

PATENT SPECIFICATION

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(19)



(52) A DEFIBRILLATOR

(71) We, CARDIAC RECORDERS LIMITED, a British Company, of 34 Scarborough Road, London, N4 4LU, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:-

This invention relates to a defibrillator.

A defibrillator is intended for use with a patient suffering from acute myocardial infarction to cause his heart to stop beating so that when it starts or is started again it beats normally.

A defibrillator in general comprises a capacitor, charging means for charging the capacitor to a desired potential, a pair of electrodes intended to be placed in contact with the patients' body, one of the electrodes being connected to one terminal of the capacitor through an inductor and the other electrode being connected to the other terminal of the capacitor, and switch means for controlling charging of the capacitor by the charging means and discharge of the capacitor through the inductor, the electrodes and the patient's body to effect defibrillation.

It has previously been proposed in the Complete Specification of British Patent Application No. 46464/74, Serial No. 1 481 469, that the two electrodes should be mounted on respective housings with the charging means, inductor, capacitor, switch means and any other circuit components used in the defibrillator being disposed in or on the housings thereby rendering the apparatus fully portable.

According to this invention there is provided a portable combined defibrillator and electrocardioscope comprising two electrodes, mounted on respective housings, for application to a patient, a capacitor, means for charging the capacitor, an inductor, switching means for discharging the capaci-

tor through the inductor, the electrodes, and the patient's body, and an electrocardioscope connectable to the electrodes, the electrocardioscope and the capacitor, inductor, charging means, and switching means being mounted in or on the said housings.

Before effecting defibrillation, which is not a treatment lightly carried out by a doctor, the doctor must examine the waveform of the electrical signals occurring within the heart of the patient, and for this purpose will normally use an electrocardioscope or electrocardiograph. In the case of the defibrillator disclosed in the complete specification of Patent Specification 1481469 the electrocardioscope is a piece of equipment separate from the defibrillator and in the event that defibrillation is necessary other than within the confines of a hospital this means that two items of equipment have to be carried to the patient. It will be appreciated that cardiac arrest can occur anywhere at any time and that consequently it is highly desirable to have equipment which is readily portable and can be carried to the patient. The advantage of the defibrillator in accordance with this invention is that it incorporates an electrocardioscope so that the doctor may first examine the waveform and then immediately, if necessary, perform defibrillation, and only needs to take one piece of readily portable equipment to the site of the patient.

A defibrillator including a cardioscope in accordance with this invention, will now be described, by way of example only, with reference to the drawings accompanying the Provisional Specification in which:-

Figure 1 is a block diagram of the defibrillator and cardioscope;

Figure 2 is a perspective view of the defibrillator and cardioscope;

Figure 3 is a view of the defibrillator and cardioscope with part of one of the housings removed; and

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Figure 4 is a view of the control panel of the defibrillator showing the screen of the cardioscope.

Referring to Figure 1 a battery unit 1 includes a charging circuit connected to charging contacts 2 for fully charging the battery. A D. C. to D.C. convertor 3 is connected through a switch 4 across the battery and has a capacitor 5 connected across its output. An electrode 6 is connected through a choke 7 and a switch 8 to one terminal of the capacitor whereas another electrode 9 is connected directly to the other terminal of the capacitor, the electrodes 6 and 9 being shown connected in position against the patient 15.

Further components are denoted by a block 10 and include an energy indicator, and a maximum energy protection bleeder connected across the capacitor and to the D.C. to D.C. convertor. The part of the circuit which has so far been described constitutes a defibrillator.

Additionally, this embodiment of the invention includes a further D.C. to D.C. converter 11 which is connected to the battery through the switch 4 and which supplies a cathode ray tube 12 constituting an electrocardioscope display. The electrode 6 is connected to an amplifier protection circuit 13 through the choke 7 whereas the electrode 9 is connected directly to the amplifier protection circuit 13. The amplifier protection circuit 13 is connected to an amplifier and time base circuit 14 which supplies the cathode ray tube 12. The D.C. to D.C. converter 11, the cathode ray tube 12, the amplifier and time base circuit 14, the amplifier protection circuit 13, the choke 7, and the electrodes 6 and 9 constitute the electrocardioscope; it will be seen that the electrocardioscope uses the same electrodes as the defibrillator.

The defibrillator and electrocardioscope has a main housing 20 which is visible in Figure 2 and which carries electrode 9 on the side not visible in Figure 2. The electrode 6 is carried by a further housing 21 which fits into a slot in the main housing 20 and which is connected to the main housing 20 by a lead 22. The main housing 20 carries the on/off switch 4, a meter 23 constituting the energy indicator and a charge/discharge switch 24 for increasing or decreasing the charge on the capacitor 5 and constituting the bleeder. Next to the switch 24 one can see the screen 25 of the cathode ray tube 12 (also see Figure 4). The housing 20 includes a handle 26 which renders it readily portable and disposed on the opposite side of the housing 20 to the electrode 9 carried by the housing 20.

Figure 3 is a view with a part of the housing 20 removed; the cathode ray tube 12 can be clearly seen as can the capacitor 5.

Further there can be seen two switches 27 one on the main housing 20 and one on the housing 21 which together constitute the switch 8 and when simultaneously pressed cause a discharge through the patient to defibrillate him.

The main housing contains the whole of the illustrated electrical circuitry with the exception of the choke 7, electrode 6 and its lead, as in Specification 1481469.

The electrode 9 may be integral with the main housing, or it may be arranged to be detachable therefrom and connected thereto by a lead, so that it can be applied to the patient either by resting the housing, with the electrode on it, on the body of the patient, or by detaching the electrode and applying it to the patient with the main housing placed or held elsewhere.

WHAT WE CLAIM IS:-

1. A portable combined defibrillator and electrocardioscope comprising two electrodes, mounted on respective housings, for application to a patient, a capacitor, means for charging the capacitor, an inductor, switching means for discharging the capacitor through the inductor, the electrodes, and the patient's body, and an electrocardioscope connectable to the electrodes, the electrocardioscope and the capacitor, charging means, inductor, and switching means being mounted in or on the said housings.
2. A defibrillator and electrocardioscope as claimed in claim 1 having a portable main housing containing the electrocardioscope and carrying a first electrode, the other electrode being carried by a further housing and being connected to the main housing by a lead.
3. A defibrillator and electrocardioscope as claimed in claim 2 in which the main housing is provided with means for removably accommodating the further housing.
4. A combined defibrillator and electrocardioscope substantially as herein described with reference to the drawings accompanying the Provisional Specification.

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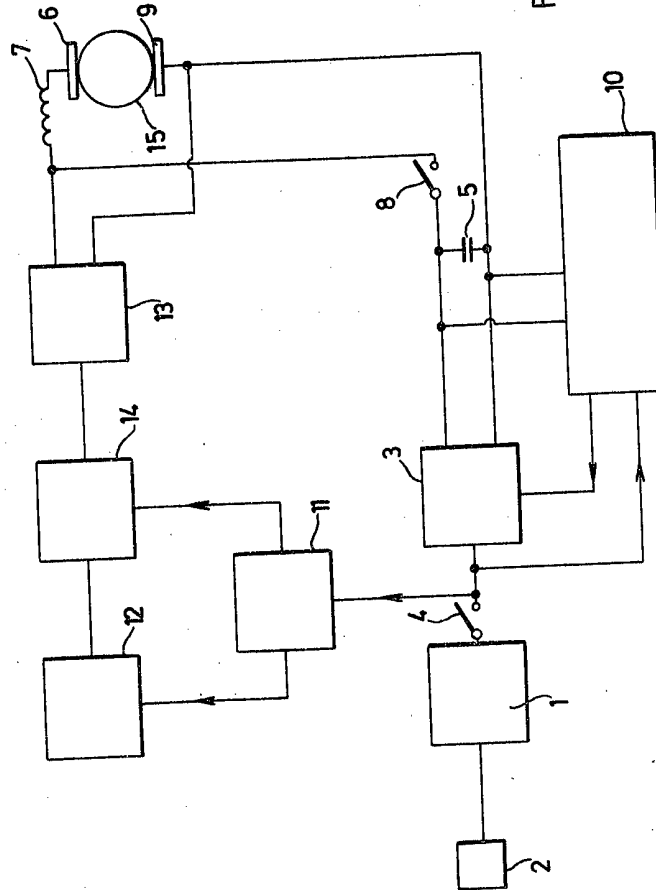


FIG. 1

