

March 24, 1942.

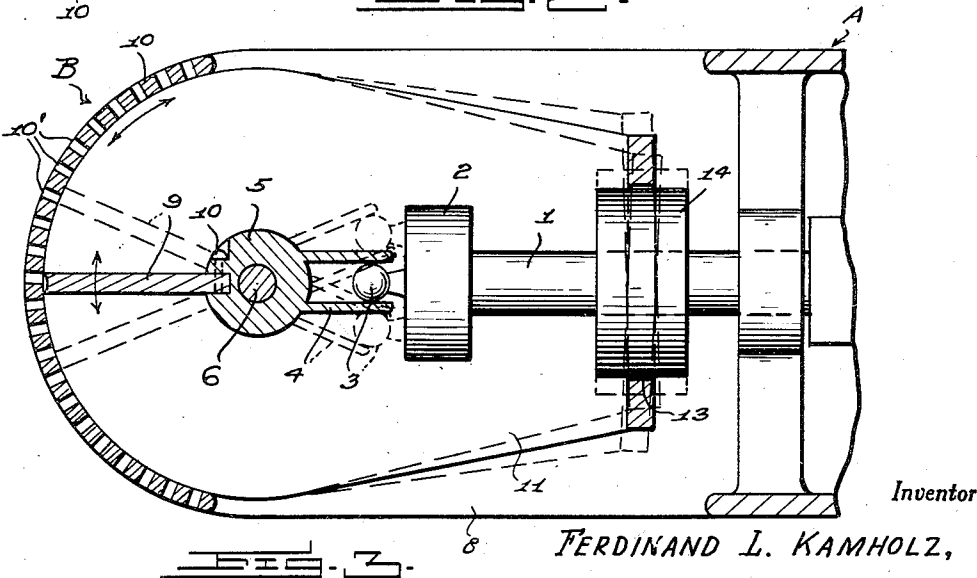
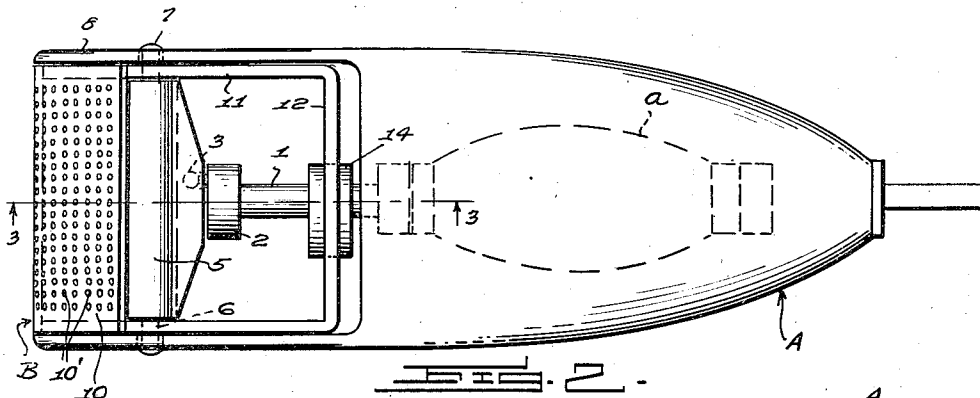
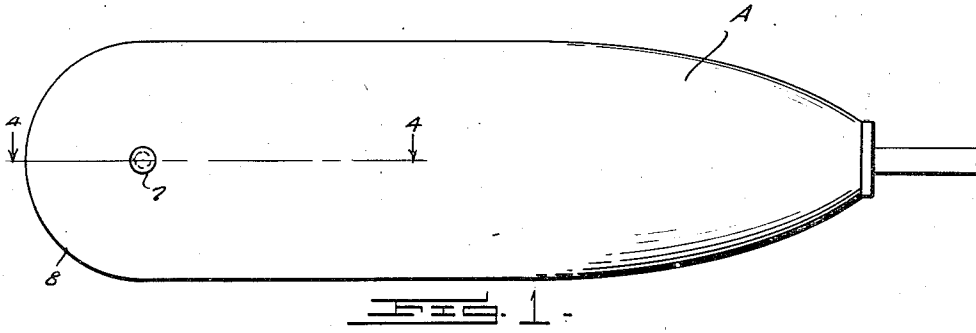
F. L. KAMHOLZ

2,277,328

ELECTRIC RAZOR

Filed March 11, 1940

6 Sheets-Sheet 1



Inventor

FERDINAND L. KAMHOLZ,

By *Clarence A. O'Brien*

Attorney

March 24, 1942.

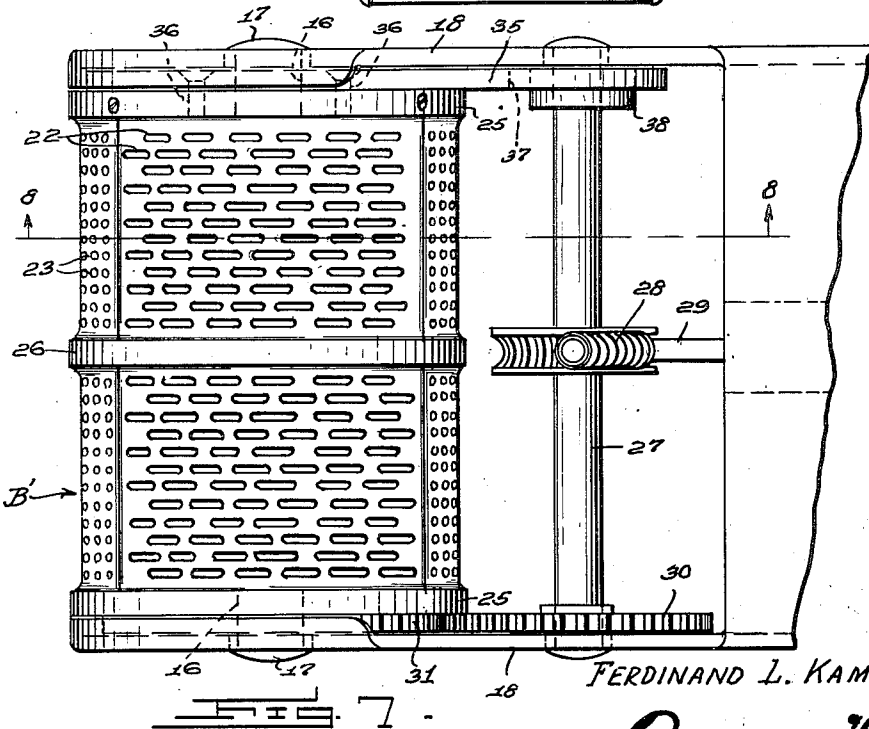
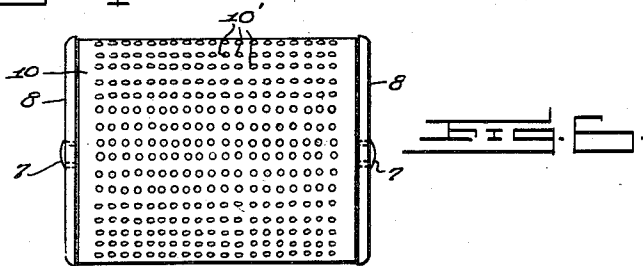
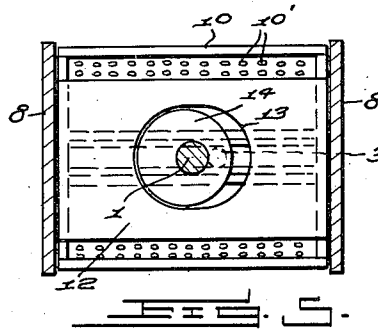
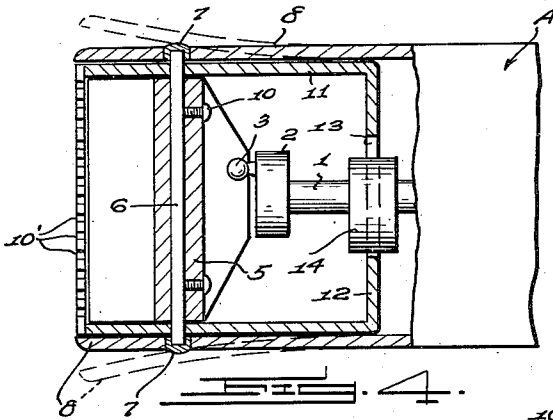
F. L. KAMHOLZ

2,277,328

ELECTRIC RAZOR

Filed March 11, 1940

6 Sheets-Sheet 2



Inventor

FERDINAND L. KAMHOLZ,

By

Clarence A. O'Brien

Attorney

March 24, 1942.

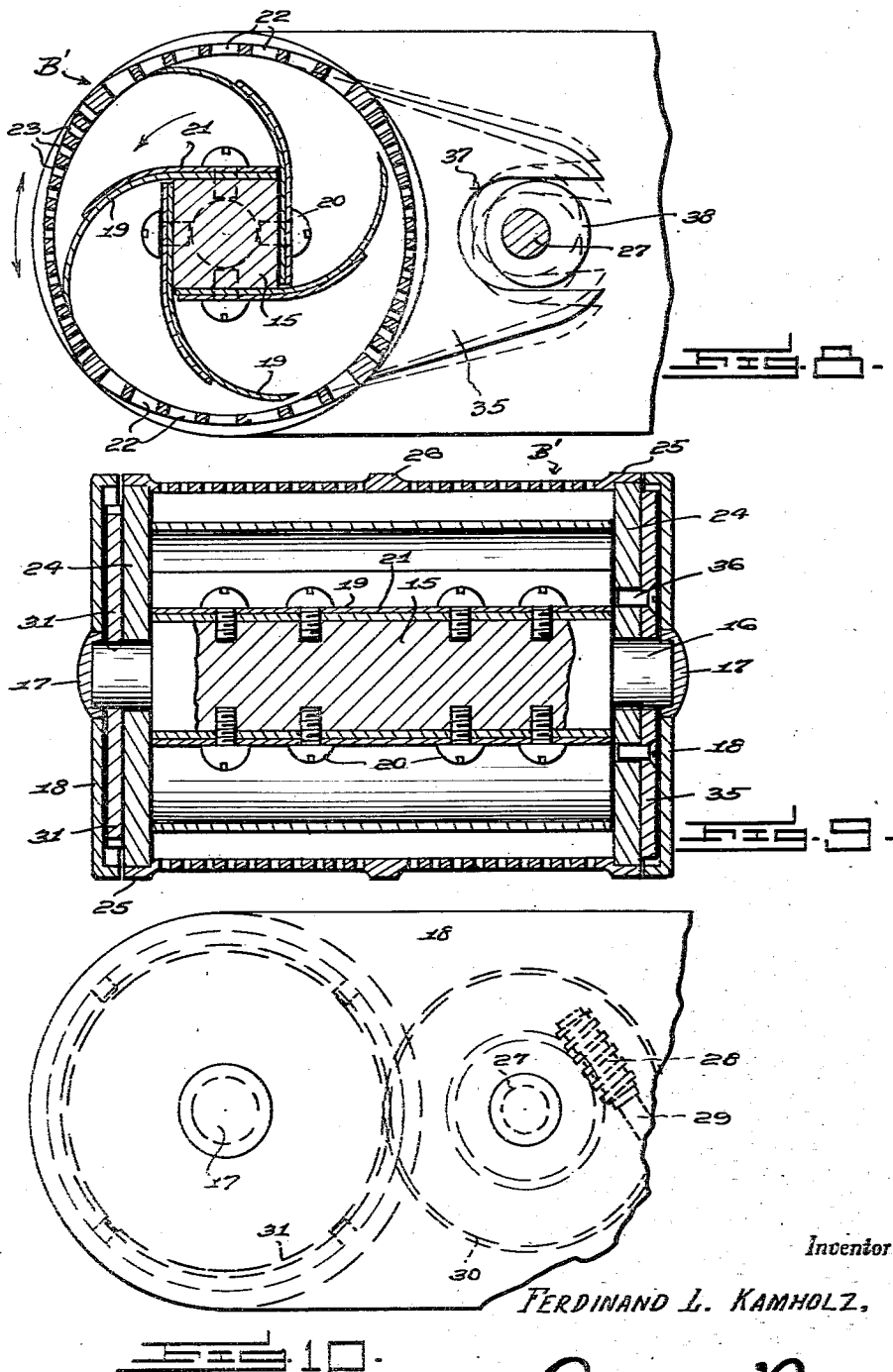
F. L. KAMHOLZ

2,277,328

ELECTRIC RAZOR

Filed March 11, 1940

6 Sheets-Sheet 3



Inventor

FERDINAND L. KAMHOLZ,

By

Clarence A. O'Brien

Attorney

March 24, 1942.

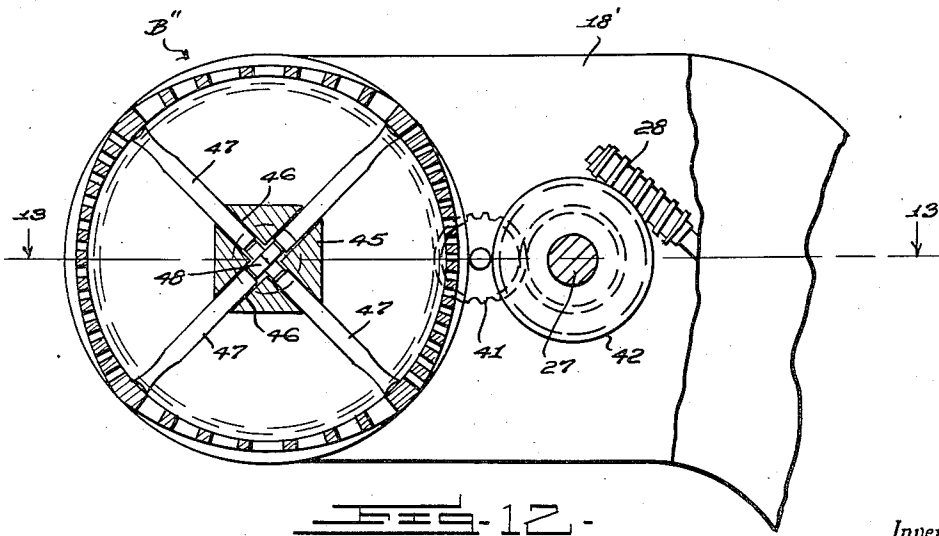
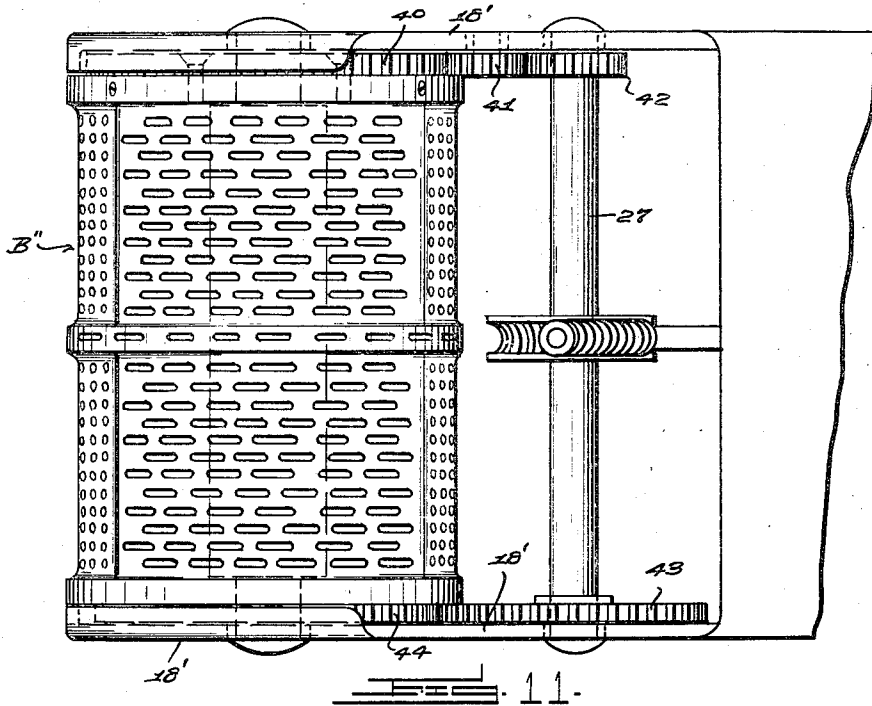
F. L. KAMHOLZ

2,277,328

ELECTRIC RAZOR

Filed March 11, 1940

6 Sheets-Sheet 4



Inventor

FERDINAND L. KAMHOLZ,

By

Clarence A. O'Brien

Attorney

March 24, 1942.

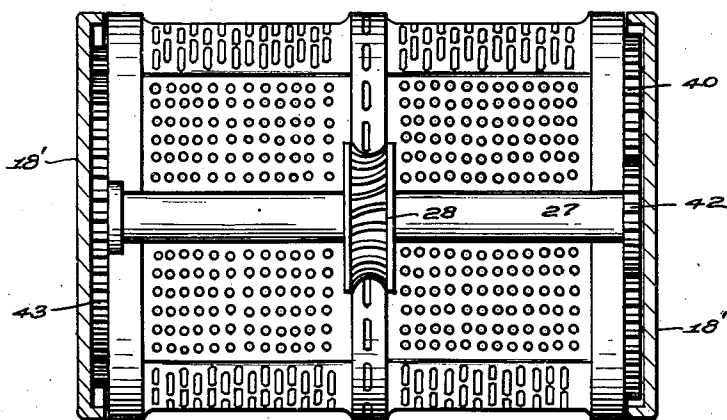
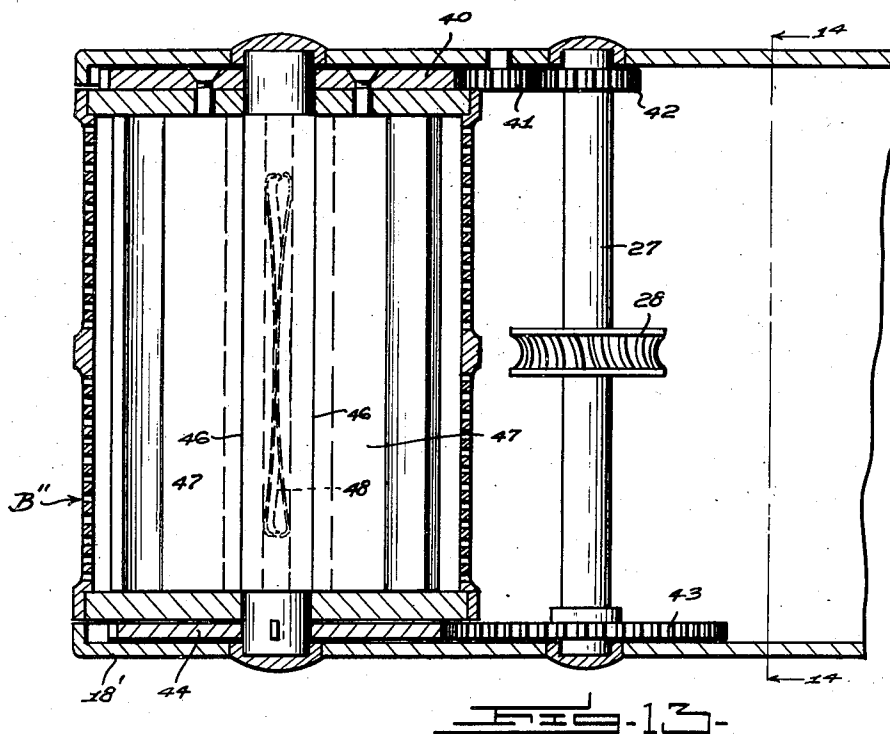
F. L. KAMHOLZ

2,277,328.

ELECTRIC RAZOR

Filed March 11, 1940

6 Sheets-Sheet 5



Inventor

FERDINAND L. KAMHOLZ,

By

Clarence A. O'Brien

Attorney

March 24, 1942.

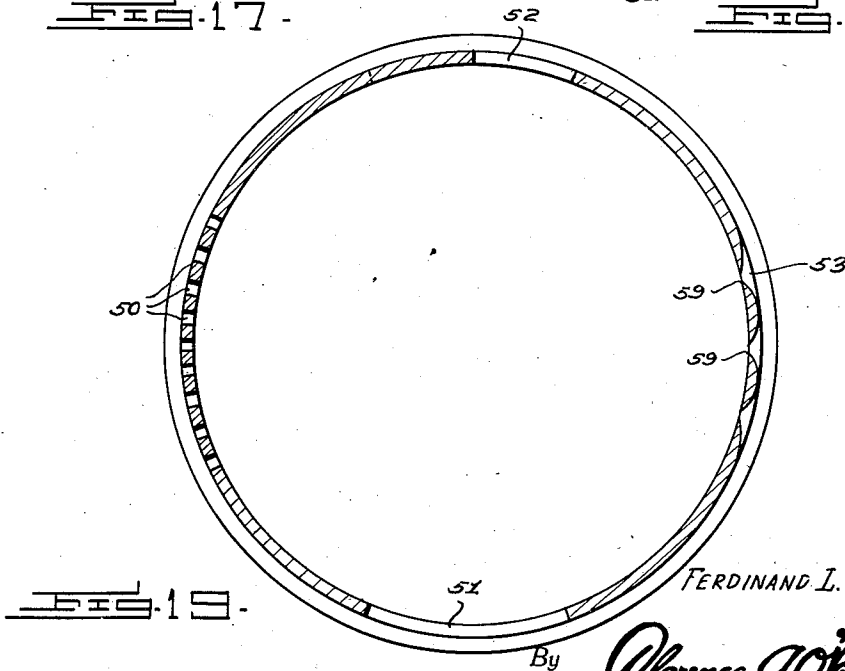
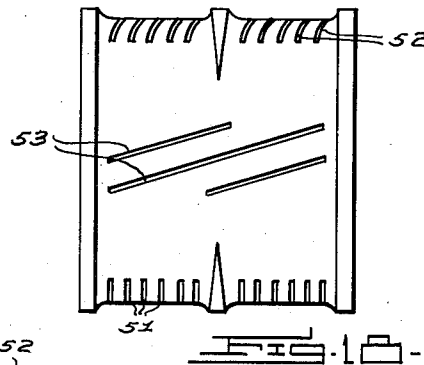
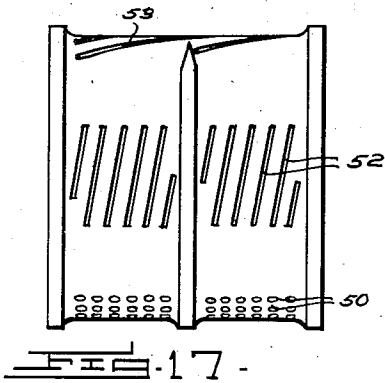
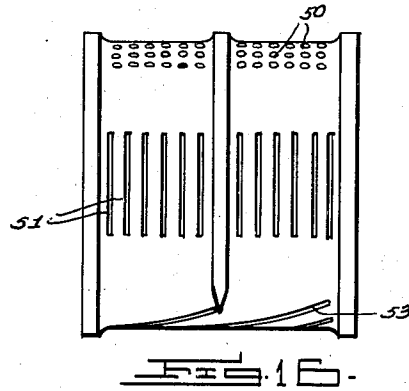
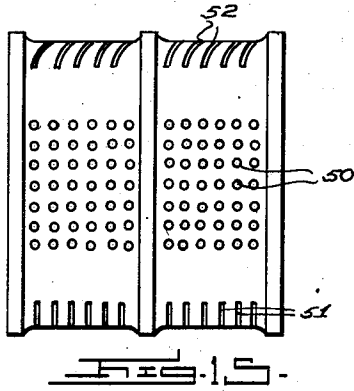
F. L. KAMHOLZ

2,277,328

ELECTRIC RAZOR

Filed March 11, 1940

6 Sheets-Sheet 6



Inventor

FERDINAND L. KAMHOLZ,

By

Clarence A. O'Brien

Attorney

UNITED STATES PATENT OFFICE

2,277,328

ELECTRIC RAZOR

Ferdinand L. Kamholz, Buffalo, N. Y.

Application March 11, 1940, Serial No. 323,424

7 Claims. (Cl. 30-43)

This invention relates to an electric razor, the general object of the invention being to provide means whereby the comb or guard of the razor will move whereby the razor is provided with a movable blade operating over a movable guard or comb which, in effect, provides movable cutting members for each hair is engaged by a portion of the blade edge and a wall of an opening in the comb.

Another object of the invention is to provide means whereby different portions of a comb can be used to suit the type of beard being cut.

Another object of the invention is to provide means whereby the blade and comb will move in different directions.

This invention also consists in certain other features of construction and in the combination and arrangement of the several parts to be hereinafter fully described, illustrated in the accompanying drawings and specifically pointed out in the appended claims.

In describing the invention in detail, reference will be had to the accompanying drawings wherein like characters denote like or corresponding parts throughout the several views, and in which:

Figure 1 is an elevational view showing one form of the improved electric razor.

Figure 2 is a top plan view of Figure 1.

Figure 3 is a section on the line 3-3 of Figure 2.

Figure 4 is a section on the line 4-4 of Figure 1.

Figure 5 is a transverse sectional view through Figure 4.

Figure 6 is an end view looking toward the comb.

Figure 7 is a plan view showing a modification.

Figure 8 is a section on the line 8-8 of Figure 7.

Figure 9 is a transverse sectional view through Figure 8.

Figure 10 is a fragmentary elevational view showing another modification.

Figure 11 is a top plan view of the form shown in Figure 10.

Figure 12 is a longitudinal sectional view through Figure 11.

Figure 13 is a sectional view on the line 13-13 of Figure 12.

Figure 14 is a sectional view on the line 14-14 of Figure 13.

Figures 15, 16, 17 and 18 are views of a modification of a cylindrical comb.

Figure 19 is a diametrical sectional view of

Figure 18 taken intermediate the center and an end thereof.

Referring to Figures 1, 2, 3, 4, 5 and 6, the body of the razor is shown at A and the electric motor is shown at *a* in dotted lines in Figure 2, the shaft driven from the motor being shown at 1 and said shaft at its outer end is formed with the head 2 carrying the eccentric 3 which engages between the spaced plates 4 on the blade carrying head 5 which is rotatably arranged on the shaft 6 having its ends journaled in the caps 7 in the side members 8 of the casing part of the body A, these side parts 8 being slightly flexible, as shown in dotted lines in Figure 4 so that by spreading them apart the head 5 with the comb member B can be removed. The outer ends of these parts 8 are rounded as shown in Figure 1 and these parts are substantially flat and an opening is formed in the casing between parts 8 as shown in Figures 2 and 3, the shaft 1 extending into this opening with the parts 2, 3, 4, 5 and 6, lying in the opening. The blade 9 fits in a groove in the head 5 and is held therein by a screw 10 or other fastening means and the outer end of the blade is hollow ground so that it will be self-sharpening in the usual manner. Of course, as will be seen from Figure 3 when the shaft 1 is rotating the eccentric 3 will cause the head 5 to rock on the shaft 6 and thus the blade 9 is oscillated. The comb member includes the substantially semi-cylindrical part 10 having its ends connected to the side parts 11 of the yoke 12, the bight of the yoke having an opening 13 therein which receives the eccentric 14 on the shaft 1 so that as the shaft 1 rotates the eccentric 14 will rock the comb member B on the shaft 6, the side parts 11 of the comb member being journaled on end portions of said shaft as shown in Figure 4.

Thus it will be seen that when the shaft 1 is being rotated by the motor the blade 9 will be oscillated and the comb member will also be oscillated so that the part 10 of the comb which has the openings 10' therein will move relative to the blade, the cutting edge of the blade being in contact with the inner wall of the part 10 in the usual manner. Thus the walls of the openings 10' form movable cutting edges with the cutting edges of the blade so that the cutting of the hairs of the beard is greatly facilitated.

By having the opening passing through the casing inwardly of the comb 10 the cut hairs and other matter passing through the openings 10' will be discharged from the razor and will not accumulate therein so that the razor is practi-

cally self-cleaning. While the drawings show the openings 10' in the form of holes it is to be understood that they may be in the form of slots or if desired both holes and slots can be used.

In that form of the invention shown in Figures 7, 8 and 9, the cutting member is of the rotary type and includes a square shaft 15 having reduced cylindrical ends 16 which are journaled in the caps 17 carried by the side members 18 of the casing and curved blades 19 are attached to the four sides of the shaft 15 by the screws 20 and a curved spring 21 engages each blade and tends to hold it in cutting position or with its hollow cutting head in engagement with the inner wall of the comb member B'. This comb member is in the shape of a cylinder and is composed of four sections, two of the opposed sections having the slots 22 therein and the other two sections having the holes 23 and if desired these holes and slots of one section may be of different sizes from those of the opposed sections and the parts are so arranged that the blades 19 will only engage the inner wall of each section when the section is in its forward or operative position as shown in Figure 8. The cylindrical comb member B is provided with end pieces 24 which have holes therein for the passage of the trunnions 16 and the cylindrical part is formed with small enlargements 25 at its ends which fit over these end pieces and the cylindrical part is also formed with a central rib 26 which extends circumferentially and acts to reinforce the cylinder. Each section also gradually decreases in thickness from its side edges to its center as shown in Figure 8. A transverse shaft 27 is journaled in the side pieces 18 of the casing and is driven by worm gearing 28 from the motor shaft 29 which is arranged at an angle and that part of the casing which carries the operating means extends at an angle from the rest of the casing as shown more particularly in Figure 12. A gear 30 is connected to one end of the shaft 27 and meshes with a gear 31 keyed to one of the trunnions 16, as shown in Figure 9 and located between an end member 24 and a side member 18. Thus the rotary blade assembly is rotated from the shaft 27 through means of these gears 30 and 31. The adjacent end member 24 is not connected with the cylindrical part but loosely fits in the enlargement 25. A wide and tapered arm 35 has its large part fitting between the other member 24 and the adjacent piece 18 and this arm 35 is removably connected with the adjacent end member 24 by the pins 36 fitting in holes in the member 24. The arm extends rearwardly and has a notch 37 in its small inner end which fits over an eccentric 38 on the shaft 27 so that the comb member B' is oscillated or rocked by the eccentric 38. As will be seen the comb member is rocked by the shaft 27 as the cutter assembly is being rotated by the gearing from the shaft 27 and the parts are so arranged that only one section of the cylindrical part of the comb member will be engaging the face during the rocking movement. By pressing the end members 18 away from each other the parts can be removed as before described and the comb member can be adjusted to place a new section in operative position so that the user can use a section having the slots 22 therein or a section having the holes 23 therein and as before stated by making the hole carrying parts of different sizes and the slot carrying parts of different sizes the razor can be adjusted

to suit practically all types of beard and also for shaving close or not so close.

Figures 11, 12, 13 and 14 show an arrangement whereby the comb member B' is rotated instead of rocked and this is done by providing a large gear 40 connected with one end of the comb member and engaged by an idle pinion 41 attached to one of the side members of the casing and which idle pinion is engaged by a pinion 42 on the shaft 27 which carries the gear 43 engaging the gear 44 attached to the blade carrying shaft 45 which has the slots 46 therein for slidably receiving the inner ends of the straight blades 47 which have their cutting edges pressed against the inner walls of the cylindrical comb member by the leaf springs 48 in the slots of the shaft 45.

Thus the comb cylinder is rotated in one direction and the blade assembly in an opposite direction and this cylinder may be provided with the slots or holes or a combination of both. Preferably in use of this type of invention the comb cylinder is held against the face and rotates in an upward direction which forces the hair into the holes or openings while the blade assembly rotates in the opposite direction. As will be seen the rotating comb acts to pull the hairs into the openings and the blades of the rotating shaft cut the hairs off.

In this form of the invention the shaft 27 is also driven by worm gearing from the motor shaft and the parts can be removed by spreading the ends or side members 18'.

Figures 15, 16, 17, 18 and 19 show a modified form of cylindrical comb which is to be oscillated in any suitable manner and which is to be supported so that it can be adjusted to bring any one of the four sections 50, 51, 52 or 53 into operative position to engage the face. As will be seen section 50 is formed with holes, section 51 with straight slots, section 52 with angle slots and section 53 with spirally arranged slots and the edges of these slots are beveled to provide cutting edges as shown at 54 in Figure 19. Also, and as will be seen, the center rib 55 does not extend over section 53 which has the spiral slots therein.

I have found that these spiral slots enable the razor to cut closer than with other types of openings so that one does not have to shave as often and these spiral slots can also be used with the half cylindrical comb shown in Figures 1 to 6.

The central ribs in all forms of the invention are provided with slots and they are of such small size as to not interfere with the shaving operation and these spiral slots can also be used with that form of the invention shown in Figures 7, 8 and 9.

The wall parts of the cylinder are formed, as shown in Figure 8, for instance, so as to add strength to the cylinder while enabling parts to be made so thin as to enable one to secure a close shave with the device.

It is thought from the foregoing description that the advantages and novel features of the invention will be readily apparent.

It is to be understood that changes may be made in the construction and in the combination and arrangement of the several parts provided that such changes fall within the scope of the appended claims.

Having described the invention, what is claimed as new is:

1. An electric razor of the class described com-

prising a body, a motor therein, said body having side extension members of a flexible nature, a comb member held between said side members and removable when the side members are moved apart, a shaft journaled in said side members and released when the side members are moved apart, a blade member carried by the shaft and engaging the inner wall of the comb member, and means for moving the comb member and the blade assembly from the motor.

2. An electric razor of the class described comprising a body, a motor therein, said body having side extension members of a flexible nature, a comb member held between said side members and removable when the side members are moved apart, a shaft journaled in said side members and released when the side members are moved apart, a blade member carried by the shaft and engaging the inner wall of the comb member, and means for moving the comb member and the blade assembly from the motor, said comb member being of arcuate shape and having side members connected therewith which are journaled on the shaft and an eccentric rotated from the motor and engaging parts of the side members of the comb to rock the same.

3. A razor of the class described comprising a body including a pair of side members and an opening between the same, a substantially yoke-shaped member, a substantially semi-cylindrical comb member having openings therein connected with the yoke-shaped member, a motor driven shaft carried by the body and an eccentric thereon, an opening in the bight of the yoke in which the eccentric is mounted whereby rotary movement of the shaft imparts a rocking movement to the comb member, a blade head supported for rocking movement, means for rocking the same from the shaft and a blade carried by said head and engaging the inner face of the comb member.

4. A razor of the class described comprising a body including a pair of side members with an opening between the side members, a cylindrical comb member supported between the side members, a motor, means for rocking the comb member from the motor, a blade assembly carried by the side members for rotary movement, means for rotating the blade assembly from the

motor, the blades of the assembly engaging the inner circumference of the comb cylinder and means for adjusting the cylinder to bring different parts thereof in operating position.

5. A razor of the class described comprising a body including a pair of side members with an opening between the side members, a cylindrical comb member supported between the side members, a motor, means for rocking the comb member from the motor, a blade assembly carried by the side members for rotary movement, means for rotating the blade assembly from the motor, the blades of the assembly engaging the inner circumference of the comb cylinder and means for adjusting the cylinder to bring different parts thereof in operating position, said cylinder being divided into longitudinally extending sections, said sections having openings of different sizes and shape.

6. A razor of the class described comprising a body, a motor therein, a shaft driven from the motor, the body including a pair of side members spaced apart to provide an opening between them, a comb cylinder rotatably supported between the side members, means for rotating the cylinder from the motor driven shaft, a blade assembly passing through the cylinder, means for rotating the same from the motor driven shaft and in an opposite direction from the rotary movement of the cylinder with the blades of the assembly engaging the inner wall of the cylinder.

7. A razor of the class described comprising a body, a motor therein, a shaft driven from the motor, the body including a pair of side members spaced apart to provide an opening between them, a comb cylinder rotatably supported between the side members, means for rotating the cylinder from the motor driven shaft, a blade assembly passing through the cylinder, means for rotating the same from the motor driven shaft and in an opposite direction from the rotary movement of the cylinder with the blades of the assembly engaging the inner wall of the cylinder, said blade assembly including movably arranged blades and spring means for holding the blades with their outer edges against the inner circumference of the cylinder.

FERDINAND L. KAMHOLZ.