2 wherein the mounting means comprises arm elements that are movable by resilient bending.

4. A device as claimed in claim 2 or claim 3 wherein the arm elements lie generally in a plane and move generally within said plane.

5. A device as claimed in any preceding claim wherein the mounting means comprises spring biassing means.

6. A device as claimed in claim 5 wherein the mounting means comprises means for adjusting the strength of the spring biassing means.

7. A device as claimed in claim 5 or claim 6 wherein said spring biassing means acts in a sense tending to move the pads together.
8. A device as claimed in any one of claim 2 to 7 wherein each pad is mounted on a respective arm element so as to be rotatable relative thereto.

9. A device as claimed in claim 8 wherein the rotatable mounting of the pad allows its rotation in one direction, but prevents its rotation in the opposite direction.

10. A device as claimed in claim 8 or claim 9 wherein the axis of rotation of the pad is generally parallel to the plane of movement of its respective arm element.

11. A device as claimed in claim 10 wherein the rotatable mounting of the pad allows it a degree of freedom of articulation about other axes.

12. A device as claimed in claim 11 wherein the pad has freedom for articulated movement about an axis generally perpendicular to the plane of movement of its respective arm element.

13. A device as claimed in any one of claims 2 to 12 wherein the pads are mounted on respective arm elements by means of a releasable connection.
14. A device as claimed in any one of claims 2 to 7 wherein the pads are formed integrally with their respective arm elements.

15. A device as claimed in any preceding claim wherein the pads have a contact surface that is suitably contoured and of a suitable material for engaging a user’s breast.

16. A device as claimed in any preceding claim and further comprising limit stop means for defining the minimum possible gap between the pads.

17. A device as claimed in claim 16 wherein said limit stop means is adjustable.

18. A device as claimed in any preceding claim and further comprising limit stop means for defining the maximum separation between the pads.

19. A device as claimed in any preceding claim wherein the mounting means further comprises a datum to act as a reference to facilitate application of the device to a user's breast.
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER

INV. A61M1/06 A61B17/28 A61B19/00

ADD.

According to International Patent Classification (IPC) and to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A61M A61B B25B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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Further documents are listed in the continuation of Box C. See patent family annex.

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