

Sept. 21, 1965

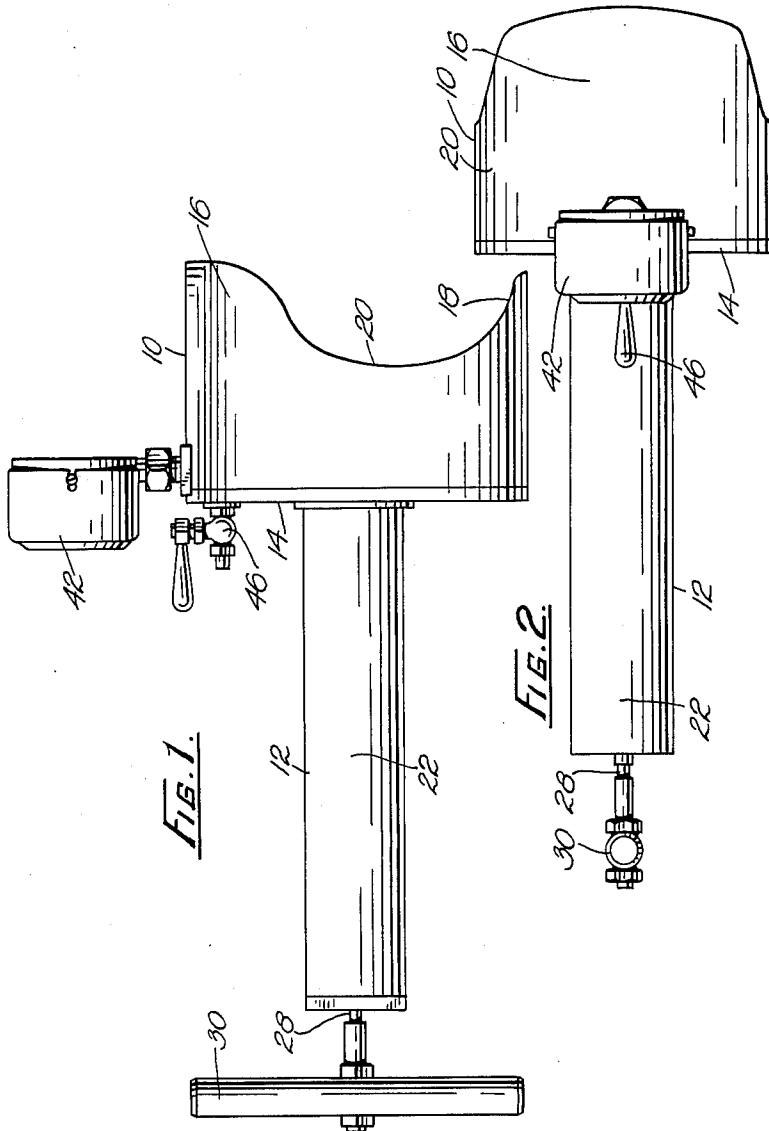
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3,207,160

APPARATUS FOR FACILITATING THE PROCESSES OF PARTURITION

Filed Nov. 5, 1963

3 Sheets-Sheet 1



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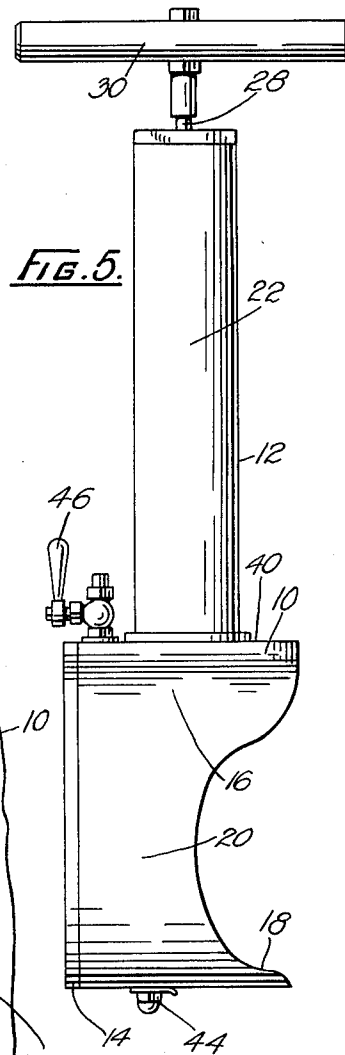
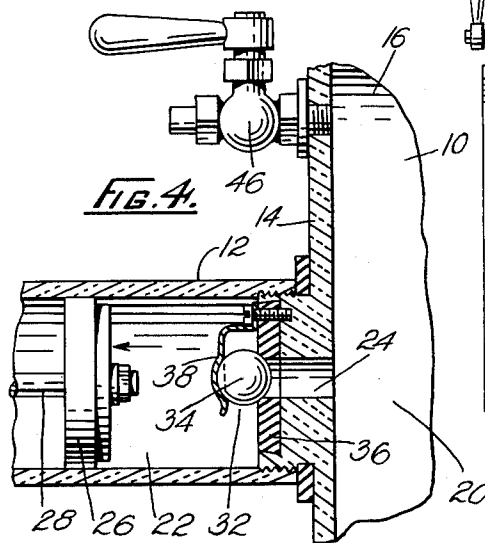
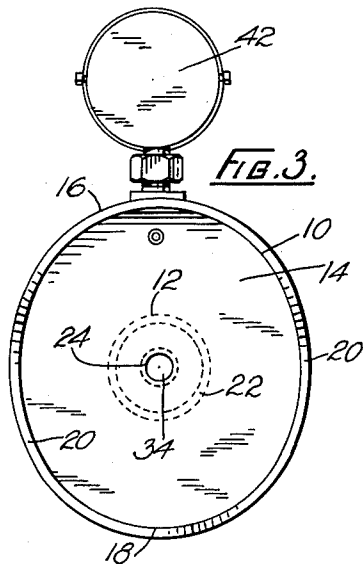
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APPARATUS FOR FACILITATING THE PROCESSES OF PARTURITION

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3 Sheets-Sheet 2



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APPARATUS FOR FACILITATING THE PROCESSES OF PARTURITION

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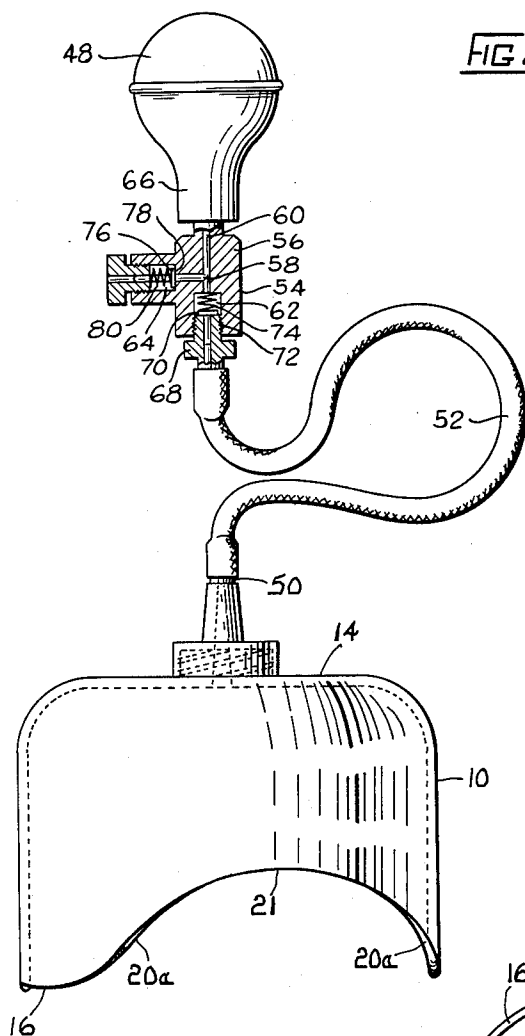
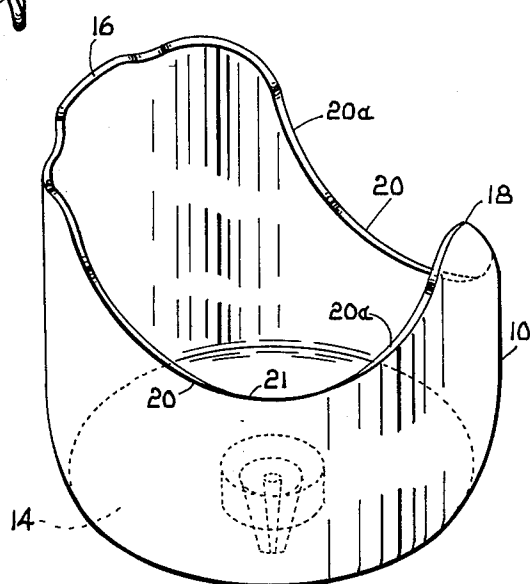


FIG. 7.



1

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APPARATUS FOR FACILITATING THE
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3 Claims. (Cl. 128—361)

This application is a continuation-in-part of applicant's patent application Serial No. 232,013 filed Oct. 22, 1962 now abandoned.

The process of parturition is naturally divided into three stages, in the first of which the cervical orifice of the uterus is caused to open preparatory to the expulsion of the foetus, while in the second stage the foetus and the uterus, opened during the first stage, are displaced towards the pelvic floor for the foetus to be expelled through the gap in the floor constituted by the vaginal canal. In the third stage the placenta is displaced.

The movements of all stages are produced by muscular contractions of the uterus induced automatically, and by movements of the abdominal diaphragm produced consciously.

Since this invention relates only to the second and third stages, no more need be said about the first stage.

The drama of the second stage opens with the foetus emerging head foremost from its uterine sanctuary into the birth canal. As the stage proceeds, the foetus advances spasmodically along the canal, which dilates to give it passage.

In a normal birth, no artificial aids are required to assist the progress of the foetus.

However, when complications occur, it may become necessary to assist the passage of the foetus down the birth canal or even, in extreme cases, to extract it by Caesarean section.

Means to assist the passage of the foetus that are customarily used are the forceps, a specialized plier which is manipulated to grip the head of the foetus; or suction means, such as the Malmstrom cup, which is clamped to the scalp by suction. The damage which can only too easily be done to the fragile infant by these devices, even in skilled hands, need not be stressed. The foetal head is ill adapted to resist crushing by the forcep jaws; and hauling the foetus along the birth canal by means of a suction cup can and often does actually detach the scalp. So potentially dangerous are these aids that most countries forbid their use to anyone other than a certificated obstetrician. This means that the midwife is deprived of aids that can spell the difference between life and death for the infant and perhaps also the mother.

The primary object of the invention is to provide means to apply the suction which is portable and is easy to manipulate in unskilled or semi-skilled hands.

A second object is to provide apparatus which can be used, in many cases, in substitution for the forceps or the suction cup.

A third object is to provide apparatus for use in the third stage, to facilitate extraction of the placenta.

Several embodiments of apparatus according to the invention are to be seen in the accompanying drawings in which:

FIGURE 1 is a side view of one embodiment;

FIGURE 2 is a plan view;

FIGURE 3 is an end view;

FIGURE 4 is a fragmentary view in section of a pump mechanism;

FIGURE 5 is a modified form of the embodiment of FIGURES 1 to 4;

FIGURE 6 is a view partly in section of another embodiment; and

2

FIGURE 7 is a perspective view of the chamber.

In all the embodiments, the apparatus consists of two parts, a chamber 10 and a pump which is operated to reduce the pressure within the chamber.

The chamber (see particularly FIGURE 7) is a hollow body of transparent material such as perspex, closed at one end by a transverse wall 14 and with a rim which is ellipsoidal in plan. The long axis of the chamber is about 16.5 cms., and the short axis about 14.5 cms. The thickness of the wall is about 6 mm.

The rim is specially shaped to make sealing contact with the parturient's body and totally to enclose the pelvic outlet.

As a result of very considerable experiment, it has been found that the shape illustrated is the best suited to the purpose and that, strangely enough, it is capable of use over a wide range of female proportions.

The rim illustrated consists in a zone 16 at one end of the long axis, which is convexly arcuate and scalloped and which makes contact with the pubic arch; a pointed cusp-like formation 18 diametrically opposite the zone 16 and which is accommodated within the posterior natal cleft and lies against the coccyx or the sacrum; and side zones 20 that are concavely arcuate and straddle the pelvic orifice at or near to the junctions of the body with the thighs. The side zones 20 are of varying radius, being of smaller radius adjacent the zone 16 and the formation 18 (designated as 20a, 20a) which two radii are preferably the same, than the radius of the medial zone 21. In other words the zones 20 are somewhat flattened medially.

In use, the rim rests on the bone of the pelvic outlet everywhere and does not, therefore, press upon the soft parts or opening of the outlet thus obstructing descent of the head. The posterior part rests on the coccyx and does not prevent the head from stretching downwards upon the anococcygeal raphe. The pelvic outlet is not situated in a plane surface and therefore the rim is cut out and shaped as described so as to fit perfectly. The shape is thus highly important to the successful operation of the device.

The depth of the chamber from the zone 16 to the wall 14 is of the order of ten to thirteen cms.

In FIGURE 6, the pump consists in a squeeze bulb 48 connected to a nipple 50 on the transverse wall 14 by a flexible tube 52 through a valve structure 54. The valve structure comprises a body 56 having a cavity 58 into which three passages 60, 62, 64 open. The passage 60 is formed within a spigot over which the neck 66 of the bulb 48 is fitted. The second passage 62 is formed within a second spigot 68 over which an end of the tube 52 is fitted and is controlled by a disc 70 biased against a seat 72 by a compressed spring 74.

The passage 64 is open to atmosphere and is controlled by a disc 76 biased against a seat 78 by a compressed spring 80. The bulb 48 is about 75 cc. in volume.

In FIGURES 1 to 5, the pump 12 consists in a barrel 22 that is connected to the chamber 10 and communicates with it through aperture 24.

Within the barrel is a piston 26, with a piston rod 28 that projects from the barrel and carries a handle 30 at its free end.

A one-way valve 32 is located at the forward end of the pump and consists in a ball 34 on a rubber seat 36, on which it is held by a spring 38.

As shown in FIGURES 1 to 3 the pump is coaxial with the chamber 10. In FIGURE 5, however, it is mounted on the circumferential wall 40 of the chamber close to the zone 16 of the rim.

In FIGURES 1 to 3, a pressure gauge 42 is mounted on the cylinder to indicate the degree of suction within the chamber. In FIGURE 5, there is no gauge but in-

3

stead there is a relief valve 44 which is arranged to open to admit air into the chamber 10 when the reduced pressure in it drops below a predetermined figure, say 100 mm. Hg.

The illustrations are arbitrary in the sense that the FIGURE 5 or the FIGURES 1 to 3 embodiments can have either pressure gauges or relief valves, or both; or the provision of a relief valve may be supplemented by a plugged nipple to receive a pressure gauge.

In both forms, there may be a cock 46 to restore atmospheric pressure within the chamber instantaneously. This cock may be present in the FIGURE 6 embodiment.

In use, the chamber is pressed against the parturient's body in the way discussed above, and the pump is operated to reduce the pressure within the chamber to say 100 mm. Hg. but not usually above 150 mm.

In the FIGURE 6 embodiment, a few rapid squeezes of the bulb 48 will produce a pressure reduction to about 100 mm. Hg. This is about the maximum pressure drop obtainable and as this is well within the limits of safety, the embodiment is especially adapted for use by semi-skilled persons. With the embodiment of FIGURES 1 to 5, without a pressure relief valve, this pressure drop can be greater and care has to be exercised that too much suction is not applied.

It has been found in practice that the device is a virtually complete substitution for the forceps or suction cup in difficult births; and as no contact is made with the head, no possible injury can result. This is, of course, a tremendous asset in less-developed areas where births are supervised by semi-skilled operators who are not to be trusted with instruments such as forceps but who from time to time must resort to them, come what may. Thus, a device such as described in a midwife's kit will be a professional tool of great value with which she can do no damage. It is pointed out that the device requires no power to operate it, other than manual power, so that it can be put to use under primitive conditions.

The embodiment of FIGURE 5 takes the matter a stage further. This is intended as a "do-it-yourself" tool, since the parturient can squat upon it and herself operate the pump. As this sort of thing is likely to occur in the normal run of events only in primitive communities, the relief valve 44 ensures that damaging suction cannot be applied; or alternatively the squeeze bulb form of FIGURE 6 is used.

So much for the second stage. After delivery, the device can be brought into use in the third stage to extract the placenta. Applicant has established that when so used, the third stage is facilitated and the risk of post-partum hemorrhage is lessened.

It is pointed out that the device, in any of its embodiments, is readily operable by one person, who may be the parturient herself. In the FIGURES 1 to 5 form, two hands are necessary, one to hold the pump barrel and one to operate the plunger. In the FIGURE 6 form, one hand presses the chamber into position while the other squeezes the bulb; and after one or two squeezes the chamber adheres to the flesh and only one hand is required to complete the evacuation of the chamber.

In this and the FIGURES 1 to 5 case, too, the chamber adheres of itself. In both cases, from time to time,

4

the suction may be boosted by an occasional squeeze or pump. The obstetrician thus enjoys considerable freedom as he has his hands free; and furthermore, he knows exactly what is going on all the time and has exact control over the amount of suction applied. He can quickly detach the chamber for periodical inspections and then re-attach it. Detachment is quickly effected by breaking the vacuum by inserting a finger under the rim; or in the FIGURE 6 embodiment by pulling the tube 52 off the nipple 50 by a quick tug.

The foetal head is not received within the chamber 10. As soon as it emerges, the chamber is removed because the equipment has fully served its purpose, and the body is delivered in the normal way.

I claim:

1. Apparatus for facilitating the second and third stages of labor during childbirth, comprising an open-ended chamber of transparent material having a bottom wall and side walls upstanding from the bottom wall, said side walls terminating away from said bottom wall in a rim which is ellipsoidal in plan and which is shaped to provide at one end of the major axis of the ellipse a convex arcuate end portion and at the opposite end of the major axis of the ellipse a pointed cusp-like end formation, said rim between said arcuate end portion and said cusp-like end formation having concave arcuate side portions of U-shaped configuration such that in use said arcuate end portion bears against the pubic arch and said cusp-like end formation bears against a lower posterior portion of the vertebral column, the bottoms of said U-shaped arcuate side portions being disposed on the same side of the minor axis of the ellipse as said cusp-like end formation and said cusp-like end formation being of less width than said arcuate end portion, a hand-operated pump communicating with the cavity of the chamber through one of said walls, and a one-way valve in the pump to allow withdrawal of atmospheric air from the chamber.

2. Apparatus as claimed in claim 1, each arcuate side portion having varying radii and being of smaller radius adjacent the arcuate end portion and the cusp-like end formation than adjacent the medial section of the side portion.

3. Apparatus as claimed in claim 1, the pump comprising a squeeze bulb connected to the chamber by a flexible tube through said one-way valve.

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