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ELECTRIC DESENSITIZER

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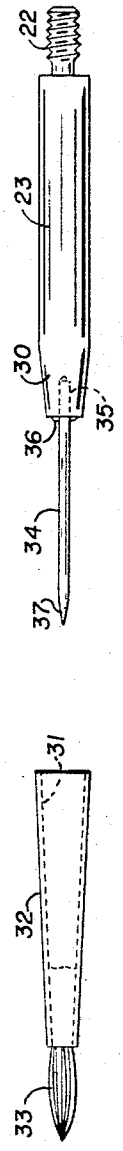


FIG. 4

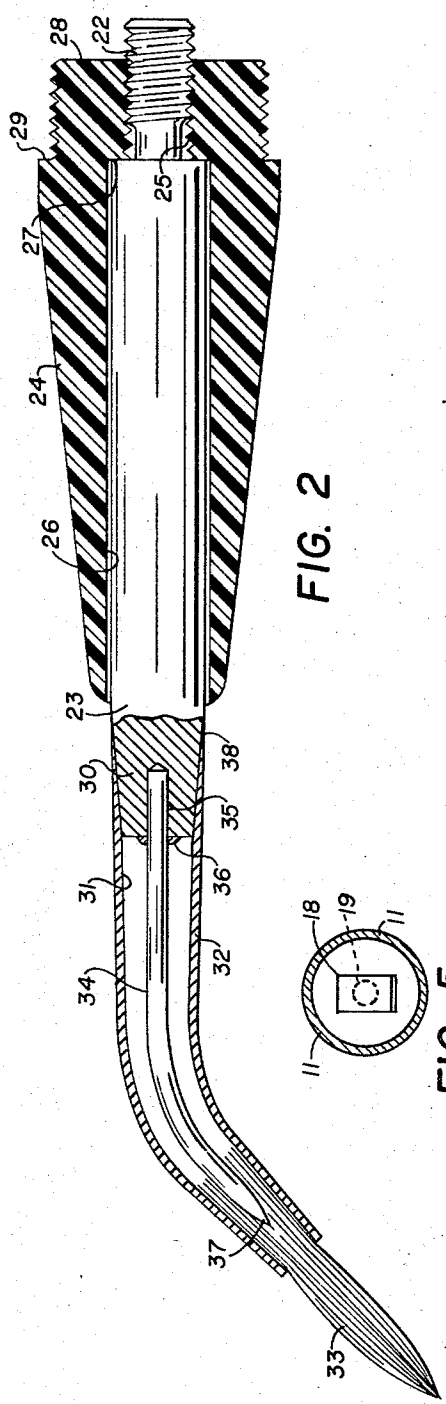


FIG. 2

FIG. 5

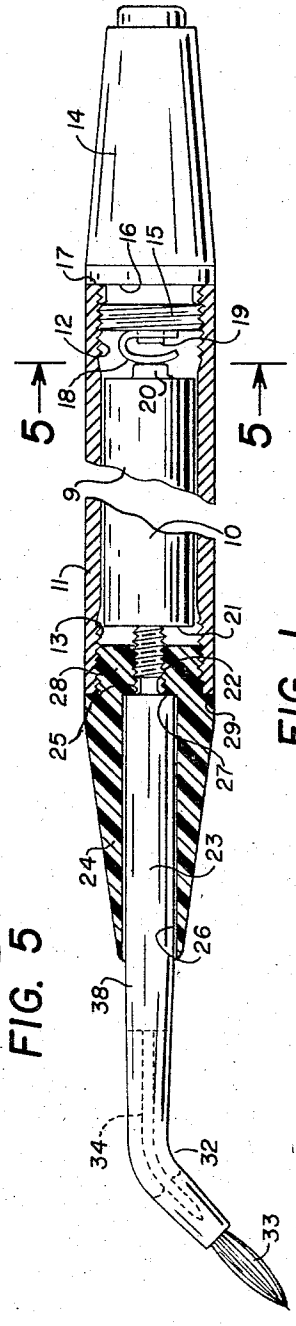


FIG. 1

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ELECTRIC DESENSITIZER

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This invention relates generally to dental instruments and devices and more particularly to a new and improved electric desensitizer for use in treating hypersensitive areas of the teeth and gums.

Desensitizers of the general type hereincontemplated have heretofore been known and used and generally operate to promote the flow of current from a hand held electrical source of energy through the body of a patient to be treated and thence back to a brush, or the like, type of medicament applicator which is connected electrically to the other side of the energy source and serves to apply the medicament to the sensitive areas, as aforementioned. This type of treatment may be applied either by the dentist to the patient, or by the patient to himself, and is known to provide immediate sensitivity relief to the patient. When properly administered, the treatment is efficacious and the results are beneficial and long lasting.

Prior art devices, however, for one reason or another, have not been found to be entirely satisfactory in service and, consequently, use of the treatment has not become as widespread as might be expected.

After giving much thought and experimentation to determine the causes of this problem, it has been found that much of the difficulty stems from various impedances which may be present in the circuit of the device itself, which impedances obstruct and prevent, or greatly reduce, the essential flow of current. The brush applicator, for example, which per se is not electrically conductive, may frequently fail to adequately wet its supporting metallic conductor ferrule by the medicament solution carried by the brush, and thus fail to provide the required current flow from the brush to the current source. Engageable but separable metallic conductor elements in the circuit of the device may likewise frequently introduce variable losses in conductivity and resultant reduction in current flow due to variations in contact resistance, particularly as these elements tend to become corroded with extended usage. These and other impedance variations lie at the source of the conductivity losses.

It is therefore an object of the present invention to provide a new and improved electric desensitizer having provision for promoting current flow sufficient to effect the desired treatment.

Another object is to provide a desensitizer having provision for minimizing the conductance losses in the device itself.

Another object is to provide a highly conductive electric desensitizer having a minimum of separable conductor elements.

Yet another object resides in the provision of new and improved means for establishing an electrical connection with a solution dipped brush applicator.

Still another object is to provide a hand held self contained desensitizer which is easy and economical to manufacture, is readily assembled for use, and is conveniently disassembled for sterilization and/or replacement of parts.

Another object is to provide a desensitizer which obviates the difficulties while retaining all of the advantages of the prior art desensitizers.

These and other objects, features and advantages of the present invention will become more clearly apparent as the description proceeds, reference being had to the accompanying drawing wherein:

FIG. 1 is a side view of the desensitizer of the present invention, certain parts for the sake of clarity, being sectionalized to show the construction;

FIG. 2 is an enlarged view of the brush end of the desensitizer shown in FIG. 1, the brush supporting ferrule also being shown in section to illustrate the assembly of parts;

FIG. 3 is a detail view of the brush and ferrule;

FIG. 4 is a detail view of the conductor pin assembly; and

FIG. 5 is a sectional view taken along the line 5—5 of FIG. 1 and showing the battery contact spring.

Referring now to the drawing for a more complete understanding of the invention, and first more particularly to FIG. 1 thereof, 9 and 10 designate a pair of dry cell batteries, two such batteries being used in the typical case. There batteries are of the pen light battery type typically rated at 1½ volts each. The batteries are housed, in the nature of a flashlight, within a metallic tubular casing or barrel 11 which preferably is formed of aluminum having a nickel plated, or the like, finish. Both ends of casing 11 are internally threaded as depicted at 12 and 13.

A tapered plug 14, which is formed of the same material and finished in the same manner as casing 11, is employed to engage threads 12 of the casing and close the same at that end, the plug for this purpose having a threaded reduced diameter portion 15 such that when the parts are fully screwed together, the shoulder 16 of the plug squarely engages the end face of the casing as at 17. The plug carries a U-shaped spring 18 which is formed of a suitable material such as beryllium copper. Spring 18 is suitably secured by one leg thereof to the plug as by being riveted thereto as depicted at 19. The results of this arrangement is that the free leg of the spring flexes, i.e., yieldably moves toward the rivet, when the spring in engagement with the positive pole 20 of battery 9, is urged thereby as the plug is screwed into the casing.

It will be understood that the batteries 9 and 10 are arranged end to end with the positive pole (not shown) of the battery 10 engaging the negative pole (not shown) of the battery 9. The negative pole 21 of battery 10 is engaged by the reduced threaded extension 22 of a conductor pin 23 which preferably is formed of brass.

A tapered adaptor 24, which is formed of a suitable insulating material, preferably nylon, has a central threaded opening 25 for threaded engagement with extension 22 of conductor pin 23. Opening 25 in the adaptor is enlarged as at 26 to freely receive the main cylindrical body of conductor pin 23 such that when extension 22 of the same is screw-tightened to adaptor 24, their fully confronting shoulders become engaged as depicted at 27.

Adaptor 24 has a reduced cylindrical end portion 28 which is externally threaded for engagement as at 13 with casing 11, the shoulder thus formed on adaptor 24 engaging squarely with the end face of the casing, as depicted at 29.

Pin 23 has a tapered end portion 30 whose surface interfits with the tapered inner surface 31 of ferrule 32, as best seen in FIG. 2. The ferrule, which is formed of brass, has a camel hair brush 33 formed therewith, and the ferrule initially is straight, i.e., unbent, as disclosed in FIG. 3. A silver plated copper wire 34 is inserted in a socket 35 provided therefor in the tapered end portion of pin 23, and the wire preferably is soldered to the pin as depicted at 36 in order to enhance the conductivity of the connection.

Wire 34 initially is straight, i.e., unbent, as disclosed in FIG. 4, and is pointed, as depicted at 37, to facilitate entry of the wire into the body of the camel hair brush cen-

trally thereof, FIG. 2, as the tapered end portion **30** of pin **23** is moved into matching engagement with the tapered surface **31** of ferrule **32**. As thus engaged, the matching tapered surfaces are brazed together to enhance the conductivity of the connection, and thereafter the parts are ground and polished externally to merge the external surfaces smoothly as in the region **38**, FIGS. 1 and 2.

Brush **33** is next suitably masked, and the assembly of ferrule **32** and pin **23** is nickel plated, to thus complete this assembly upon removal of the mask, the parts still being unbent. The ferrule **32** and wire **34**, being soft brass and copper respectively, are then readily bent to the curved configuration as required and depicted in FIGS. 1 and 2.

From the foregoing description of the desensitizer of the present invention, it will now be apparent that there are only four engaging, separable connections in the circuit of the desensitizer from the brush as the negative electrode to the casing as the positive electrode. These separable contacts are the pin extension **22** in contact with the negative pole **21** of battery **10**, the positive pole of battery **10** in contact with the negative pole of battery **9**, positive pole **20** of battery **9** in contact with spring **18**, and plug **14** in contact with casing **11** at their end face-shoulder connection **17** and at their screw connection **12**. Plug **14**, moreover, in use is grasped by the hand as well as the casing and thus, in this case, the plug as the positive electrode is only three separable contacts removed from the brush **33**. It is significant, furthermore, that of these separable contacts, spring contact **18** is the only yieldable one in the group, but notwithstanding, being of U-configuration, produces a firm and forcible engagement of all of the separable contacts in the circuit. The net result is that contact resistance in the circuit is reduced to a minimum and remains substantially constant in continued usage of the desensitizer.

The silver plated wire **34**, furthermore, being soldered to pin **23**, provides a highly conductive primary current path between the pin **23** and the central portion of the brush **33** and, likewise, the brass ferrule **32** being brazed to pin **23**, provides a secondary current path to the outer portion of the brush, thus greatly reducing the impedance to current flow between these parts.

It will be apparent that the desensitizer comprises few parts of simple construction characterized by ease and economy of manufacture as well as by ease of assembly and disassembly, as for replacing the batteries, or for sterilizing or cleaning such parts as the ferrule-pin combination, the casing, and the plug **14**.

In the use of the aforedescribed desensitizer, the hypersensitive area to be treated is first dried, it being assumed that the patient is being treated by the dentist and is seated in his chair. The dentist then grasps the desensitizer with a dampened hand and retracts the patient's cheek with his other hand. The brush is next touched to the patient's tongue to check the batteries. The patient should experience a prickly sensation or metallic taste if

the batteries are adequate for the purpose. Assuming that the batteries are adequate, the brush is then dipped into a suitable medicament solution such, for example, as stannous fluoride, 2% sodium fluoride or sodium chloride, after which the medicated brush is applied to the sensitive area for at least one minute, allowing the patient to remain in the chair while the solution dries. If necessary, this procedure is repeated and the treatments continued every two weeks for a period of two months.

It will thus be apparent that a new and improved electric desensitizer has been provided which is well adapted to fulfill the aforestated objects of the invention, and that while the same has been described in reference to a preferred example thereof which gives satisfactory results, it will be apparent that other examples and forms of the invention are possible without departing from the principle and scope thereof as set forth in the appended claim.

What I claim as my invention and desire to secure by Letters Patent of the United States is:

An electric desensitizer comprising a nickel plated tubular aluminum casing, a dry cell battery source of electrical energy disposed inside said casing, a centrally apertured nylon adaptor threadedly secured to one end of said casing, a liquid medicament brush applicator formed of camel hair, a unitary tapered nickel plated brass ferrule, one end portion of said brush applicator mounted within the small diameter end portion of the ferrule, a nickel plated brass pin having a tapered end portion disposed within the large diameter end portion of said tapered ferrule and brazed thereto, the remaining portion of said pin being disposed within the central aperture of said adaptor and having the opposite end thereof disposed in electrical engagement with the negative terminal of said energy source, said tapered end portion of the pin having an axial opening therein, a silver plated copper wire having a first end portion disposed within said axial opening in the pin and having an opposite end portion disposed centrally within said ferrule mounted end portion of said brush applicator thereby to produce a good contact between the applicator and the wire when medicament is applied thereto, said first end portion of the wire being soldered to said pin, a nickel plated aluminum closure plug threadedly secured to the opposite end of said casing, and a U-shaped beryllium copper spring having one leg secured to said plug and the other leg disposed in flexed engagement with the positive terminal of said battery source when said plug is threadedly secured to the casing.

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