

July 14, 1959

R. TAPPER
EPILATION DEVICE
Filed Oct. 7, 1957

2,894,512

FIG. 1.

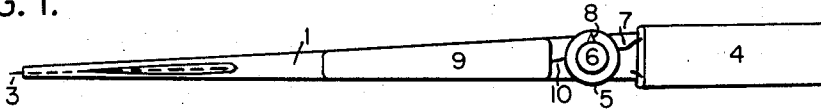


FIG. 2.

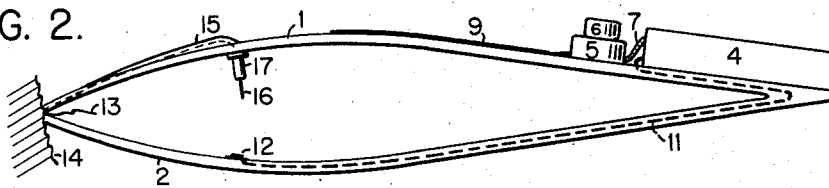


FIG. 3.

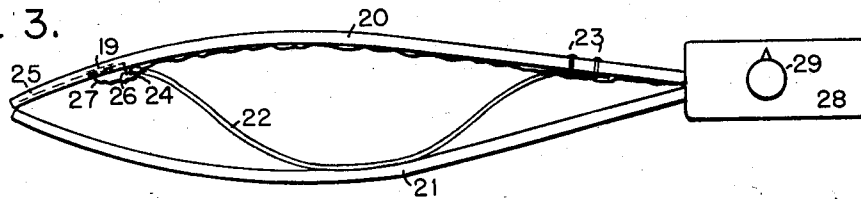


FIG. 4.

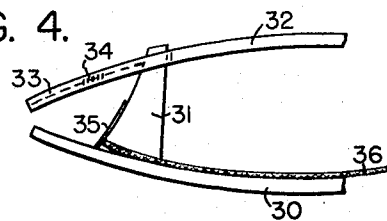
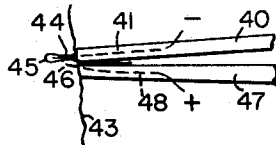


FIG. 5.



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2,894,512

EPILATION DEVICE

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Application October 7, 1957, Serial No. 688,512

19 Claims. (Cl. 128—303.18)

My invention relates to means for removing hair and particularly to a device which allows a user to remove one hair at a time.

The desire to remove unwanted hair from various portions of the human body has been a long-standing one. To effect a permanent removal thereof has heretofore been the province of the professional beautician. However, by evolving a new device I have been able to empower any user who can engage a hair with a pair of forceps to remove that hair according to the professional process. Only one hand is required.

Briefly, I provide forceps of the larger size having mechanical means for partially ejecting an epilation needle from one side of the forceps, or tweezers, as these may be called. The needle is so directed that it passes down through the hair follicle, or pore, of the hair held and penetrates only as far as the hair papilla, or root, which latter is to be destroyed. The mechanical relation between the forceps and the needle is such that the ejection of the latter takes place after the hair to be removed has been grasped. Further tightening of the forceps closes an electrical switch. This causes the epilative current to flow, destroying the papilla and allowing the now unrooted hair to be removed by the forceps which grasp it. A suitable electrode or equivalent means are also provided elsewhere on the forceps to complete the electrical circuit of the current accomplishing the process.

An object of my invention is to provide an electrical self-epilation device.

Another object is to provide an epilation device that can be manipulated with one hand.

Another object is to provide a hair removal device in which the needle is automatically properly directed in relation to the hair to be removed.

Another object is to provide epilation means in which the several steps in the process are accomplished in proper sequence by only one continuing manipulation.

Another object is to provide a relatively simple epilation device of low cost suitable for home use.

Other objects of my invention will become apparent upon reading the following detailed specification and upon examining the accompanying drawings, in which:

Fig. 1 shows a plan view of one embodiment of my epilation device,

Fig. 2 shows a side elevation view of the same,

Fig. 3 shows a side elevation of an alternate form of my device,

Fig. 4 shows a fragmentary elevation of a further alternate embodiment, and

Fig. 5 shows a fragmentary elevation of a still further alternate embodiment.

In Figs. 1 and 2 numeral 1 designates the upper side of a pair of forceps and in the latter figure numeral 2 designates the lower side. In Fig. 1 needle 3 is shown in the extended position, as obtained when the forceps are pressed together by the user, whereas in Fig. 2 the forceps are in the non-operated position. Battery 4 is

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attached to the upper side of the forceps. This source of electrical energy is used when electrolysis, or galvanic current, is employed as the epilatory agent. The battery may have a voltage of the order of nine volts and may be of miniature size since it is called upon to supply a current less than that required for the usual flashlight bulb. Rheostat 5, having adjusting knob 6, is connected by wire 7 to the positive pole of the battery. This rheostat may have a resistance variable from zero to approximately 150,000 ohms, and is of miniature construction. A pointer 8 may indicate desired adjustments over an arbitrary or functional scale. A return circuit electrode 9 is electrically insulated from but lies along the upper surface of the upper side 1 of the forceps. This electrode is electrically connected to the variable arm terminal of rheostat 5 by wire 10. In using my device one or more fingers of the user comes in contact with electrode 9 and the electrical circuit is completed from there through the arm of the user and thence to where needle 3 may be located.

The negative terminal of battery 4 passes to the other side of the forceps through insulated wire 11, which terminates in contact 12.

Suitable materials for the forceps are either a nylon plastic or a metal having a certain degree of spring-like resiliency. When the plastic is employed the electrical circuit is rather easily formed of the necessary wires and contacts mounted upon the plastic. When metal is used the same configuration obtains but insulating bushings are required between each conductor and the metal forceps in order that the latter will not short circuit the electricity from the needle 3 and the return circuit initiated through the user by electrode 9.

The forceps are so sprung that the ends near needle 3 are slightly apart when the forceps lie free. The first action on the part of the user is to grasp the hair 13 to be removed with a light pressure at the skin line 14. Further pressure causes the sides of the forceps to come more nearly together and to become more nearly parallel. Needle 3 extends through the upper side of the forceps to provide a necessary bearing and is then attached to flexible shaft 15. Within the latter is inner axially movable cable 16, formed of a conductor of electricity. Bushing 17 supports outer element 15.

When the forceps are sufficiently pressed together cable 16 touches contact 12. This acts to both partially eject the needle, as shown in Fig. 1, and to complete the electrical circuit. The forceps are held at a slight angle to the skin as shown in Fig. 2 and when these are fully compressed the needle passes directly through the hair follicle without piercing the skin as to draw blood and stops at the depth where the papilla is found because of bushing 17 physically impinging upon contact 12.

This position is held by the user for a suitable interval, of the order of five or more seconds. The negative electric needle forms sodium hydroxide by electrolyzing the salt solution found in the follicle. After the necessary period a slight foam is noted at the surface of the skin and the hair can be lifted out, still being held by the forceps. When it is out the pressure exerted by the thumb and fingers of the user is relaxed from the forceps and the device is ready for the next operation. A small coiled spring within bushing 17 (not shown for sake of clarity) causes the needle to retract as soon as pressure is removed from the forceps. The proper current to accomplish epilation and yet not to cause undue pain or too great chemical action is controlled by rheostat 5. This varies somewhat from individual to individual.

In the alternate embodiment shown in Fig. 3 the forceps are essentially the same as in the prior figures, and have upper side 20 and lower side 21. These sides are rigidly

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fastened together at the rear, or right hand end. The new element is arcuate shaped leaf spring 22. This is fastened to the upper side by rivets 23. Because of the shape of the spring it is seen that as the forceps are pressed together the left-hand end of the spring moves farther to the left. A small insulated piece 24 on the end of the spring prevents the latter from shorting the needle electrically. The needle has a projection 26 at the rear end against which spring 22 pushes. In this way the required self-ejecting action is secured.

An otherwise insulated conductor 27 makes resilient contact with the needle when an insulating sleeve 19 thereon has moved beyond the contacting end of conductor 27 as the needle moves outward from the end of the forceps. Conductor 27 passes back along the under side of side 20 to transistor oscillator 28. This device is approximately the same size as former battery 4. It contains a transistor, suitable reactive components of small size to form an oscillator having a frequency of the order of thirteen megacycles, a variable output control 29 and a small primary battery having a voltage of from nine to twelve volts.

The needle and mechanical elements operate in this embodiment as before but the epilation process is by thermolysis rather than by electrolysis. In thermolysis the papilla is destroyed by heat rather than by chemical action. The manipulative process is the same as has been recited. A specific return electrode is not required, since the return for radio frequency is capacitive between the body of the user and the device.

Fig. 4 illustrates a modification of the needle ejecting mechanism which may be applied to any of the former embodiments. The lower side of the forceps 30 is provided with an extensive but thin wedge-shaped piece 31. This extends through a slot in the upper side 32 of the forceps. Needle 33 is housed in a channel in side 32 as before and is provided with a minute spring 34 which urges the needle against piece 31. In the position shown this causes the needle to be retracted. As the forceps are closed together it is seen that the needle is urged outward against the pressure exerted by the spring. The slope of the forward (left) face of wedge piece 31 is proportioned to give the desired travel of the needle. Part of the distance downward on the forward face of the wedge a metallic contact 35 is located. This makes electrical contact with the needle after it has been pushed into operating position. An insulating shoe between the wedge and contact prevents shorting if the wedge is formed of metal. An insulated wire 36 leads from contact 35 and passes either to battery 4, to transistor oscillator 28, or to equivalents.

Fig. 5 shows a somewhat enlarged view of the active portion of my device in another alternate form and of the hair structure upon which it operates. The upper side of the forceps and the epilation needle 41 may be according to any of the previous embodiments. The electrolysis method is used, however, and the needle is connected to the negative pole of the system as before. The skin line is at 43. Numeral 44 identifies the hair follicle, which in the operative position of the needle is also coextensive with the needle. The papilla is represented at 45, into which the needle just penetrates.

In this embodiment another electrode 46 of a relatively sharp nature is formed on the lower side 47 of the forceps. This enters the epidermis a short distance from the follicle and is connected to the positive pole of the electrical system. This electrode of positive polarity is known in the beautician art to act as a sedative; i.e., to reduce any pain sensation induced by the epilation process. The positive polarity is conveyed to electrode 46 by insulated conductor 48.

It is to be noted how the forcep side 40 and needle 41 are relatively perpendicular to the skin line 43 so that the needle will pass directly through the follicle and reach the papilla.

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Certain other modifications are possible according to the teaching of my invention.

Rather than the transistor oscillator 28 of Fig. 3 being attached to the forceps, insulated lead 27 may be extended to a vacuum tube oscillator or the equivalent nearby. While I prefer a self-contained device, the coaction of forceps, needle, switch, etc. is highly valuable and enables the user to operate upon himself regardless of the self-contained oscillator aspect.

The switch of the embodiment of Fig. 2 is capable of modification to cause the needle to enter the papilla before the current is turned on by merely arranging the cable 16 to have an insulated end which contacts contact 12 and by providing bushing 17 to have a conductive lower end which contacts cable 16. Obviously, the lower end of bushing 17 does not contact contact 12 until the forceps are fully compressed.

As a further alternate, electrode 46 is not sharply formed to enter the epidermis, but impresses the positive pole over a minute surface skin area.

An alternate frequency for the oscillator is around 27 megacycles.

The transverse mechanical construction of oscillator 28 may be alternately employed for the battery 4 and variable resistor 5 of Figs. 1 and 2.

Still other modifications may be made in the arrangement, size, proportions, shape and streamlining of my device without departing from the scope of this invention.

Having thus fully described my invention and the manner in which it is to be practiced, I claim:

1. Means for removing hair comprising forceps to engage a hair, a needle ejectably mounted in said forceps, means to partially eject said needle active after said forceps have engaged said hair, a source of electrical energy, and means upon said forceps to connect said source to said needle active after said needle has been partially ejected to enable one-handed operation by a user.

2. Means for removing hair comprising tweezers for holding a hair to be removed, a needle protrudably mounted upon said tweezers, means active to protrude said needle from said tweezers after said tweezers have hold of said hair, an electrical energy source, and means actuated by said tweezers to electrically connect said source to said needle active after said needle has protruded from said tweezers to thereby enable one-handed actuation by a user.

3. Means for removing hair comprising forceps for holding a hair to be removed, a needle protrudably mounted within an end of said forceps, mechanical means to protrude said needle from said forceps when the sides of said forceps are brought together, an electrical energy source, and means coactive with the sides of said forceps to connect said source to said needle when said sides are closest together; said means for removing hair adapted for single-handed operation by a user.

4. An epilation device comprising means for grasping a hair to be removed, a needle extendably attached to said means for grasping, means to axially extend said needle into the root of said hair active after said hair has been grasped by said means for grasping, an electrical source, and means to connect said source to said needle to accomplish epilation, said means to connect formed to be actuated by said means for grasping when said needle enters said root; said device adapted for single-handed manipulation by the user.

5. A device for removing hair comprising a tweezer for holding a hair to be removed, a sharp needle mounted for partial ejection from an extremity of said tweezer, a spring to actuate said needle disposed on one side of said tweezer and mechanically formed to partially eject said needle upon said tweezer being pressed together, a contact to make electrical contact with said needle as this is ejected, and an electrical source, said

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source connected to said contact; the structure adapted for manipulation by said user to engage a hair with said tweezers, enter the needle into the papilla of said hair, electrically alter said papilla and remove the same with said hair with one hand.

6. A device for removing hair comprising tweezers for holding a hair to be removed, a needle mounted for ejection at the hair-holding extremity of said tweezers, a spring disposed between the sides of said tweezers formed to mechanically partially eject said needle upon the sides of said tweezers being pressed together, a contact to make electrical contact with said needle formed to make said contact when said needle has been partially ejected, and an electrical source, said source connected to said contact; the recited structure adapted for single-handed manipulation by the user to hold a hair with said tweezers, enter said needle into the papilla of said hair, electro-chemically alter said papilla and remove said papilla with said hair.

7. A device for epilation comprising tweezers for holding a hair to be removed, a needle reciprocally attached to one end of said tweezers, means to urge said needle through the follicle and into the papilla of said hair actuated upon said hair being tightly grasped by said tweezers, a source of electrical energy, and means to connect said source to said needle when said tweezers are brought together still more tightly; said device adapted for one hand manipulation by the user.

8. A device for electrical epilation comprising forceps to grasp a hair to be removed, a needle slidably contained within one free end of said forceps, means to pass said needle through the follicle and into the papilla of said hair as said hair is more tightly grasped by the sides of said forceps being brought together, a source of electrical energy, and contact means to connect said source to said needle adapted to be actuated as said forceps are still more closely brought together; said device adapted for one-handed manipulation by the user thereof.

9. A device for removing hair comprising forceps-like means for holding the hair to be removed, a needle, said needle slidable in said forceps-like means, a member bearing upon said needle, said member disposed between the sides of said forceps-like means such that the bringing together thereof urges the point of said needle beyond the end of said forceps-like means and into the papilla of the hair held, means mounted upon said forceps-like means to complete electrical contact when said needle has passed beyond the end of said forceps, and a source of electrical energy, said source electrically coactive with said needle for epilation; the recited structure adapted to allow said user to hold a hair with the forceps-like means, enter the needle into the papilla of said hair, destroy said papilla and remove said hair with the forceps-like means in one operation with one hand.

10. A device for epilation comprising forceps for holding the hair to be removed, an epilation needle, said needle slidable in a channel in one side of said forceps, a member between the sides of said forceps bearing upon said needle such that bringing together the sides of said forceps urges the point of said needle beyond the end of said forceps, through the follicle and into the papilla of the hair held by said forceps, electrical contact means mounted upon said forceps to complete the electrical circuit only when said needle has entered said follicle, a source of electrical energy, one connection of said source connected to said needle through said electrical contact means, the other connection of said source coactive with the body of the user, and means mounted upon said forceps to adjust the amount of electrical energy flowing through said needle and the body of said user; the recited structure adapted to enable the user to hold a hair with said forceps, enter the needle through

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the follicle and into the papilla of said hair, destructively alter said papilla and remove the thus freed papilla and hair with said forceps in one unified operation with one hand.

11. A device for epilation comprising forceps for holding the hair to be removed substantially at skin level, an epilation needle, said needle slidably held in a hollow channel in one side of said forceps by resilient retractive means, an actuating member on the same side of said forceps as said needle, one end of said member attached to said needle and disposed between the sides of said forceps so that bringing together said sides urges the point of said needle beyond the end of said forceps through the follicle and into the papilla of the hair held by said forceps, an electrical contact mounted upon said forceps opposite said retractively constrained actuating member to complete electrical contact when said needle is urged beyond the end of said forceps, a source of electrical energy mounted upon said forceps, the negative pole of said source connected to said needle through said contact, the positive pole of said source connected to an electrode on one side of said forceps contacted by the hand of the user, and means mounted upon said forceps to adjust the amount of current flowing when said contact completes the series circuit composed of said needle, the user, the electrode, the means to adjust and the source; the several elements related to allow the user to epilate in one unified operation employing only one hand.

12. A device for removing hair comprising forceps-like means for holding the hair to be removed, a needle, said needle slidably mounted at an extremity of said forceps-like means, a leaf spring disposed between the sides of said forceps-like means and mechanically engaging the rear of said needle to partially eject said needle when the sides of said forceps-like means are pressed together, insulative means coactive with electrical contact means to make electrical contact with said needle only when said needle has been partially ejected, and an electrical source, said source mounted upon said forceps-like means and connected to said electrical contact means; said structure adapted for manipulation by a user to engage a hair with the forceps-like means, enter the needle into the papilla of said hair, destructively alter said papilla and remove the same with said hair in an operation with one hand.

13. A device for removing hair comprising forceps for holding the hair to be removed, a needle, said needle slidably mounted at an extreme end of said forceps, an arcuate leaf spring disposed between the sides of said forceps and mechanically engaging the rear of said needle to eject said needle through the follicle and into the papilla of the hair held when the sides of said forceps are pressed together, needle insulative means coactive with electrical contact means to make electrical contact to said needle only when said needle has entered said papilla, and a source of oscillatory electrical energy, said source mounted upon said forceps and connected to said electrical contact means; said device adapted for manipulation by the user to engage a hair with said forceps, enter the needle into said papilla of said hair, thermolyze said papilla and remove the same with said hair in one unified operation with one hand.

14. A device for removing hair comprising means to hold the hair to be removed, pointed means axially resiliently mounted at an extremity of said means to hold, a member attached to said means to hold opposite that extremity mounting said needle, a slot in said means to hold behind said pointed means, said member disposed and proportioned to progressively eject the point of said pointed means from the extremity of said means to hold as the latter more tightly holds said hair, electrical means upon said member to contact said pointed means when the latter is relatively fully ejected, and an electrical source, said source connected to said electrical means; the recited structure adapted for manipulation by the

user to engage a hair with said means to hold, enter the pointed means into the root of said hair, destructively alter and remove said root and said hair in a one hand operation.

15. A device for removing hair comprising forceps-like means for holding the hair to be removed, a needle, said needle slidably and resiliently mounted at an extremity of said forceps-like means, a wedge-shaped piece rigidly attached to the side of said forceps-like means opposite that mounting said needle, said wedge-shaped piece disposed and proportioned to progressively eject the point of said needle from the extremity of said forceps-like means as the sides of the forceps-like means are pressed together, an electrical contact upon said wedge-shaped piece to contact said needle when said needle is relatively fully extended from the extremity of said forceps-like means, and a source of electrical energy, said source connected to said electrical contact; the recited structure adapted for manipulation by the user to engage a hair with said forceps-like means, enter the needle into the root of said hair, destructively alter said root and remove the same with said hair in an operation by one hand.

16. A device for removing hair comprising forceps for holding the hair to be removed, a needle, said needle slidably mounted with spring retractive means at an extremity of said forceps, a wedge-shaped piece rigidly attached to the side of said forceps opposite that mounting said needle, a slot in the side of said forceps behind said needle, said wedge-shaped piece disposed and proportioned to pass through said slot and to progressively translate the point of said needle from the extremity of said forceps as the sides of said forceps are pressed together, an electrical contact affixed to said wedge-shaped piece to electrically contact said needle when said needle is fully extended, and a source of electrical energy, said source connected to said electrical contact; the recited structure adapted for manipulation by the user to engage a hair with said forceps, enter the needle into the papilla of said hair, destructively alter said papilla and remove the same with said hair in one unified operation with one hand.

17. A device for removing hair comprising means to hold a hair to be removed, sharply pointed means slidably mounted at an extremity of said means to hold, means to partially eject said sharply pointed means upon pressing said means to hold firmly upon said hair, an electrode mounted at the extremity of said means to hold adjacent that mounting said sharply pointed means, an electrical source, means to connect said source to said sharply pointed means, and means to also connect said source to

said electrode for reducing sensation during the processing of said hair; the recited structure adapted for manipulation by the user to engage a hair with said means to hold, enter said sharply pointed means into the root of said hair, destructively act upon said root and remove the same and said hair by manipulation with one hand.

18. A device for removing hair comprising spring tweezers for holding the hair to be removed, a needle, said needle slidably and resiliently mounted at an end of said tweezers, means to partially eject said needle upon pressing the sides of said tweezers together, an electrode mounted at the end of said tweezers adjacent that mounting said needle, a source of electrical energy, means to connect the negative pole of said source to said needle when the same has been ejected, and means to connect the positive pole to said electrode to minimize pain during epilation; the recited structure adapted for manipulation by the user to hold a hair with said tweezers, enter the needle into the papilla of said hair, destructively loosen said papilla and remove the same and said hair in one operation with one hand.

19. A device for removing hair comprising forceps for holding one hair to be removed, a needle, said needle slidably and axially resiliently mounted at an extremity of said forceps, means to partially eject said needle upon pressing the sides of said forceps together, a sharp electrode mounted at the extremity of said forceps adjacent that mounting said needle, a source of electrical energy, means to connect the negative pole of said source to said needle when the same has been partially ejected, and means to connect the positive pole of said source to said sharp electrode to provide a sedative action during the hair removing process; the recited structure adapted for manipulation by the user to engage a hair with said forceps, enter the needle through the follicle and into the papilla of said hair, enter the sharp electrode adjacent thereto, electrically destructively alter said papilla and remove the same and said hair in one unified operation with one hand.

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