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UNIVERSAL ELECTRODE HOLDER FOR DIATHERMIC APPLICATIONS

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Fig. 1

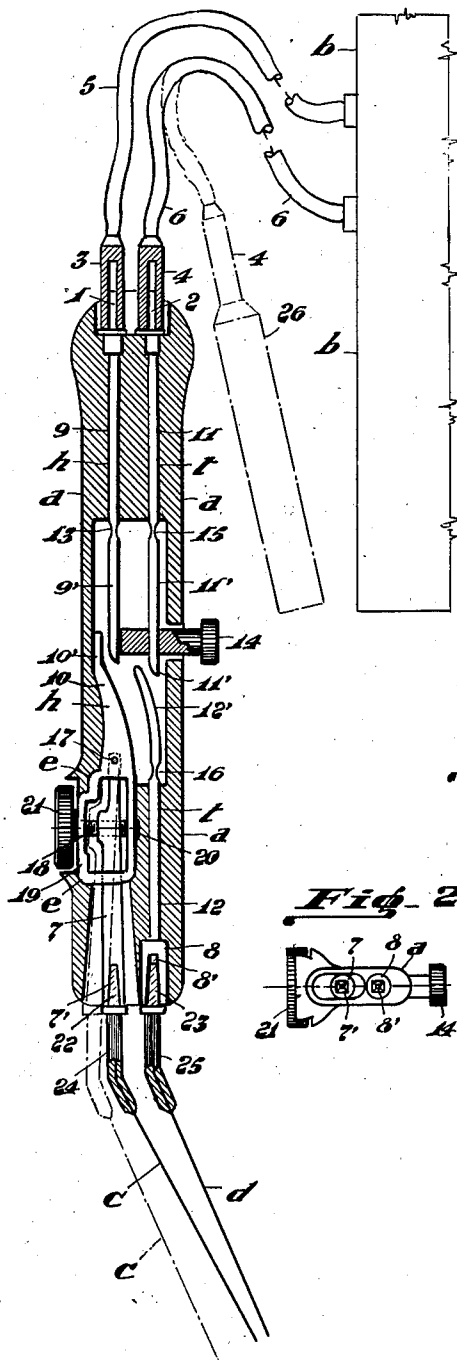


Fig. 2

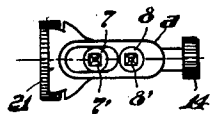


Fig. 3

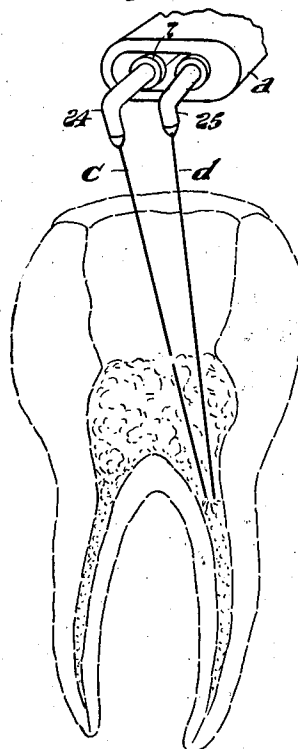
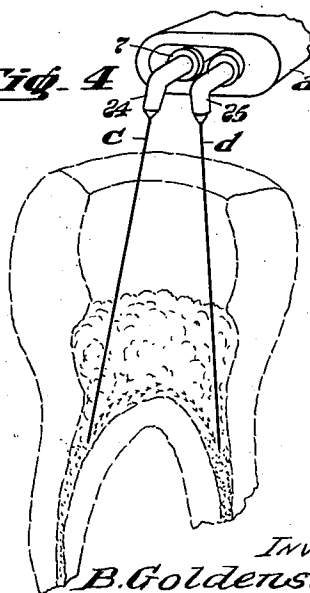


Fig. 4



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UNIVERSAL ELECTRODE HOLDER FOR
DIATHERMIC APPLICATIONS

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8 Claims. (Cl. 128—303.13)

This invention relates to a universal electrode holder for diathermic applications, based on scientific studies and experiments. As it is well known, the diathermic instruments used heretofore are only prepared for a single application, and therefore for different mouth treatments, for instance, it would be necessary to provide each equipment with a series of electrodes of different types and having a different relation or spacing between each other, apart from the various arrangements and structures required according to the instruments, which would be complicated for the doctor or dentist who requires suitable and practical instruments for the good performance of his work.

In this kind of instrument, the ideal would undoubtedly be the use of a handle capable of being used for any of the above-mentioned kinds of work, and this is precisely what has been attained by the electrode-holding instrument subject of the present invention, which due to its features may be called universal, as it is provided with means which enable the use of any short or long circuit, and with adapting means for any type of electrode, with the additional feature that at least one of the electrode adapters is variable to graduate at will the distance between the electrodes, which means that by simple changes the apparatus may be prepared for all kinds of operations.

Due to the manner in which the adapters thereof are combined, the new universal instrument for diathermic applications subject of the present invention is particularly well adapted for intradental treatments, as it enables the use of diactive electrodes with such an exact nearness of the ends thereof as to operate directly on the cavities or affected parts, without the possibility of derivations to strange regions, and consequently, without causing burns or overdosing outside of the field of action, for the purpose of producing a positive effect located on the operative spot. Therefore, with short treatments it is possible to obtain accurate sterilizations and destructions of affected tissues.

The electrodes used are in the form of filamentary needles but having a certain temper for the purpose of maintaining a determined position or shape, so that after graduating the spacing, regardless of how small the cavity may be, same may enter keeping the distance necessary for obtaining a spark arc or heat effect generated in the tissue itself which behaves as a live conductor in the space comprised between the two active electrodes.

The rear end of the instrument being provided with stems for receiving plugs for the feeding of diathermic current, in accordance with the case to be treated, same admits the direct feed of one or both poles for the use of one or two electrodes, that is to say, that apart from the diactive or short circuit, the instrument may be used for long circuit with monoactive electrode, which matches a further hand electrode connected to that effect.

In order that the invention may be more clearly understood and readily carried into practice, same has been illustrated by way of example and in a preferred embodiment in the accompanying drawing, wherein:

Figure 1 is a longitudinal sectional view of the instrument showing the simple structure thereof and giving an idea as to the manner in which the electrodes are adapted, which in this case assume the form of flexible needles arranged in the corresponding adapters, of which one is variable for regulating the distance comprised between both electrodes, and also showing the connecting plug which enables the instrument to be used also as a long circuit electrode (monoactive).

Figure 2 is a sectional view of the end of the instrument, showing the adapters of the frustum socket for the adaptation of the frustum stems constituting the base of the electrodes.

Figure 3 shows the application of the instrument with intradental diactive electrodes arranged in such a manner that the ends thereof are very close together, that is to say, only maintaining sufficient separation to form the spark or arc required to coagulate, sterilize or destroy the tissues if necessary; and

Figure 4 shows a further application of the instrument, indicating the manner in which the electrodes may be arranged to operate with a certain separation.

The same reference characters indicate like or equivalent parts or elements throughout the different figures.

As may be seen in the drawing, *a* is the instrument handle, which is made of dielectric material and provided with a pair of stems 1 and 2 for a pair of plugs 3 and 4 proper of the conductors 5 and 6 which receive diathermic current from the equipment *b*; said stems 1 and 2 are connected to the conductors *h* and *t* leading through the interior of the handle *a*, and said conductors *h* and *t* are connected to metallic adapters 7 and 8 arranged at the opposite end to that of the admission of current.

Before reaching the adapters 7 and 8, the conductors *h* and *t* are cut so that conductor *h* is formed by two portions 9 and 10, while conductor *t* is formed by two portions 11 and 12.

The portion 9 of conductor *h* is provided with a groove 13, so that the terminal 9' is made flexible and capable of making contact with the terminal 10' of portion 10, and for this purpose said terminal 9' is connected to the end of the stem 14' of button 14. In turn, the portion 11 of conductor *t* is also provided with a groove 15 so that terminal 11' is made flexible and capable of making contact with terminal 12', which is also flexible and has a groove 16, and for this connection the terminal 11' is crossed over the stem 14' of button 14. Thus upon pressing the button 14, the simultaneous contact of both conductors *h* and *t* for closing the circuit is obtained, and upon releasing the button 14, the circuit is interrupted due to the resiliency of terminals 9' and 11'. Therefore, the button 14 acts as a double interrupter which the doctor or dentist can control at will.

As the instrument should be applied for different uses, the adapter 7 (which matches adapter 8) is mounted in a variable manner in armature *e* forming part of the portion 10 of conductor *h*, said adapter having a rotation point provided by pivot 17 on said armature *e*, and a screw 18 passes through the middle portion thereof, said screw 18 being rotatably mounted on portions 19 and 20 and armature *e* which serve as a bearing therefor; said screw ends at the knob 21 which is made of dielectric material, and the unit described is so combined that the armature *e* and adapter 7 are housed in the handle *a*, while the knob 21 remains within the reach of the fingers for the corresponding actuation thereof, as upon turning the knob 21 same will rotate the screw 18, causing the piece constituting the adapter 7 to displace angularly with the corresponding bearing on the pivot 17, and therefore the end of socket 7' for applying the base of electrode *c* becomes variable as regards the distance in respect to adapter 8. Thus, by suitable control of knob 21, both electrodes *c* and *d* may be brought towards or away from each other due to the displacement of the first electrode *c*. In this manner, both electrodes may be arranged so that there will be a minimum separation between the points thereof, that is to say, sufficient to avoid contact with each other so that, upon closing the circuit, they will form a spark or arc as shown in Figure 3, for the purpose of destroying and coagulating the tissue, and as both needles constituting the electrodes form a substantially acute angle, they behave as a single needle, to enter not only the cavity of the caries, but even the channels of the teeth roots (Figure 3), and by opening or separating the electrodes by means of the knob 21, it is possible to operate in the manner shown in Figure 4, or prepare to act between gums or other tissues.

Electrodes *c* and *d* have as a base two male frustums 22 and 23 coinciding with cavities 7' and 8' of adapters 7 and 8, and said electrodes *c* and *d*, which in this case are intradental, are formed by needles of considerable length which start in the respective males 22 and 23; as may be seen, these needles are screened by linings 24 and 25, made of dielectric material, and said linings extend beyond the angles, said needles then continuing bare, as required for use.

Instead of electrodes in the shape of filamentary needles as shown, the instrument may be pro-

vided with rigid or semi-rigid electrodes, such as for gums and the like, provided they are adapted by means of a male 23 in the sockets 7' and 8'.

Due to the fact that the electrodes are detachable, the unit may be arranged with a monoactive electrode, if desired, as by removing the electrode *d* and plug 4, the hand electrode 26 for long circuit may be applied by means of this same plug. This means that the instrument is capable of being used for any application, whether with monoactive or diactive electrodes, and therefore it may be called universal.

The instrument subject of the present invention, as described above, is capable of suffering modifications in construction and detail, without departing from the scope of the invention as clearly set forth in the appended claims.

What is claimed is:

1. A therapeutic apparatus for local application of electrical current comprising an insulating handle, conductors carried and insulated by said handle, adapters connected to said conductors, electrodes connected to said adapters and means for pivoting one of said adapters to vary the spacing between said electrodes.

2. A therapeutic apparatus for local application of electrical current comprising an insulating handle, conductors carried and insulated by said handle, adapters connected to said conductors, electrodes connected to said adapters, one of said adapters being fixed in said handle and another adapter being pivotally mounted in said handle whereby the spacing between electrodes may be varied.

3. A therapeutic apparatus for local application of electrical current comprising an insulating handle, conductors carried and insulated by said handle, adapters connected to said conductors, electrodes connected to said adapters, one of said adapters being fixed in said handle and another adapter being pivotally mounted in said handle on an axis transverse to the longitudinal axis of said handle, whereby the spacing between electrodes may be varied.

4. A therapeutic apparatus for local application of electrical current comprising an insulating handle, conductors carried and insulated by said handle, adapters connected to said conductors, electrodes connected to said adapters, one of said adapters being pivotally mounted in said handle and manually operable screw threaded means controlling said pivotally mounted adapter for varying the spacing of said electrodes.

5. A therapeutic apparatus for local application of electrical current comprising an insulating handle, conductors carried and insulated by said handle, adapters connected to said conductors, electrodes connected to said adapters, means for pivoting one of said adapters to vary the spacing between said electrodes and a manually operable switch mounted in said handle controlling said conductors.

6. A therapeutic apparatus for local application of electrical current comprising an insulating handle, conductors carried and insulated by said handle, adapters connected to said conductors, electrodes connected to said adapters, said conductors in said handle having a break therein with the ends adjacent said break normally spaced, certain of said ends being flexible and manually operable means for moving said flexible ends to close the current through said conductors.

7. A therapeutic apparatus for local applica-

tion of electrical current comprising an insulating handle, conductors carried and insulated by said handle, adapters connected to said conductors, electrodes connected to said adapters, said conductors in said handle having a break therein with the ends adjacent said break normally spaced, certain of said ends being flexible, manually operable means for moving said flexible ends to close the current through said conductors and means for pivoting one of said adapters for varying the spacing between said electrodes.

8. A therapeutic apparatus for local application of electrical current comprising an insulating handle, conductors carried and insulated

5 by said handle, adapters connected to said conductors, electrodes connected to said adapters, said conductors in said handle having a break therein with the ends adjacent said break normally spaced, certain of said ends being flexible, manually operable means for moving said flexible ends to close the current through said conductors, one of said adapters being pivotally mounted in said handle and manually operable screw threaded means controlling said pivotally mounted adapter for varying the spacing of said electrodes.

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