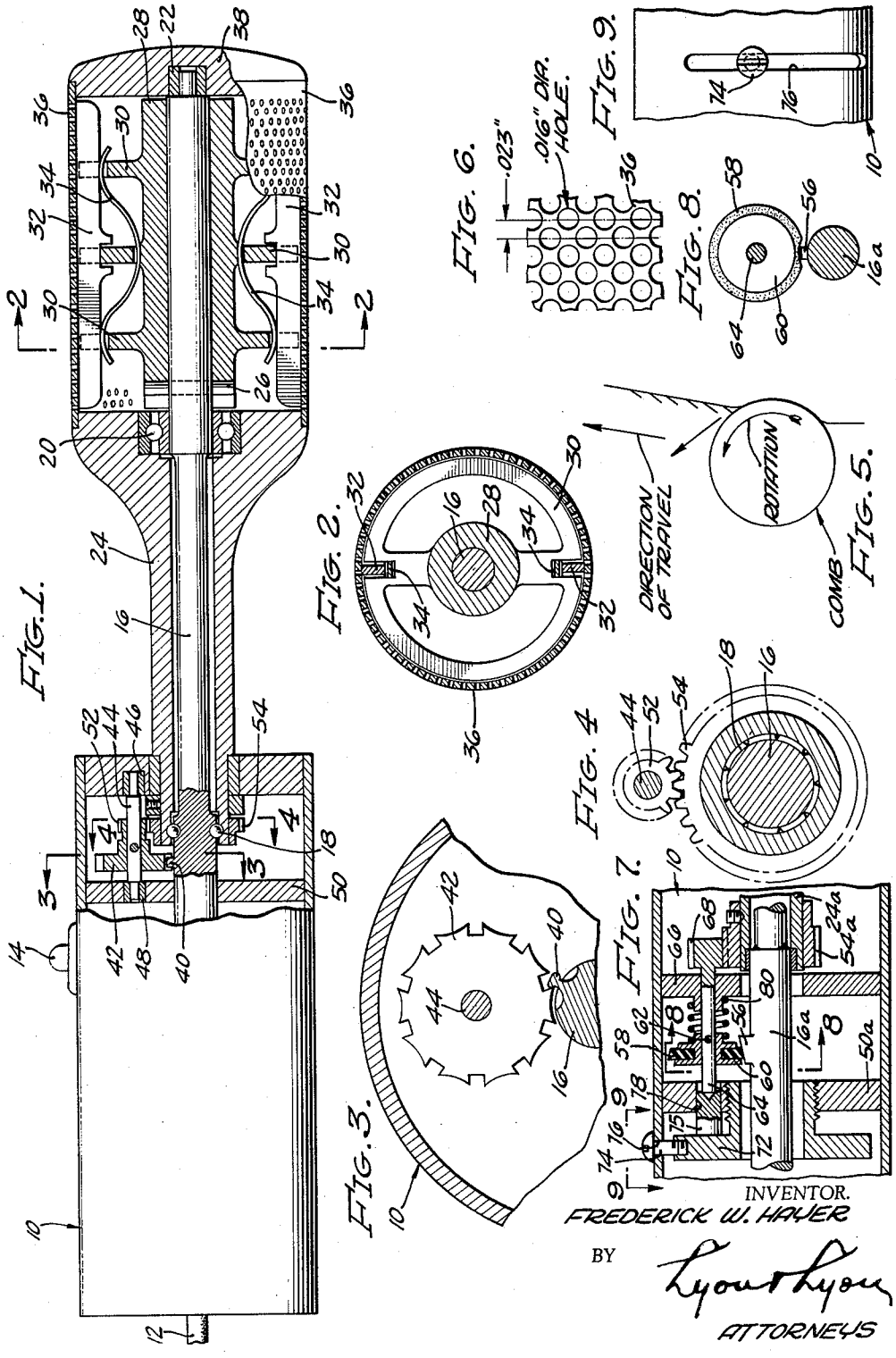
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ROTARY ELECTRIC SHAVER

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ROTARY ELECTRIC SHAVER

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This invention relates to an improved electric shaver.

It is an object of this invention to provide an electric shaver having a greatly improved shaving action.

It is a further object of this invention to provide a shaver wherein the comb is subjected to intermittent unidirectional rotation in such a manner as to improve the shaving action of the shaver.

It is still a further object of this invention to control the intermittent unidirectional rotation of the comb to produce optimum shaving.

Other objects and advantages will be readily apparent from the following description:

In the drawings:

FIGURE 1 is a side view partially in section of a shaver embodying this invention.

FIGURE 2 is a view taken along line 2—2 of FIGURE 1.

FIGURE 3 is a view taken along line 3—3 of FIGURE 1.

FIGURE 4 is a view taken along line 4—4 of FIGURE 1.

FIGURE 5 is a diagrammatic view of the comb rotation.

FIGURE 6 is a fragmentary view of the comb face.

FIGURE 7 is a fragmentary section of a modified form of this invention.

FIGURE 8 is a view taken along line 8—8 of FIGURE 7.

FIGURE 9 is a view taken along line 9—9 of FIGURE 7.

The electric shaver embodying this invention includes a handle **10** which contains an electric motor connected to a suitable power source by cord **12** and operated by switch **14**. The motor drives shaft **16** which is supported in bearings **18**, **20** and **22** of the comb supporting head **24**. Shaft **16** has fixed thereon by pin **26** blade supporting sleeve **28**. Three ribs **30** are spaced along sleeve **28** having grooves in their outer edges which receive razor blades **32** which float in said grooves and are urged outwardly by spring **34**. Comb **36** is cylindrical in shape and surrounds sleeve **28** holding blades **32** in the grooves. The ribs **30** provide support for the thin comb when same is at rest while the rotating blades provide support therefor during operation of the shaver.

The comb support head telescopically receives one end of comb **36** while the comb telescopically receives cap **38**, within which bearing **22** is mounted, at its opposite extremity.

The comb **36** and its associated structure is intermittently rotated. This rotation is provided by a Geneva drive with a projection **40** formed upon shaft **16** and meshing with Geneva gear **42**. Gear **42** is rotatably mounted by shaft **44** to which it is keyed. Shaft **44** is rotatably mounted within handle **10** by bearings **46** and **48**, the former supported in the end wall of the handle and the latter in web **50** through which shaft **16** freely passes.

Also mounted upon shaft **44** is a spur gear **52** which meshes with a spur gear **54** secured upon comb supporting head **24**. Thus as shaft **16** is rotated, rotating the two blades **32**, the projection **40** meshes with Geneva gear **42** which through gears **52** and **54** rotate comb **36**. This rotation of the comb is unidirectional and intermittent.

It is desirable for optimum results that the comb be at rest most of the time. The rotation of the comb greatly increases the effectiveness of the shaver. However, the

greatest shaving action occurs at the extremity of the comb movement and the greatest shaving action is realized by providing a definite rest period between increments of rotation for the reason that the inertia of the whisker requires a period of time for making entry into the shaving aperture. For this reason the Geneva gear is formed as viewed in FIG. 3, requiring ten revolutions more or less of shaft **16** for one revolution of shaft **44**, and gears **52** and **54** are fixed so that comb **36** is at rest approximately ninety-five percent of the time and rotating five percent of the time with an average angular velocity of 20 r.p.m. for comb supporting head **24**.

Inasmuch as the diameter of a whisker is .0025" approximately, the comb apertures are .016" in diameter to provide maximum combing. Adjacent rows of comb apertures are in staggered relationship with the center lines of the rows spaced .023" apart to the present an aperture to a whisker within the area of contact of the comb with the skin. An example of the desired length of movement of the comb would be approximately one-half aperture diameter or .008". This is, of course, controlled by the number of teeth provided upon gears **42**, **52** and **54** and provides for maximum coverage by the apertures to cover the skin and maximum time for the whiskers to enter the apertures, also preventing an aperture so that any whisker will be subject to the comb.

In FIGURES 7 through 9 a modified form of this invention is illustrated wherein like parts are given the same numerical designation with the addition of the exponent "*a*."

The shaft **16***a* carries a cam element **56** which increases in height as it approaches the blade carrying extremity of the shaft. A resilient wheel **58** is mounted upon a wheel carrying element **60** in turn connected by pin **62** to shaft **64**. The shaft **64** is rotatably mounted in web **66** and on the side of the web nearest the blade carrying extremity of shaft **16**a carries a gear **68** which meshes with spur gear **54***a* secured to comb supporting head **24***a* so that rotation of the shaft **16***a* results in intermittent rotation of the comb. By controlling the size of the cam **56** the frequency and duration of comb rotation can be adjusted to within the range previously described.

The device of this embodiment contemplates adjusting the length of rotation of the comb. For this purpose the web **50***a* in handle **10** is provided with a threaded bore receiving adjusting element **72** which carries a locking screw **74** which in turn rides in slot **76** in handle **10**.

The adjusting member **72** has a stud **75** thereon which projects through hole **78** in web **50***a* and receives the tip of shaft **64**, spring **80** urging same into frictional engagement. When screw **74** is loosened it may be moved in slot **76** screwing the adjustor further into or out of web **50***a* with a resultant movement of shaft **64** and wheel **58**. When wheel **58** is moved to the right in FIG. 7, the cam **56** will further compress the resilient wheel (see FIG. 8) rotating shaft **64** and hence the comb. Thus the length of rotation of the comb may be varied.

While what hereinbefore has been described as the preferred embodiment of this invention, it is readily apparent that alterations and modifications can be resorted to without departing from the scope of this invention and such alterations and modifications are intended to be included within the scope of the appended claims.

I claim:

1. In an electric shaver the combination of: a cylindrical comb, at least one razor blade rotated within and in close proximity to said comb, and means for imparting a unidirectional intermittent rotation to said comb.

2. In an electric shaver the combination of: a cylindrical comb, at least one razor blade rotated within and in close proximity to said comb, and means for imparting a unidirectional intermittent rotation to said comb, where-

by said comb is at rest a greater period of time than in motion.

3. In an electric shaver the combination of: a rotating shaft, at least one razor blade rotating with said shaft, a cylindrical comb surrounding said shaft in close proximity to said razor blade, a support for said comb and means driving said comb in response to rotation of said shaft to impart unidirectional intermittent rotation thereto.

4. In an electric shaver the combination of: a rotating shaft, at least one razor blade rotating with said shaft, a cylindrical comb surrounding said shaft in close proximity to said razor blade, a support for said comb, and gears connecting said shaft to said comb support imparting to said comb in response to rotation of said shaft unidirectional intermittent rotation.

5. In an electric shaver the combination of: a rotating shaft, at least one razor blade rotating with said shaft, a cylindrical comb surrounding said shaft in close proximity to said razor blade, a support for said comb, and gears connecting said shaft to said comb support imparting to said comb in response to rotation of said shaft unidirectional intermittent rotation, with said comb at rest a greater period of time than in motion.

6. In an electric shaver the combination of: a rotating shaft, at least one razor blade rotating with said shaft, a cylindrical comb surrounding said shaft in close proximiy to said razor blade, a support for said comb, and gears connecting said shaft to said comb support imparting to said comb in response to rotation of said shaft unidirectional intermittent rotation, with said comb at rest approximately ninety-five percent of the time.

7. In an electric shaver the combination of: a rotating shaft, at least one razor blade rotating with said shaft,

a cylindrical comb surrounding said shaft in close proximity to said razor blade having a plurality of uniform apertures therein and gears connecting said shaft to said comb support imparting to said comb in response to rotation of said shaft unidirectional intermittent rotation, wherein the increment of rotation of said comb is approximately one-half the diameter of one of said apertures.

8. In an electric shaver the combination of: a rotating shaft, at least one razor blade rotating with said shaft, a cylindrical comb surrounding said shaft in close proximity to said razor blade having a plurality of uniform apertures therein and gears connecting said shaft to said comb support imparting to said comb in response to rotation of said shaft unidirectional intermittent rotation, wherein the increment of rotation of said comb is approximately one-half the diameter of one of said apertures, with said comb at rest approximately ninety-five percent of the time.

9. In an electric shaver the combination of: a cylindrical comb, at least one razor blade rotated within and in close proximity to said comb, means for imparting a unidirectional intermittent rotation to said comb, and means for variably controlling the amount of increment of unidirectional intermittent rotation.

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