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C. T. RUSSELL

2,243,441

SHAVING DEVICE

Filed Oct. 2, 1939

Fig. 1

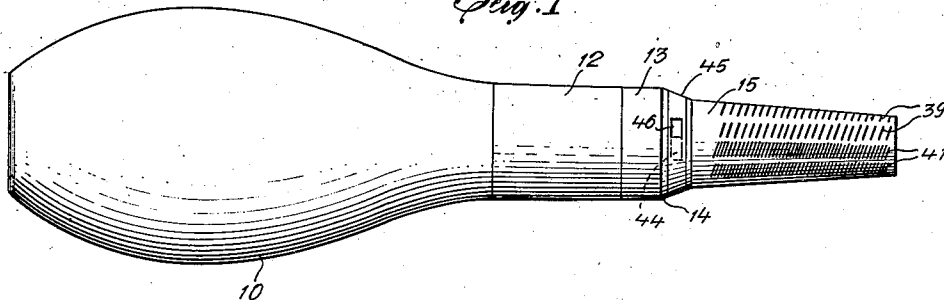


Fig. 2

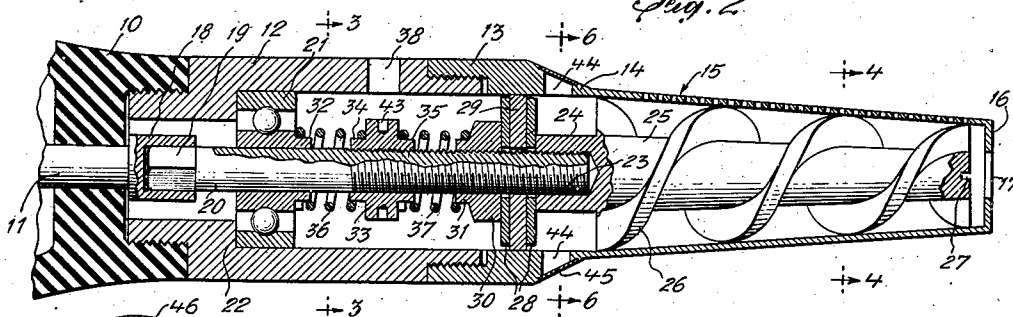


Fig. 6

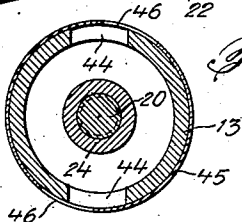


Fig. 5

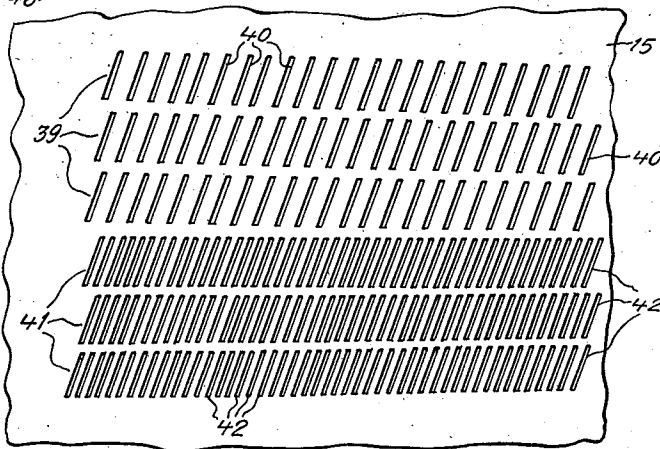


Fig. 3

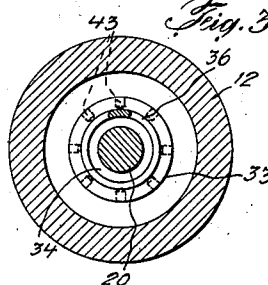
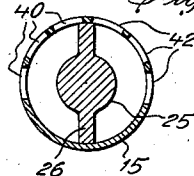


Fig. 4



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2,243,441

SHAVING DEVICE

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15 Claims. (Cl. 30-43)

This invention relates to electric shavers, and one object thereof is the provision of an improved clip shaving device having a spiral inner blade driven by a direct drive from the motor and revolving inside the cone-shaped outer blade.

Other objects of the invention are the provision of means for adjusting tension of all parts of the cutter blades, a bearing assembly which reduces tension on the motor, the spiral blade carrying the clippings into the chamber back of the cutting blade, which can be emptied, and a particular design of the teeth on the round outer blade which insures cleaner and faster shaving.

With the above and other objects in view, the invention is illustrated in the accompanying drawing, in which

Figure 1 is a plan view of the shaving device.

Figure 2 is a fragmentary longitudinal cross-sectional elevational view of the same.

Figure 3 is a cross-sectional view taken on the line 3-3 of Figure 2.

Figure 4 is a cross-sectional view taken on the line 4-4 of Figure 2.

Figure 5 is an enlarged fragmentary view of the outside of the cone-shaped outer blade.

Figure 6 is a cross-sectional view taken on the line 6-6 of Figure 2.

Referring in detail to the drawing, the numeral 10 indicates a handle housing in which an electric motor, not shown, is housed, the drive shaft of the motor being shown at 11. A sleeve 12 screws into the handle 10, as shown, and at its other end has a barrel 13 screwed thereon. A relatively sharply beveled shoulder, frusto-conical in shape, extends outward at 14 from the outer end of the barrel 13, and from the outer edge of this shoulder a relatively lesser tapering frusto-conical shell 15 extends. The parts 13, 14, and 15 are formed in one piece. A cap 16, having a central opening 17 therethrough, covers the end of the shell 15.

The motor shaft terminates in a square socket 18 which receives the square head 19 of the blade drive shaft 20. A ball bearing 21 is provided around the shaft 20, and lies against a shoulder 22 formed within the sleeve 12. The end 23 of the shaft 20 is threaded, and thereon is screwed the hub 24 of the shaft 25 of a spiral blade 26. At its outer extremity a slot 27 is provided in the shaft 26, accessible to a screw driver inserted through the opening 17.

A pair of spaced washers 28 loosely surround the shaft 20 adjacent the hub 24, and therebetween a gasket 29 is clamped; thus the combination of the washers 28 and gasket 29 may be

termed a reinforced gasket. A nut 30 having a boss 31, is screwed against the adjacent washer 28. The ball bearing 21 also has a boss, shown at 32. Intermediate the shaft 20, a nut 33 is threadedly positioned, and is provided with opposed bosses 34 and 35. Coiled compression springs 36 and 37 surround the shaft 20, the former between the ball bearing 21 and the nut 33, and the latter between the nut 33 and the nut 30. The bosses 31, 32, 34, and 35, serve to keep these springs spaced radially outward from the shaft 20. The sleeve 12 is provided with a radial opening 38 positioned in radial alignment with the nut 35.

The cone-shaped shell 15 provides the outer blade of the device, and is provided with a series of three rows 39 of relatively wide slanting slots 40 cut through the shell, which is relatively thin. Below the rows 39 are three rows 41 of relatively narrower slanting slots 42. It is to be noted that the slots 40 of one row 39 are staggered with reference to the slots 40 of the row 39 directly above or below the same. The same staggered relationship is provided in the rows 41 of slots 42.

The nut 33 is provided with a plurality of circumferentially spaced apart radial holes 43, any one of which may be aligned with the opening 38 in the sleeve 12 to receive the end of a pin (not shown) passed through the opening 38. In the shoulder 14, two or more openings 44 are provided therethrough, giving access into the space between the gasket 28 and the end of the blade 26, around the hub 24. A frusto-conical band 45 is rotatably slidably mounted on the shoulder 14 and is provided with openings 46, equal in number to and peripherally spaced-apart in the same position as, the openings 44. The outer surface of the band 45 may be knurled, if desired, so that it may be readily rotated on the shoulder 14.

The shaver is operated by actuating the electric motor, not shown, whence the shaft 11 rotates the spiral blade 26. At the start of the shaving operation the wider slots 40 are first applied to the face, to clip the longer or coarser hairs, and later the narrower slots 42 are applied to the face to clip the shorter or finer hairs, thus providing a really close shave and a quicker one. As the hairs are removed and fall into the shell 15, the spiral blade carries them back into the space bounded by the shoulder 14. When the shaving has been completed, the band 45 is rotated to bring the openings 46 and 44 into alignment, whence the hairs may be shaken out of

the device therethrough. The band is then again rotated so as to close the openings 44.

The proximity and the degree of pressure of the spiral blade 26 against the inner surface of the shell 15, may be varied at will to suit the desires of the user for a closer or a coarser shave. The spring 36, since its left-hand end (Figure 2) is in contact with the rigid ball bearing housing 21, is longitudinally fixed in position. If now the nut 33 is held stationary with respect to the housing (by means of a pin or tool inserted through the opening 38) while shaft 20 is rotated in a direction which will advance the shaft 20 toward the tapering end of the device, then spring 36 will be compressed while spring 37 will simultaneously expand owing to the increase of the axial distance between the nuts 35 and 30. Then, upon removal of the pin from one of the holes 43 in the nut 33, thus releasing the nut, the spring 36 will be free to resume its former condition of tension and thus will expand until its pressure again counterbalances that of the spring 37 which is now again compressed to its former condition. In thus expanding, since its one end is stationary against the ball bearing housing 21, as just stated, the spring 36 will push the entire cutter mechanism including the shafts 20 and 25, as a unit, forward; or, if the cutter has already been in close but light-pressured contact with the shell 15, it will simply increase the pressure of that contact. The reverse adjustment takes place when the shaft 20 is rotated in the opposite direction while the nut 33 is held fixed by the pin or tool inserted through the opening 38. Since the extreme range of movement necessary, or even possible, of the shafts 20—25 axially, is very small, probably not as much as one-sixteenth of an inch, the changing of position with respect to the housing of the nut 33, does not cause the nut to move at any time beyond a position of accessibility of the pin inserted through the opening 38, as is obvious.

In the manufacture of the device, the clamping pressure between the nut 30 and the socket of the shaft 24 against the reinforced gasket may be sufficiently great as to practically lock the shafts 20 and 25 together so that for purposes of the adjustment just described they will act as though they were but the ends of a unitary rigid shaft. With this assumption, the shaft 20 may be rotated in either direction, as stated in the previous paragraph, by means of a screw driver inserted through the end opening 17. As an alternative way of rotating the shaft 20 for the purposes of the said adjustment of the spiral blade, the handle 10 could be unscrewed and the square end 19 of the shaft 20 could be held by a wrench or other tool and rotated thereby.

A shaving device constructed along the lines above set forth is most practical and efficient in use, and more closely than the usual type of electrical shaver approximates the advantages to be obtained by using the common barber's straight edge razor. It can be drawn over the face in the manner of a straight edge razor, permitting the operator, as with a straight edge razor, to use the fingers of his other hand to smooth and stretch out the skin so that the hair stubs will stand out from the skin in the path of the razor, yet permitting him to see the area he is shaving.

Obviously, modifications in form and structure may be made without departing from the spirit and scope of the invention.

I claim:

1. A shaving device comprising a housing hav-

ing a drive shaft rotatably mounted therein, a frustro-conical slotted shell extending from said housing and having a spiral blade therein joined axially with said shaft, said shaft having screw threads thereon, a nut on said shaft intermediate its length, a gasket or the like near the blade end of said shaft, a second nut on said shaft lying against said gasket between said first nut and said gasket, a coiled spring surrounding said shaft between said nuts and normally urging said nuts apart, an opening through said housing, said first nut having a plurality of peripheral holes therein and being positioned radially inward from said opening.

2. A shaving device comprising a housing having a drive shaft rotatably mounted therein, a frustro-conical slotted shell extending from said housing and having a spiral blade therein joined axially with said shaft, said shaft having screw threads thereon, a nut on said shaft intermediate its length, a gasket or the like near the blade end of said shaft, a second nut on said shaft lying against said gasket between said first nut and said gasket, a coiled spring surrounding said shaft between said nuts and normally urging said nuts apart, an opening through said housing, said first nut having a plurality of peripheral holes therein and being positioned in the same radial plane as said opening, a ball bearing in said housing receiving the motor end of said shaft, a second coiled spring surrounding said shaft between said ball bearing and said first nut and normally urging the same apart.

3. A shaving device comprising a housing having a drive shaft rotatably mounted therein, a frustro-conical slotted shell extending from said housing and having a spiral blade therein in axial alignment with said shaft, a peripheral frustro-conical shoulder formed between said housing and said shell and having a plurality of spaced openings therethrough, a gasket or the like surrounding said shaft at the end of said housing adjacent said shoulder, a frustro-conical band slidably mounted on said shoulder and peripherally rotatable thereon, said band having openings therethrough adapted to be aligned with said shoulder openings.

4. A shaving device comprising a housing having a drive shaft rotatably mounted therein, a frustro-conical slotted shell extending from said housing and having a spiral blade therein in axial alignment with said shaft, a shoulder formed between said housing and said shell and having a plurality of spaced openings therethrough, a gasket or the like surrounding said shaft at the end of said housing adjacent said shoulder, and means for opening or closing said openings, said means comprising a band slidably mounted on said shoulder and peripherally rotatably thereon, said band having openings therethrough adapted to be aligned with said shoulder openings.

5. A shaving device comprising a housing having a drive shaft rotatably mounted therein, a frustro-conical slotted shell extending from said housing and having a spiral blade therein in axial alignment with said shaft, a tapering shoulder formed between said housing and said shell and having a plurality of spaced openings therethrough, a gasket or the like surrounding said shaft at the end of said housing adjacent said shoulder, means for opening or closing said openings, said shell having a group of longitudinal rows of slanting slots cut therethrough, the slots of each of said rows being peripherally staggered with respect to the slots of its adjacent row.

6. A shaving device comprising a housing having a drive shaft rotatably mounted therein, a frustro-conical slotted shell extending from said housing and having a spiral blade therein in axial alignment with said shaft, a shoulder formed between said housing and said shell and having a plurality of spaced openings therethrough, a gasket or the like surrounding said shaft at the end of said housing adjacent said shoulder, means for opening or closing said openings, said shell having a group of longitudinal rows of slanting slots cut therethrough, the slots of each of said rows being peripherally staggered with respect to the slots of its adjacent row, said shell having a second group of longitudinal rows of slanting slots cut therethrough with the slots of each of said rows thereof being peripherally staggered with respect to the slots of its adjacent row thereof, said slots of said second group of rows being of substantially equal length but of lesser width than said slots of said first group of rows.

7. A shaving device comprising a housing having a drive shaft rotatably mounted therein, a frustro-conical slotted shell extending from said housing and having a spiral blade therein in axial alignment with said shaft, a shoulder formed between said housing and said shell and having a plurality of spaced openings therethrough, a gasket or the like surrounding said shaft at the end of said housing adjacent said shoulder, means for opening or closing said openings, said means comprising a band slidably mounted on said shoulder and peripherally rotatable thereon, said band having openings therethrough adapted to be aligned with said shoulder openings, said shell having a group of longitudinal rows of slanting slots cut therethrough, the slots of each of said rows being peripherally staggered with respect to the slots of its adjacent row.

8. A shaving device comprising a housing having a drive shaft rotatably mounted therein, a frustro-conical slotted shell extending from said housing and having a spiral blade therein in axial alignment with said shaft, a shoulder formed between said housing and said shell and having a plurality of spaced openings therethrough, a gasket or the like surrounding said shaft at the end of said housing adjacent said shoulder, means for opening or closing said openings, said means comprising a band slidably mounted on said shoulder and peripherally rotatable thereon, said band having openings therethrough adapted to be aligned with said shoulder openings, said shell having a group of longitudinal rows of slanting slots cut therethrough, the slots of each of said rows being peripherally staggered with respect to the slots of its adjacent row, said shell having a second group of longitudinal rows of slanting slots cut therethrough with the slots of each of said rows thereof being peripherally staggered with respect to the slots of its adjacent row thereof, said slots of said second group of rows being of lesser width than said slots of said first group of rows.

9. A shaving device comprising a housing having a drive shaft rotatably mounted therein, a frustro-conical slotted shell extending from said housing and having a spiral blade therein in axial alignment with said shaft, a shoulder formed between said housing and said shell and having a plurality of spaced openings therethrough, a gasket or the like surrounding said shaft at the end of said housing adjacent said shoulder, means for opening or closing said openings, and means

for moving said blade axially toward or away from the tip of said shell to bring the cutting edges of said blade closer to or farther from, respectively, the inner surface of said shell.

10. A shaving device comprising a housing having a drive shaft rotatably mounted therein, a frustro-conical slotted shell extending from said housing and having a spiral blade therein in axial alignment with said shaft, a shoulder formed between said housing and said shell and having a plurality of spaced openings therethrough, a gasket or the like surrounding said shaft at the end of said housing adjacent said shoulder, means for opening or closing said openings, means for moving said blade axially to vary the proximity of the cutting edges of said blade to the inner surface of said shell, and releasable locking resilient means for varying the tension of said blade against said shell.

11. A shaving device comprising a housing having a drive shaft rotatably mounted therein, a frustro-conical slotted shell extending from said housing and having a spiral blade therein in axial alignment with said shaft, a shoulder formed between said housing and said shell and having a plurality of spaced openings therethrough, a gasket or the like surrounding said shaft at the end of said housing adjacent said shoulder, means for opening or closing said openings, and means for moving said blade axially to vary the proximity of the cutting edges of said blade to the inner surface of said shell, said shell having a group of longitudinal rows of slanting slots cut therethrough, the slots of each of said rows being peripherally staggered with respect to the slots of its adjacent row.

12. A shaving device comprising a housing having a drive shaft rotatably mounted therein, a frustro-conical slotted shell extending from said housing and having a spiral blade therein in axial alignment with said shaft, a shoulder formed between said housing and said shell and having a plurality of spaced openings therethrough, a gasket or the like surrounding said shaft at the end of said housing adjacent said shoulder, means for opening or closing said openings, and means for moving said blade axially toward or away from the tip of said shell to vary the distance between the cutting edges of said blade and the inner surface of said shell, said shell having a group of longitudinal rows of slanting slots cut therethrough, the slots of each of said rows being peripherally staggered with respect to the slots of its adjacent row, said shell having a second group of longitudinal rows of slanting slots cut therethrough with the slots of each of said rows thereof being peripherally staggered with respect to the slots of its adjacent row thereof, said slots of said second group of rows being of lesser width than said slots of said first group of rows.

13. A shaving device comprising a housing having a drive shaft rotatably mounted therein, a frustro-conical slotted shell extending from said housing and having a spiral blade therein in axial alignment with said shaft, a shoulder formed between said housing and said shell and having a plurality of spaced openings therethrough, a gasket or the like surrounding said shaft at the end of said housing adjacent said shoulder, means for opening or closing said openings, said means comprising a band slidably mounted on said shoulder and peripherally rotatable thereon, said band having openings therethrough adapted to be aligned with said shoulder openings, said shell having a group of longitudinal rows of slanting

slots cut therethrough, the slots of each of said rows being peripherally staggered with respect to the slots of its adjacent row, and releasable locking resilient means for varying the tension of said blade against said shell.

14. A shaving device comprising a housing having a drive shaft rotatably mounted therein, a frustro-conical slotted shell extending from said housing and having a spiral blade therein in axial alignment with said shaft, said shaft having 10 screw threads thereon, a nut on said shaft intermediate its length, said blade having an internally threaded socket on its inner end having the inner end of said shaft screwed thereinto, a second nut on said shaft adjacent the inner end 15 thereof, a coiled spring on said shaft between said nuts and normally urging said nuts apart, a pair of spaced washers on said shaft between said last-named nut and the peripheral wall of said blade socket, a gasket between said washers, said wash- 20 ers and said gasket being clamped together between said last-named nut and said peripheral wall of said blade socket and forming a partition between said housing and said shell.

15. A shaving device comprising a housing having a drive shaft rotatably mounted therein, a frustro-conical slotted shell extending from said housing and having a spiral blade therein in axial alignment with said shaft, said shaft having screw threads thereon, a nut on said shaft intermediate its length, said blade having an internally threaded socket on its inner end having the inner end of said shaft screwed thereinto, a second nut on said shaft adjacent the inner end thereof, a coiled spring on said shaft between said nuts and normally urging said nuts apart, a pair of spaced washers on said shaft between said last-named nut and the peripheral wall of said blade socket, a gasket between said washers, said washers and said gasket being clamped together between said last-named nut and said peripheral wall of said blade socket and forming a partition between said housing and said shell, a ball bearing in said housing receiving the outer end of said shaft, a second coiled spring on said shaft between said ball bearing and said first-named nut and normally urging the same apart.

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