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ELECTRICALLY HEATED VIBRATORY MEDICAMENT APPLICATOR

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Fig. 1.

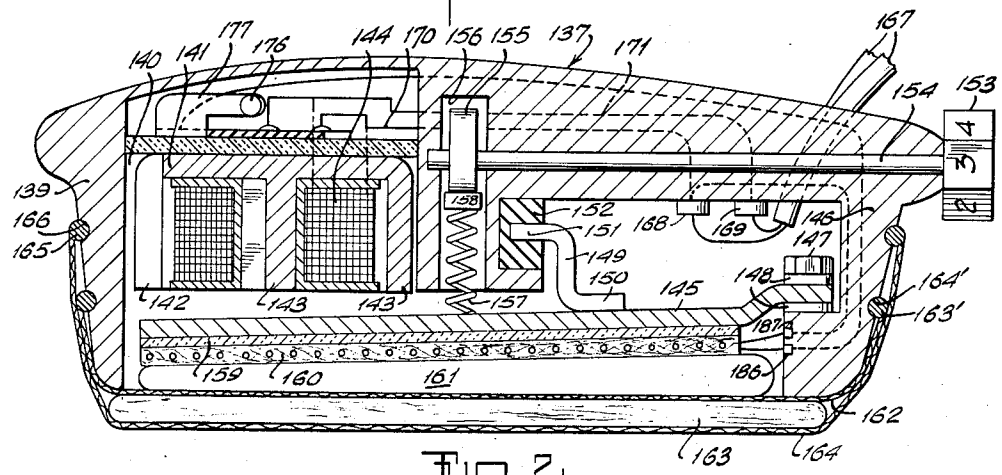
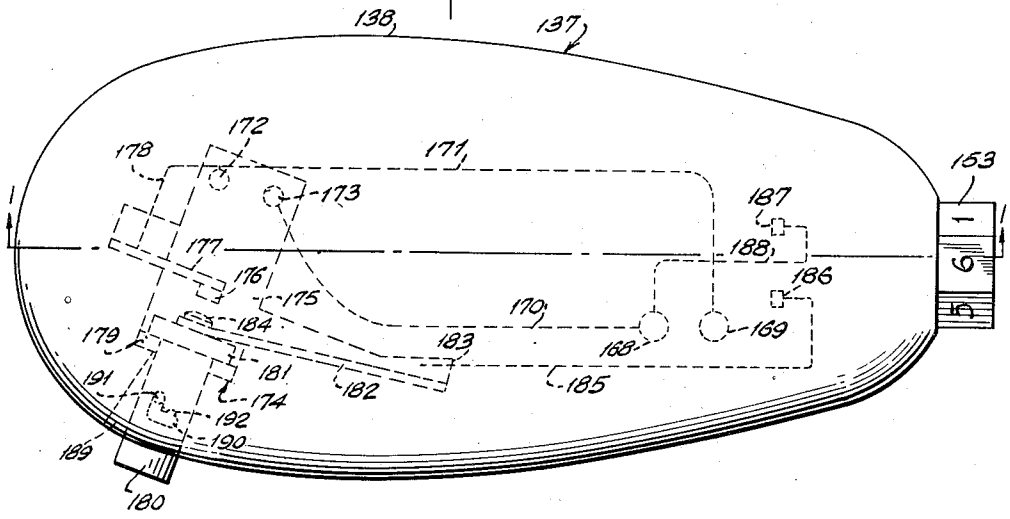


Fig. 2.



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ELECTRICALLY HEATED VIBRATORY MEDICAMENT APPLICATOR

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6 Claims. (Cl. 128—24.1)

This invention relates to electromechanical medicament applicators and more particularly to apparatus for applying medicaments to the body and stimulating absorption by the application of heat and vibration.

Direct medication of surface areas of the body has often been found to be desirable and beneficial, particularly under conditions whereby the skin and interior tissues such as muscles and the like can be conditioned to absorb a reasonable amount of such medicine. It has been found that local skin areas can be conditioned to absorb controlled amounts of a medicament by the application of heat accompanied by mechanical stimulation which will effect enlargement of the pores and dilation of the surface vessels. Accordingly it is one object of the invention to provide a simple effective device for treating skin areas to absorb medicaments through the simultaneous application of heat and mechanical stimulation in the presence of such medicaments.

In many cases, where large body areas are involved, a relatively large amount of medicant is required and must be constantly applied to all sections of the area undergoing treatment. It is therefore another object of the invention to provide a new and improved structure coordinated with the treating apparatus whereby a constant supply of medicament, under control at all times by the operator, is available to keep the treated area constantly coated.

A further object of the invention is a device for treating surfaces of the body wherein the heating and vibrating means are coordinated and electrically associated to prevent the high voltages used to power the unit from contacting the skin directly or indirectly and thereby prevent subjection of the user to any annoying and harmful shocks or burns that may otherwise result.

A still further object of the invention is a new and improved apparatus for diffusing medicaments into the skin that is highly efficient and effective and wherein the medicament and associated means for applying the medicament can be easily changed and cleaned. In addition the particular arrangement of the components and elements enables the use of readily changeable disposable applicators that can be easily and quickly replaced when the device is to be used on successive patients.

Another object of the invention is an applicator for medicaments wherein a relatively high rate of absorption by the skin is obtainable without damaging, bruising or otherwise injuring the skin.

The above and other objects of the invention will become more apparent in the following description and associated drawings forming a part of this application.

In the drawings:

Fig. 1 is still another embodiment of the invention; and,

Fig. 2 is a top plan view of Fig. 1 with some parts omitted for clarity and Fig. 1 is a section taken along the line 1—1 thereof.

As pointed out above this invention concerns apparatus for treating the surfaces of the body in a way

that will cause the pores of the skin to absorb a medicament that is applied simultaneously with such treatment.

The invention is illustrated in Figs. 1 and 2 of the drawings and may be used for applying a medicament to relatively large or sharply curved areas of the body. In this embodiment of the invention the housing 137 which may be formed or cast of any suitable material such as plastic, metal or the like is generally of oval shape and has a top wall formed integrally with the peripheral wall 138. The curved end 139 of the housing 137 is formed with a central recess 140 which receives a cup-shaped magnet structure 141 having a cylindrical pole piece 142 and a central pole piece 143. A coil 144 is mounted between the pole pieces 142 and 143 and is energized to produce vibration of the armature 145. The armature 145 is mounted on the end wall 146 of the housing 137 by means of at least one bolt 147 extending through the armature 145 and threaded into the housing. The armature is isolated from the bolt 147 by means of a pair of rubber washers on either side of the armature and vibration is partially limited by means of a Z-shaped bracket 149 having its lower end 150 welded or otherwise fixed to the upper side of the armature 145 and its upper end 151 imbedded in a rubber block 152 contained within a corresponding recess formed in the housing 137. The vibration or amplitude of motion of the armature can also be adjusted by means of a knob 153 which is connected by means of a shaft 154 to an eccentric cam 155 contained within a recess 156 of the housing. A spring 157 is interposed between the armature 145 and a cam follower 158 which in turn rides on the underside of the cam 155. With this arrangement rotation of the knob 153 will modify the pressure of the spring 157 on the armature 145 and thus adjust its amplitude of vibration.

Directly beneath the armature 145 and substantially coextensive therewith is an insulating layer of asbestos or another similar material. Beneath this insulating layer is a heating pad 160 having an electrical element therein which is adapted to heat the surface of the body during the application of the medicament. This heating pad is preferably fabricated of a slightly resilient material that will efficiently transmit vibratory motion of the armature 145.

Beneath the heating pad 160 is a fluid or liquid sac 161 preferably made of an inelastic deformable material such as an impregnated cloth or fabric that will hold a fluid such as oil, water or the like. This liquid sac or cushion 161 is firmly held against the heating pad 160 and armature 145 by means of a moisture proof membrane 162 which completely closes the bottom side of the housing 137 and is held in place by an elastic band 163′ cooperating with a peripheral groove 164′ about the edge of the housing 137. Beneath this waterproof membrane 162 is an absorbent pad 163 for holding the medicament to be applied to the body. This pad is held against the membrane 162 by a porous membrane 164 which surrounds the pad 163 and is held in position on the housing by a second elastic band 165 cooperating with a groove 166 about the edge of the housing 137 and at a point above the groove 164′.

With this arrangement the liquid cushion 161 compensates for the arcuate motion of the armature 145 about its pivot 147 and produces a more uniform and effective transmission of vibrations through the absorbant pad 163 to the body surface. For example the free end of the armature in moving toward and away from the magnet 141 actually moves through a vertical arc about the pivot 147 so that the free end of the armature 145 moves through a greater distance than those portions of the armature nearer the pivot 147. Furthermore by reason of the Z-shaped member 149 which is secured to

the armature at a mid point thereof there is a tendency for the armature to oscillate about a plane generally determined by the central axis of the Z-shaped member 149. This composite oscillation reacts on the body surface through the deformable liquid cushion 161 which in addition compensates for any tilt of the applicator and unevenness of the surface being treated. The cushion in following the vibration of the armature in this way and compensating for surface irregularities enables the attainment of substantially maximum efficiency at all times.

Electrical energy is fed to the device by means of a pair of leads 167 which enter the housing 137 through the upper wall thereof and connect to terminals 168 and 169 mounted within the housing. The electromagnetic coil 144 is connected to the terminals by a pair of leads 170 and 171 also shown in Fig. 2. The terminals 172 and 173 of Fig. 2 represent the terminals of the coil 144 of Fig. 1.

Directly above the electro-magnet 141 is a pushbutton switch illustrated generally by the numeral 174. This switch comprises a baseplate 175 preferably of an insulating material and carries a contact 176 supported by a resilient arm 177. This contact is connected to terminal 172 by means of a lead 178 and to terminal 169 by lead 171. The bracket 175 includes an upright member 179 having an opening therein to slidably receive a pushbutton 180 having a shoulder 181 which rests against the bracket member 179 when the switch is in the open position. The pushbutton 180 is held in the open position by means of a spring member 182 which is fastened to the housing 137 by means of a bracket 183 and carries a contact 184 on the free end thereof and positioned for cooperation with the fixed contact 176. The resilient arm 183 is connected by means of a lead 185 to terminal 186 of the heating element 160. The terminal 187 of this heating element is connected by a lead 188 to the terminal 168. With this arrangement depression of the button 180 causes the contacts 184 and 176 to complete the electrical circuit to the heating element.

As shown in Fig. 2 the pushbutton 180 extends through an elongated opening in the side of the housing 137 so that it can be moved forwardly and backwardly through a horizontal arc. The button 180 also has an L-shaped opening 190 therein for cooperation with a pin 191 mounted in the housing 137. In this way the button 180 may be depressed to close the contacts 184 and 176 moved forwardly within the slot 189 to cause the pin 190 to engage a slightly depressed part 192 in the longitudinal section of the slot 190. With this arrangement the button will stay in a depressed position until positive pressure is applied to move the button 180 rearwardly to release the pin 190 from the depression 192 and permit the button to move outwardly to its "off" position.

The invention in its broader aspects is not limited to the specific mechanism shown and described but departures may be made therefrom within the scope of the accompanying claims without departing from the principles of the invention and without sacrificing its chief advantages.

What is claimed is:

1. An applicator for applying medicaments to a body surface comprising an electromechanical vibrator, vibration transmitting means coupling said vibrator with the body surface, an absorbent pad including retaining means therefor adapted to be saturated with a medicament between said transmitting means and the surface to be treated and means for heating said absorbent pad, said vibration transmitting means including a fluid filled deformable sac.

2. An applicator for medicaments comprising a housing, an electromagnet in said housing, an armature associated with said magnet, an elastic mount securing one end of said armature to said housing, a second elastic mount fastened on one end to said housing and on the other end to a point on said armature between the ends thereof, vibration transmitting means coupled with said armature, an absorbent pad for holding medicament overlying said transmitting means, and means for heating said absorbent pad.

3. An applicator according to claim 2 wherein said vibration transmitting means includes a liquid filled sac of deformable material.

4. An applicator according to claim 2 wherein said vibration tarnsmitting means comprises a resilient pad having an electric heating element and a liquid filled sac of deformable material.

5. An applicator for applying medicaments to a body surface comprising an electromechanical vibrator having a driving coil and vibrating means associated with said coil and supported by a pair of resilient mounts with one mount disposed at one end thereof and the other at a point between the ends, vibration transmitting means coupling said vibrator with the body surface and means including an absorbent pad adapted to be saturated with a medicament disposed between said transmitting means and the surface to be treated.

6. In an applicator for applying medicaments to a body surface, an electromechanical vibrator comprising a driving coil including a magnetizable core adapted to be energized by a suitable source of electrical energy, a vibrating armature associated with said coil, said armature being resiliently pivoted at one end thereof for movement of the other end toward and away from said driving coil and a second resilient mount for said armature positioned between the first said mount and said coil for effecting substantially uniform vibratory action of the entire armature.

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