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WO 2004/045485 A2 **WO 1991/011166 A1**
US 4088124 A **US 3809065 A**
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(54) Abstract Title: **Infant soothing device**

(57) The present invention provides an infant soothing device comprising a flexible bladder 11 containing a fluid or gel medium 12 which is adapted to locate around the torso 14 of an infant. The infant soothing device comprises vibration means 23 that impart vibrations to said medium, and pressure adjusting means 20, 21 for raising and lowering the static pressure within the bladder. The bladder may, in use, be located around the torso 14 of an infant such that the vibrations caused by the vibration means 23 and/or the changes in pressure within the bladder 11 caused by the pressure adjusting means 20, 21 sooth said infant. The soothing effect often includes induction of eructation in the infant to relieve wind.

Figure 2

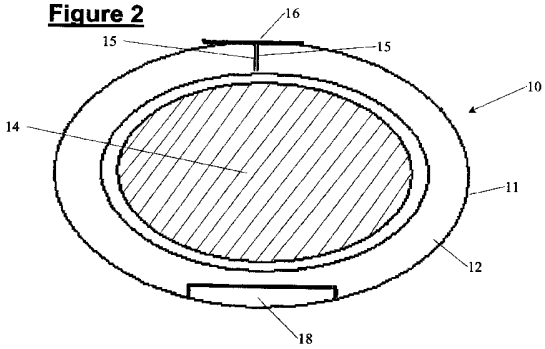

Figure 3

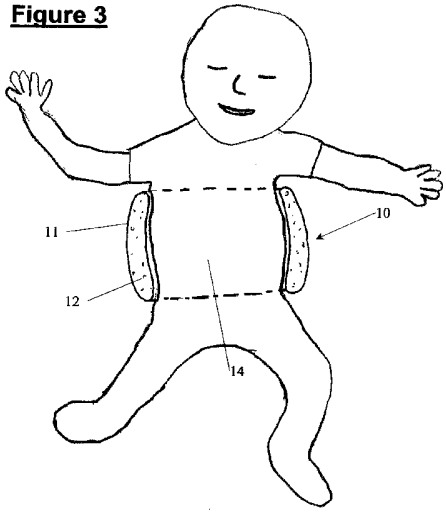

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Figure 1

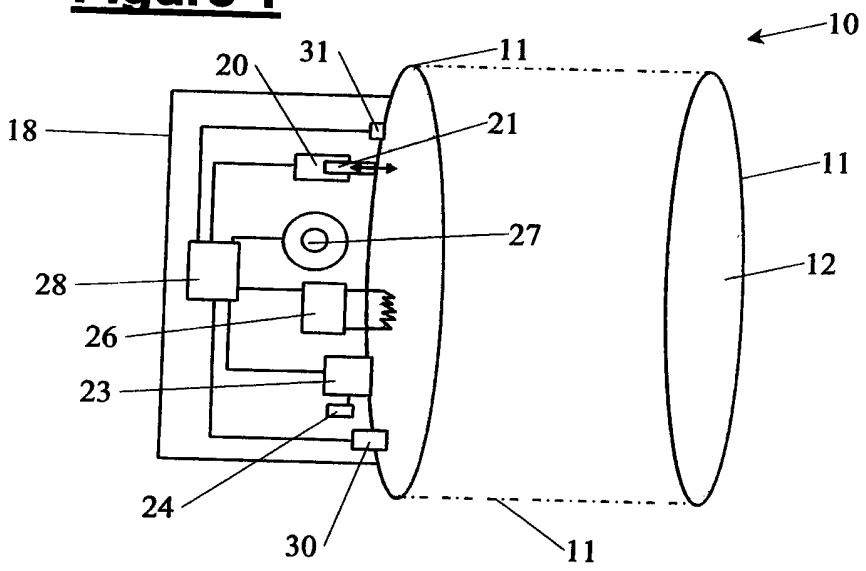


Figure 2

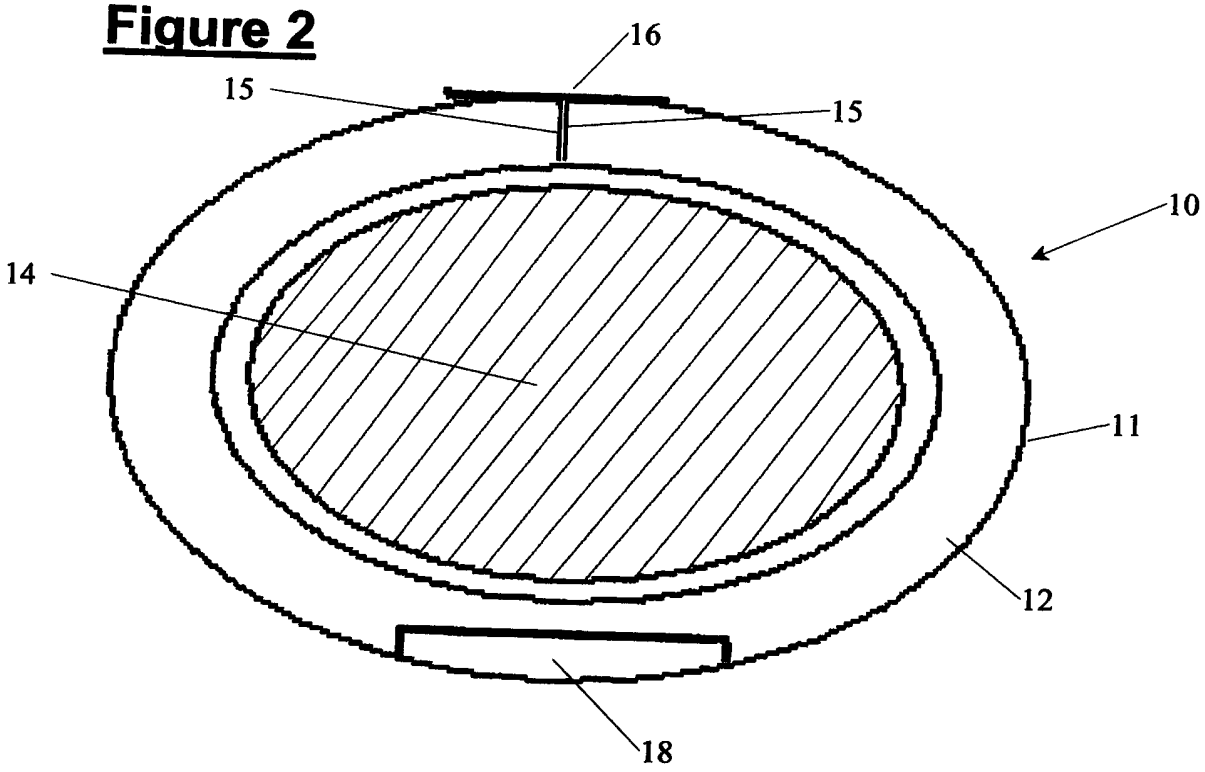
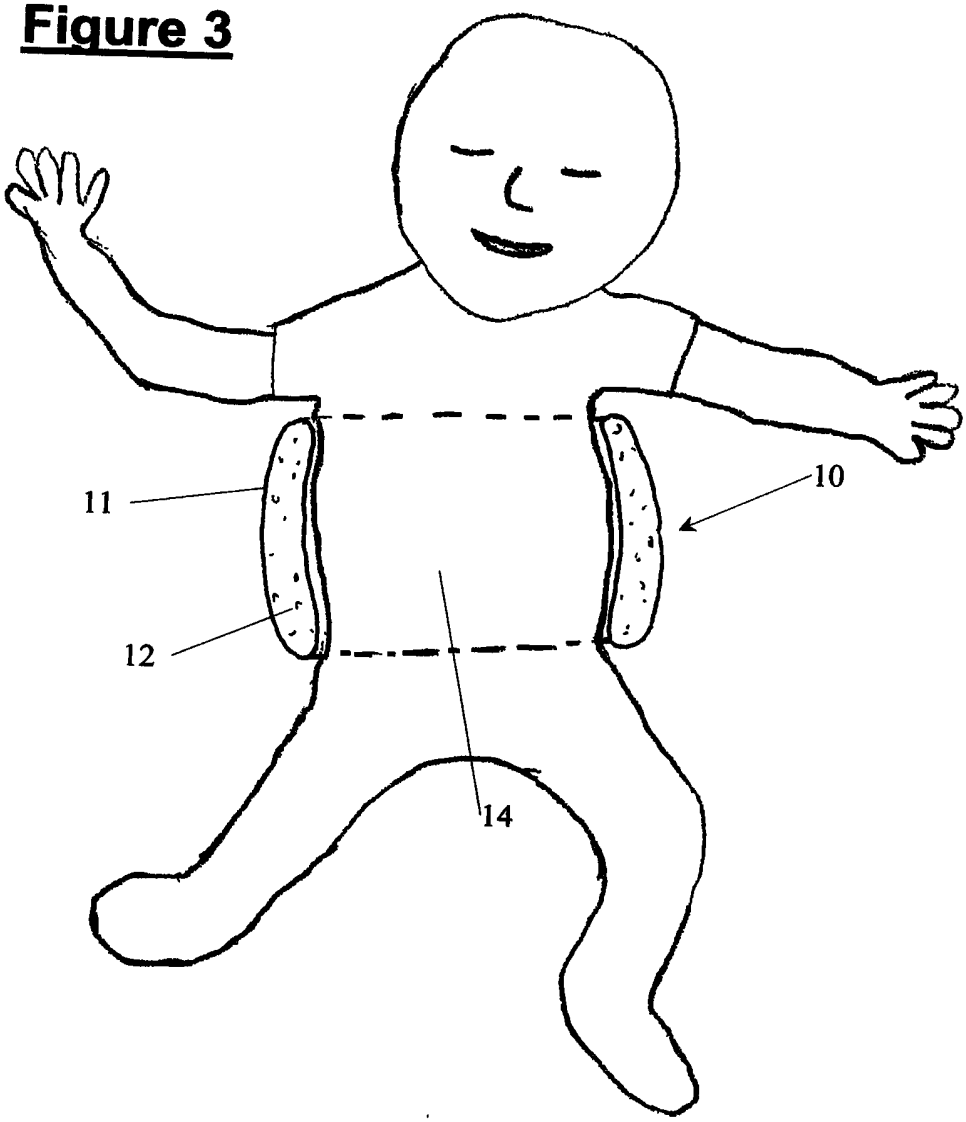


Figure 3



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Infant Soothing Device

The present invention relates to an infant soothing device and in particular to an infant soothing device to aid winding.

Most infants, in their early stages of growth, suffer from trapped wind accumulated during the feeding process. This can cause considerable distress until the pressure is relieved by eructation. Presently, the so called "winding" of infants is carried out by a variety of time consuming manual techniques such as placing the child on the shoulder and patting their back. However, in addition to being time consuming, these methods are far from foolproof.

It is an aim of the present invention to provide a mechanical device which improves the winding of children and encourages eructation or burping to relieve discomfort. As a secondary aim, the present invention also provides a soothing mechanism to calm a distressed child, by mimicking the physical phenomena encountered when being held by a parent, or indeed when in the womb. This can be particularly useful if the child is being cared for by another person, whose embrace does not offer as much familiar reassurance as that of a regular carer.

The present invention provides an infant soothing device comprising a flexible bladder containing a fluid or gel medium and being adapted to locate against or around the torso of an infant, vibration means for imparting vibrations to said medium, and pressure adjusting means for raising and lowering the static pressure within the bladder whereby in use the bladder may be located adjacent the torso of an infant such that the vibrations caused by the vibration

means and/or the changes in pressure within the bladder caused by the pressure adjusting means sooth said infant.

The bladder should be able to fit against or around the torso of an infant snugly and this may be achieved in a variety of ways. It is possible for the bladder to be shaped in such a way that an infant may be fitted into it like a nappy or vest. However, in some instances it is advantageous that the bladder is adapted to be wrapped round the infant's torso and then fixed in place. This arrangement permits, as discussed in more detail later, the bladder to be connected for setting-up purposes to an adult's torso, which obviously would be difficult if a fixed size item such as a vest were used. When the bladder is adapted to be wrapped around the infant's torso it is preferred that the opposed edges of the bladder are provided with releasable inter-engagement means such as straps or hook and loop fasteners so that they may inter-engage to hold the bladder in place when wrapped around the infant or adult.

A bladder may be intended to extend all the way round the torso of an infant, or may instead only lie against a part, such as the front, of that infant's torso. In such circumstances a suitable device such as a belt to which the bladder is attached may be provided to connect the bladder to the infant.

Preferably the bladder is formed from a flexible plastics material as this is both suitable for use on a child as well as being able to transmit the pressure and vibration changes within the bladder to an infant. Such a material is also conveniently cleaned and may be formed into bladders of a variety of different shapes to suit the particular embodiment. The flexible nature of such a material also permits the bladder to conform to a variety of body shapes.

The vibration means may take any suitable form capable of imparting vibrations with an appropriate frequency to the medium within the bladder – and thereby to the torso of the infant. It is preferred however that the vibrations means includes an electric motor with an eccentric weight or a vibrating speaker oscillating at a suitable frequency. The vibration means is preferably adapted to ensure the vibrations are communicated evenly throughout the medium to all parts of the bladder.

The pressure adjusting means must be capable of varying the internal pressure of the bladder and this may be achieved by any suitable mechanism. However, it is preferred that the pressure adjusting means includes an electromechanical device that acts upon the medium in the bag. Such an electromechanical device might take the form of a separate reservoir and pump, which pump is adapted to force medium backwards and forwards between the bladder and the reservoir to alter the pressure within the reservoir. For example, pumping extra medium from the reservoir into the bladder will increase the pressure within the bladder and drawing medium from the bladder back into the reservoir will have a reverse effect. An alternative electromechanical device for altering the pressure could include a plunger or other physical device, the movement of which exerts a force on the bladder to reduce its volume and hence increase its internal pressure.

The pressure adjusting means and vibration means can be the same device. For example, the vibration can be imparted by rapid pressure variation caused by the pressure adjusting means.

The vibration means and the pressure adjusting means have an effect on the medium within the bladder which in turn has an effect on the infant around

whose torso the device is attached. This effect has been found to rapidly soothe the infant by causing eructation and consequently relieving the discomfort of trapped wind. It has also been found however that in addition to this advantage there is a soothing effect even when winding has occurred or is not required. To improve on this certain further features may also be provided within the device.

In particular the device may be further provided with a speaker through which audible sounds may be played to the infant. Such sounds may take any suitable form such as soothing music, but it has been found that sounds mimicking (or indeed recordings of) the sounds made by the infant's mother have a particularly soothing effect. Clearly such sounds will differ between different mothers and to achieve the best effect the device needs to mimic the sounds of the mother of the particular infant to which it is to be attached. To permit this the device is preferably further provided with recording means such that the device may be placed against a mother and the sounds she produces over a period of time may be recorded and then, once attached to the infant, played back through the speaker.

In addition, to further mimic the effect of being held by a mother or other carer, it has been found advantageous to mimic the breathing pattern of that adult. Therefore, the device is preferably further provided with a pressure sensor to monitor the pressure within the bladder. By placing the device against the adult the pressure changes caused, for example, by that adult's breathing can be monitored and recorded, and then using the pressure adjustment means can be mimicked to the infant. The pressure sensing means may also provide a useful function in monitoring for safety purposes the

pressure within the bladder to ensure that safe working parameters are not exceeded.

Preferably the soothing device is further provided with heating means such that the bladder may be gently warmed to improve the comfort and soothing effect, as well as the quality of parental mimicry of the device. Temperature monitoring means may also be provided to ensure correct operation.

In order to accurately control the various electrical and mechanical components within the present invention, as well as the recording and playback functions, it is preferred that there is further provided a microprocessor adapted to control the components. Further, a power source from batteries or an external power supply may be provided to drive the various electrical components.

External programming and control of the device may be desirable. To aid this it may be further provided with an input and/or output connection to a PC or other programming/monitoring device. Such input or output may be by physical connection or wirelessly.

In order that the present invention may be better understood, but by way of example only, one embodiment will now be described in detail with reference to the accompanying drawings in which:

Figure 1 is a schematic view of one possible embodiment of the present invention;

Figure 2 is a cross-section through a device when attached to an infant; and

Figure 3 is a partial cross-sectional view of the device attached to the infant.

Referring to all of the Figures, which show essentially the same embodiment, there is shown an infant soothing device generally indicated 10. Figure 1 shows the embodiment in a generally schematic view wherein the components controlling and acting on the bladder are shown in a representative fashion for clarity.

The device comprises a bladder 11 that is filled with a liquid medium 12. The bladder is essentially rectangular in shape but is flexible and may be wrapped around the torso of an infant 14 shown in Figures 2 and 3 to form a tube. Wrapping of the bladder 11 around the torso of the child 14 brings free edges 15 of the bladder into contact and these may be connected together using attachment means 16, which in this embodiment take the form of co-operating hook and loop fasteners such as those sold under the trade name Velcro. A control unit 18 is connected to the bladder and as shown in Figure 1 contains various components.

The device includes a pressure adjusting means in the form of an electromechanical plunger 20, the operating arm 21 of which bears upon the bladder 11 such that extension of the arm 21 will increase the pressure within the bag by reducing the volume. This increase in pressure gently squeezes the infant 14. An alternative pressure adjusting means could include a pump and reservoir to alter the amount of medium within the bladder.

The medium 12 within the bladder 11 has vibrations imparted to it by vibration means comprising an electric motor 23 with an eccentrically mounted weight 24. Operation of the motor causes the eccentric weight to rotate, thus

providing mechanical oscillation, which in turn vibrates the medium within the bag. Variation in the speed of the motor can control the frequency of that oscillation.

The medium within the bladder is a fluid or gel.

A heater 26 is provided to gently warm the medium within the bag. Warming the medium helps to simulate proximity to a parent.

A speaker 27 is provided to play back sounds to the infant. A microprocessor 28 connects and controls the various components to provide co-ordinated operation.

A highly advantageous feature of the present invention is its ability to record and subsequently mimic the breathing and audible patterns of a particular adult to match it to what a child is used to. To aid in achieving this the device is further provided with a microphone 30 that is adapted to record sounds from an adult when the device is temporarily attached to the adult. Also, when so attached the breathing pattern of the adult can be monitored by way of a pressure sensor 31 which monitors the internal pressure variations of the bladder 11. Information over a particular timeframe from both the pressure sensor 31 and the microphone 30 is relayed to and stored in or by the microprocessor 28 such that subsequently in a playback mode the same pattern of pressure changes and sounds may be imparted to the infant by controlling the pressure using the pressure adjusting means 20, 21 and the speaker 27. Whilst not specifically shown in the embodiment, the present invention would also include a power supply adapted to power the various electrical components.

In operation the present device is attached around the torso of an infant 14 by connecting together the free ends 15 of the bladder 11 using the strap 16. The bladder could then be vibrated by the motor 23 and eccentric weight 24 and have its pressure dynamically varied by the pressure adjusting means 20, 21 to cause the infant 14 to eructate. Tests have shown that as compared to conventional winding techniques the efficiency of the present invention shows a dramatic improvement, as winding time is far shorter.

In addition to this, when aiming to soothe a child more generally, appropriate parental mimicking is desired. To achieve this parental mimicking the bladder 11 is opened and is placed against and connected to the torso of an adult (usually the mother of the child). The device is then put in a learning mode in which the internal pressure variations and sounds are monitored and stored over a suitable timeframe. Then the device is removed from the adult and connected to the child 14 and attached as appropriate. The device, which remains in close but comfortable contact with the torso of the child, is then put in a playback mode during which the sound recorded from the adult is played back through the speaker 27, and the pressure variations of the breathing pattern are reproduced. Vibration/heating may also be imparted as desired.

Although not shown in the Figures the bladder may be separated into lateral compartments to prevent flow of the medium to the lower regions of the bladder. Such downward flow would cause undesirable pressure variations from top to bottom, but the necessity for these depends upon the medium included within the bladder and the dimensions of the bladder itself.

Claims

1. An infant soothing device comprising a flexible bladder containing a fluid or gel medium and adapted to locate around the torso of an infant, vibration means for imparting vibrations to said medium, and pressure adjusting means for raising and lowering the static pressure within the bladder whereby in use the bladder may be located around the torso of an infant such that the vibrations caused by the vibration means and/or the changes in pressure within the bladder caused by the pressure adjusting means sooth said infant.

2. A infant soothing device as claimed in claim 1, wherein the bladder is adapted to be wrapped around the infant's torso and wherein opposed edges of the bladder are provided with releasable inter-engagement means such that the opposed edges may be inter-engaged when wrapped around the infant.

3. An infant soothing device as claimed in claim 1 or claim 2, wherein the bladder is formed from a flexible plastics material.

4. An infant soothing device as claimed in any of the preceding claims, wherein the vibration means includes a vibrating speaker or an electric motor with an eccentric weight.

5. An infant soothing device as claimed in any of the preceding claims, wherein the pressure adjusting means includes an electro-mechanical device that acts on the medium in the bag.

6. An infant soothing device as claimed in claim 5, wherein the electro-mechanical device includes a separate reservoir and a pump to force medium backwards and forwards between the bladder and the reservoir to alter the pressure with the bladder.

7. An infant soothing device as claimed in claim 5, wherein the electro mechanical device includes a plunger which exerts a force on the bladder to reduce its volume and increase the internal pressure.

8. An infant soothing device as claimed in any of the preceding claims, wherein there is further provided a speaker through which audible sounds may be played to the infant.

9. An infant soothing device as claimed in claim 8, wherein sound recording means are included and the device may be placed against a mother to record sounds, which can in turn be played back to the infant through the speaker.

10. An infant soothing device as claimed in any of the preceding claims, wherein there is further provided a pressure sensor to monitor the pressure within the bladder.

11. A infant soothing device as claimed in claim 10, which may be connected to an adult so that the breathing of that adult causes changes in the pressure of the bladder, which rhythmical pressure changes are monitored by the pressure sensor and recorded, such that when the device is attached to an infant a mimicking pattern of pressure changes can be imparted to the bladder by the pressure adjusting means.

12. An infant soothing device as claimed in any of the preceding claims, wherein there is provided heating means to warm the bladder and contained medium.

13. An infant soothing device as claimed in any of the preceding claims, wherein the vibration means and the pressure adjusting means as well as when

present heating means, sound recording/playback apparatus and other components are controlled by a microprocessor.

14. An infant soothing device as claimed in claim 1, and substantially as herein described with reference to and as illustrated in the accompanying drawings.

Application No:	GB0422462.2	**Examiner:**	Mr Alex Robinson
Claims searched:	1 to 13	**Date of search:**	23 November 2005

Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
X	1 to 13	US 2002/0068886 A1 (Lin) Whole document.
X	1 to 13	WO 2004/045485 A2 (Van Brunt) Whole document.
X	1 to 13	WO 91/11166 A1 (Warwick) Whole document.
A	-	US 2004/0002669 A1 (Keng) Whole document.
A	-	US 4088124 A (Korner) Whole document.
A	-	US 3809065 A (Gatts) Whole document.

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X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category	P	Document published on or after the declared priority date but before the filing date of this invention
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC[X] :

A5R

Worldwide search of patent documents classified in the following areas of the IPC[07]

A61H

The following online and other databases have been used in the preparation of this search report

EPODOC, WPI.