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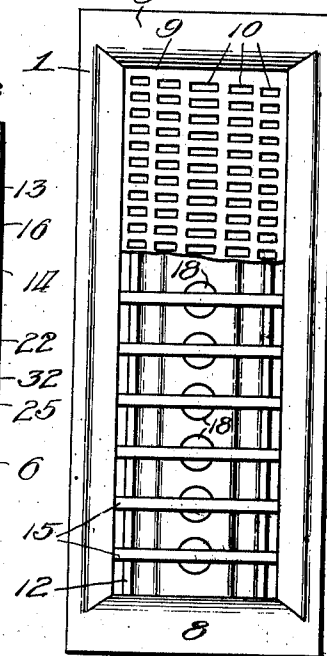
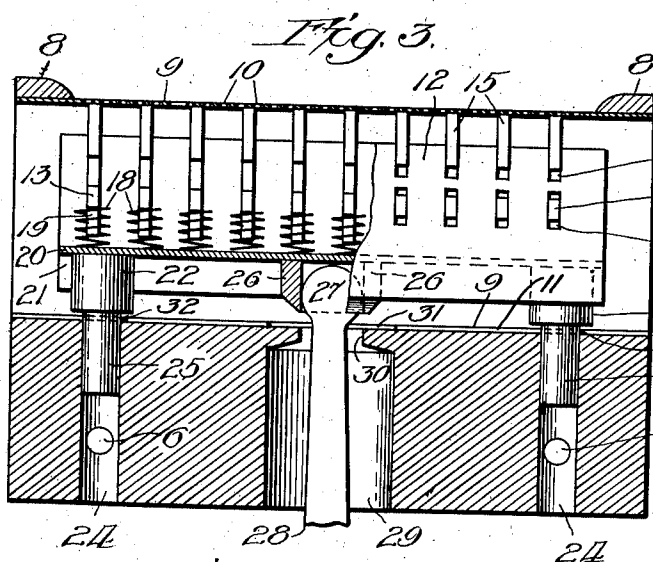
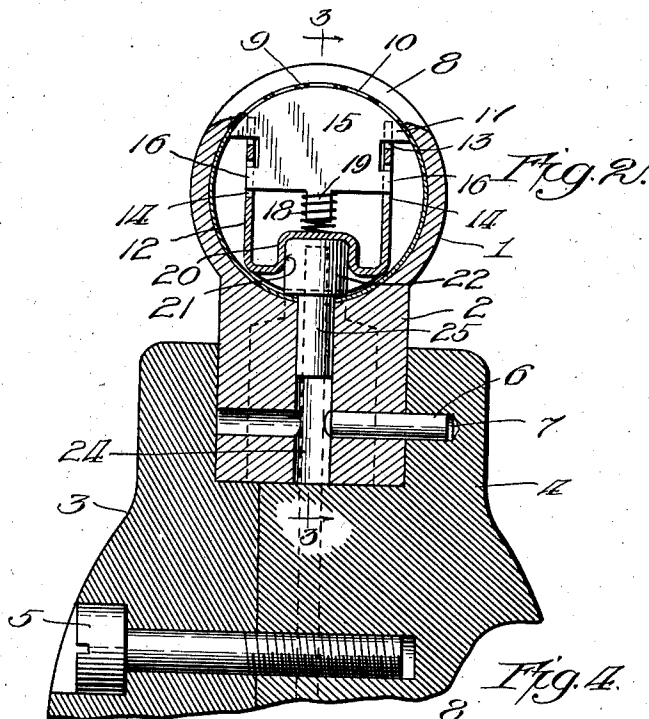
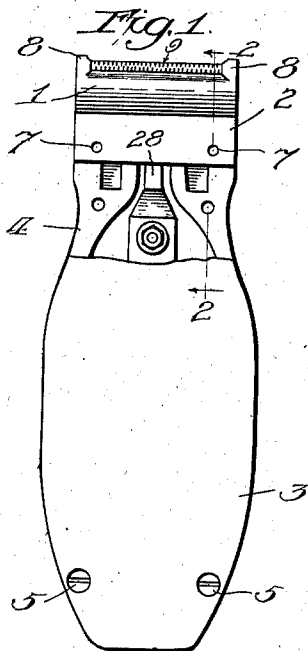
C. C. WRIGHT

2,296,134

ELECTRIC POWER-DRIVEN RAZOR

Filed April 7, 1939

2 Sheets-Sheet 1



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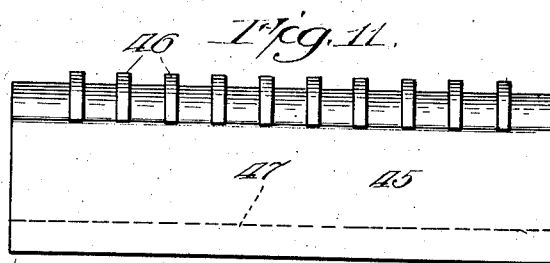
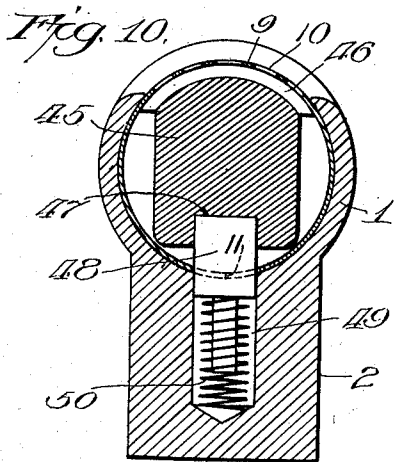
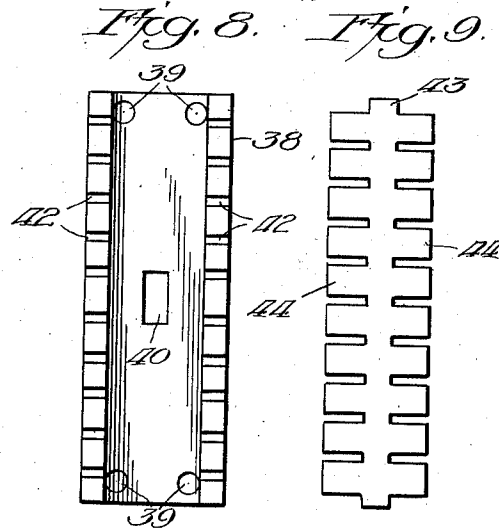
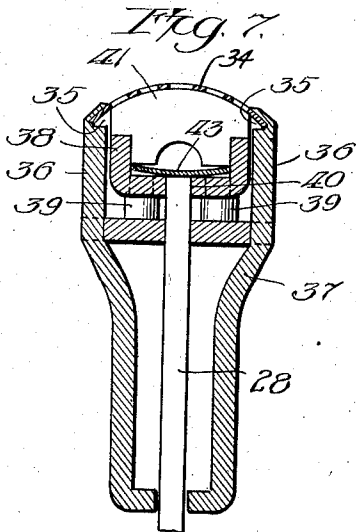
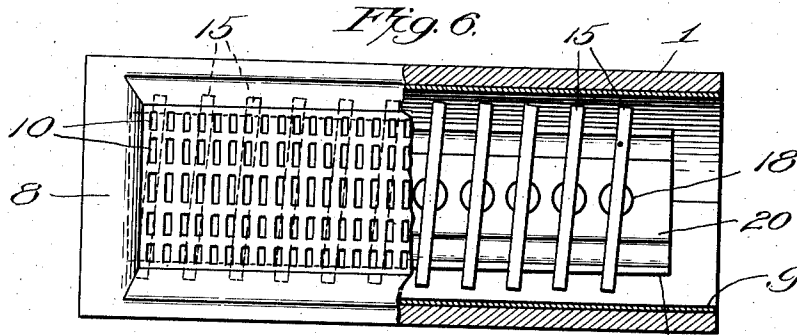
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ELECTRIC POWER-DRIVEN RAZOR

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

2,296,134

ELECTRIC POWER-DRIVEN RAZOR

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Application April 7, 1939, Serial No. 266,468

9 Claims. (Cl. 30—43)

The present invention relates to that type of razor in which there is a hollow head containing numerous perforations through which the hairs to be cut are adapted to enter, together with an internal reciprocable cutting member having blades cooperating with the perforated portion of the head to shear off the inwardly projecting ends of the hairs; and has for its object greatly to improve the construction and operation of razors of this type.

In order to produce a close shave without danger of cutting the skin, the wall containing the perforations should be very thin and the openings of such sizes and shapes that the skin will not push through the same when the razor is lightly pressed against the skin. One of the objects of the present invention is to produce a simple and novel head in which the perforated section is formed from very thin sheet material separate from the body portion of the head which may therefore be formed from commoner metals or even materials other than metal.

It is common practice to provide razor heads with openings in the form of parallel rows of slots and the cutter member with as many blades as there are slots in a single row. In that arrangement, if corresponding slots in the several rows are aligned and parallel to the blades, a shearing operation is performed simultaneously at every slot. While the blades are passing the slots, no hairs can move into the head through the latter, so that the positioning of the hairs for cutting, and the cutting operations alternate with each other at all points in the cutting zone. One of the objects of the present invention is to make both the operations of hair positioning and shearing substantially continuous through permitting a considerable portion of the holes, corresponding to the holes or slots in a single row in present types of construction, to remain open for the reception of hairs while the blades are performing shearing operations at the other holes. In this way the entrance of the hairs into the head is facilitated and the cutting is more easily accomplished because each portion of each cutting blade may perform a plurality of separate cutting operations during each stroke. It is, of course, not necessary that the corresponding slots in a plurality of rows be aligned, since they may be progressively offset; the principle of operation remaining the same in that from one-half to two-thirds of the slots always remain uncovered if, for example, a given point in a blade cooperates in succes-

sion with two or three holes or slots instead of with only one.

The various features of novelty whereby my invention is characterized will hereinafter be pointed out with particularity in the claims; but, for a full understanding of my invention and of its objects and advantages, reference may be had to the following detailed description taken in connection with the accompanying drawings, wherein:

Figure 1 is a side elevation of a razor embodying the present invention, a fragment of the handle being broken away at the head end; Fig. 2 is a section, on a larger scale, on line 2—2 of Fig. 1; Fig. 3 is a section on line 3—3 of Fig. 1, the reciprocable blade carrier being shown partly in section and partly in elevation; Fig. 4 is a top plan view of the head, a portion of the slotted plate or wall being omitted; Fig. 5 is a bottom plan view, on the same scale as Fig. 1, of the tubular element containing the holes or slots; Fig. 6 is a view similar to Fig. 4, with one end of the body portion shown in section, illustrating a slight modification; Fig. 7 is a longitudinal section through a modified form of head; Fig. 8 is a top plan view of the reciprocable carrier for the blades illustrated in Fig. 7; Fig. 9 is a plan view of the spring underlying the blades in Fig. 7; Fig. 10 is a transverse section through a head similar to that in Figs. 1 to 4, showing a modified form of cutter, and Fig. 11 is a side view of the cutter member appearing in Fig. 10.

Referring to Figs. 1 to 5 of the drawings, 1 represents an open-ended tubular member which may be formed from metal or a suitable composition capable of being molded. Formed integral with the member 1 is a heavy rectangular block member 2 of the same length as the member 1 but having a width somewhat less than the diameter of the member 1. The part 2 is adapted to be clamped between two handle members 3 and 4 held together by suitable screws 5. In order to hold the head, composed of the members 1 and 2, immovable, the part 2, which may be regarded as the shank portion of the head, may be provided with one or more laterally projecting pins 6 adapted to enter a hole or holes 7 in one of the handle sections, when the parts are assembled. The upper part of the tubular portion of the head is cut away so as to leave only narrow end pieces 8 remaining. The opening thus formed in the top of the head is closed by a thin wafer-like plate 9 containing numerous holes. In the arrangement shown,

these holes are in the form of narrow slots 10 arranged in five rows extending lengthwise of the top of the head; the long dimensions of the slots being transverse to the rows; and the corresponding slots in the several rows being progressively offset lengthwise of the top of the head.

In the arrangement shown, the plate 9 is a sheet or plate of hard steel, only a few one-thousandths of an inch thick, bent into the form of a cylinder which just fits within the head proper: the line of division in the cylindrical structure being indicated at 11. In actual practice this element is so accurately made that if, after being inserted in the head in a contracted condition with its long free edges overlapping, it is expanded by means of a suitable expanding device introduced into the same, the meeting ends 11 snap or spring into edge engagement and hold the tube thus formed tightly against the surrounding walls of the head.

Arranged within the head is a reciprocable cutter device. In the arrangement shown, this comprises a trough-shaped carrier 12 provided with vertical side walls having a series of notches 13 cut into each side wall from the upper edge, and provided with closed vertical slots 14 each lying directly below one of the notches 13. There are as many blades as there are notches. Each blade comprises a body portion 15 slightly narrower than the width of the trough and provided with ears 16 at the lower end; each ear extending through one of the slots 14. The width of the ears, measured in the vertical direction, is less than the length of the slots 14, so that the blades may move up and down a limited distance. The upper part of the body member of the blade is widened, as indicated at 17, so as to project through the notches 13 on opposite sides of the holder or carrier, and it is shaped to fit accurately against the overlying portion of the slotted sheet or plate 9. Underneath each of the blades is a compression spring 18 resting on the bottom of the trough in the carrier or holder, and held centered by means of a little stem 19 integral with and extending down from the blade into the spring. These springs hold the blades yieldingly against the overlying slotted portion of the head.

The central portion of the bottom wall of the trough-shaped carrier or holder is pressed upwardly to form a wide, deep central longitudinal rib 20 within the trough, and a central longitudinal channel 21 on the under side of the carrier or holder. Into this channel project two pins 22 fixed in the bottom of the chamber within the head. In the arrangement shown, the head has two holes 24 drilled in the vertical direction up through the bottom of the stem portion 2, and the pins 22 have stems or shanks 25 extending down into these holes and accurately fitting the same so that the parts 22 are held firmly against movement. The pins 22 are of the same diameter as the width of the channel 21 and are long enough so that when the wall forming the bottom of the channel rests on the pins, the carrier or holder is held clear of that portion of the sleeve 9 which underlies the same. In other words, the pins 22 serve both as supports and as guides for the reciprocable cutter member.

The cutter member may be reciprocated in any suitable way. In the arrangement shown, there are two barriers 26 extending transversely across the channel 21 in spaced relation to each other, about midway between the ends of the cutter.

The rounded end 27 of a rocker arm or lever 28, that extends up through a large central hole 29 in the shank portion 2 of the head, fits into the space between the barriers or partitions 26 so that, as the arm or lever 28 oscillates from side to side, it causes the cutter member to reciprocate. The arm or lever 27 may be driven by a suitable motor device, not shown, housed within the handle 3. The bore 29 is restricted at the upper end, as indicated at 30, so as to provide definite limiting stops for the movements of the arm or lever 28.

It will be seen that, when the parts are assembled, the arm or lever 28 prevents the cutter member from moving far enough in either direction to project beyond either end of the head, and that the pins 22 prevent the removal of the cutter until one of them is taken out. In order to remove the cutter from the head, the head must first be taken out of the handle so as to separate the arm or lever 28 from the head. The cutter may then be shifted lengthwise far enough to leave one of the pins 22 exposed; so that, upon taking out that pin, the way is left clear for the removal of the cutter through the corresponding end of the head.

The pins serve still another purpose. It will be seen in Fig. 5 that the meeting edges of the sheet from which the cylindrical sleeve 9 is formed are shaped to produce between them a central slot 31 and two round holes 32 lying near opposite ends of the sleeve. The purpose of the slot 31 is to permit the end of the arm or lever 28 to pass through into the interior of the head. The round holes 32, however, register with the holes 24 in the head. Consequently, when the stems 25 of the pins 22 are inserted in the holes 24, they must first pass through the holes 32 in the sleeve 9, and thereby serve as fastening devices for the sleeve to prevent the removal of the latter from the head as long as either pin remains in place.

In the arrangement shown there are three times as many slots as cutting blades, and the stroke of the cutter is such that each blade crosses three of the slots in each row during each stroke. Therefore, while a blade is cutting off a hair projecting into the head through one slot, two adjacent slots in the same row are open for the entry of other hairs. In other words, it is not necessary for the hairs to enter slots only during the pauses at the ends of the strokes of a blade, but they may enter two of the holes, in a given row, in advance of or behind a blade, while the blade is cutting off a hair extending through another hole.

It will be seen that the blades are self-sharpening, because they are yieldingly held against the overlying slotted element of hard steel and thus wear uniformly while in service.

It is, of course, not necessary that the holes in the working face of the head be in the form of slots or in definite rows, as long as the principle which I have explained is retained. Furthermore, when the holes are in the form of slots which are arranged in rows, it is not necessary to offset corresponding slots in the several rows, but they may be arranged in alignment with each other as they are in Fig. 6. Also, if desired, the blades may be arranged at a slight angle to the longitudinal center of the cutter, as are the blades in Fig. 6. In other words, Figs. 4 and 6 are intended to show two different arrangements for the slots and for the blades, either arrangement of the

blades being adapted to be employed in connection with either type of slot disposition.

In Figs. 7, 8 and 9 there is illustrated a somewhat different form of head. In this arrangement, the slotted element 34 of the head is in the form of a thin, strip of steel sprung at its long edges into notches 35 along the upper marginal portions of two separated side walls 36 of a head device 37. The carrier for the blades comprises a simple trough-shaped member 38 provided with feet in the form of downwardly-projecting pins 39 and a central slot 40 for the reception of the upper end of the operating arm or lever 28. The blades 41 are arranged in notches 42 in the upper portions of the side walls of the carrier or holder, and are pressed against the blade 34 by an underlying spring device which consists of a spring plate 43 about as long and as wide as the trough in the blade holder, resting in the bottom of the trough underneath the blades. Notches are cut into the long edges of the spring plate so as to transform the plate into a central longitudinal member flanked on both sides by small wings 44; the wings on each side corresponding in number to the number of blades and being so disposed that each blade overlies two wings lying opposite each other. The spring plate is curved about a longitudinal axis and the parts are so proportioned that when they are initially assembled, the blades must be pressed down far enough to flatten the spring plate somewhat in order to permit the blades to underlie the slotted plate 34. Therefore, after the assembly has been completed, the blades are yieldingly pressed up against the plate 34.

Instead of having blades which are supported independently of each other and therefore have independent movements, all of the blades may be fixed into the holder or carrier and the yielding pressure to hold the blades against the overlying slotted plate may be applied to the holder or carrier instead of to the blades themselves. Such an arrangement is shown in Figs. 10 and 11, wherein the holder or carrier is a molded block 45 to which blades 46 are fixed, conveniently by partially embedding the blades in the block during the molding process. The block is provided with a groove or channel 47 in the under side, this groove or channel corresponding to the channel 21 in the first form. The pins 48, corresponding to the pins 22 in the first form, not only serve as guides and supports for the block or carrier, but also as pressure devices to hold the blades yieldingly against the overlying slotted plate. To this end the holes 49 in the shank or stem 2 of the head are made large enough to receive the pins 48. Compression springs 50 within these holes, below the pins, exert a constant upward pressure on the latter. The head illustrated in Figs. 10 and 11 otherwise corresponds to that of Figs. 1 and 2, although the modifications just described are, of course, applicable to other types of heads.

While I have illustrated and described with particularity only a single preferred form of my invention, with a few modifications, I do not desire to be limited to the exact structural details thus illustrated and described; but intend to cover all forms and arrangements which come within the definitions of my invention constituting the appended claims.

I claim:

1. In a razor, a long, thin, transversely-bowed plate adapted to contact the skin of a person and having numerous openings for the reception

same, a member arranged underneath the concave side of the plate and having thereon a series of blades much fewer in number than the number of holes, means yieldingly to press the blades independently of each other against said plate, and means to reciprocate said member through a distance sufficient to cause each opening to be crossed by a blade.

2. In a razor, a long, thin, transversely-bowed plate adapted to contact the skin of a person and having numerous openings for the reception of hairs distributed in a row lengthwise of the same, a member arranged underneath the concave side of the plate and having thereon a series of individual blades much fewer in number than the number of holes in a given longitudinal line, means yieldingly to press each of the blades individually against said plate, and means to reciprocate said member through a distance sufficient to cause each opening to be crossed by a blade.

3. In a razor, a head having a tubular portion open at the ends and having a wide side opening extending through almost the entire length thereof, a sleeve of thin, resilient, hard steel fitting in said tubular portion and having numerous openings in the part spanning the side opening in the head, removable pins extending through the sleeve opposite the part having the openings therein and into the head to hold the sleeve in place, and a reciprocable cutter member resting on and guided by said pins.

4. In a razor, a tubular head open at the ends and having a wide side opening extending throughout almost the entire length thereof, and a sleeve of thin, hard steel fitting in said tubular portion and having numerous openings in the part spanning the side opening in the head, a reciprocable member arranged within and movable lengthwise of said sleeve, a series of blades carried by said member, and springs on said member acting on said blades to hold them in operative relation to the perforated part of the sleeve.

5. In a razor, a tubular head opening at the ends and having a wide side opening extending throughout almost the entire length thereof, a sleeve of thin, hard steel fitted in said head and having numerous openings in the part spanning said side opening, detachable fastenings for holding said sleeve in the head, an elongated trough-shaped member arranged within the sleeve and receptacle lengthwise of the latter, the open side of the trough being directly behind that part of the sleeve having the openings therein, blades slidably mounted in said member so as to lie transversely of the axis of the head and be movable from and toward the perforated part of the sleeve, and springs arranged in the trough of said member underneath the blades to press the blades outwardly against the sleeve.

6. In a razor, a head comprising a tubular part having a wide side opening extending throughout almost the entire length thereof, and a sleeve of thin, hard steel fitting in said tubular portion and having numerous openings in the part spanning the side opening in the head, the sleeve being divided lengthwise on the side thereof opposite said openings, the parts being constructed to permit the sleeve to be placed in and removed from said tubular portion when the sleeve is in a contracted condition, a reciprocable member arranged within and movable lengthwise of the

sleeve, a series of blades carried by said member, and means yieldingly pressing said blades against the perforated portion of the sleeve.

7. In a razor, a hollow head having a wide side opening extending throughout almost the entire length thereof, a thin, transversely-bowed plate of hard steel forming a closure for said opening and having numerous small openings for the reception of hairs distributed lengthwise of the same, a reciprocable member arranged within and movable lengthwise of said head, a series of individual blades mounted in said member for edge contact with said plate, and movements from and toward the latter, means carried by said member yieldingly to press said blades individually against said plate, and means to reciprocate said member.

8. In a razor, a hollow head having numerous small openings for the reception of hairs extending through and distributed lengthwise of a wall thereof, a receptacle member arranged within and movable lengthwise of said head, a series of individual blades mounted in said member for

edge contact with said wall in the zone containing said openings and for movements from and toward said wall, means carried by said member yieldingly to press said blades individually against said plate, and means to reciprocate said member.

9. In a razor, a hollow head having numerous small openings for the reception of hairs extending through and distributed lengthwise of a wall thereof, a receptacle member arranged within and movable lengthwise of said head, a series of individual blades mounted in said member for edge contact with said wall in the zone containing said openings and for movements from and toward said wall, means carried by said member yieldingly to press said blades against said plate, said blades being fewer in number than said openings and being spaced farther apart lengthwise of the head than are said openings and means to reciprocate said member through a distance sufficient to cause each opening to be crossed by a blade.

CLIFTON C. WRIGHT.