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DESCRIPTION

OF AN

ELEMENT BOARD

AND

COMBINED HANDLE ELECTRODE

FOR THE

MEDICAL APPLICATION OF ELECTRICITY

BY

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DESCRIPTION OF AN ELEMENT BOARD, AND COMBINED HANDLE ELECTRODE, FOR THE MEDICAL APPLICATION OF ELECTRICITY.

For the scientific employment of electrity in medicine, in addition to the currents from different batteries, certain accessories are essential. There must be,—1st, a method of graduating the strength of the currents, by means of which the feeblest or the most powerful efforts of the battery may be obtained, or any intermediate grade that may be desired; this moreover must be effected gradually so as to avoid unnecessary changes or shock; 2nd, a means of opening and closing the currents; 3rd, a mode of alternating or reversing the direction of the currents; 4th, an apparatus for indicating the existence, and measuring the strength, of the currents; and 5th, an appliance for interrupting the currents slowly or rapidly as may be required.

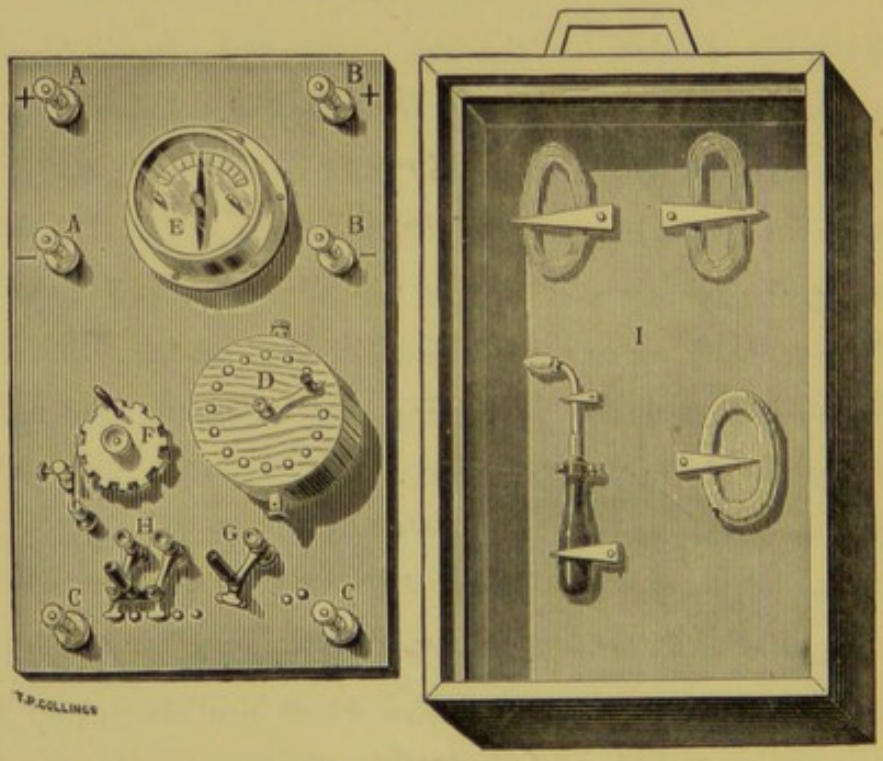
Many of the batteries supplied for medical purposes do not possess all these accessories which are absolutely essential for scientific investigation and treatment.

With the object of attempting to supply this want I have had constructed the following instruments, the first of which may be called, the Element Board, and the other the Combined Handle Electrode.

The Element Board.

This is especially useful for home and hospital practice as it supplies all the requirements for both diagnosis and treatment, and moreover is of solid construction and not likely to get out of order. It is however very portable and may be attached to any battery. To it are fixed wires

Fig. 1.



from both the faradic and galvanic apparatus, and by means of a switch either of the currents may be directed through the pair of rheophores to which the electrodes are attached. Both currents pass through the rheostat

which regulates their strength. The galvanic current is further connected with a galvanometer, a commutator, and a rheotome. Thus the two batteries being attached to the same element board, either can be passed through the same electrodes, either can be opened, closed, regulated, measured, slowly or rapidly interrupted, and alternated, as desired.

In figure 1; A.A. represent binding screws for attaching the galvanic current; B.B., binding screws for attaching the faradic current; C.C., binding screws for attaching the electrodes; D., a rheostat for regulating the strength of both the faradic and galvanic currents; E., a galvanometer for measuring the strength of the galvanic current; F., a rheotome for rapidly interrupting the galvanic current; G., a switch, the turning of which causes either the faradic or galvanic current to pass through C.C.; H., a commutator for reversing, or slowly interrupting the galvanic current; I., lid of the element board containing Gaiffe's handle, plate electrode, and rheophores.

The full strength of both batteries should be applied to their attachments at the element board, that is assuming the rheostat is sufficiently powerful to thoroughly control them. In the case of a strange instrument being used for the first time this must be experimentally ascertained. This is rapidly effected by introducing the full resistance into the circuit and by increasing the strength of the battery till a minimum of action is felt through it. The

apparatus is then in a controlable condition, for by reducing the resistance in the element board the strength of the current will thereby be increased. The element board has been manufactured by Mr. Thistleton, Old Quebec Street, London.

The Combined Handle Electrode.

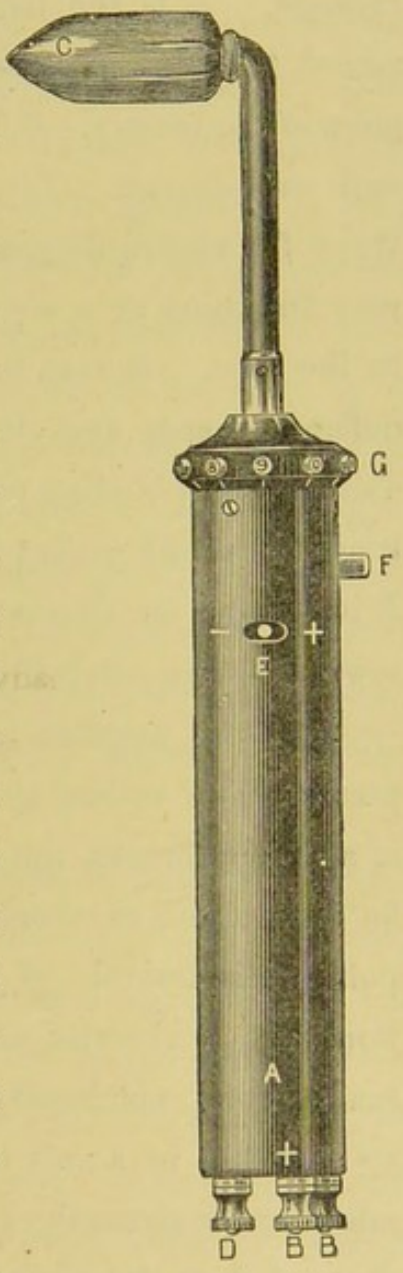
This instrument may be employed either for electrical treatment or diagnosis, but it has been constructed more especially for the latter purpose. In addition to its portability it possesses in some respects advantages over the element board already described.

The practical worker will have satisfied himself of the difficulty and inconvenience, in delicate diagnostic investigations, of dividing his attention, between the electrode with which he makes his experiments on the patient, and the element board upon which are placed the different apparatus he has to manipulate. In the endeavour to, in some measure, obviate these difficulties, the instrument has been constructed, of which the accompanying woodcut, Fig. 2 (half size), indicates the chief features.

Since the completion of this electrode some time ago, my attention has been directed to attempts which have already been made in this direction. Dr. Poore has figured a sponge electrode containing in its handle a rheostat for

the purpose of modifying the strength of the current. Dr. John Wyllie, of Edinburgh, (*Edin. Med. Jour.*, Feb. 1881,) and Messrs Beard and Rockwell of New York, have also described a sponge electrode containing a mechanism for interrupting and alternating the current. I have not, unfortunately, had an opportunity of seeing any of these instruments. These with Gaiffe's interrupting handle are as far as I am aware the only attempts which have yet been made to introduce suitable accessories into the electrode itself. Those just enumerated however useful, are imperfect and do not contain *all* the essentials for electro-diagnosis, nor are they of that construction suitable for this purpose.

FIG. 2.



The handle here figured consists of an electrode of convenient shape and size, and contains all the necessary elements for scientific clinical investigation, namely—

1st, A current graduator; 2nd, A current interruptor, and a means of opening and closing it, and 3rd, A current reverser. A is the handle. B.B. are two connecting screws to which are attached the positive and negative poles of the battery. C is a metal or carbon point covered with wash-leather. In the figure this is of convenient shape for electro-diagnostic purposes by which either a very fine point, or a considerable surface can be applied to the skin. It may be unscrewed and other heads of different shapes and sizes fixed on as necessity may require. D is a binding screw for the other electrode which is applied to the patient in order to complete the circuit. E is a lever for alternating the current. When moved towards + the point C is the positive, and when towards — it is the negative pole. F is a peg, which when pressed down makes, and when it moves back by means of a spring, breaks the circuit; the current can thereby be interrupted as slowly or as quickly, up to a certain point, as is desired. G is a revolving wheel in connection with a rheostat in its interior. This consists of ten sections, numbered respectively; and each of these by throwing in a unit of resistance, in consequence diminishes the strength of the current, and *vice versa*. This rheostat does not profess to be an exact or measurable amount of resistance, but it is simply a means of gradually increasing or diminishing the strength of the current for practical purposes. It has been so arranged that

its power is convenient for clinical use. For example, when the instrument is attached to the full power of a forty-cell Leclanché battery, and the entire resistance is introduced into the circuit, a minimum amount of sensation is perceptible to the skin. As each division of the wheel is turned, a tenth of the whole resistance is taken from the circuit, and consequently the current increases in strength, till, when it reaches the last section where there is no resistance, the full power of the forty cells is obtained. More correctly estimated by a galvanometer, the properties of this rheostat may be thus stated. Supposing the current from the forty cells passing through the human body to indicate 12 m.v., one unit of resistance of the rheostat introduced into the circuit reduces the reading to 11 m.v., and so on till, when the whole resistance is included, 2 m.v. is the result.

This electrode therefore contains in itself all the essential elements for medical electrical appliances, and more especially for the purposes of electro-diagnosis. It may be attached to either the faradic or galvanic currents. When in the hand of the observer all the accessories can be put in action by the movement of one finger, thus greatly facilitating the delicate manipulations of the investigator, and obviating the necessity of dividing his attention, and altering his position, as he is compelled to do when working with an element board. Finally with this instrument, which can be carried in the pocket,

the physician, provided he obtains a sufficiently powerful current is independent of the imperfect construction of most of the apparatus now supplied to the profession, as all the necessary accessories he requires are contained in his electrode. The instrument has been manufactured by Mr. Hawksley, Oxford Street, London.

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