Aug. 9, 1955 T. C. DI GIOVANNA 2,714,788

ELECTRICALLY OPERATED AUTOMATIC ABRASIVE PORTABLE HAIR REMOVER

Filed April 16, 1954 2 Sheets-Sheet 1

Fig. 1

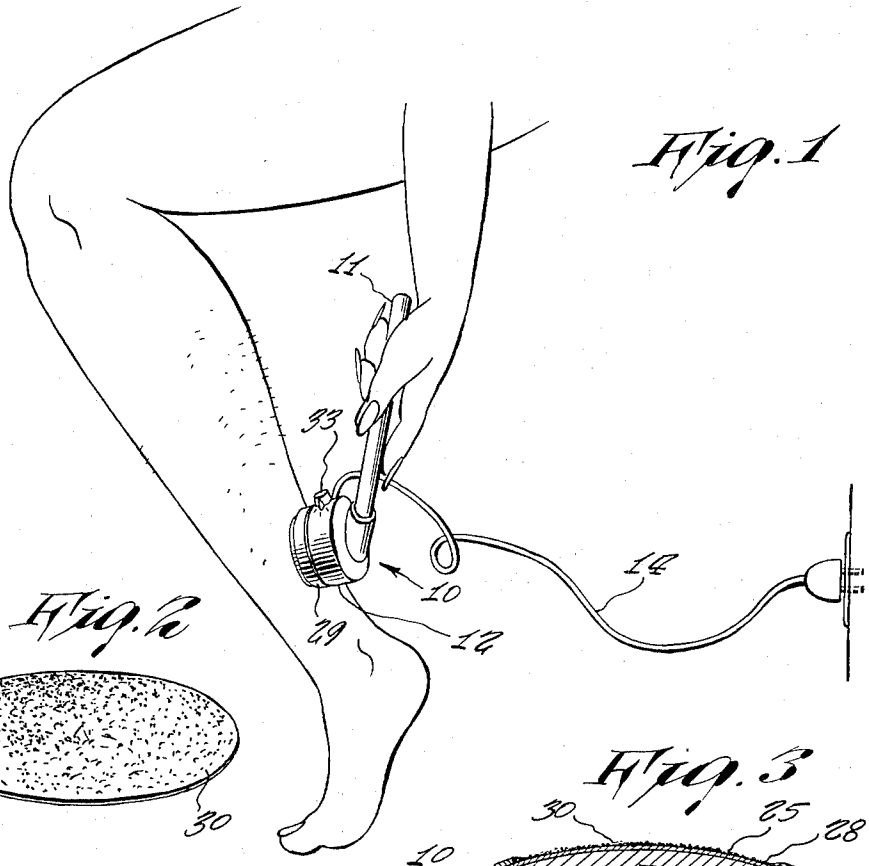

Fig. 2

Fig. 3

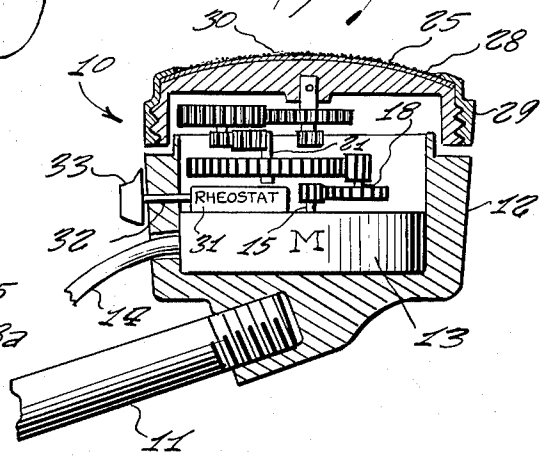

Fig. 4

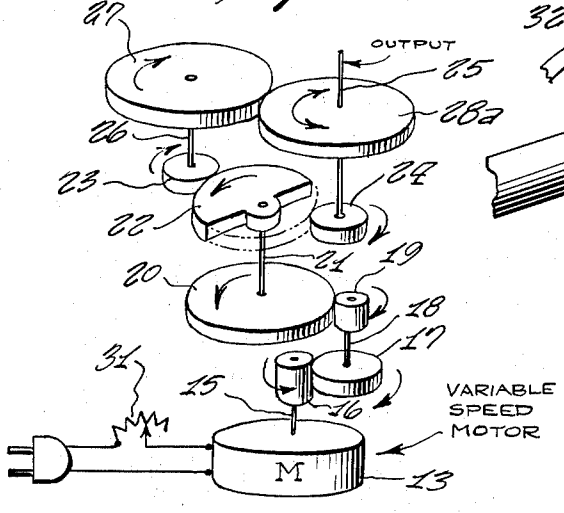

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Fig. 5

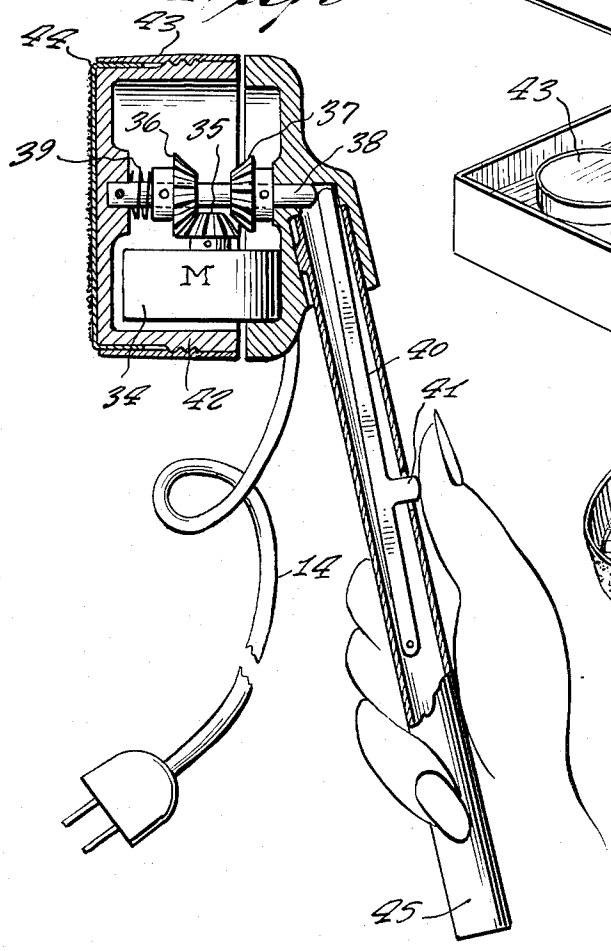
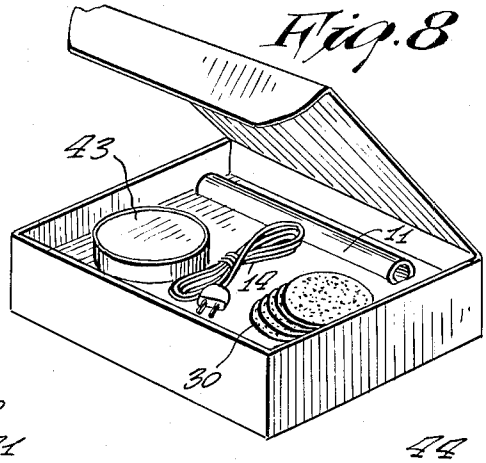


Fig. 8



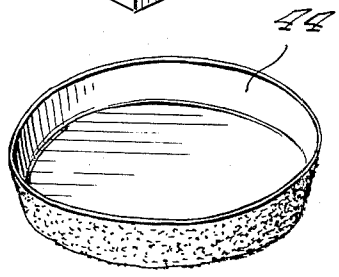


Fig. 6

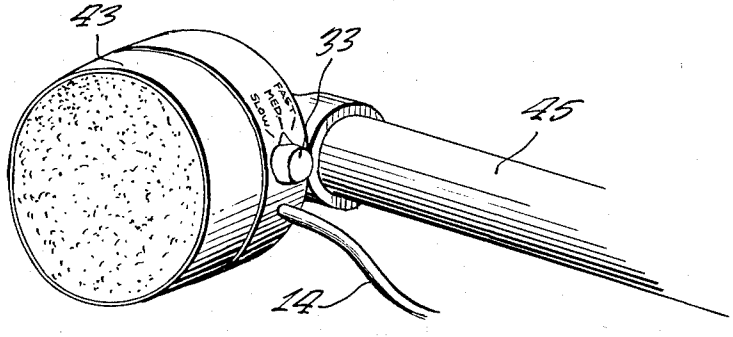


Fig. 7

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ELECTRICALLY OPERATED AUTOMATIC ABRASIVE PORTABLE HAIR REMOVER

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Application April 16, 1954, Serial No. 423,776

9 Claims. (Cl. 51—170)

The present invention relates to a device for removing hair from the body of a person.

Over the years, many methods and means have been tried in an attempt to devise an efficient way to remove the hair that grows on women's legs. The desirability of removing leg hair is well established by the dictates of fashion and recent custom. To solve this problem, various creams have been devised. However, these have the disadvantage of being messy and inconvenient to apply. Another proposed method for removing this hair is electrolysis. But here again, disadvantages appear that prevent wide acceptance of this method. The electric current causes the user much pain and suffering. In addition, the expense of the electrolysis method is prohibitive in many cases, and therefore beyond the reach of much of the general public. The well-known method of shaving has of course been used to some extent. While shaving is effective in cutting the hair, this method leaves a rough stubble.

Because of the undesirable features of the other methods of hair removal, the abrasive method has recently become widely accepted. In this regard, reference may be had to United States Patents 2,046,240 and 2,040,599, which are directed to pads that are manually operable to depilate. The abrasive method is highly satisfactory in result, in that the hair is effectively removed and only a soft stub remains. Abrasive hair removing, however effective the result, is an arduous and laborious task when performed manually as heretofore done.

It is therefore an object of the present invention to produce an automatically operable machine for removing hair and especially adapted for removing hair from women's legs.

Another object of the present invention is provided by an abrasive hair removing machine that is convenient and easy to control.

Another object of this invention is to provide a rotatably operable hair remover that rotates in one direction and then reverses and rotates in the opposite direction.

A further object of this invention is to provide an automatic hair removing machine, the direction of rotation of which may be manually controlled.

These and other objects of the present invention will become apparent from the following description taken with the drawings in which

Figure 1 is a perspective view of the invention shown in operative use,

Figure 2 is a perspective view of an abrasive disc used with the device,

Figure 3 is a cross-sectional view through the machine showing the operating mechanism thereof,

Figure 4 is a diagrammatic showing of a gear train employed in the device to cause the abrasive disc to automatically reverse direction of rotation periodically.

Figure 5 is a modification of the device of Fig. 3, wherein the direction of rotation may be manually controlled.

Figure 6 is a perspective view of a modified abrasive disc.

Figure 7 is a perspective view of the device showing the location of the speed control, and

Figure 8 shows the invention as it may be packaged and prepared for sale.

Experience has shown that in order to achieve results from the abrasive method of hair removal, the abrasive sheet must be rubbed over the skin in a circular motion. After a number of revolutions in one direction, the sheet must then be reversed and rubbed over the same skin area in the other direction. It is readily seen that if the abrasive sheet were rubbed over the skin in only one direction, there would be a tendency for the hairs to lay over on the skin, thereby preventing a complete reduction of each hair perpendicular across a cross-section thereof. This should be especially noted because the present invention has been designed to produce the above described rotary motion, and the reversal of direction thereof.

Referring now to the drawings, numeral **10** indicates the machine of the present invention and comprises a handle **11** received in a casing **12** which may be made of any suitable material. An electric motor **13** is mounted in the casing **12** and is supplied with a source of electric power by cord **14** which passes through an opening in the side of the casing. The motor shaft **15** has a pinion gear **16** secured thereto which meshes with a gear **17** secured to a shaft **18**. The other end of shaft **18** has a pinion gear **19** fastened thereto which in turn meshes with a gear **20** secured to a shaft **21** which, through the gear train thus far described, rotates counterclockwise as indicated by the arrows in Fig. 4. A sector gear **22** of approximately 180° is secured to the upper end of shaft **21** to rotate in a counterclockwise direction with the shaft. This sector gear alternately meshes with the pinion gears **23** and **24** during each rotation of the sector. In the position shown in Fig. 4, the sector gear is in engagement, with pinion **23** to rotate the latter in a clockwise direction. When the sector gear **22** has rotated to the dashed line in the figure, it engages pinion **24** to rotate it in a clockwise direction during which time it is disengaged from pinion **23**. The gear **24** is secured to the output shaft **25** which is thereby rotated clockwise during the period that sector gear **22** engages pinion **24**. The pinion **23** is fastened to shaft **26** which has a gear **27** fastened to the upper end thereof. Gear **27** meshes with gear **28***a* secured to output shaft **25**. During the period that sector **22** engages pinion **23** to transmit clockwise rotation to gear **27**, the output shaft is caused to rotate in a counterclockwise direction. It is seen therefore, that the output shaft is alternately rotated clockwise and counter-clockwise. The gear ratio between the sector **22** and pinions **23, 24**, may be chosen so that the output shaft makes any predetermined number of revolutions before it reverses direction. For example, the number of revolutions may be in the range of from 3 to 10.

The output shaft **25** has a cylindrical head **28** fastened thereto to rotate with the shaft. The upper surface of head **28** may have a curved crown as seen in Fig. 3. Also, the head is provided with screw threads to receive an internally threaded pad holder **29**. A pad **30** is made of sheet material and has on the other surface thereof an abrasive substance which engages and breaks down the hair structure. The abrasive substance is of such fineness as to rub down the hair but incapable of scratching the skin. A fine emery has been found to give satisfactory results though other abrasives may be used. The pad **30** is placed on the curved surface of the head **28** and held in place by pad holder **29**. This arrangement makes it convenient to replace worn out pads with fresh ones.

The motor **13** may be of any convenient type that operates from a 110 volt A. C. source or it may be a motor that operates on either A. C. or D. C. current.

A rheostat **31** is mounted within the casing, and connected to control the speed of the motor. The rheostat is controlled by an arm **32** brought out through an opening in the side of the casing and has a knob **33** fastened thereto. Markings on the side of the casing may indicate

the speed of the motor in terms of fast, medium and slow. The device is used on the legs as seen in Figure 1.

Referring to Figure 5, there is shown a modification of the above described device that is manually controlled. In this modification, the motor **34** has a bevel gear **35** secured to its shaft which continually rotates in one direction as long as the power is connected thereto. The bevel gear **35** is adapted to engage either one of two bevel gears **36** and **37** which are secured to the output shaft **38**. A spring **39** urges the shaft **38** into the position shown in Figure 5, wherein bevel gears **35** and **36** are in mesh and the shaft **38** rotates in one direction. An operating lever **40** is pivoted within the hollow handle **41** and engages the inner end of the output shaft **38**. By pivoting the lever **40** in a counterclockwise direction, shaft **38** is moved against the spring **39** to disengage gears **35** and **36**, and engage gear **37** with gear **35**. This results in a reversal of direction of the output shaft. The pivotal movement of lever **40** is conveniently effected by pressing a projection **41** of the lever which extends through an opening in the handle. A cylindrical head **42** is secured to the output shaft **38** to turn therewith. A cylindrical-shaped pad holder **43** fits around the head **42** and has internal screw threads for securing the holder to the threaded head **42**. In this modification, the abrasive pad **44** is cup-shaped. The rim of the pad fits snugly between the cylindrical head **42** and the holder **43** so as to rotate as these members are rotated by shaft **38**. Pad **44** may be made of the same material as pad **30**, hereinbefore described. In operation, the device of Figure 5 is permitted to operate in one direction for a period of time within the control of the operator who then presses projection **41** to effect a reversal of rotation as above described. The hollow handle **45** is received into the casing by a friction fit. In either modification therefor, the device may be disassembled for packaging as shown in Figure 8.

While the present invention has been described with reference to a specific embodiment thereof, it is understood that various modifications may be made without departing from the scope and spirit of the invention as defined in the appended claims.

Having defined my invention, what I claim to be new and novel, is:

1. In a device for removing hair, a supporting means, an electric motor mounted within said means, a shaft adapted to be rotated by said motor, an abrasive pad and a holder for the latter secured to said shaft, said abrasive pad comprising a sheet member covered with an abrasive material of such fineness as to inter-engage with the hair structure but incapable of scratching the skin, means for reversing the direction of rotation of the said shaft.

2. In a device for removing hair, a supporting means, an electric motor mounted within said means, a shaft adapted to be rotated by said motor, a cylindrical member fixedly mounted on said shaft, an abrasive pad and a holder for the latter having internal screw threads adapted to be screw-fastened to said cylindrical member, whereby said abrasive pad may be mounted, said abrasive pad comprising a sheet member covered with an abrasive material of such fineness as to interengage with the hair structure but incapable of scratching the skin, means for reversing the direction of rotation of the said shaft.

3. In a device for removing hair, a supporting means, an electric motor mounted within said means, a shaft adapted to be rotated by said motor, a cylindrical member fixedly mounted on said shaft, an abrasive pad and a holder for the latter having internal screw threads adapted to be screw-fastened to said cylindrical member, said abrasive pad comprising a sheet member covered with an abrasive material of such fineness as to interengage with the hair structure but incapable of scratching the skin, means for reversing the direction of rotation of the said shaft, and a handle fastened to said supporting means whereby said device may be conveniently operated.

4. A device for removing hair from the body, comprising a cylindrical casing, an electric motor mounted within said casing, a shaft mounted to be rotated by said motor, a cylindrical head mounted on said shaft and adapted to rotate therewith, a pad holder screw fastened to said cylindrical head, an abrasive pad held in place along the outer periphery thereof by said cylindrical head and said pad holder, said pad comprising a sheet member and an abrasive material of such fineness as to inter-engage with the hair structure, but incapable of scratching the skin, means for reversing the direction of rotation of the said shaft, a rheostat connected to said motor to vary the speed thereof, a control arm connected to said rheostat and a handle removably fastened to said casing.

5. A device for removing hair from the body comprising a casing, an electric motor mounted in said casing, a motor shaft adapted to be rotated by said motor, an output shaft, a cylindrical head mounted on said output shaft, an abrasive pad mounted on said cylindrical head, said abrasive pad including a sheet member and an abrasive material of such fineness as to inter-engage the hair structure but incapable of scratching the skin, and a gear train operatively coupling, said motor shaft and said output shaft the said gear train including means to rotate the said output shaft intermittently in one and the other direction, respectively.

6. The device as described in claim 5 in which said gear train includes pinion gears and a sector gear, all said gears being coplanar, one of the said pinion gears being connected to the output shaft and the other of said pinion gears being connected to an auxiliary shaft, and additional gear means coupling, said auxiliary shaft with said output shaft.

7. A device for removing hair from the body, comprising a casing, an electric motor mounted in said casing, a motor shaft adapted to be rotated by said motor, an output shaft, a cylindrical head mounted on said output shaft, a cup-shaped abrasive pad mounted on said cylindrical head, said abrasive pad including a sheet member, and fine abrasive material, a first bevel gear mounted on said motor shaft and a pair of bevel gears secured to said output shaft located to selectively engage said first bevel gear.

8. A device for removing hair from the body, comprising a casing, an electric motor mounted in said casing, a motor shaft adapted to be rotated by said motor, an output shaft, a cylindrical head mounted on said output shaft, a cup-shaped abrasive pad mounted on said cylindrical head, said abrasive pad including a sheet member, and fine abrasive material, a first bevel gear mounted on said motor shaft and a pair of bevel gears secured to said output shaft located to selectively engage said first bevel gear, a coil spring to urge said output shaft in one direction so that one of said pair of bevel gears normally engages said first bevel gear to rotate said output shaft in one direction and means to move said output shaft against said coil spring to disengage said one of said pair of bevel gears and cause engagement of said other of the pair of bevel gears to reverse the direction of rotation of said output shaft.

9. The device as set forth in claim 8, including a hollow handle secured to said casing, said means to move the output shaft against said coil spring comprising a pivoted lever mounted within said handle and being manually operable to engage said outpnt shaft.

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