United States Patent

Weber

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[45] **June 27, 1972**

[54] REST-INDUCING DEVICE

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[73] Assignee: **Scovill Manufacturing Company**, Waterbury, Conn.

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[52] **U.S. Cl.** ..... **128/33**, 128/1 C

[51] **Int. Cl.** **A61h 1/00**

[58] **Field of Search** ..... 128/24, 1 C, 33, 64; 5/108, 5/109, 248

[56] **References Cited**

UNITED STATES PATENTS

3,419,923	1/1969	Cowan	5/348
3,085,568	4/1963	Whitesell	128/33

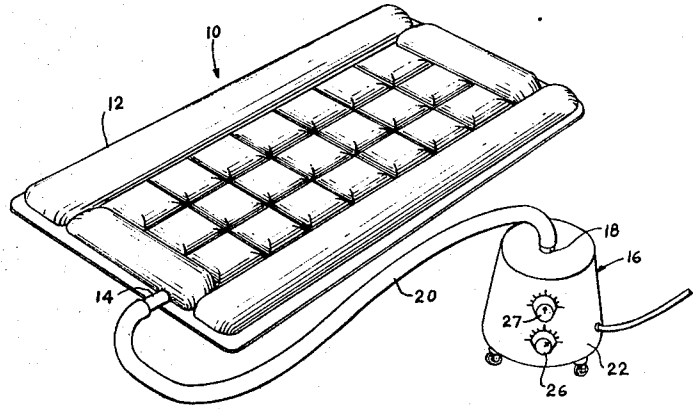
Primary Examiner—L. W. Trapp

Attorney—Dallett Hoopes

[57] **ABSTRACT**

Air pump gives a pulse cycle at human heartbeat frequency to air mattress to simulate the prenatal womb experience to an infant supported thereon.

3 Claims, 6 Drawing Figures



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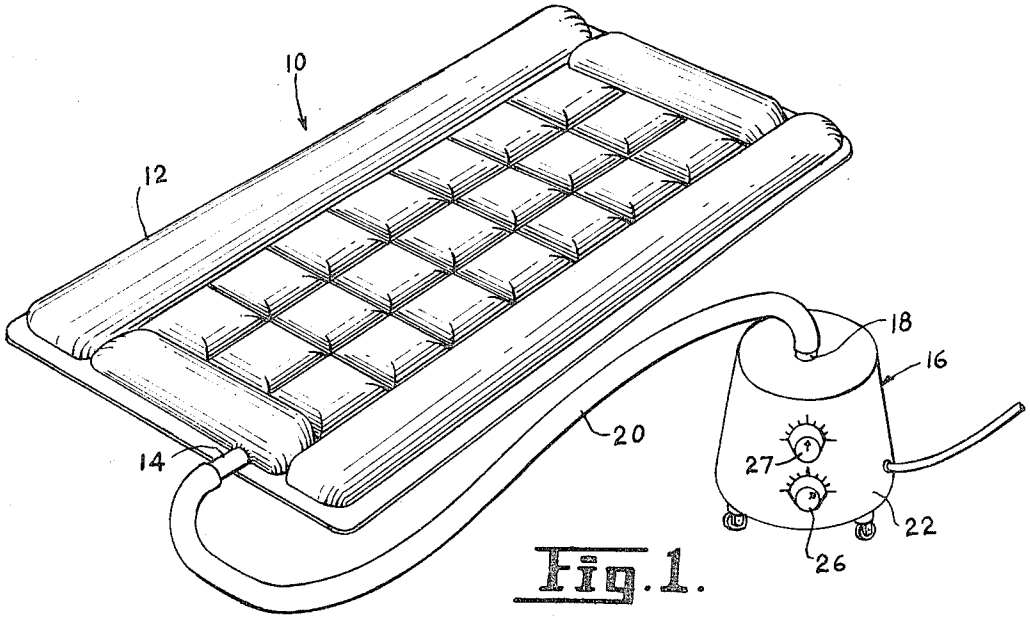

Fig. 1.

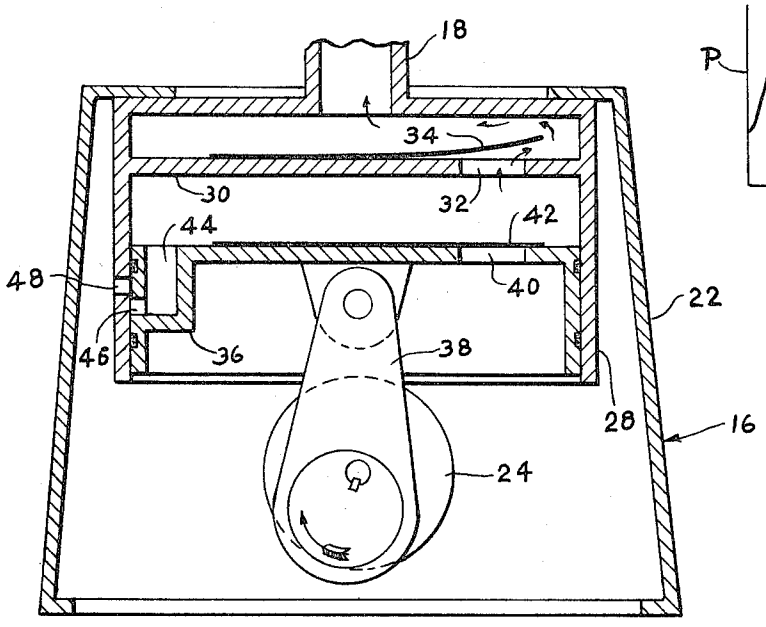

Fig. 2.

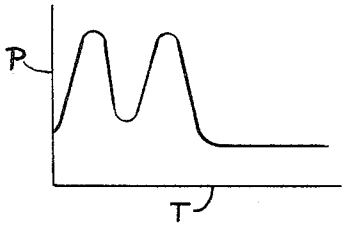

Fig. 1a.

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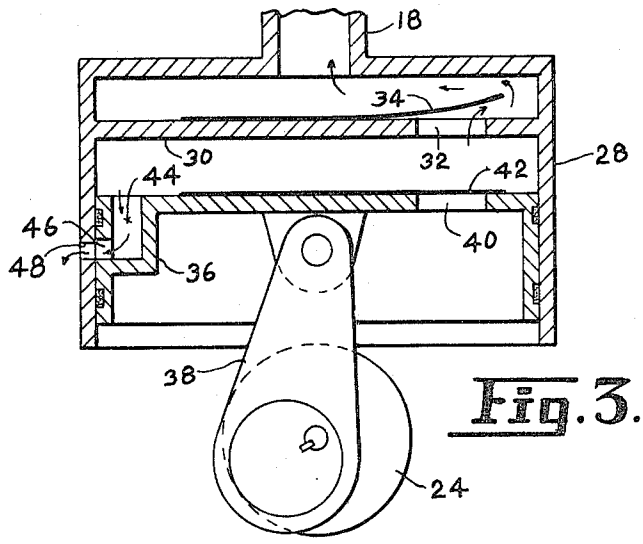

Fig. 3.

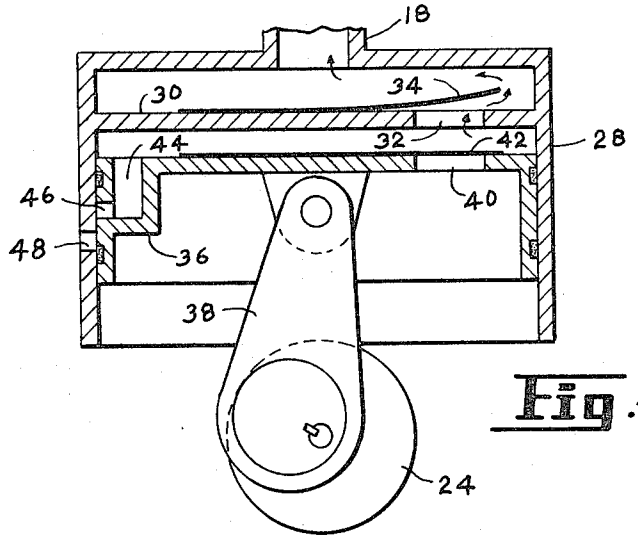

Fig. 4.

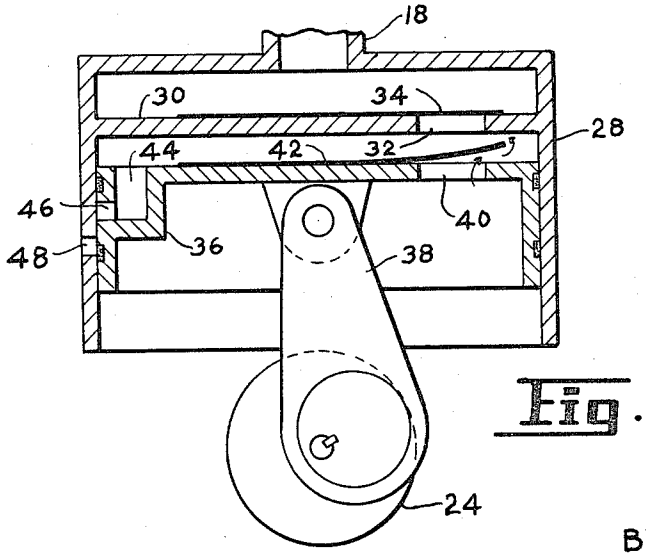

Fig. 5.

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REST-INDUCING DEVICE

This invention relates to a rest-inducing device which more specifically comprises an air-filled inflatable pad or the like to which is delivered air in pulses from an air pump, at the frequency of human heartbeat.

For some time it has been noted that certain quieting effects are produced on infants when the support on which they are lying is given a pulsing or throbbing movement. It is theorized that when the throbbing movement is at approximately human heartbeat frequency, the quieting effect is the result of a secure feeling stemming from the infant's association of the movement with prenatal movements experienced by his fetus while residing in his mother's womb. Elaborate clinical experiments have tended to confirm this theory in that the throbbing movement is not so effective in producing quiet or rest when the frequency of the movement is varied substantially from heartbeat frequency.

Prior patents have employed many different means for effecting the throbbing movement of the infant's bed or support. As an example, the U.S. Pat. No. 3,292,611, created a throbbing movement by a "ticking" device mounted on the frame of the crib. Lesk et al, U.S. Pat. No. 2,916,745, mounts on the crib a motor driving an eccentric weight at phonograph turntable speed. In addition, there have been physio-therapeutic devices such as Whitesall U.S. Pat. No. 3,085,568 which have pulsed water through a mattress, at heartbeat speed.

The devices of the prior art though numerous have not provided as effective a rest-inducing device as has been desired. I have noted that in each of the above-noted patents, the throbbing effect has been produced either by movement of a mechanical device acting directly through a solid material, e.g., a bed frame, on the subject or the movement of a non-compressible fluid, e.g., water, directly in contact with the subject. Thus, while the pulsing has been roughly at the appropriate frequency, the harsh mechanical contact aspect against the subject has been annoying and disturbing, attributes which did not characterize the residence of the fetus in the womb.

I have found after much examination that an ideal means by which the presence in the womb may be closely simulated is easy to produce and convenient to use. It is, briefly, a more or less conventional inflatable pad, for example, an air mattress, and air pump means delivering air (a naturally compressible medium) to the pad in pulses at an appropriate frequency. The infant in turn is moved in a soothing manner deeply reminiscent of the womb experience.

Many tests in doctors' offices have lent support to my belief that devices embodying my invention, which appear to more closely simulate residence in the mother's womb than do other devices, are indeed more effective than such other devices.

Other features of the invention will be apparent from a reading of the following specification and reference to the drawings all of which describe a non-limiting example embodying the invention.

In the drawings:

FIG. **1** is a perspective view of an apparatus embodying the invention;

FIG. **1***a* is a simplified graph plotting time against pressure showing the pressure within the inflated pad in a preferred embodiment; and

FIGS. **2** through **5** show successive conditions during the operation of a simplified pump comprising part of the embodiment.

Referring more specifically to the drawings, an apparatus embodying the invention is generally designated **10** in FIG. **1**. It comprises an inflatable pad **12** which may be, for instance, a rubberized cloth air mattress having interconnecting chambers defined by a stitched or welded together grid pattern of the upper and lower sheets. The mattress is provided with a filler neck **14**. An air pump **16** has its outlet **18** connected to the filler neck **14** by a hose **20** comparable to a circumferentially inexpansible vacuum cleaner hose.

The pump **16** comprises, in the version shown, a frustoconical housing **22** within which is mounted by means not shown a motor **24** to which electricity may be supplied through switch and control rheostat **26** adapted to control frequency and a timer **27**. The pump cylinder **28** is secured in the housing **22** and is substantially cylindrical, its upper end terminating in the pump output **18**. A partition **30** is spaced down from the top wall of the cylinder and is formed with a port **32** through which air may pass in an upward direction as shown, past the resilient flap **34**, but not in a downward direction because the natural resilience of the flap **34** will close the port **32** to check backward flow of air.

A piston **36** is operatively reciprocal within the cylinder **28** and is connected to an eccentric on the shaft of the motor **24** by a connecting rod **38**. Formed in the top wall of the piston **36** is a port **40**. On the top wall of the piston a second flap **42** is provided and operates as a check valve in a manner similar to flap **34**. The piston **36** is formed with a passage **44** which extends from the top wall down to an opening **46** in the side of the piston spaced from the top wall.

The cylinder is formed with a sidewall port **48**.

The operation of the pump is as follows. As the piston starts its up stroke, air is forced through port **32** into the mattress creating the first pressure surge in graph **1***a*. Further along (FIG. **3**) the ports **46** and **48** align permitting the momentary escape of air through the port **32** prior to the closing of the flap **34**. This creates the first dip-in pressure in graph **1***a*. Following this, the piston continues (FIG. **4**) its upward stroke producing the second increase in pressure in the graph. On the downstroke (FIG. **5**), flap **34** is closed and flap **42** opens permitting air to enter the space between the piston **36** and the partition **30**.

Means for varying the amplitude of the pulsing may take various forms. For instance, an opening of adjustable size may, in the top wall of the cylinder **28**, permit escape of some of the air to a selected extent. Alternatively, the adjustable leak may be an opening in the sidewall of the filler neck **40** which may be eclipsed or not eclipsed by a plastic "C" clamp comparable to that adjusting the suction on a tank-type cleaner.

Variations within the scope of my invention are possible. Thus, to produce a two-pulse cycle in accordance with FIG. **1***a*, the pump structure may take the form of a thick-walled cylinder having a simple vertical recess on the inside of the wall intermediate the ends of the piston stroke, the recess being longer than the height of the piston to permit momentary escape of air intermediate the ends of the piston upstroke. A further variation may comprise a rigid connecting rod extending down from the piston in place of the connecting rod **36** and connected to the eccentric at a point spaced from the drive shaft with the result that the tilting of the piston in the center of its stroke breaks the seal between the piston and the cylinder to permit a momentary escape of air intermediate the ends of the upstroke travel.

Thus, many variations are contemplated, all within the scope of the following claims:

1. A rest-inducing device primarily for infants comprising:

a. a single-stroke reciprocating air pump having a cycle frequency comparable to that of the human heart and having means modifying the pressure stroke output of the pump to induce a pair of pulses during each pressure stroke;

b. an air mattress having a filling port; and

c. means connecting the output of the pump and the filling port of the air mattress whereby the mattress imparts to a body resting thereon a throbbing movement comparable to that of a mother's womb.

2. A rest-inducing device as described in claim **2** wherein the means for modifying the pressure stroke output comprises a vent in the wall of the pump cylinder, the piston having a passage from its working face down to an opening in its side, the vent being covered by the piston at all times except when the opening aligns with the vent intermediate the ends of the stroke of the piston.

3. A rest-inducing device as described in claim 2 wherein the pump is equipped with an outlet-oriented check valve permitting passage of air out of the pump outlet, but not in the reverse direction.

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