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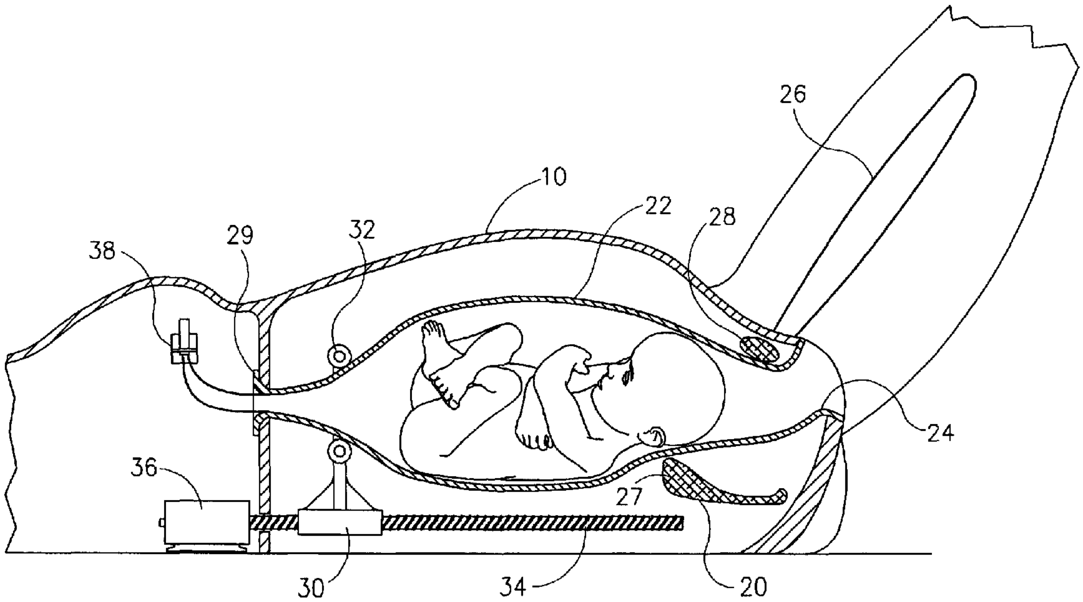

(57) Abstract: An interactive, computerized system for training health professionals in delivering babies, the system including a life size manikin (10) including: a pelvis (20) formed of artificial bones; an elastomeric uterus (22), integrally formed with an artificial vaginal canal (24), seated in the pelvis; a device for providing controlled simulated contractions of the uterus (22), mounted in the manikin (10); and a computerized controller controllably coupled to the device for providing controlled simulated contractions.

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MEDICAL TRAINING SIMULATOR

FIELD OF THE INVENTION

The present invention relates to an interactive computerized system for use in training obstetricians and midwives in complicated childbirth cases, like Shoulder Dystocia, vacuum, forceps and breech presentation.

BACKGROUND OF THE INVENTION

Several million babies are born each year in hospitals around the world. A significant number of these babies have complicated births, due, for example, to problematic presentation, engagement of a shoulder or other bone behind the mother's pelvis. Such births require an attending obstetrician or midwife to assist the infant through the birth canal. However, since the percentage of births having these complications is relatively small (i.e., about 0.4%), obstetricians (physicians) and midwives rarely have hands-on experience with the birthing techniques required to deliver the infant without damage. Thus, assistance at complicated births is required by attending obstetricians and midwives without specialized expertise or sufficient experience. Of particular interest are shoulder dystocia, breech birth, and instrumental (forceps and vacuum) deliveries. Shoulder dystocia occurs when a shoulder of the infant becomes stuck on a symphysis pubis, after the head is through the birth canal. It is crucial that the shoulder be released quickly and efficiently (within about 60 seconds), as complications with the umbilical cord can arise. However, incorrect intervention in the case of shoulder dystocia can result in Braxia plexus injury, clavicular and humeral fractures, or other consequences with which the newborn must cope throughout its life. In instrumental deliveries, it is crucial to know how to attach the instruments and how to pull the infant synchronized with the contractions and position.

Conventional teaching methods consist of textbooks, lectures, and live or multimedia demonstrations of suggested techniques. However, it is not possible to permit a student to practice treating such cases, in order to gain experience. While providing a low cost source for learning theory, textbooks and flash cards clearly lack the important benefit that can only be acquired from "hands-on" training and practice. Training materials of the foregoing type must also be updated frequently with advances in delivery techniques, making it difficult for users to be updated in recommended teachings.

In other fields of medicine with similar difficulties, various training simulator systems have been developed. There is shown, for example, in US Patent 5,882,206 to Gillio, a virtual surgery system or virtual testing system, providing a simulation or test based on image data. A simulator combined with a real exam requires simulation tasks by a test taker. Additionally, a surgical procedure may be simulated using image data of a patient in devices simulating the physical instruments a surgeon uses in performing the actual procedure, for example. The user input device, such as a mouse, three dimensional mouse, joystick, seven dimensional joystick, full size simulator, etc., can be used in a virtual simulation to move through the image data while the user looks at the data and interaction of the input device with the image data on a display screen. Force feedback can be provided based on physical constraint models (of the anatomy, for example), or based on edge and collision detection between the virtual scope or virtual tool used by the operator and walls or edges of the image data in the image space.

US Patent 5,454,722 to Holland et al, describes an interactive computer system for use in training persons in surgical procedures for the eye. The system employs visual, audio and/or textual databases to provide training to students of such procedures using a personal computer based system with graphics and multimedia capabilities. These patents do not provide “hands-on” experience.

US Patent 5,509,810 to Schertz, et al., discloses an interactive neonatal resuscitation simulator and method, which provide a trainee with a life-like simulation of a resuscitation process on a newborn infant, and in particular, a life-like simulation of what an attending obstetrician would experience while resuscitating a newborn infant at a resuscitation station within a hospital's delivery room.

US Patent 5,853,292 to Eggert et al., describes an interactive, computerized education system for teaching patient care, including an interactive computer program for use with a simulator, such as a manikin, and virtual instruments for performing simulated patient care activity under the direction of the program. The virtual instruments are used with the simulator in performing the patient care activity, the virtual instruments cooperating with sensors that interface with the computer program for providing feedback to the program regarding the activity and confirming proper placement and use of the virtual instruments on the simulator.

Three patents to Knapp et al, US Patents 3,797,130, 3,824,709, and 3,826,019 provide a simulator for teaching conventional delivery during normal childbirth. The system includes a programmable patient simulator for teaching maternity patient care, including a life size manikin with a pelvis, vaginal canal, uterus, placenta, umbilical cord, and fetal doll, from which heart sounds are emitted. However, these training simulator systems are deficient in that they are not computer controlled, and have no software for training and real time interaction.

Accordingly, there is a long felt need for a training simulator which permits an obstetrician or midwife to practice delivery techniques for a variety of complicated births on a lifelike manikin having a deliverable fetal doll.

SUMMARY OF THE INVENTION

The present invention relates generally to an interactive, computerized training simulator system for training obstetricians and hospital staff in complicated deliveries techniques, and more particularly to such a system for use in conducting real time full virtual training sessions using real manikins for fetus and for the pregnant female. The training system includes the following major components: (1) a life size manikin, with a pelvis, vaginal canal, and uterus, which accurately simulates a pregnant woman; (2) a sensorized, computer controlled infant (fetal doll); (3) a multimedia presentation viewer; (4) a robotics system, for actuating the pelvic region of the manikin; and (5) supporting/controlling system software. The system of the present invention is particularly useful for teaching training techniques for use in complicated childbirth cases, like Shoulder Dystocia, vacuum, forceps and breech deliveries.

There is thus provided in accordance with the present invention an interactive, computerized system for training health professionals in delivering babies, the system including a life size manikin including: a pelvis formed of artificial bones; an elastomeric uterus integrally formed with an artificial vaginal canal seated in the pelvis; a device for providing controlled simulated contractions of the uterus, mounted in the manikin; and a computerized controller controllably coupled to the device for providing controlled simulated contractions.

There is also provided method for interactive computerized training of training health professionals in delivering babies, the method including providing a life size manikin including a pelvis formed of artificial bones, artificial thigh bones coupled to the pelvis, and arranged to interact therewith as in a live woman, an artificial uterus integrally formed with an artificial vaginal canal seated in the pelvis, and a computerized controller coupled to the pelvis for controlling the position of the pelvis and to the uterus to simulating uterine contractions, selecting a training module in the computerized controller for training a difficult delivery, inserting a fetal doll into the uterus in a position for simulating the difficult delivery, and providing feedback regarding success of the trained difficult delivery.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will be further understood and appreciated from the following detailed description taken in conjunction with the drawings in which:

Fig. 1 is a schematic illustration of a training system constructed and operative in accordance with one embodiment of the present invention;

Fig. 2 is a schematic side sectional view of a manikin according to one embodiment of the invention with a fetal doll inside;

Figs. 3a and 3b are schematic illustrations of the "bones" in the pelvic region of the manikin showing the pelvic inlet under the McRoberts procedure;

Figs. 3c and 3d are schematic illustrations of the location of the sacrum in Figs. 3a and 3b, respectively;

Fig. 4a is a schematic view of a uterus and fetal doll position control system according to one embodiment of the invention;

Fig. 4b is a view of the uterus of Fig. 4a in an open orientation for positioning a fetal doll in the correct location for the selected simulator exercise;

Figs. 5a and 5b are schematic illustrations of a fetal doll according to one embodiment of the invention, showing sensors on the skull and shoulders, and on the neck, respectively;

Fig. 6 is a schematic illustration of a multimedia presentation viewer according to one embodiment of the invention;

Fig. 7 is a flow chart of the controller software according to one embodiment of the present invention; and

Fig. 8 is a side sectional view of a portion of a manikin, according to an alternative embodiment of the invention.

DETAILED DESCRIPTION OF THE INVENTION

The present invention relates generally to an interactive, computerized training simulator system for training obstetricians and hospital staff in complicated deliveries techniques, and more particularly to such a system for use in conducting real time full virtual training sessions using manikins for the fetus and for the pregnant female. The system of the present invention is particularly useful for teaching techniques for use in complicated childbirth cases, like Shoulder Dystocia, vacuum, forceps, and breech deliveries. The system employs animations, audio, and textual databases to provide training of such procedures, using a personal computer or a network of such computers. The training operation consists of state of the art multimedia capabilities, synchronized simultaneously to the real activity on a life size manikin, with a pelvis, vaginal canal, uterus, and a sensorized fetal doll.

In general, the interactive training simulator and training method of the present invention are designed to present a life-like simulation of a variety of difficult birth situations. The system accurately simulates what an attending obstetrician or midwife might encounter when delivering a newborn infant in a hospital delivery room, while providing feedback regarding the trainee's handling of the infant throughout the "delivery" process. It is a particular feature of the invention that the trainee cannot see the fetal doll during the delivery, as would be the case in an actual delivery, and so must develop his or her sense of touch and control over the amount of force applied in any given situation.

Referring now to Fig. 1, there is shown a schematic illustration of a training system constructed and operative in accordance with the present invention. The training system includes the following major components: (1) a manikin 10 affixed to a bed, the manikin including a pelvic region (pelvis, vaginal canal and uterus) which accurately simulates a pregnant woman; (2) a computer controlled robotic infant (fetal doll) 12; (3) a multimedia presentation viewer 14, preferably synchronized simultaneously to the real activity on the life size manikin; (4) a computer controlled system (not shown) for positioning the pelvis and pelvic region under control of the computer; and (5) supporting/controlling system software running on a personal computer 16 or a network of such computers. Each of these components is described in detail herein with reference to the accompanying drawings.

One example of a manikin 10 is shown in side sectional view in Fig. 2. The manikin 10 is a life size doll having a pelvic region including a pelvis 20, and a uterus 22 with an integral vaginal canal 24. Preferably, pelvis 20 and leg bones 26 are formed of substantially rigid rubber or plastic. It is a particular feature of the present invention that, as seen in Figs. 3a and 3b, movement of the legs of the manikin (hyperflexion) causes a corresponding change in the angle and relationship of the various pelvic bones to one another, as in a live woman. Thus, the shape and the angle of the pelvic inlet, as well as the location of the sacrum 27 relative to the symphysis pubis 28 (see Figs. 3c and 3d), can be changed by the student, as when performing the McRoberts maneuver. In addition, a mechanical linkage or electrical control is also provided to permit the simulator to change the position of the manikin's pelvis, depending upon the selected training problem. A robotics system is provided to actuate the limbs and pelvic region of the manikin, and is controlled by the training system controller. The robotics system can be any conventional robotics system, such as that shown in US Patent 5,509,810.

Uterus 22 is formed of a flexible material, such as rubber or any other elastomeric material, preferably Latex, and is fixed at one end 29 to the uterine wall. The uterus merges into the vaginal canal 24 ending in a simulated cervix, which is adapted to dilate is accordance with the particular training program. Preferably, a cervix opening device is provided, which consists of an electromechanical device for controlled dilation of the cervix.

As can be seen, uterus 22 passes between the manikin's sacrum 27 and symphysis pubis 28. Preferably, the "feel" of the uterus is very similar to that of a live patient. A device 30 for providing controlled simulated contractions of the uterus is mounted in manikin 10. In the embodiment illustrated in Fig. 2, device 30 is an electromechanical device, including a rigid ring 32 of the approximate diameter of a fully dilated cervix, about 10 cm diameter, mounted on a linear actuator 34. As explained hereinbelow, movement of ring 32 in the direction of the manikin's legs stretches the elastomeric uterus, causing it to "contract" around a fetal doll inside the uterus, thereby forcing the fetal doll in the uterus towards the vaginal canal, as occurs during natural contractions. It will be appreciated that, by using computer controlled servo devices, step motors, dc motors, or other electrical driving source 36, the computerized electromechanical simulation of the pelvic region of the manikin simulates uterine contraction and expulsion of a fetal doll. A gel pump 38, or other mechanism, may be provided to pump gel into the uterus to simulate amniotic fluid.

According to another embodiment of the invention, shown in Fig. 8, the uterus 22' is not affixed to the uterine wall, but rather to a relatively large ring 31. Ring 31 is arranged for linear sliding movement relative to the vaginal canal. This movement stretches the uterus lengthwise, thereby creating radial pressure on the fetal doll, which can be felt by personnel during the simulated delivery as in a real delivery.

Located inside uterus 22 is a fetal doll 40. Preferably, uterus 22 includes an openable and closable panel 42, such as a Ziplock or zippered panel, to permit positioning of a fetal doll in the correct location for the selected simulator exercise. While it is possible to provide a transparent panel in the uterus, it is preferable that the entire uterus be opaque, so as to more accurately reflect an actual childbirth situation. In any case, it will be appreciated that panel 42 provides a tight seal, so as to prevent leakage of "amniotic fluid" from the uterus. Alternatively, as shown in Fig. 8, the fetal doll 40 can be inserted through ring 31 into the uterus, by sliding cover 33 along rod 35, thereby opening the uterus.

Fetal doll 40 is a doll of the approximate size of a full term infant. In some instances, fetal doll 40 can be formed with an oversize head, so as to permit the practice of deliveries with hydrocephalation, and similar large heads. The limbs of fetal doll 40 are not fixed in position, but rather can move, as would the limbs of a live infant, although the movements of the hands and legs of the fetal doll are not controlled. Preferably the fetal doll has articulated joints, so the limbs can be manipulated, as would a live fetus.

Movement and position of the fetal doll 40, relative to the uterus, can be controlled by the controller of the system. One embodiment of a fetal doll position control system is shown in Fig. 4a, and includes a rod 44 releasably couplable to the buttocks, or head (for a breech presentation), of the fetal doll. Rod 44 permits the doll to be rotated and/or pushed by the training system controller towards the vaginal canal, as may be required by different types of deliveries.

One embodiment of a system including a fetal doll position control system is shown in Fig. 8. As can be seen, a slidable cover 33 for ring 31 is provided on a rod 35. Cover 33 includes an aperture through which a threaded rod 44' passes. Rod 44' is couplable to the fetal doll, and is arranged to provide horizontal and rotatable movement of the fetal doll within the uterus, by means of a driving system 37.

It is a particular feature of the present invention that a plurality of sensors are coupled to vulnerable body locations (areas likely to be injured during incorrect delivery) on the fetal doll. Two examples are shown in Figs. 5a and 5b. Fig. 5a shows a fetal doll 46 having a plurality of pressure sensors 48 mounted on the skull and shoulders, while Fig. 5b shows a fetal doll 50 having a plurality of pressure sensors 52 mounted on the neck. Preferably, pressure sensors are provided in all three locations, so as to measure the pressure applied to each of these areas during the training exercise, and to provide an indication of excess pressure during the exercise. Pressure sensors 48 and 52 are preferably force measurement devices, such as different springs on a regular micro switch. A cable 48, which may pass internally through the doll, is connected to all the sensors, and leads from the umbilical cord position via an interface device to the computerized controller.

In addition to the life size manikin and fetal doll, the training system further includes a multimedia presentation viewer, preferably synchronized simultaneously to the real activity on the life size manikin. One embodiment of such a multimedia viewer is illustrated schematically in Fig. 6. Preferably, multimedia viewer 60 includes a screen 62 for presenting an animated simulation of the type of delivery being practiced by the trainee. The viewer is preferably mounted at about eye level of the trainee while he or she is performing the technique on the manikin, as shown in Fig. 1. Thus, the trainee can choose to view the animation showing precisely how to perform the technique before actually doing it him- or herself, and can also view the training clip during the actual practice session. Preferably, the viewer also includes a section 64 for displaying special instructions for the selected technique and the trainee's grade, as well as a section 66 tracking the condition of the fetal doll, i.e., the level of pressure registered by the various pressure sensors. Needless to say, one or more loudspeakers 68 may be provided, for example, to add an aural description of the technique, and/or to provide an alarm indication, in case the pressure on the fetal doll exceeds a predetermined threshold during the training session.

All the above elements of the training system are coupled to a synchronized, self contained, interactive computer system having a GUI (Graphic User Interface), and a program to control and support all the various steps in the above-mentioned procedures. Thus, the computer system, which can run on a personal computer, or any other suitable computer or network of computers, is coupled to the multimedia presentation viewer, to the robotics system of the manikin, to the motion controller and sensors of the fetal doll, and to the devices for providing controlled simulated contractions of the uterus and dilation of the cervix. The software is operative to display a particular selected technique and to provide the corresponding movements of the manikin.

With reference to Fig. 7, there is shown a flow chart of the controller software, according to one embodiment of the present invention. First, a menu with a plurality of birth types is provided to the trainee, who selects the desired exercise type and level of difficulty (block 70). The exercise type can first be selected from various difficult births, such as shoulder dystocia, forceps, breech presentation, vacuum. Then, the trainee can select the particular technique for solving the problem to be practiced. Similarly, the trainee selects the desired level of difficulty, which can be easy to hard, or can require slow, medium or fast intervention.

The trainee now selects either a training session, i.e., viewing a multimedia presentation of the proper way to resolve the difficulty, or an integrated session, including hands-on training on the simulator (block 72). The training system now begins to run, in accordance with the trainee's selection in the previous stage (block 74). If the trainee chooses to merely watch the method of carrying out the preferred procedure, the appropriate animation or video presentation will be displayed on the multimedia presentation viewer. Alternatively, if the trainee also desires hands on practice, the animation will be displayed, preferably synchronized simultaneously to the real activity of the trainee on the life size manikin (block 76). In such a training mode, the computer controller can "direct" the training selected by the trainee. For one example, the system can include computer program modules which provide the training sessions in a self guiding format using graphics buttons that respond to a point- and-click computer user interface.

During a hands on training session, full information concerning the correct way to carry out the procedure will be displayed on the screen, together with information regarding the position of the pelvic region, the fetal doll, and the sensors on the doll (block 78), while the trainee works through the entire routine.

If desired, the system can include a testing module to test the progress or skill of the trainee. Thus, at the end of the training session (block 80), a testing session can be provided, if desired, and the trainee's grades or overall score can be evaluated and displayed (block 82). The program then returns to the main menu (block 84) or shuts down.

A test module may include a menu of selectable scenarios, each of which requires a different training protocol to be administered during the course of complicated delivery. A series of events pertaining to the selected scenario are presented, each event including a description of the event accompanied by a plurality of possible training choices to be made in response to the event, at least one of which choices is correct, according to the training protocol for the scenario. The trainee must enter the correct choices before the next event in the series will be presented. An indication can be provided following the entered choice indicating whether the entered choice is correct and if not, displaying an explanation of why the entered choice is not correct and/or why another choice would be correct. In addition, the test module may include a timer for indicating to the trainee failure to enter a correct choice within a predetermined time period for the event. This is particularly important for testing those techniques where speed of execution is critical to the success of the technique.

If desired, the test module may also include a selection for enabling or disabling virtual instruments during presentation of the selected scenario, such that when enabled, for events requiring performance of an activity on the simulator, the user entry of the correct choice requires the user to perform the activity on the simulator using the at least one virtual instrument, and such that when disabled, for events requiring performance of an activity on the simulator, the user may complete an event in the selected scenario without performing the activity.

It will be appreciated that training sessions can be carried out with or without a live trainer. If practicing with a live trainer, the system can include a second display, i.e., of the sensor output from the fetal doll, for viewing by the trainer.

It will further be appreciated that, preferably, the controlling software will provide the option to repeat any procedure from any depicted scenarios, both in the viewing mode and in the hands-on mode. In addition, the software is programmed to provide critical conditioned messages that enable the trainee to develop appropriate strategies for the complicated labor management, for example, indicating when the trainee is using too much pressure or traction to the shoulder or skull.

It will be appreciated that the invention is not limited to what has been described hereinabove merely by way of example. Rather, the invention is limited solely by the claims which follow.

CLAIMS

1. An interactive, computerized system for training health professionals in delivering babies, the system comprising:

a life size manikin including:

a pelvis formed of artificial bones;

an elastomeric uterus, integrally formed with an artificial vaginal canal, seated in said pelvis;

a device for providing controlled simulated contractions of the uterus, mounted in said manikin; and

a computerized controller coupled to said device for providing controlled simulated contractions.

2. The system according to claim 1, wherein said vaginal canal includes an artificial cervix having an opening coupled to said computerized controller for controlled dilation.

3. The system according to claim 1 or claim 2, further comprising a fetal doll arranged for insertion into and expulsion from said artificial uterus, said fetal doll including a plurality of sensors coupled to vulnerable portions of its body.

4. The system according to claim 3, wherein said sensors are coupled to at least a head, neck and shoulders of said fetal doll.

5. The system according to claim 3, wherein said computerized controller is coupled to positioning means coupled to said fetal doll for positioning of said fetal doll.

6. The system according to any of claims 1 to 5, further comprising artificial thigh bones coupled to said pelvis, and arranged to interact therewith as in a live woman, and wherein said computerized controller is coupled to said pelvis for controlling positioning of the pelvis.

7. The system according to claim 6, wherein said mechanism for simulating contractions includes a rigid ring, of the approximate diameter of a fully dilated cervix, mounted on a linear actuator such that movement of ring in the direction of the manikin's legs causes the uterus to contract.

8. An interactive, computerized system for training health professionals in delivering babies, the system comprising:

a manikin affixed to a bed, the manikin including a pelvis, vaginal canal, and uterus, which accurately simulate a pregnant woman;

a fetal doll seated in said uterus, said fetal doll having a plurality of sensors coupled to vulnerable body locations;

a multimedia presentation viewer coupled to the bed;

a robotics system for actuating the manikin's pelvis, vaginal canal, and uterus; and controlling system software for controlling the manikin, fetal doll, viewer and robotics system and providing controlled simulated contractions for expulsion of said fetal doll.

9. The training system according to claim 8, wherein said multimedia presentation viewer is synchronized to real activity by a trainee on the life size manikin.

10. The training system according to claim 8 or 9, wherein said uterus is formed of flexible Latex which is tensioned by pulling an end of the uterus through a stable ring, so as to simulate uterine contractions.

11. The training system according to claim 10, wherein said uterus includes a controlled cervix opening device.

12. The training system according to claim 11, wherein said controlled cervix opening device includes an electromechanical device for controlled dilation of the said cervix.

13. The training system of any of claims 8 to 12, further comprising an electromechanical device for control of the uterus and simulation of uterine contractions for expulsion said fetal doll.

14. The training system of any of claims 8 to 13, wherein said manikin includes life size pelvic bones coupled to said controlling system for computer control of said bones relative to said manikin vaginal canal.

15. The training system of any of claims 8 to 13, wherein said controlling system software includes training modules including protocols for providing training sessions on techniques for complicated deliveries.

16. The training system of claim 15, wherein said complicated deliveries are selected from: shoulder dystocia, forceps, breech presentation, and vacuum.

the fetal doll has articulated joints, so the limbs can be manipulated, as would a live fetus.

Movement and position of the fetal doll 40, relative to the uterus, can be controlled by the controller of the system fetal doll position control system is shown in Fig. 4a, and includes a rod 44 releasably couplable to the buttocks, or head, for a breech presentation, of the fetal doll. Rod 44 permits the doll to be rotated and/or pushed by the training system controller towards the vaginal canal,

17. The training system of any of claims 8 to 16, wherein said controlling system software includes testing modules for providing training sessions that evaluate the ability of a user to perform the selected difficult delivery techniques on the manikin and the fetal doll.

18. The training system according to claim 17, wherein at least one of said testing module comprises:

a menu of selectable scenarios, each of which scenarios requires a different training protocol to be administered during the course of complicated delivery: and

a presentation of a series of events pertaining to a selected scenario, each event including a description of the event accompanied by a plurality of possible training choices to be made in response to the event, at least one of which choices is correct according to the training protocol for the scenario, such that the user must enter the correct choices before the next event in the series will be presented.

19. The training system of claim 18 wherein the event series presentation of the test module further comprises an indication following the choice entry of whether the entered choice is correct and if not, a displayed explanation of why the entered choice is not correct.

20. The training system according to any of claims 8 to 19, wherein said sensors are coupled to at least a head, neck and shoulders of said fetal doll.

21. A method for interactive computerized training of training health professionals in delivering babies, the method comprising:

providing a life size manikin including:

a pelvis formed of artificial bones;

an artificial uterus integrally formed with an artificial vaginal canal seated in said pelvis; and a computerized controller coupled to said uterus to simulating uterine contractions;

selecting a training module in said computerized controller for training a difficult delivery;

inserting a fetal doll into said uterus in a position for simulating said difficult delivery; and

providing feedback regarding success of said trained difficult delivery.

22. The method of claim 21, wherein said manikin further includes artificial thigh bones coupled to said pelvis, and arranged to interact therewith as in a live woman; and said a computerized controller is coupled to said pelvis for controlling positioning of the pelvis.

23. A computer program product, for execution on a computer, comprising:

means for displaying a selection of modules to assist a user in training complicated deliveries techniques, the modules being selectable by the user for providing different interactive training sessions involving the techniques,

a physical simulator for receiving simulated mother and fetus responses from a plurality of sensors,

an interface module for interfacing the sensors with the computer program, the interface module comprising lines each coupled with one of the sensors and a processor coupled with the sensor lines for receiving signals from the sensor and converting the signals to inputs for the computer program product,

wherein the computer program modules comprise at least one training module for providing training sessions that display techniques for complicated deliveries in accordance with pre-programmed protocols.

24. The computer program product according to claim 23, further comprising at least one testing module for evaluationg the ability of the user to perform the

techniques described in the training module on the manikin in accordance with the protocols.

25. The computer program product of claim 24, wherein said training module includes a menu of selectable scenarios each one of which requires a different treatment protocol to be administered during the course of complicated deliveries and a presentation of a series of events pertaining to a selected scenario, each event including a description on the event accompanied by a plurality of possible treatment choices to be made in response to the event, at least one of which choices is correct according to the treatment protocol for the scenario, such that the user is promoted to enter the correct choice or choices before the next event in the series will be presented: wherein the event series presentation of the testing module further comprises an indication following the choice entry of whether the entered choice is correct and if not, for displaying an explanation of why the entered choice is not correct.

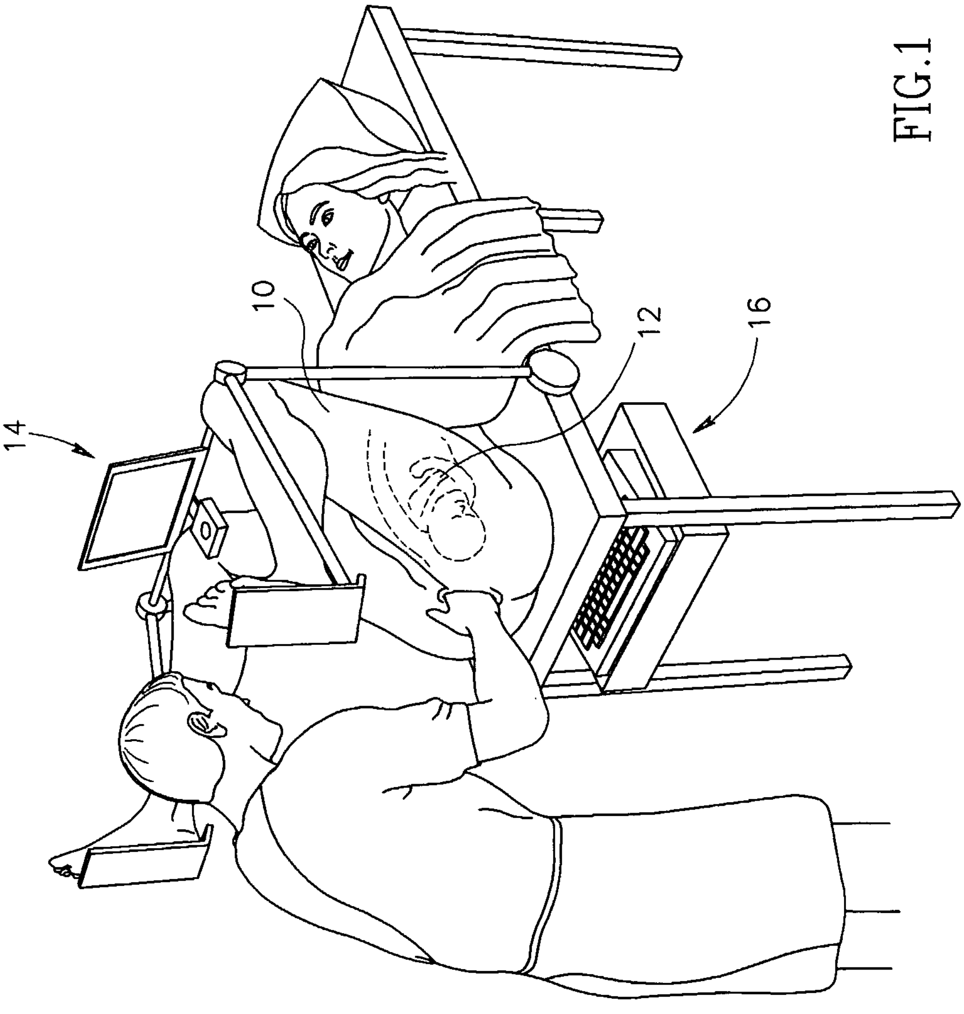

FIG.1

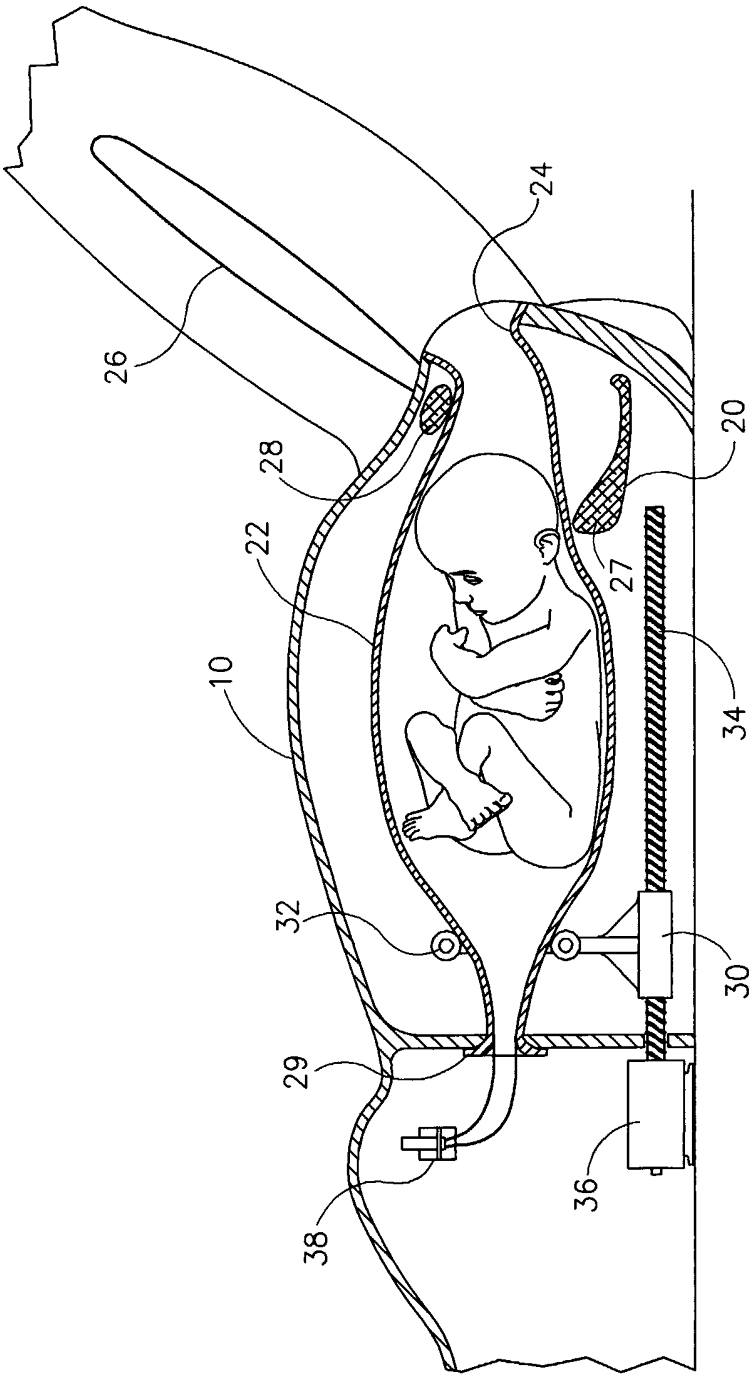

FIG.2

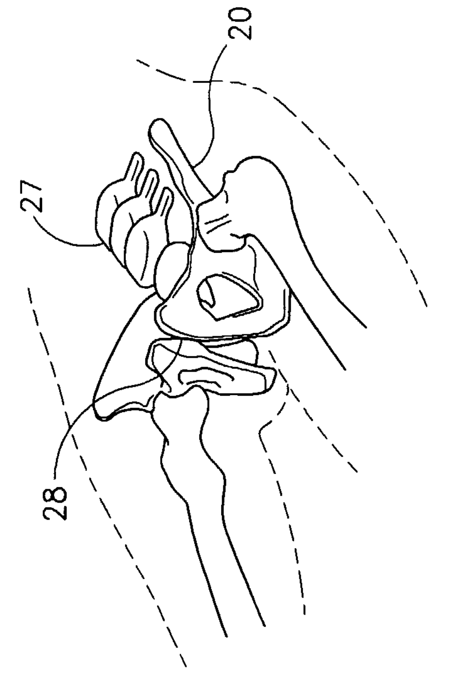

FIG.3A

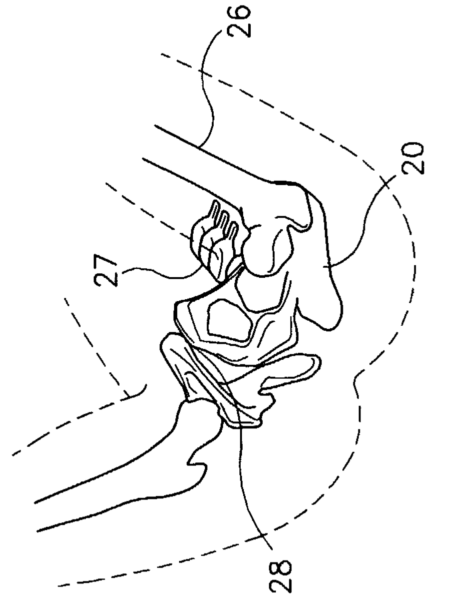

FIG.3B

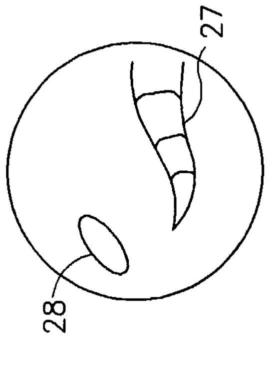

FIG.3C

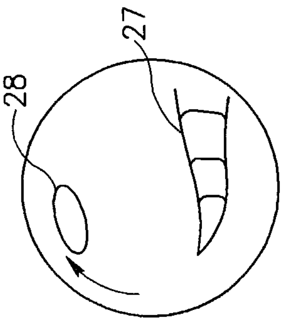

FIG.3D

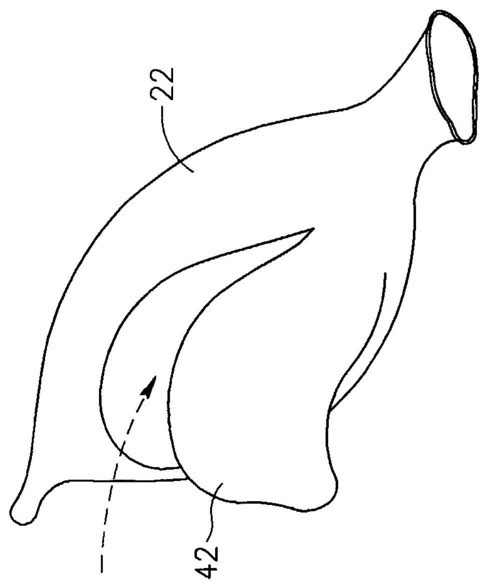

FIG.4B

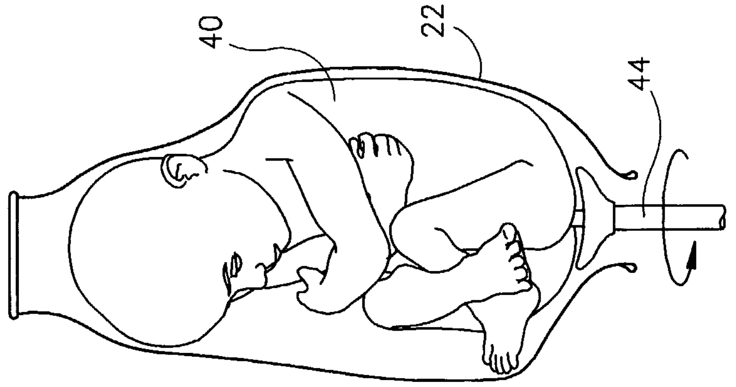

FIG.4A

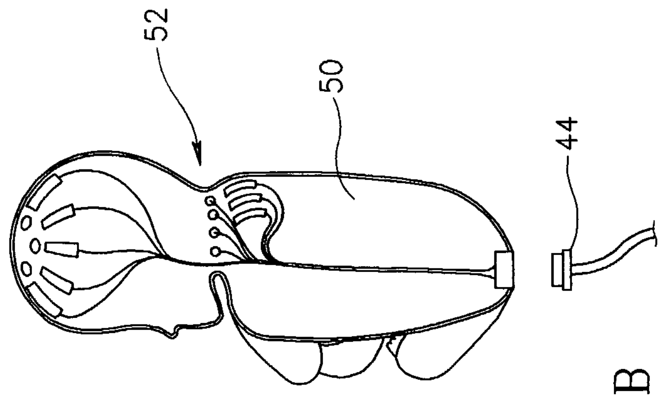

FIG.5B

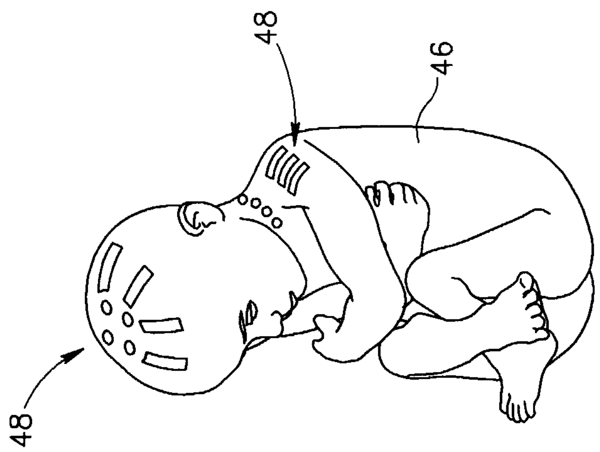

FIG.5A

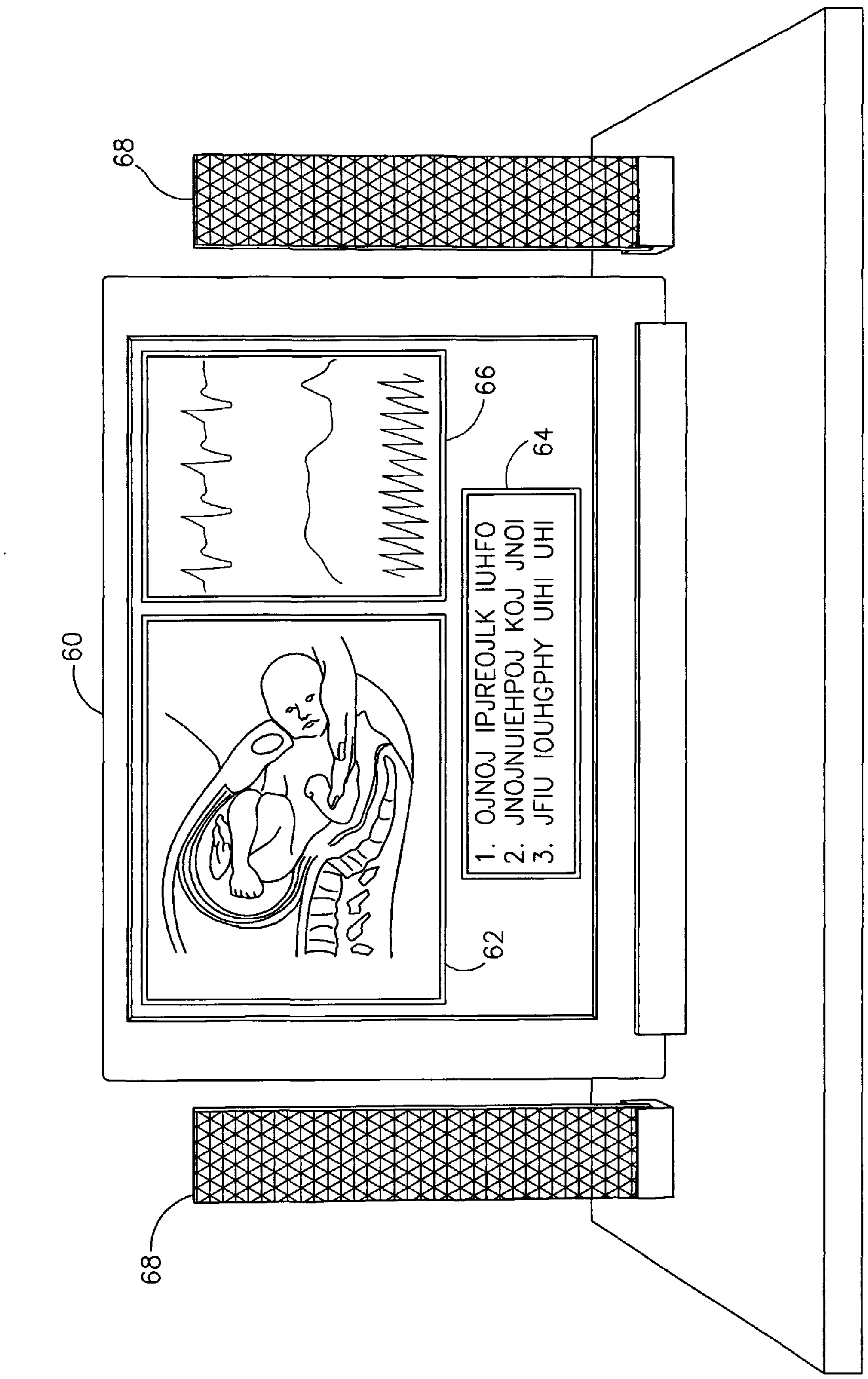
60
62
64
66
68
68
1. OJNOJ IPJREOJLK IUHFO
2. JNOJNUIEHPOJ KOJ JNOI
3. JFIU IOUHGPHY UIHI UHI

FIG.6

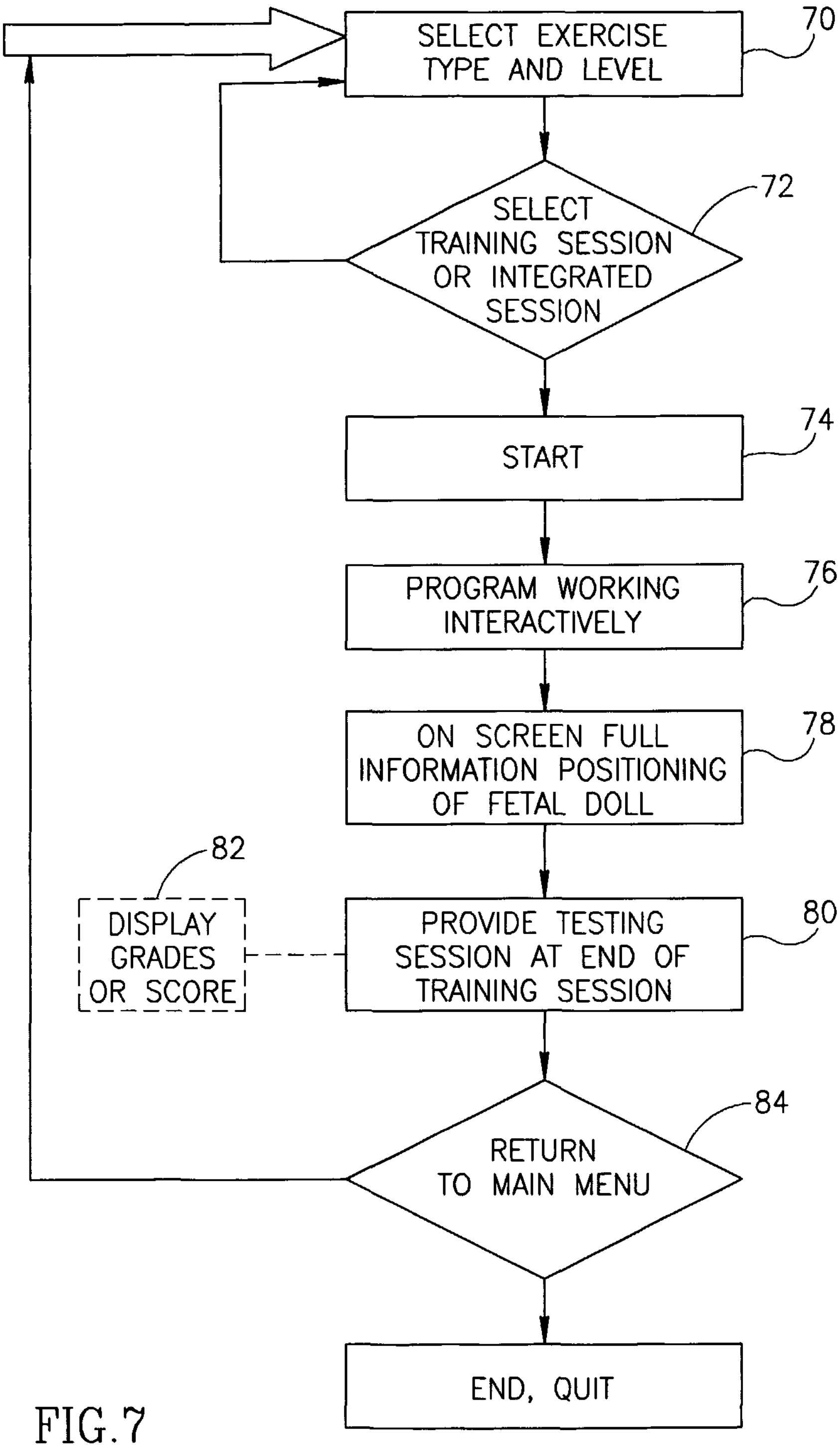
SELECT EXERCISE TYPE AND LEVEL
70
SELECT TRAINING SESSION OR INTEGRATED SESSION
72
START
74
PROGRAM WORKING INTERACTIVELY
76
ON SCREEN FULL INFORMATION POSITIONING OF FETAL DOLL
78
DISPLAY GRADES OR SCORE
82
PROVIDE TESTING SESSION AT END OF TRAINING SESSION
80
RETURN TO MAIN MENU
84
END, QUIT

FIG.7

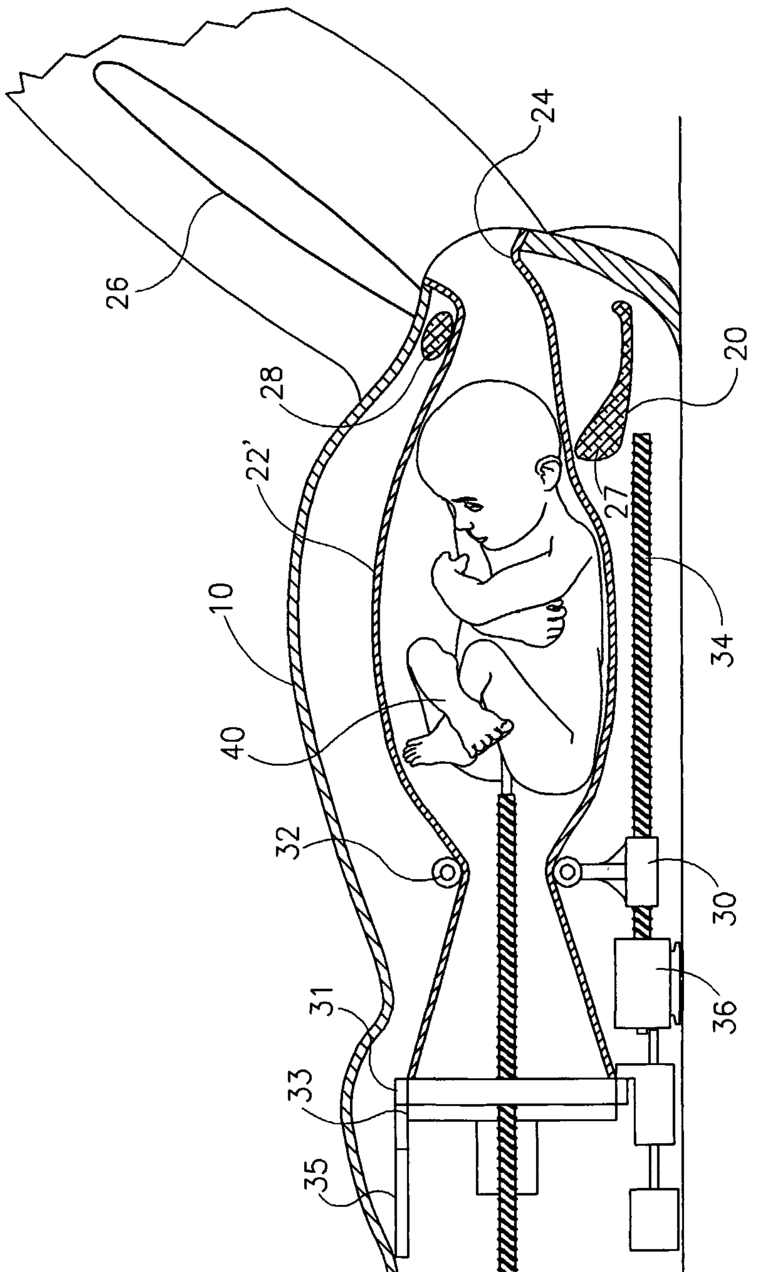

FIG.8

INTERNATIONAL SEARCH REPORT

International application No.

PCT/IL02/00895

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : G09B 23/28
US CL : 434/262,273

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
U.S. : 434/262,273

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 practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X, E	US 6,503,087 B1 (EGGERT et al.) 07 January 2003, see entire document.	1-25
Y,P	WO 02/01536 A1 (MARKIEWICZ) 03 January 2002, see entire document.	1-25
Y	US 5,104,328 A (LOUNSBURY) 14 April 1992, see entire document	1-25
Y	US 3,822,486 A (KNAPP et al.) 09 July 1974, see entire document.	1-25
Y	US 3,824,709 A (KNAPP et al.) 23 July 1974, see entire document.	1-25
Y	US 5,472,345 A (EGGERT) 05 December 1995, see entire document.	1-25
Y, P	US 6,428,323 B1 (PUGH) 06 August 2002, see entire document.	1-25

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

* Special categories of cited documents:

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"P" document published prior to the international filing date but later than the priority date claimed

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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

20 March 2003 (20.03.2003)

Date of mailing of the international search report

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