Feb. 22, 1949. I. FLORMAN 2,462,625

SHAVING MACHINE

Filed May 7, 1945

FIG. 1.

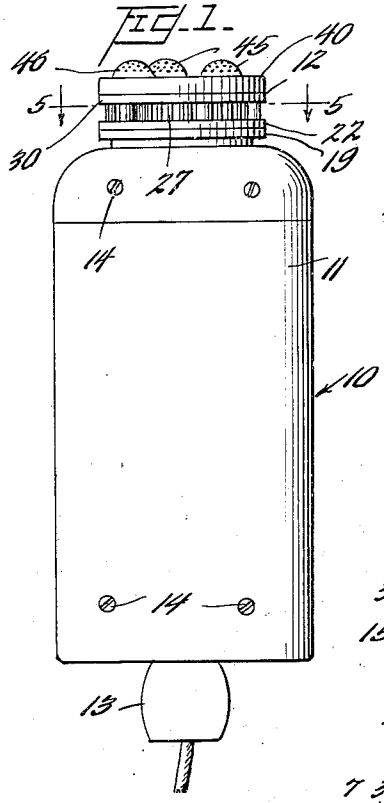


FIG. 2.

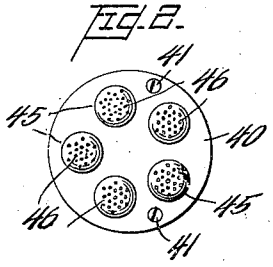


FIG. 3.

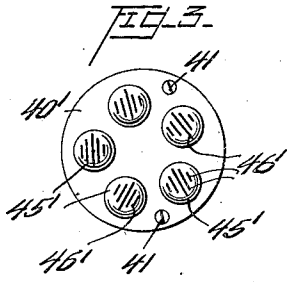


FIG. 4.

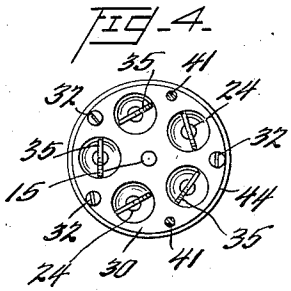


FIG. 5.

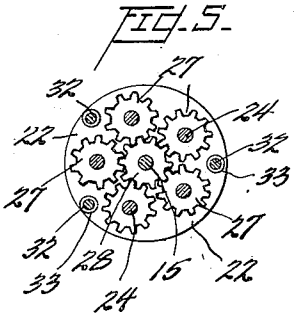


FIG. 6.

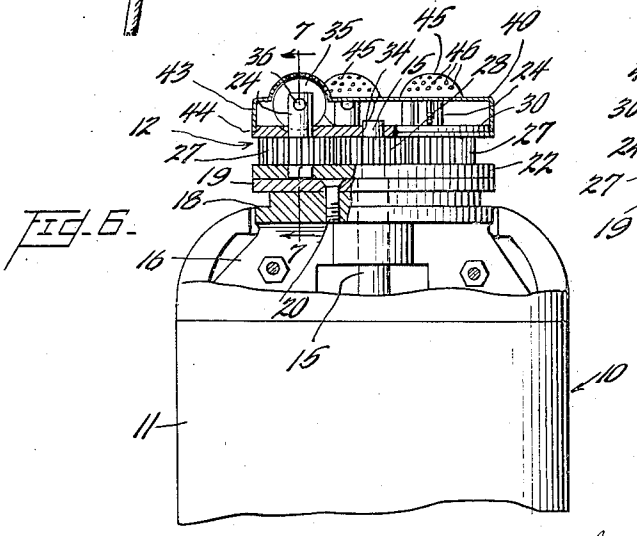
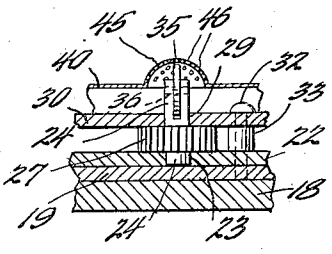


FIG. 7.



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Patented Feb. 22, 1949 2,462,625

UNITED STATES PATENT OFFICE

2,462,625

SHAVING MACHINE

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Application May 7, 1945, Serial No. 592,295

4 Claims. (Cl. 30—43)

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This invention relates to shaving machines and more particularly to that class of devices having relatively movable cutters and known as dry shavers.

The principal object of the invention is to provide a novel and improved shaver of this general type.

More specifically, it is an object of the invention to provide a shaving machine having a shearing head provided with a plurality of separated operative portions of substantially hemispherical configuration, whereby when applied to the face, the irregular or undulatory surfaces cause the skin to assume a contour most conducive to forcing the hair into the shearing openings.

Another object is to provide, in a razor or shaving machine of this type, a novel shearing assembly comprising a dome-like guard or gage plate having perforations therein and adapted to cooperate with a rotary cutting blade disposed beneath the plate and running with proper shearing clearance with the underside of the plate, the blade, of course, being of an arcuate configuration to conform to the concavity of the plate.

A further object of the invention is to provide in a razor or shaving machine of this class, novel cutting blades which cooperate with the guard or gage plate, said blades, in the preferred embodiment of the invention, being circular and freely rotatable on their central axes so that new arcuate portions of the blades are continually being brought into action as the operation proceeds.

Other objects and features of novelty will be apparent from the following specification when read in connection with the accompanying drawings in which certain embodiments of the invention are illustrated by way of example.

In the drawings,

Fig. 1 is a view in side elevation of a shaving instrument embodying the principles of the invention;

Fig. 2 is a top plan view of the shaving head of the instrument showing one form of contact plate or guard;

Fg. 3 is a similar view showing another embodiment of this guard or gage plate;

Fig. 4 is a top plan view of the shaving head with the gage plate or cover removed;

Fig. 5 is a transverse sectional view taken through the shaving head taken on line 5—5 of Fig. 1;

Fig. 6 is a view of the upper portion of the instrument partly in side elevation and partly in central vertical section, and on an enlarged scale; and

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Fig. 7 is a fragmentary vertical sectional view showing one shaving blade in edgewise position with respect to the observer.

In Figs. 1 and 6 of the drawings, the shaving instrument, designated generally by the reference numeral 10 is seen to comprise the body portion 11 and the shaving head 12. The body portion 11 contains the electric motor or other power means for driving the operative parts and is provided at its lower end with wiring connections indicated at 13. As is conventional in this type of machine, the casing or housing of the body portion 11 may be divided to provide a removable cover plate which is secured in position as by means of the screws 14.

The driving motor contained within the body portion 11 may be of any suitable or conventional type and it is operatively connected with the drive shaft 15 so as to rotate it during the shaving operation.

The inner framework 16 of the body portion of the shaver is surmounted by a circular flanged portion 18 which in turn has a disk 19 secured thereto as by means of the screws 20. Above the disk 19 there is disposed a bearing plate 22 which is provided with a central opening for the drive shaft 15 and a series of circumferentially spaced openings 23 to accommodate the lower ends of the cutting blade shafts 24. Each of these blade-carrying shafts 24 has a pinion 27 secured thereto immediately above the upper surface of the disk or plate 22. A driving pinion 28 secured to the drive shaft 15 is disposed in the same plane as the pinions 27 and is in mesh with each one of them.

The blade-carrying shafts 24 extend upwardly through openings 29 in the upper disk 30 which is secured in spaced relationship with the lower disk 22 by means of the set screws 32 and the spacing bushings or posts 33, best shown in Figs. 5 and 7 of the drawings. The posts or sleeves 33 are of a height slightly greater than the thickness of the pinions 27 and 28 so that the latter may have a good running clearance between the plates 22 and 30. An opening 34 is provided in the upper plate 30 for the upper end of the main driving shaft 15.

The shafts 24 are split or forked at their upper ends to receive the circular cutting disks 35 which are freely rotated and mounted with respect to the upper ends of the shafts 24 by means of the axles or pintles 36.

A guard or gage plate 40 surmounts the cutting head and is secured to the upper disk or plate 30 as by means of the screws 41. The plate 40 acts as a cover for the upper portion of the shaving head and is provided with cylindrical side walls 43 which are seated in rabbetted edges 44 of the disk 30.

The cover or gage plate 40 is provided with dome-like raised portions or protuberances 45, there being as many of these protuberances as there are cutting blades 35. These protuberances are preferably hemi-spherical, but within the broader aspects of the invention may be of any convex configuration. These protuberances, in the embodiment illustrated in Figs. 1, 2, 6 and 7 of the drawings, are provided with a multiplicity of small openings 46. The inner surfaces of the protuberances 45 fit with a fine shearing clearance with the upper arcuate edge portions of the blades 35 and it will be readily understood that as the blades 35 are rapidly rotated about the axes of the shafts 24, any hairs projecting into the openings 46 of the protuberances 45 will be sheared off between the edges of the blades 35 and the inner edges of the openings 46.

In operation the head of the shaver is passed over the skin surface and the area contacted by the plurality of rounded protuberances 45 is flexed and kneaded, so to speak, so that each cutting protuberance, cooperates with the others and effectively forces the hairs into the openings 46 to be sheared off.

In Fig. 3 there is shown an embodiment of the shearing or cover plate designated 40' in which the protuberances 45' are provided with very narrow elongated slits 46' beneath which the blades 35 rotate and cooperate to shear the hair entering the slots. The slits 46' extend at various angles and thus continually shift the angle of shear at a given point on the skin as the shaver progresses across the face.

Since the cutting blades 35 are freely rotatably mounted on the rotating shafts 24, the vibration of the device will cause the blades to rotate around the axes of the pintles 36 and thus the effective or active arcuate cutting portions of the blades will be continually renewed as the operation proceeds. This will double the wear of the blades and prolong the life of the shaver.

The cutting blades, within the broader aspects of the invention, may be driven by any suitable means whether mechanical or electrical, and the number of spherical cutting elements on the cutting head may be varied from two up to any number conveniently applicable to the surface of the cutting head of the razor.

Various changes and modifications may be made in the embodiments illustrated and described herein without departing from the scope of the invention as defined by the following claims.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. A shaving machine of the class described which comprises a shearing couple consisting of a dome-like plate the convex surface of which is adapted to contact the surface to be shaved, said plate being of a generally spherical configuration, a completely circular shearing blade rotatably mounted beneath said plate whereby the edge of said blade substantially defines a great circle of the sphere of which the plate is a part, and means for freely rotatably mounting said circular blade for rotation about its own axis so as to continually renew the effective cutting arc of its periphery which cooperates with the concavity of the plate, during operation.

2. In a shaving machine of the class described having a shearing head a cutting mechanism comprising a plurality of rotatable cutting blades displaced radially from the center of and in shearing relationship with said head, a plurality of rotatable shafts carrying said blades, a pinion carried by each shaft, a centrally disposed drive shaft, and a driving pinion fixed on said drive shaft and meshing with each of said first named pinions.

3. In a shaving machine of the class described, a shearing couple comprising a plate having a protuberance of spherical configuration projecting therefrom, at least one opening in said protuberance through which a hair can pass, the convex side of said protuberance being adapted to engage the surface to be shaved and the concave side being adapted to receive a cutter, means mounting a circular cutter for rotation as an arc of revolution for and in shearing engagement with said concave side, and further means for mounting said cutter for free rotation about its own axis.

4. A shaving machine of the class described having a shearing head including a cutter plate provided with a plurality of concavo-convex embossments with openings therethrough, the convex sides of said embossments being adapted to engage the surface to be shaved, a plurality of rotatable cutting blades displaced radially from the center of said head, each of said blades being disposed in shear cutting relationship with the concave side of one of said embossments, a plurality of rotatable shafts carrying said blades, means mounting each blade for free rotation upon its axis on its respective shaft, a centrally disposed drive shaft, and means for driving said rotatable shafts from said drive shaft.

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