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(54) **PROGRAMMABLE AED-CPR TRAINING DEVICE**

(57)

ABSTRACT

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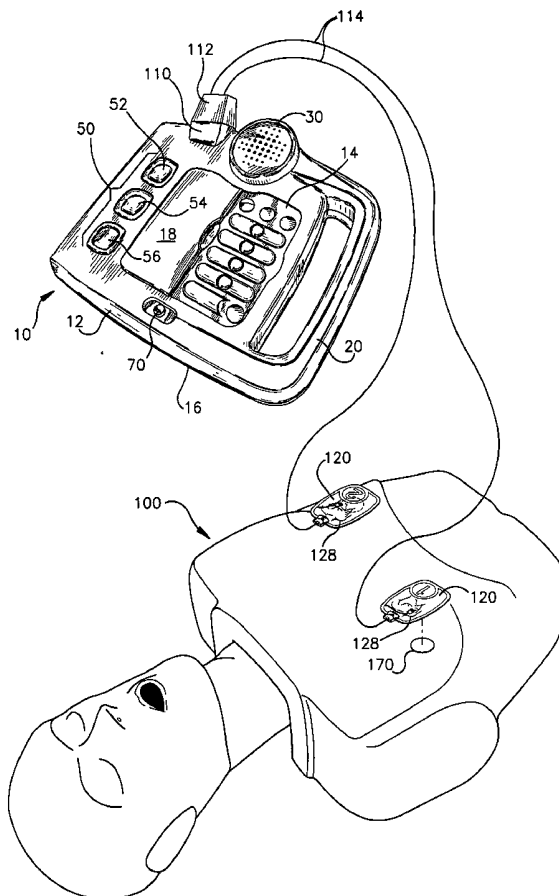
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A portable, interactive electronic training device for prompting a trainee on the proper sequence of steps for performing CPR, using a defibrillator and performing CPR in conjunction with the use of a defibrillator. The device simulates the obtaining of direct information about a patient's condition, such as ECG data collected directly from the patient. The device receives information pertinent to the treatment of the patient indirectly through an operator of the device. The device prompts a trainee on the medically appropriate action such as a defibrillation shock in response to the indirect and direct information. Indirect information is obtained through information processing means that includes means for prompting the operator of the device and means for receiving the operator's responses thereto. Prompts may include both questions and instructions, and in one embodiment the information processing means obtains the assent of the operator before causing the defibrillation shock. Indirect information may include information as to whether the patient is conscious, whether the patient is an adult, baby or child, and as to whether or not cardiopulmonary resuscitation has been performed. The device also prompts the user on proper placement of training electrode pads upon a simulated victim's chest by prompting feedback to the trainee if the pads are not placed on the conductive targets located upon the simulated victim's chest.



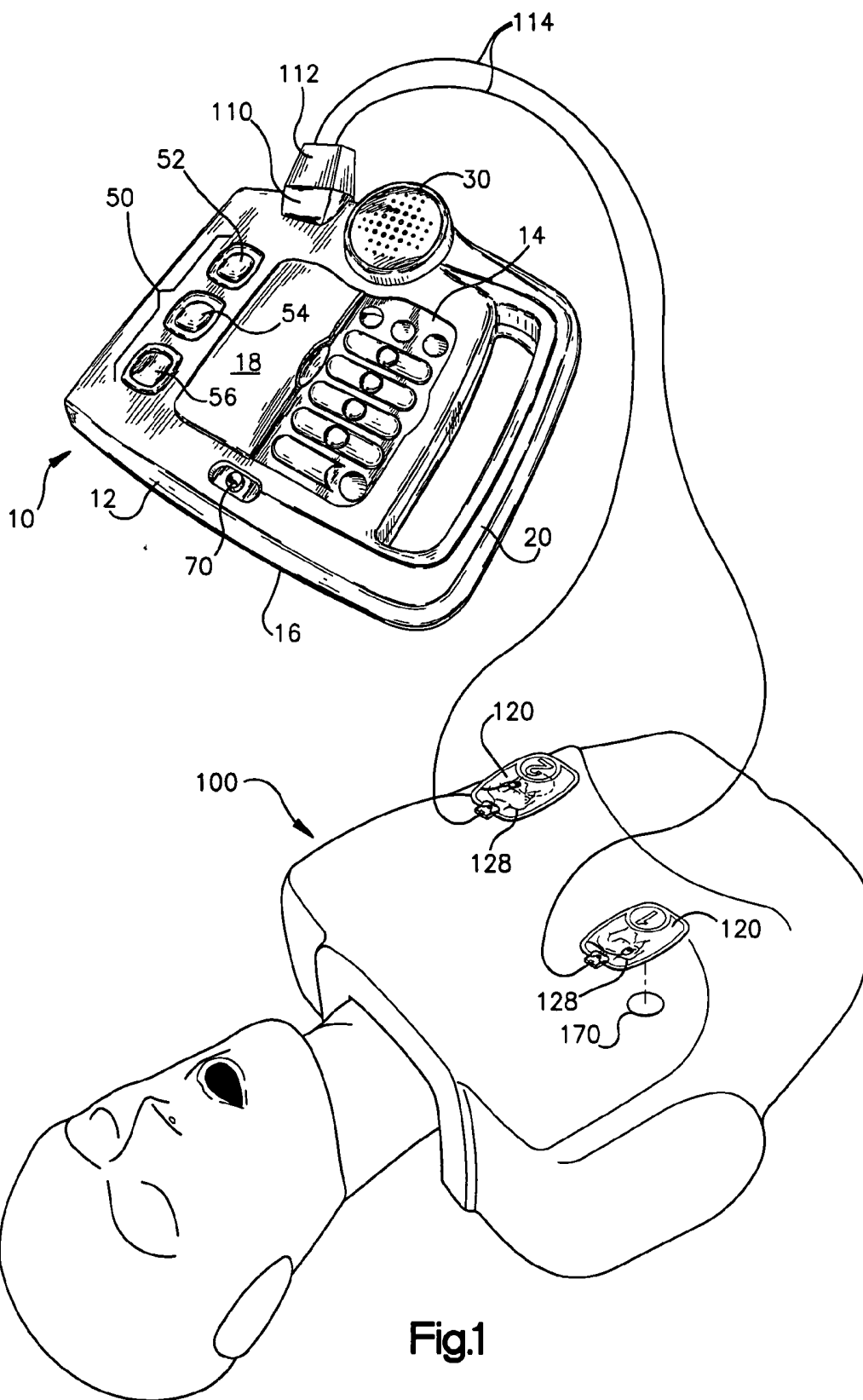


Fig.1

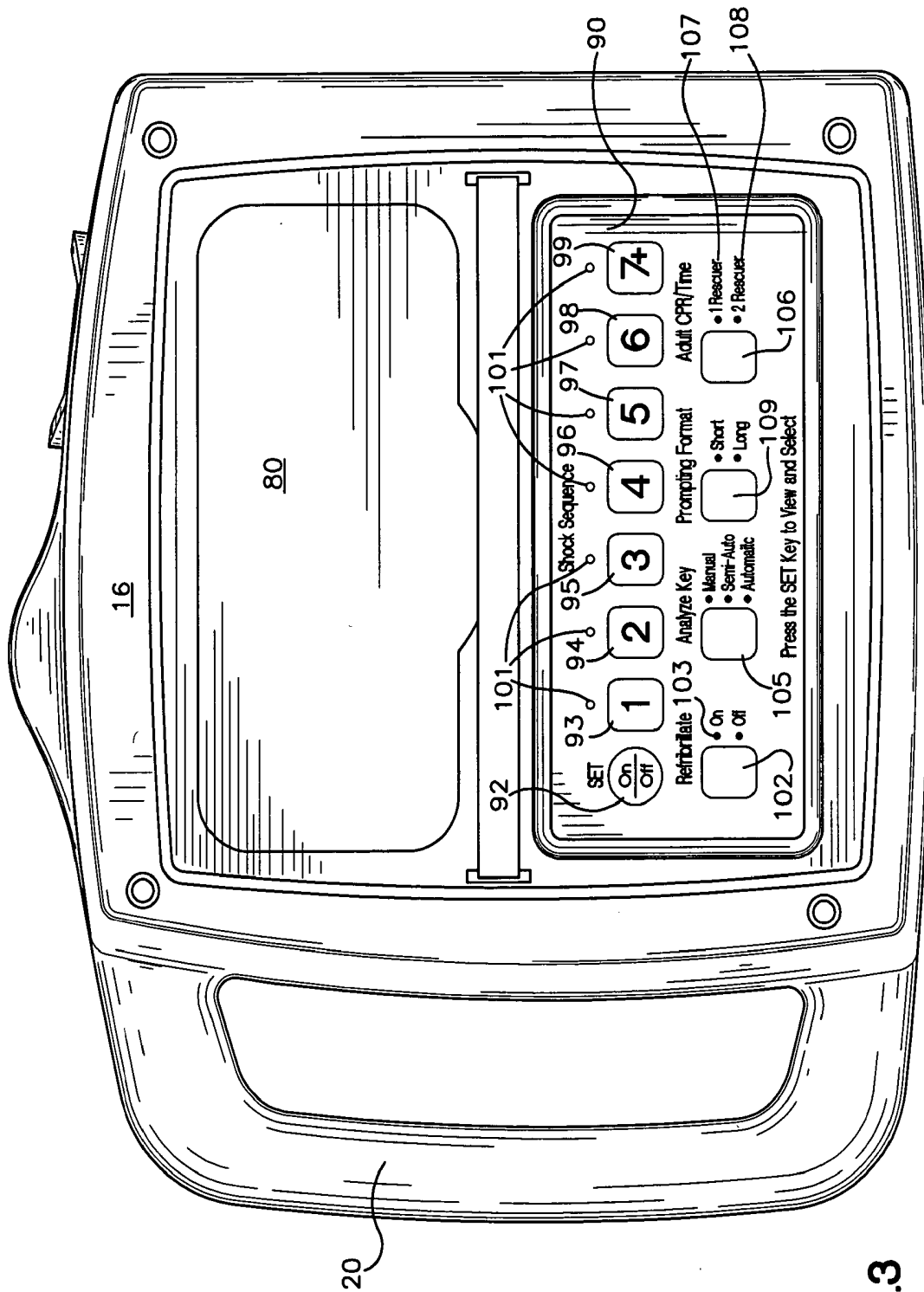
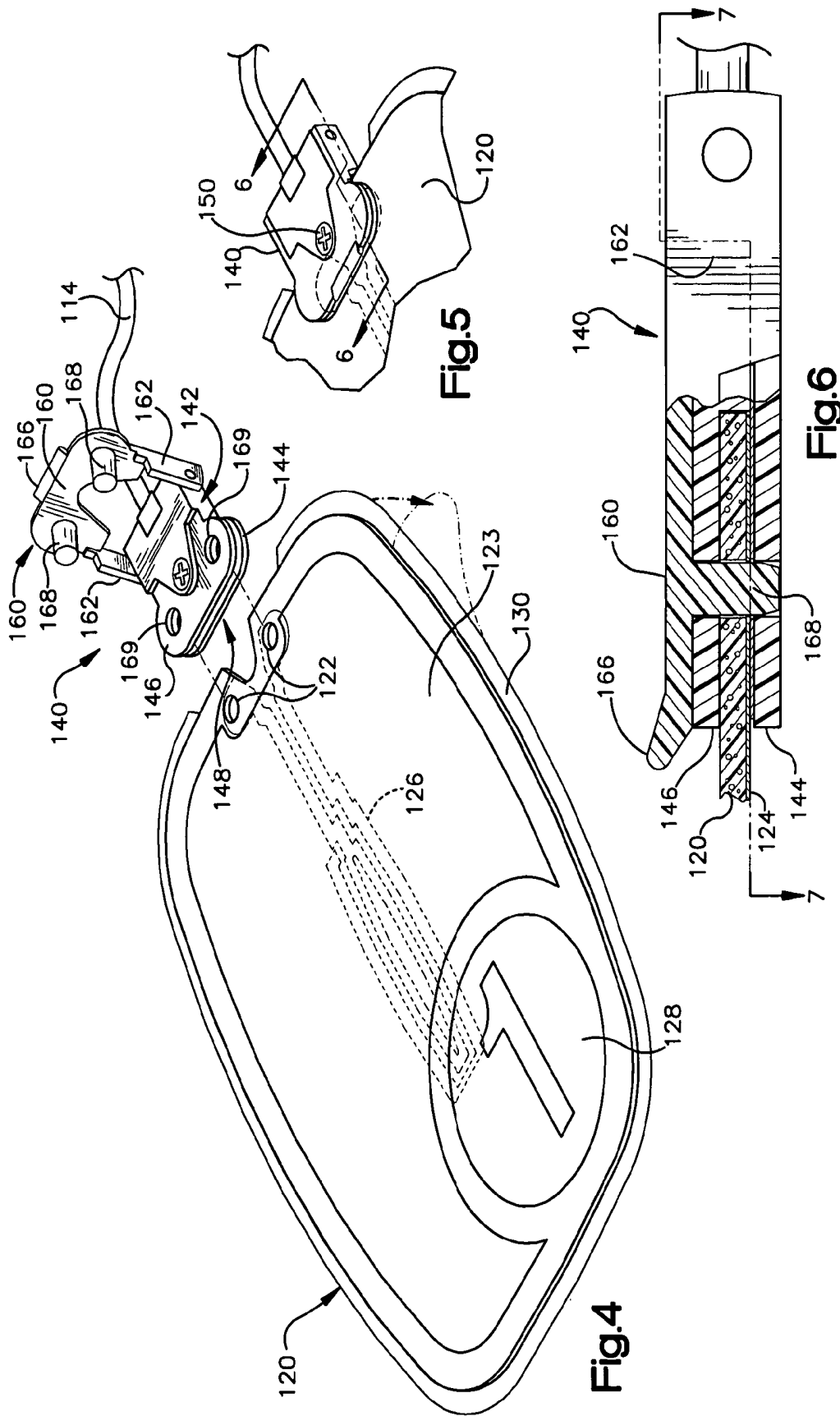


Fig.3



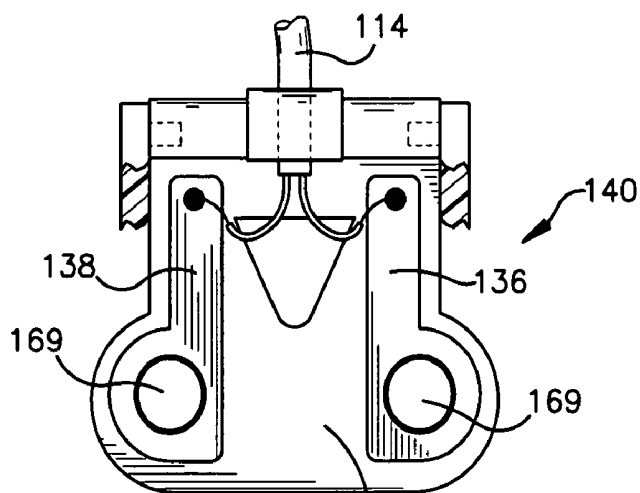


Fig.7

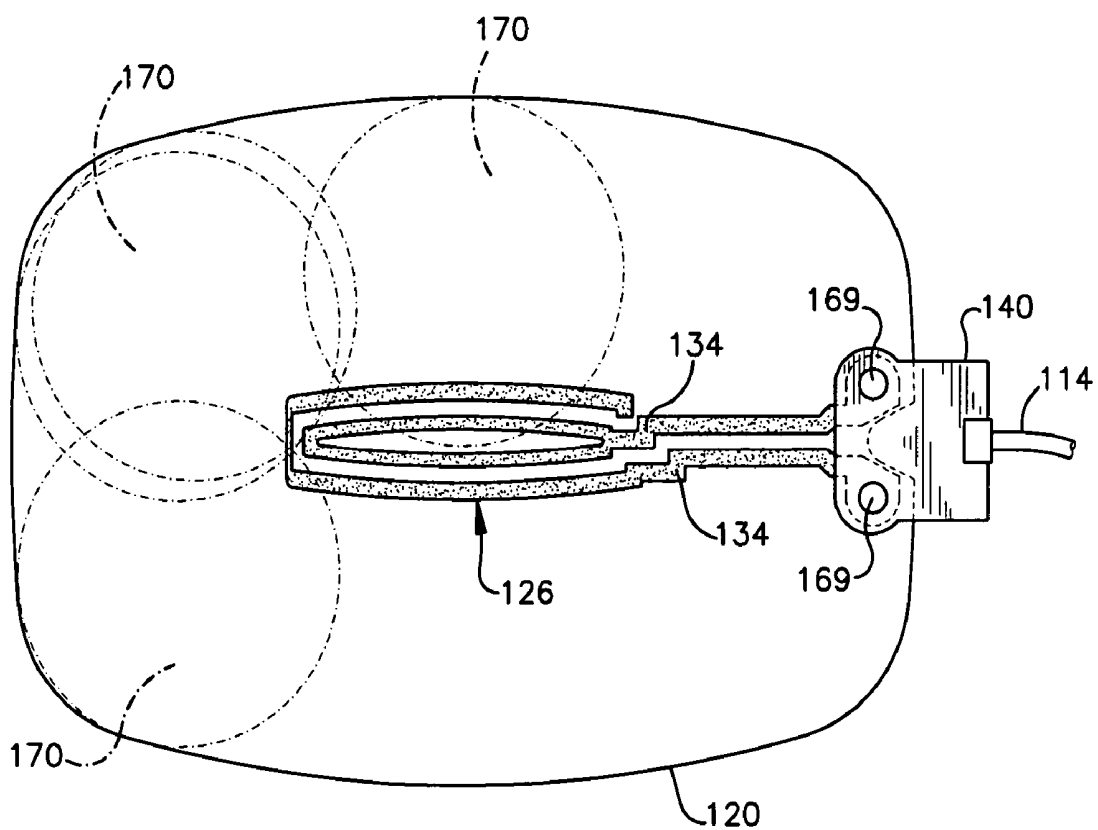


Fig.8

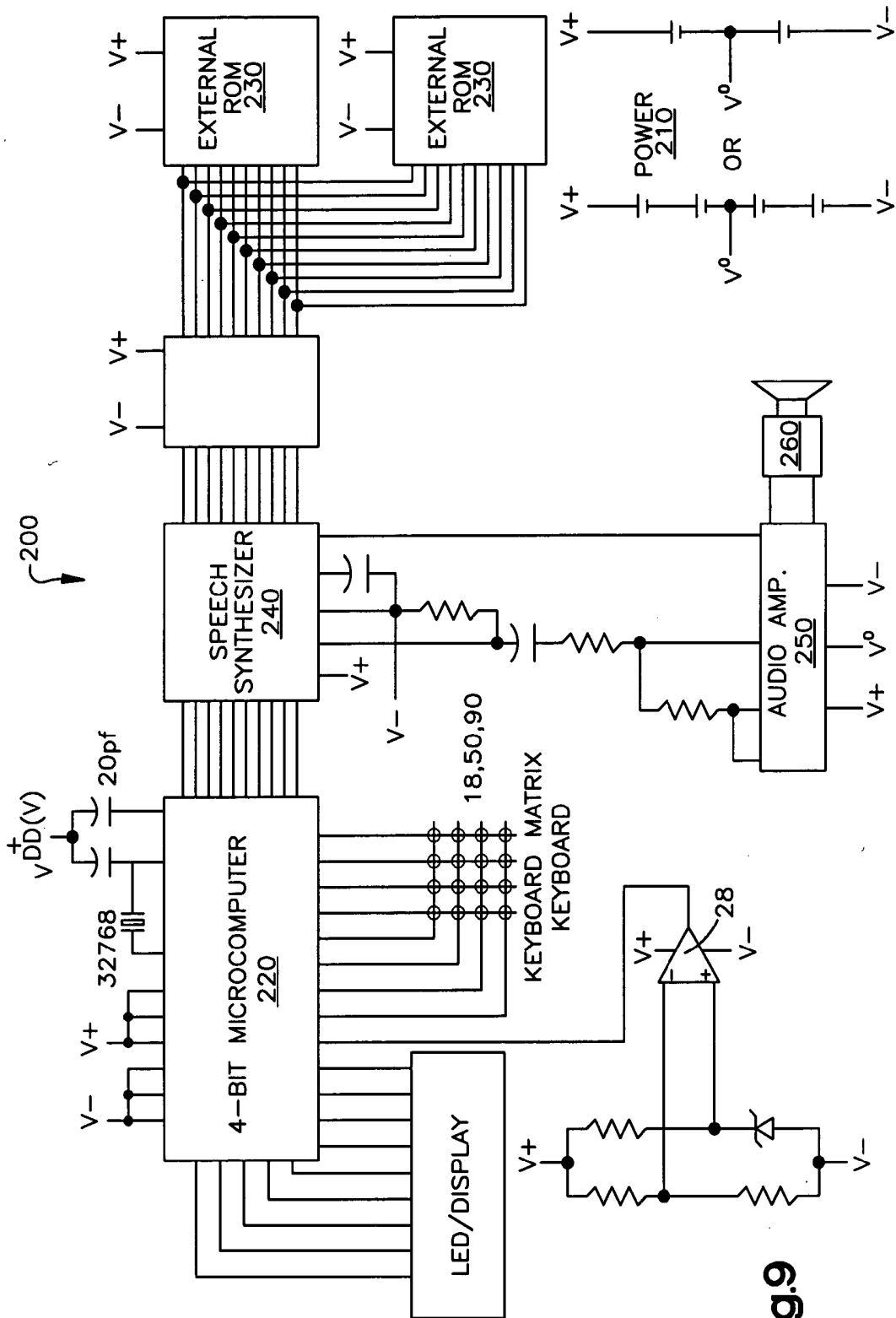


Fig.9

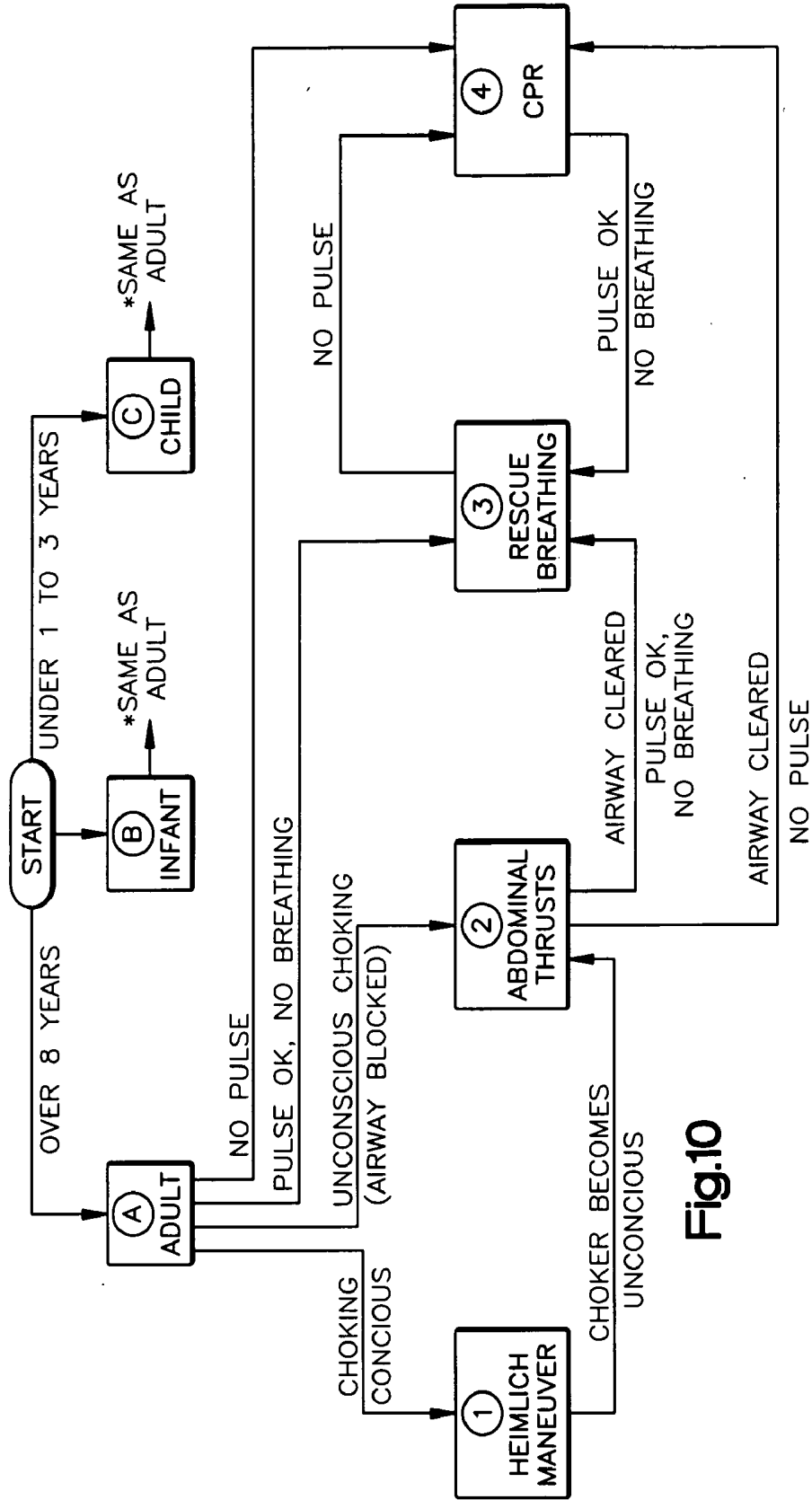


Fig.10

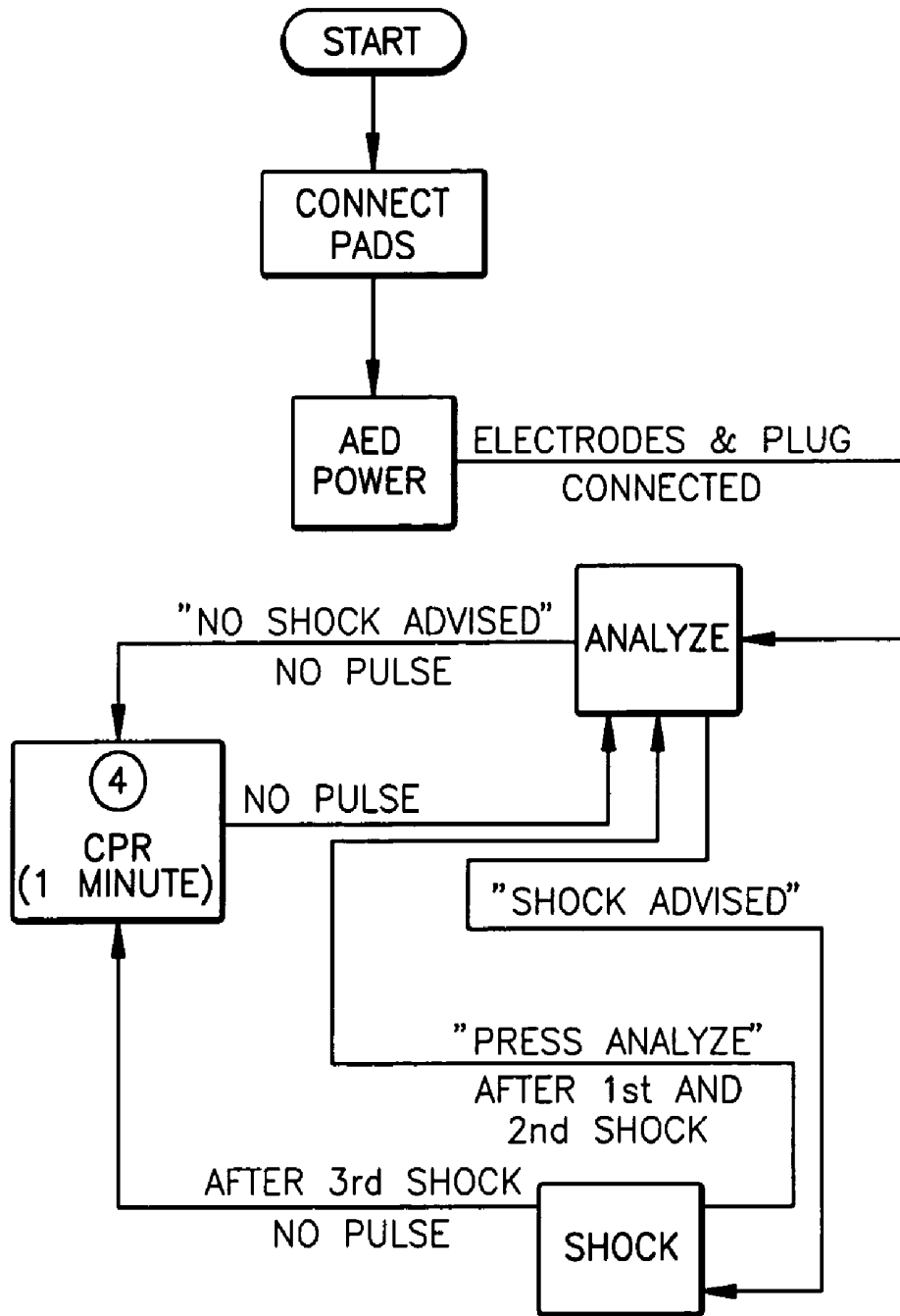


Fig.12

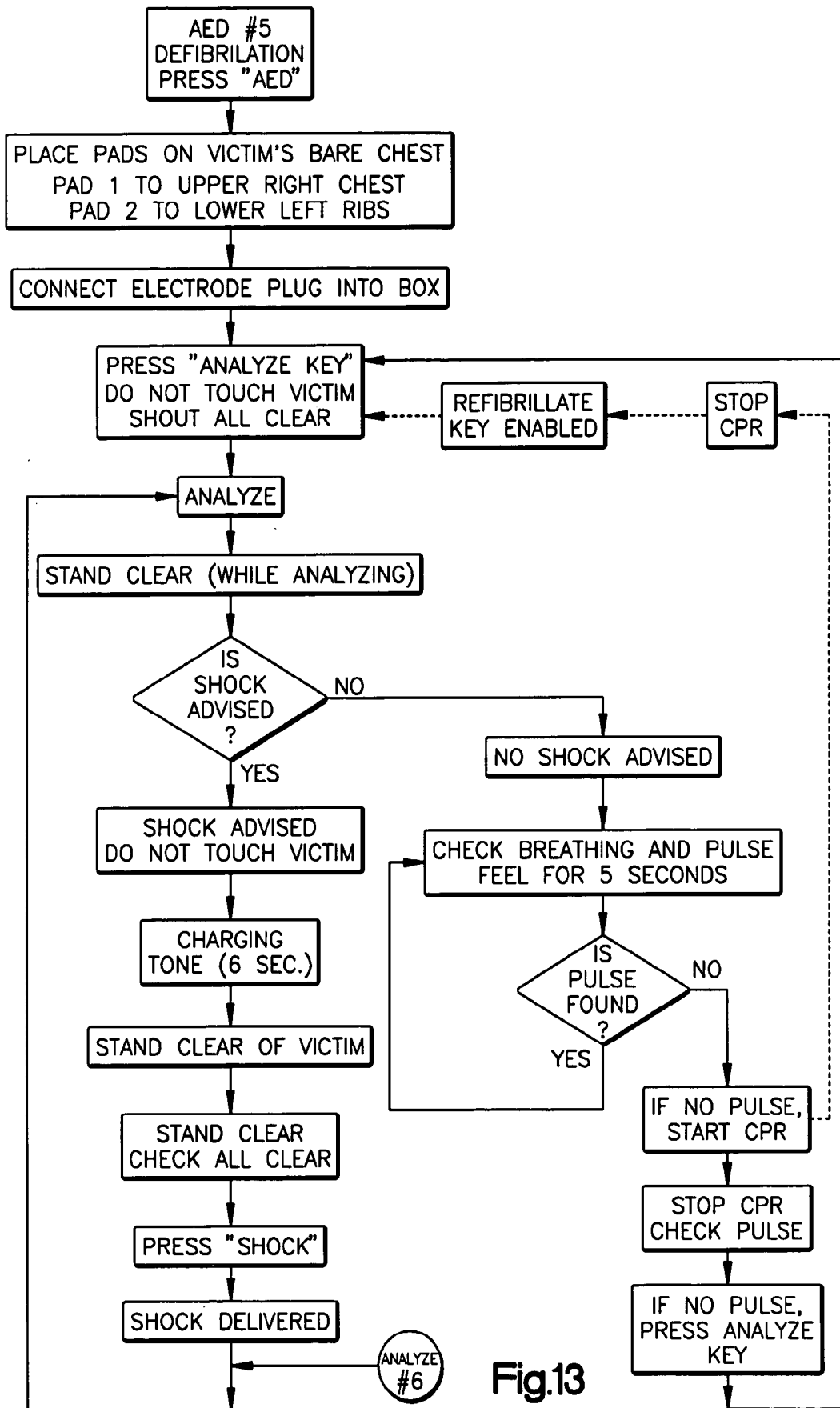


Fig.13

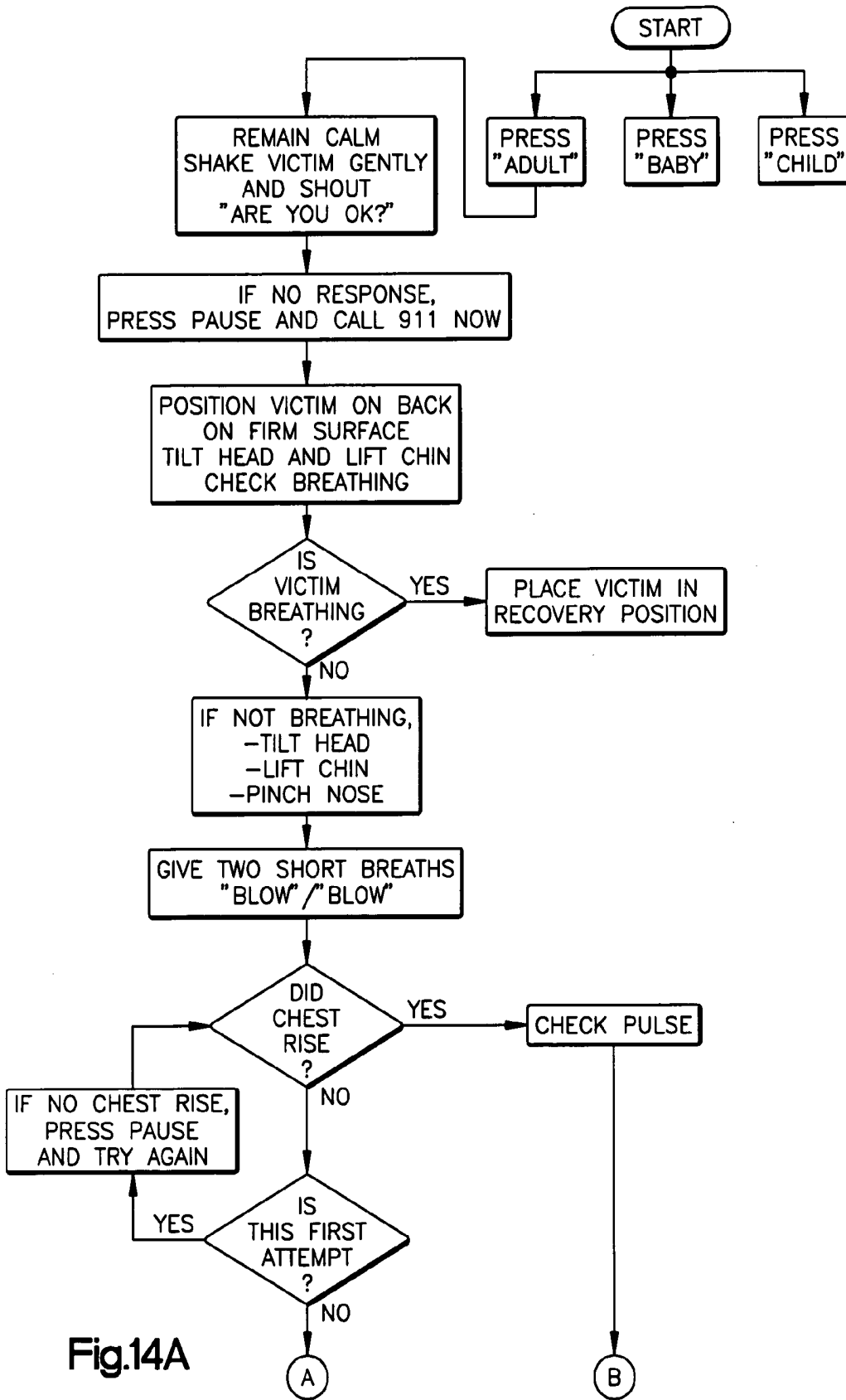


Fig.14A

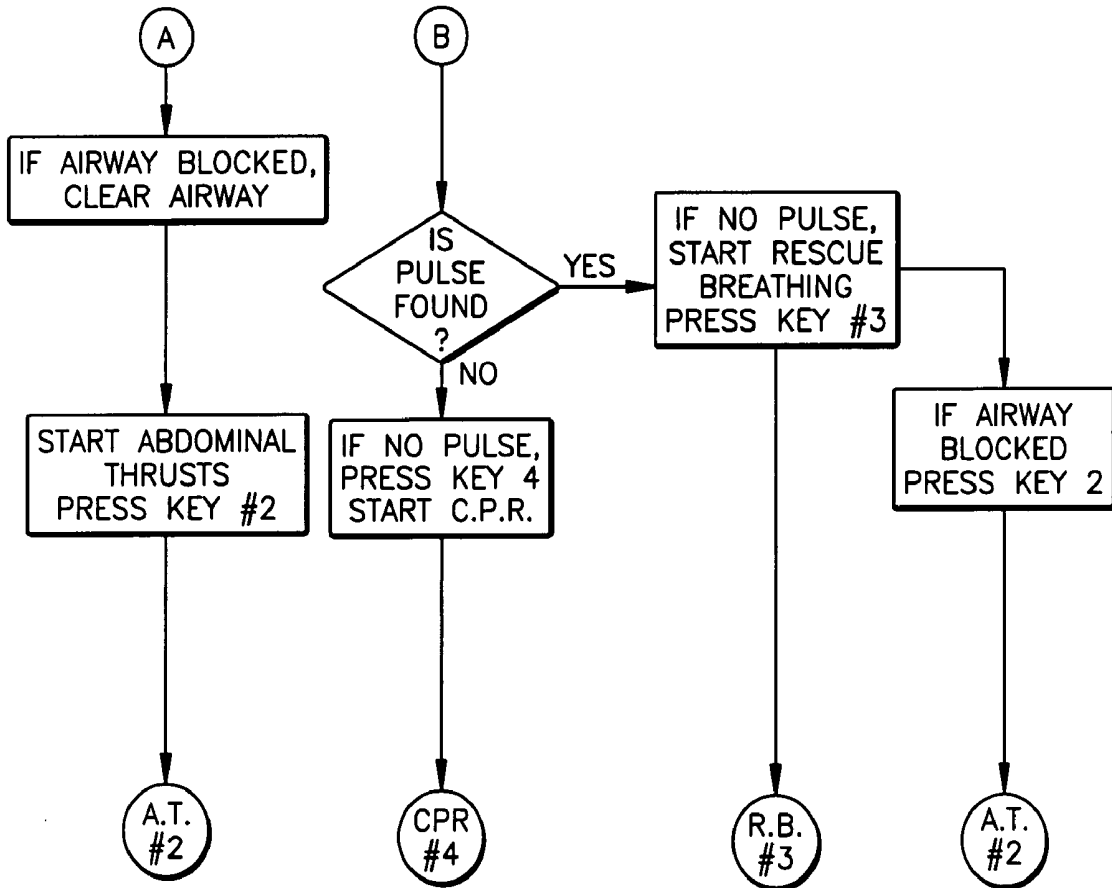


Fig.14B

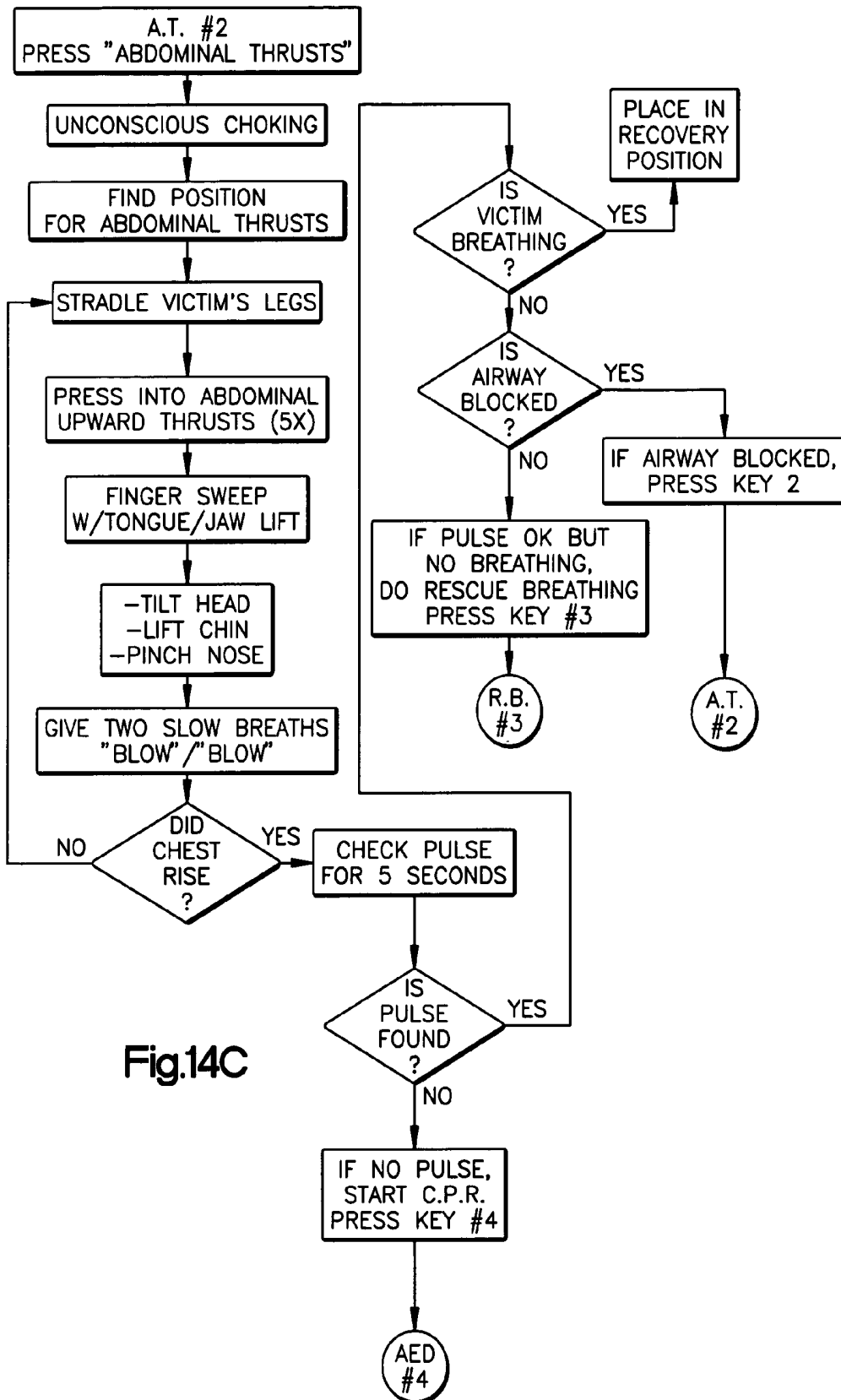


Fig.14C

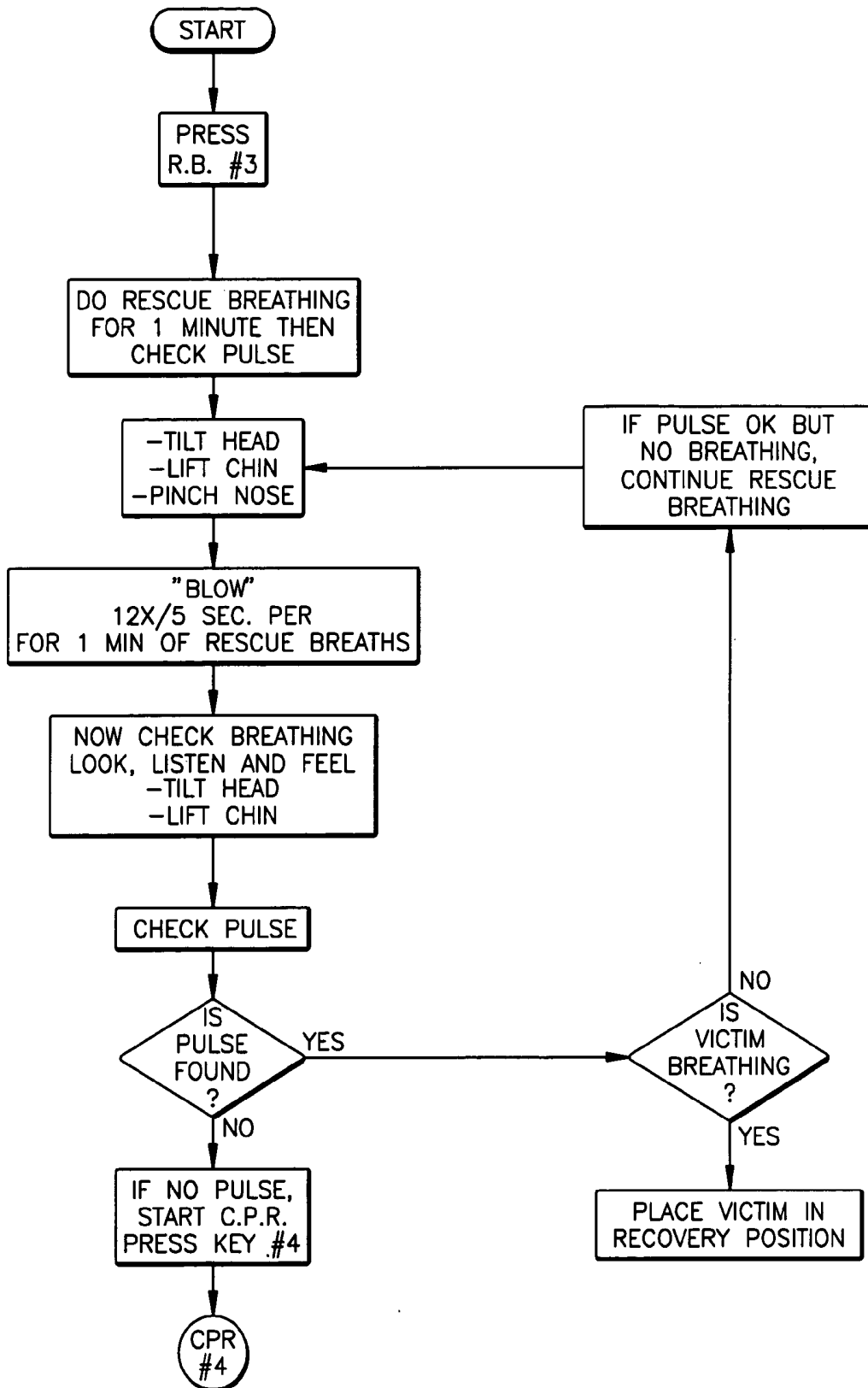


Fig.14D

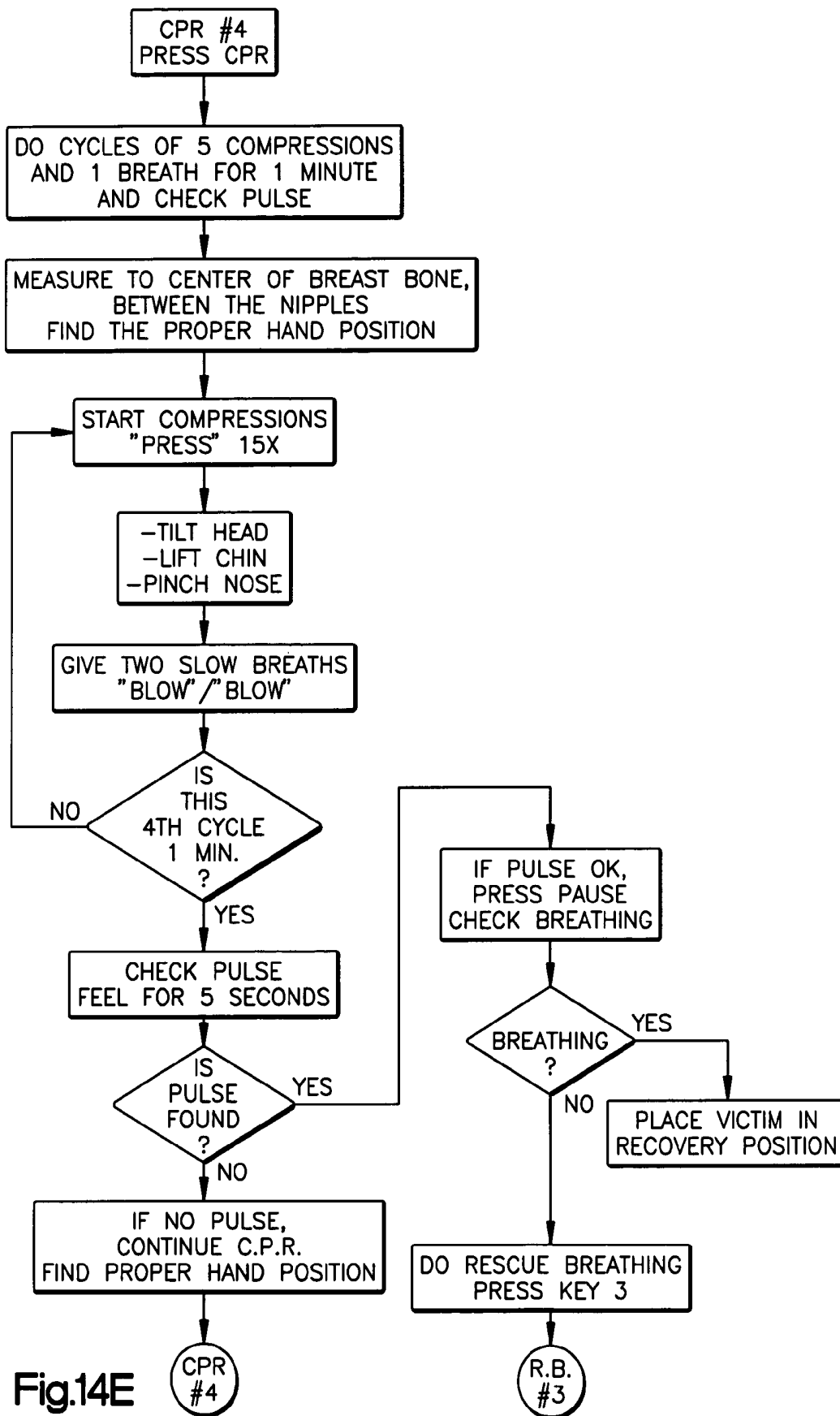


Fig.14E

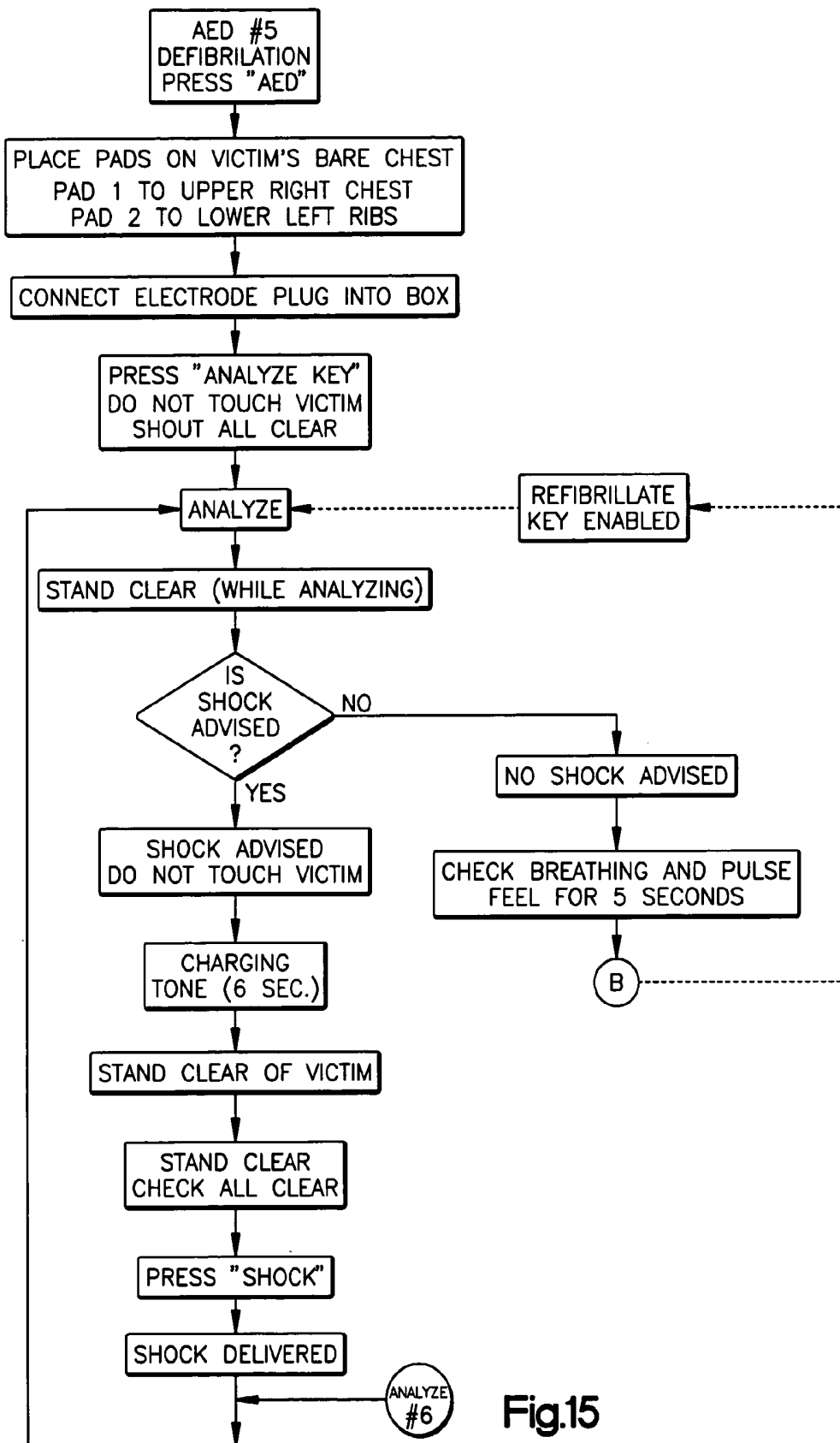


Fig.15

PROGRAMMABLE AED-CPR TRAINING DEVICE**PRIORITY CLAIM**

[0001] This application is a divisional application of pending application Ser. No. 09/494,590 filed on Jan. 31, 2000 which is currently pending and which claims priority to provisional patent application No. 60/117,727 filed on Jan. 29, 1999.

FIELD OF THE INVENTION

[0002] The present invention pertains generally to a training device used to assist a student operator in rescue procedures, and more particularly a hand-on training device used to assist a student in learning cardiopulmonary resuscitation (CPR), training instructions in the use of a defibrillator and rescue procedures such as rescue breathing and choking procedures.

BACKGROUND OF THE INVENTION

[0003] It has been estimated that over 350,000 deaths occur each year in the United States due to cardiac arrhythmia. Many of these deaths could be prevented by rescue procedures such as CPR and defibrillation by properly trained persons in rescue procedures. Thus, there is a continuing need to provide training to the public and to medical personnel in the proper treatment of a patient undergoing cardiac arrest or in need of rescue procedures. In order to train a student properly in rescue techniques, hands-on training aids such as manikins are often utilized. The disadvantage to prior art training aids is that separate devices are often needed to provide the full range of training. For example, CPR manikins and CPR prompting devices are used in training students CPR, while real defibrillator devices are used as defibrillator training aids. These devices can be quite costly. Further, the use of real defibrillator devices in a training environment creates a possible danger of discharging an unintended potent electric shock. Further, these type of devices in general only assist in the instruction of the use of the defibrillator, and do not provide instruction in the use of CPR or other rescue techniques such as rescue breathing. Still further yet, these training devices generally assume that the patient is of a sufficient age to receive shock treatment. In addition, prior art defibrillator and CPR training devices generally do not instruct the trainee to check for a pulse after a victim has received a shock treatment nor after a series of CPR compressions have been given. Finally, these type of training devices do not teach the proper placement of the paddles upon the patient.

[0004] These and other features and advantages of the invention will become apparent in the detailed description and claims to follow, taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] **FIG. 1** is a perspective view of a CPR-AED training device shown in use with a manikin according to the present invention;

[0006] **FIG. 2** is a front view of the CPR-AED training device of **FIG. 1** with the cover plate removed and the electrodes withdrawn.

[0007] **FIG. 3** is a rear view of the CPR-AED training device of **FIG. 1** with the programmable display panel in view.

[0008] **FIG. 4** is a perspective view of a training electrode pad and cable shown with a removable attachment clip for insertion onto the training electrode pads.

[0009] **FIG. 5** is an enlarged perspective view of the removable attachment clip shown in **FIG. 4** which is shown installed on the training electrode pad.

[0010] **FIG. 6** is a side view of the removable attachment clip shown in the direction 6-6 of **FIG. 5**.

[0011] **FIG. 7** is an enlarged view of the removable attachment clip shown in the direction 7-7 of **FIG. 6**.

[0012] **FIG. 8** is a bottom view of a training electrode pad with the target means shown in phantom in several locations.

[0013] **FIG. 9** is a block diagram of the CPR-AED training device of **FIG. 1**.

[0014] **FIGS. 10-12** are logic diagrams of the CPR-AED training device in the CPR ONLY Mode, the AED MODE, and the CPR-AED Mode.

[0015] **FIGS. 13-15** are program control logic diagrams of the prompting sequences of the CPR-AED training device in CPR Mode, AED Mode, and CPR-AED Mode, respectively.

DETAILED DESCRIPTION OF THE INVENTION**[0016] Mechanical System**

[0017] Referring initially to **FIGS. 1-3**, a CPR-AED training device **10** of the present invention is shown. The device **10** prompts trainees with instructions on the proper sequence of steps of CPR and defibrillation in a non-emergency setting, with input information from the trainee to the device **10**. With respect to the defibrillation prompting, the device **10** allows a trainee to evaluate simulated patient electrocardiogram (ECG) signals and perform simulated defibrillation with or without CPR prompting. As shown in **FIG. 1**, the device **10** may be used alone or in conjunction with a manikin **100** or other means for simulating a victim. The CPR-AED training device **10** comprises a body **12** having a front panel **14** and a rear panel **16**, a cover plate **18**, and carrying handle **20**. The training device **10** further comprises an audio speaker **30** with volume control (not shown) for audibly prompting a trainee in rescue operations. The cover plate **18** is slidably mounted within grooves (not shown) of the body **12** of the training device and may be used to cover and protect the device CPR keypad **40**. The CPR keypad **40** comprises a plurality of interactive key switches which are operative in the CPR mode **74** and are used by the trainee to provide feedback to the device **10** of the simulated victim's condition. The CPR keypad **40** includes an adult key **41**, a baby key **42** and a child key **43** used by trainee to provide feedback to the device **10** of the victim's age. Additionally, the keypad **40** comprises a Heimlich maneuver labeled key "1"**44** used when victim is conscious and choking, and an abdominal thrust key "2"**45** utilized when the victim is unconscious with a blocked airway. Key "3" labeled Rescue breathing **46** is used when victim has a pulse but is unconscious, while key **447** labeled "CPR" is used when victim has been assessed by the trainee to be unconscious with no

pulse or breathing. The CPR keypad **40** further comprises an off switch **48** which will switch off the device, and the pause key **49** which will pause the algorithm. The off switch is operative in all three modes, while the pause key is only active in both mode **76** and CPR mode **74**. Finally, each of the keys (except the off key) on keypad has its own LED indicator light to indicate when the key has been activated by the trainee.

[0018] The front panel **14** further comprises an AED keypad **50** comprising an AED POWER switch **52**, an ANALYZE switch **54**, and a SHOCK switch **56**. Each AED switch **52-56** has its own LED indicating light **58-62** to indicate that the switch has been activated when lit. In addition, the front panel of the device **10** further comprises a Select Prompting Mode switch **70** for allowing the trainee to select only defibrillation mode denoted as "AED" as mode **72** the CPR mode **74**, or both CPR and AED prompts denoted as "Both"**76**.

[0019] As shown in FIG. 3, the rear panel **16** of the device **10** comprises a power source **80** such as a battery pack and a Shock Sequence keypad **90**. The Shock Sequence keypad **90** is used by the trainee or instructor to program the sequences of shockable and non-shockable simulated heart rhythms when in the AED mode **72** or CPR-AED mode **76**, as explained in more detail below.

[0020] As shown in FIGS. 1 and 2, the front panel of the device **10** also comprises a plug receptacle **110** for receiving the plug end **112** of electrode cables **114**. The plug end **112** of the electrode cables has a built in jumper (not shown) in order to indicate continuity of the plug connection when it is properly installed within receptacle **110**. If not, trainee will be prompted to install the cable until the trainee has successfully plugged the electrode cable **114** into its receptacle **110-114**.

[0021] The opposite ends of the electrode cables **114** all connected to disposable electrode pads **120** via an electrode clip **140**. The disposable electrode pads **120** are simulated defibrillator pads and are to be inserted into the electrode clip **140** and then mounted by the trainee upon a simulated victim's chest as explained in more detail, below. The electrode clip **140** as best shown in FIGS. 4-6, comprises two main components made of any suitable non-conductive material such as plastic. The first main component of the electrode clip **140** is the housing **142** which has a first and second mating member **144,146**, which together form a slot **148** for receiving an electrode training pad **120** therein. The first and second mating members **144,146** are connected together by a screw **150** or other connecting means. The second main component of the clip **140** is the securing means **160** which secures the electrode training pads **120** to the clip **140**. The securing means **160** comprises a first and second arm **162** rotatably mounted to the clip housing **142**, and a planar surface **164** with a tabular extension **166** for easy opening and closing of the clip securing means **160** to the housing **142**. The inner surface of the tabular extension **166** has two spaced prongs **168** aligned for insertion into holes **169** of the first and second mating members **144,146** and holes **122** of the electrode pads **120**.

[0022] Each electrode-training pad **120** is disposable and comprises an upper surface layer **122**, a lower adhesive layer **124**, and a conductive layer **126**. The upper surface layer **122** of the training pad comprises a flexible plastic or foam

material. The upper surface layer **122** of each training pad **120** is color coded with a graphic design **128** on the front surface layer **122** of the pads which illustrates the proper placement upon a victim's chest. The design further includes the number 1 or 2 that indicates the proper sequence of placement of the pads **120** upon the simulated victim's chest. The lower adhesive layer **124** of the electrode pads **120** has a removable protective liner **130** which is peeled away by the trainee prior to installation upon the simulated victim. The outer conductive layer **126** is adhered to the lower adhesive layer **124**, and is formed of a thin plastic having a metallic or conductive substrate bonded thereto. The outer conductive layer **126** of each electrode training pad **120** acts as a built in sensor means which generates an output signal to the device **10** when the training pad is properly connected to the electrode clip **140** and placed in contact with a conductive target means **170**. The conductive target means **170** is preferably an adhesive disc having an outer conductive layer such as metal. The conductive target means **170** are mounted upon a simulated victim's chest in the upper right chest and lower left rib position for defibrillation.

[0023] The sensor means **126** of the electrode training pad **120** as shown in FIG. 4 in phantom, has a first and second conductive path **132,134** respectively, with said second conductive path **134** preferably being located within the interior of said first conductive path **132**, without touching said first conductive path **132**. Preferably, each of said paths have an elongated rectangular shape, although other shapes would work for the invention. When the electrode pad **120** is received within the slot of the clip **160**, the first and second conductive paths **132,134** of the conductive layer **126** contact a first and second conducting strip **136,138** mounted upon the interior surface of the first mounting member **144** of the clip housing **142**. The first and second conducting strip **136,138** is soldered to a first and second wire of the electrode cable **114** which has been inserted into the rear end of the clip housing **142**.

[0024] Thus in order for the trainee to secure the removable electrode pads **120** to the clips **160**, the holes **122** of the electrode training pad **120** are inserted through the slot **148** of the clip **160** such that the holes **122** and **169** are aligned. Then the clip securing means **160** is rotated into position such that the prongs **168** are inserted into the aligned holes **122** and **169**, such that the first and second conducting strip **136,138** of the first mating member of the clip **160** contact with the conductive layer **126** of the electrode pads **120**. After notched receiving end of the electrode pad **120** is inserted into the slot **148**, the securing means **160** of the clip **140** is snapped into place such that the prongs **168** are inserted through holes **169** and **122** of the members and the electrode pad, respectively. When the trainee properly mounts each of the electrode pads within its clip **160** and properly places each electrode training pad **120** over its respective target means **170** on the simulated victim's chest, the target means **170** shorts or completes the circuit formed by the first and second conductive paths **132,134**. When the circuit is closed, a small current is generated by the device **10** through the first conducting strip **136** and the first conductive path **132**, through the target means **170** and then back to the device through the second conductive path **134** and the strip **138**, thus indicating that the electrode training pad **120** has been properly placed upon the target **170**. Each electrode training pad **120** must be properly placed over its conductive target **170**, else the trainee will be continually

prompted to "PLACE PADS ON VICTIMS BARE CHEST" until the operation is performed correctly for each pad 120. The trainee will continually be voice prompted until the sequence of operations has been correctly performed.

[0025] In an alternative embodiment of the invention, a reed switch is utilized as the sensing means in each disposable electrode pads. A reed switch may be attached to the outer surface layer of each electrode pad or mounted within the pad. The reed switch is used to sense when the pads are in close proximity to a target means having a magnet or magnetized surface. The target means are mounted in the proper area of a victim's chest for defibrillation. Alternatively, a magnet may be mounted upon the electrode pads and the reed switched mounted on the simulated victim's chest. When the reed switch is in close proximity to the target means, the reed switch generates an electric signal which is communicated to the device 10, and the trainee will no longer be prompted to "PLACE PADS ON VICTIM'S BARE CHEST".

[0026] Electrical System

[0027] There is shown in FIG. 9, a block diagram illustrating the logical arrangement of a system 200 according to the invention. The invention includes a first and second electronic input device, which is preferably keypads 18 and 50 or other keying means. The invention also includes multiple button switches and LED indicator lights. An energy source 210 such as battery pack provides power to the system. The training device further comprises a central processing unit 220, memory 230 (RAM), and a speech synthesizer unit 240. The speech synthesizer unit 240 further comprises an amplifier 250, speaker 260, a text to speech translator 270, and a speech chip 280. The speech chip 280 may comprise any chip which furnishes understandable speech suitable for use in the invention.

[0028] Operation of the Device

[0029] In order to begin operation of the AED-CPR training device 10, the trainee first selects the desired training mode using the Prompting Mode switch 70. The AED-CPR training device 10 has three different training modes denoted as: "AED", "BOTH", and "CPR". If the AED mode is selected, the training device 10 will only provide training prompts that simulate the operation of an actual defibrillator device. The device 10 will first simulate the collection of patient ECG data, then simulate the analyzing of the ECG data by the training device and then the delivery of a simulated electrical pulse to a simulated patient in response to actuation by the trainee. No actual electrical pulse is delivered. If the CPR mode is selected by the trainee, the training device 10 will provide detailed training prompts for the proper sequence of CPR rescue steps. If the "BOTH" mode is selected, the device 10 will provide the trainee with CPR and AED prompts. The operation of these three modes is described in more detail, below.

[0030] AED Mode

[0031] If the trainee selects the AED mode by setting the Prompting Mode switch 70 to the "AED" position, the CPR panel 40 is deactivated and the AED panel 50 is activated. The AED mode has three programmable modes for the ANALYZE key. The ANALYZE key may be programmed using the Shock Sequence keypad 90 to toggle key 111 to simulate a manual defibrillator, a semi-automatic defibrilla-

tor or an automatic defibrillator. The programming steps are described in more detail, below.

[0032] As illustrated in FIGS. 12 & 13, the simulation of a manual defibrillator in AED mode 72 is described as follows. The trainee must press the "AED" switch 52 in order to begin. The trainee is then prompted by the device to place the training electrode pads 120 on the simulated victim's bare chest, with pad "1" to be placed on victim's upper right chest and pad "2" to be positioned on victim's lower left ribs. If the training electrode pads are not placed on the simulated victim in the proper sequence, i.e., first training pad labeled "1" and then training pad labeled "2", the trainee will be continually prompted until the trainee performs the operation in the required sequence. Further, each training electrode pad 120 must be placed such that each of its respective sensors 132, 134 contacts the respective conductive target 170 located on the simulated victim 100 or manikin. The trainee will continue to be prompted until the trainee successfully performs the sequence of operations. The trainee will then be prompted to connect the electrode plug 112 into the plug receptacle 110 of the device 10. If the trainee performs this operation successfully, a jumper 111 located within the plug will complete the internal circuit. The device 10 senses that the plug 112 is installed when the jumper 111 completes the intended current.

[0033] After the training electrode pads 120 and the plug 110 of the electrode cable have been properly installed by the trainee, the trainee is prompted to press the "ANALYZE" switch 54 and to "STAND CLEAR" of the victim. The analyze LED 55 will flash on and off while the device simulates the Analyze function of a real defibrillator. The device 10 will have been previously programmed by an instructor or the trainee as described in more detail, below. The device will indicate to the user via voice prompting whether a shock is advised. If a shock is advised, the Analyze LED 55 will turn off and the shock LED light 62 will flash on and off, while the trainee is voice prompted "SHOCK ADVISED". If a shock sequence is advised, the trainee will be prompted to "STAND CLEAR" of the victim while a simulated charging tone is emitted from the speaker. The trainee is prompted to "SHOUT ALL CLEAR" and to check if all clear and then press the "SHOCK" key 56. When the "SHOCK" key 56 is pressed, the trainee will hear a simulated shock ready tone of approximately 15 seconds in duration and then a simulated shock delivered tone. Then the Shock LED light 62 will be deactivated. The trainee will be prompted to press the ANALYZE key 54 to repeat the process. If no shock is advised, the Analyze LED 60 is turned off and the trainee is prompted to check the simulated victim's breathing and pulse. If no pulse is detected, the trainee is prompted to do CPR for a 1 minute interval. If no pulse is detected by the simulated defibrillator after the trainee has performed CPR for a set interval of time, the trainee is prompted to check the victim's pulse, and if no pulse is found, to press the Analyze key 54.

[0034] The shock sequence as described above is programmable by the trainee or instructor using the shock sequence keypad 90 located on the rear panel. Thus the user may program the sequence of shock/no shock heart rhythms. Up to seven shock/no-shock sequences may be programmed. In order to program the device, the set key 92 is toggled on. Adjacent the set key 92 is seven toggle keys 93-99 labeled "1" through "7+", with each numbered key

representing the numerical cycle of analyzed heart rhythms. Thus key "1"93 represents the first cycle of simulated analyzed heart rhythms, key "2"94 represents the second cycle of simulated analyzed heart rhythms, etc. Thus up to seven cycles may be programmed. In addition, each numerical key has its own LED indicator light 101 located immediately thereabove. The indicator light indicates (i.e., when lit) whether a shockable rhythm has been programmed. When the set key 92 is toggled on, the LED indicator lights 101 will light up if a shockable rhythm is desired for its respective numerical cycle. If the LED indicator light 101 is not lit, then the device will not recommend a shockable rhythm for that particular cycle. For example, if the American Heart Association recommended teaching shock sequence is: shock:shock:shock:no shock:shock:shock, then keys 1-3 and keys 5-7 will be toggled on such that their respective LED indicator lights 100 are lit. When finished programming, the set key 92 is toggled off.

[0035] The Shock Sequence Panel 90 also provides for turning on a "REFIBRILLATE" key 102. To program the device for the REFIBRILLATE function, the set key 92 is toggled on and then the REFIBRILLATE key 102 is toggled on such that the LED indicator light 103 labeled "ON" lights up. The set key 92 is then toggled off. In order to use this feature, a non shockable rhythm must have been programmed. After the trainee receives the first "NO SHOCK ADVISED" prompt, the trainee will be instructed to "CHECK BREATHING AND PULSE", and "IF NO PULSE PERFORM CPR". The CPR interval will be interrupted to instruct the trainee that the victim has went into a shockable rhythm. The trainee will be prompted to press the ANALYZE key. Thus when the REFIBRILLATE key is activated, a simulation of a non-shockable rhythm which converts into a shockable rhythm is demonstrated.

[0036] The Shock Sequence panel 90 also provides for the simulation of a manual, semi-automatic or automatic defibrillator by programming the Analyze key 111. The simulation of a semi-automatic defibrillator is the same as the manual defibrillator as described above, except the trainee is not prompted to press the Analyze key after it has been pressed once by the trainee. The simulation of an automatic defibrillator is the same as the above description, except the trainee is not prompted to press the ANALYZE key at anytime, as the device automatically goes into the simulated Analyze mode.

[0037] The Shock Sequence panel 90 also provides for the altering of the CPR prompting based upon the number of rescuers present for the CPR mode. After the set key 92 is toggled on, the "ADULT/CPR/TIME" key 106 may be set to either "1 Rescuer"107 or "2 Rescuer"108 mode. The timing of the CPR interval and the breathing rate will be affected. For 1 Rescuer attending a victim, the trainee will be prompted to do cycles of 5 chest compressions and 1 breath for 1 minute, while 2 Rescuers will be prompted to do cycles of 15 compressions and 2 breaths for 1 minute intervals. In addition, the Shock Sequence panel 90 also allows the trainee to program short or long prompting scripts for the rescue instructions for the AED, CPR or AED/CPR modes of operation by selecting the "PROMPTING FORMAT" key 109 and setting it to "short" or "long" formats. The "short" prompting format contains only the essential prompting queues, while "long" format gives trainee more detailed instructions. In addition, the Shock Sequence Panel 90

provides for programming the CPR interval, i.e., the time CPR is prompted, to 30, 60 or 90 second intervals.

[0038] CPR Mode

[0039] When the trainee manually sets the SELECT PROMPTING MODE switch 70 to CPR mode 74, the trainee will receive instructive prompts for performing CPR in conjunction with other rescue operations such as the HEIMLICH maneuver, abdominal thrusts and rescue breathing. In order to activate the device in this mode, the trainee must assess the victim's age and select the appropriate ADULT, BABY or CHILD key. As shown in FIGS. 10 and 13, the trainee will be prompted to "REMAIN CALM; SHAKE VICTIM GENTLY AND SHOUT ARE YOU OKAY; IF NO RESPONSE CALL 911 NOW." Next the trainee is prompted to "POSITION THE VICTIM ON HIS OR HER BACK ON A FIRM SURFACE." and to "TILT HEAD; LIFT CHIN; CHECK BREATHING." The trainee is then prompted to assess whether the victim is breathing. If the victim is not breathing, the trainee is instructed to "TILT HEAD LIFT CHIN; PINCH NOSE; BLOW; BLOW." The trainee is then prompted to press pause key and repeat the above steps if no chest rise. The trainee will then be prompted to CHECK THE VICTIM'S PULSE. If a pulse is found but the victim is not breathing, the trainee is prompted to press Key 3 (Rescue Breathing). If no pulse is found, the trainee is instructed to press KEY 4 CPR. IF the victim's airway is blocked, the trainee is prompted to press KEY 2 for abdominal thrust prompting.

[0040] CPR Plus AED (Both) Mode

[0041] When the trainee manually sets the SELECT PROMPTING MODE switch to BOTH, the trainee will receive instructive prompts for performing CPR in conjunction with use of a defibrillator. The user may initiate this mode by pressing the ADULT key after assessing the victim's age. If the BABY or CHILD key is pressed, the trainee will be prompted that he or she has pressed a wrong key, because infants or children are not recommended to receive defibrillation. After the ADULT key is selected, the trainee will be prompted as described above under the CPR mode. However, if no pulse is found, the trainee is instructed to press the AED power key 52 instead of the CPR key 4. The AED sequence of prompting is as described above under the AED ONLY section.

[0042] While the preferred embodiments of the invention have been illustrated and described, it should be understood that variations will become apparent to those skilled in the art. Accordingly, the invention is not to be limited to the specific embodiments illustrated and described herein, but rather the true scope and spirit of the invention are to be determined by reference to the appended claims.

1. An interactive electronic training device for obtaining indirect information about a simulated patient's condition from a operator pertinent to an analysis of the simulated patient's condition, and for prompting a operator on the medically appropriate steps for defibrillation in conjunction with CPR in response thereto, said device comprising:

interactive communication means including means for obtaining indirect information pertinent to an analysis of the simulated patient's condition from the operator, the means for obtaining indirect information further

comprising means for prompting the operator, and means for receiving the operator's response thereto; and

output means responsive to said interactive communication means for prompting an operator on the medically appropriate steps for defibrillation in conjunction with CPR in response thereto.

2. The device of claim 1, wherein the means for prompting the operator comprises means for communicating questions to the operator.

3. The device of claim 2, wherein the means for prompting the operator are a simulated voice.

4. The device of claim 3, wherein the means for receiving the operator's responses comprises touch activated means.

5. The device of claim 1, wherein the interactive communication means includes means for communicating instructions to the operator.

6. The device of claim 1, wherein the interactive communication means comprises means for obtaining a response from the operator before producing a simulated shock to the patient.

7. The device of claim 1, wherein said device includes a simulated analyzing feature for simulating the detecting of the electrical activity of the simulated patient's heart.

8. The device of claim 7, wherein the output means comprises means simulating applying a defibrillation shock to a patient.

9. The device of claim 8, wherein the means for determining indirect information comprises means for obtaining information indicating whether or not the patient is conscious.

10. The device of claim 9, wherein the means for obtaining indirect information comprises means for obtaining information indicating whether or not the patient is an adult, baby or child.

11. The device of claim 8, wherein the information processing means comprises means for obtaining the assent of the operator before producing the simulated defibrillation pulse.

12. An interactive defibrillator training device for providing an operator instructions on aiding a simulated victim and the proper placing of electrode pads thereon, the device comprising:

input means for obtaining indirect information from the operator about the victim;

interactive processing means responsive to said input information for prompting an operator on the proper steps for using said simulated defibrillator training device;

target means positioned on a first and second chest region on said simulated victim in the proper area for mounting said electrode pads;

electrode pads connected to said training device having an internally mounted sensor for outputting a signal when each of said electrode pads are properly placed on said maniken by said operator;

said interactive means responsive to said signal from said electrode pads wherein said operator is prompted to reapply pads until said electrode pads generate a signal; and

said processing means outputting appropriate prompts to operator either for inputting further information or providing operator instructions for using said training device and the proper placing of the electrode pads on the simulated victim.

13. The device of claim 12, wherein said device further includes a simulated analyzing feature for simulating the detecting of the electrical activity of the simulated patient's heart.

14. The device of claim 12, wherein the output means further comprises means simulating applying a defibrillation pulse to a patient.

15. The interactive defibrillator training device in accordance with claim 12 wherein said interactive processing means comprises an algorithm stored within said apparatus.

16. The interactive defibrillator training device in accordance with claim 12 wherein said processing means comprises a voice synthesizer for producing audible voice prompts.

17. The interactive defibrillator training device in accordance with claim 12 wherein said input information comprises whether the victim is an adult, baby or child.

18. The interactive defibrillator training device in accordance with claim 12 wherein said input information further comprises the number of rescue personnel present.

19. The device of claim 12, wherein said device includes a simulated analyzing feature for simulating the detecting of the electrical activity of the simulated patient's heart.

20. The device of claim 12, wherein the output means comprises means simulating applying a defibrillation pulse to a patient.

21. The device of claim 12 wherein said output means further comprises means for prompting an operator on the medically appropriate steps for defibrillation in conjunction with CPR in response thereto.

22. The device of claim 12 wherein said input information comprises whether the victim is an adult, baby or child.

23. The device of claim 12 wherein said operator inputs whether the simulated patient is an adult, baby or child; said interactive processing means responsive to said input information for prompting an operator on the medically appropriate steps for CPR when a baby or child is input, wherein said simulated defibrillator is disabled.

24. The device of claim 12, wherein the means for prompting the operator comprises means for communicating questions to the operator.

25. The device of claim 12, wherein the means for receiving the operator's responses comprises touch activated means.

26. The device of claim 12, wherein the interactive communication means comprises means for obtaining a response from the operator before producing a simulated shock to the patient.

27. The device of claim 12, wherein the means for determining indirect information comprises means for obtaining information indicating whether or not the patient is conscious.

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摘要(译)

一种便携式交互式电子训练设备，用于使用除颤器并结合使用除颤器来提示受训者正确执行CPR的步骤顺序。该设备模拟获得关于患者状况的直接信息，例如直接从患者收集的ECG数据。该装置通过装置的操作者间接地接收与患者的治疗有关的信息。该装置响应于间接和直接信息，向受训者提示医学上适当的动作，例如除颤电击。间接信息是通过信息处理装置获得的，该装置包括用于提示设备操作员的装置和用于接收操作员对其的响应的装置。提示可以包括问题和指令，并且在一个实施例中，信息处理装置在引起除颤电击之前获得操作者的同意。间接信息可以包括关于患者是否有意识的信息，患者是否是成人，婴儿或儿童，以及是否已经进行了心肺复苏。如果垫未放置在模拟受害者胸部上的导电目标上，则该装置还通过提示反馈给受训者来提示用户将训练电极垫正确放置在模拟受害者胸部上。

