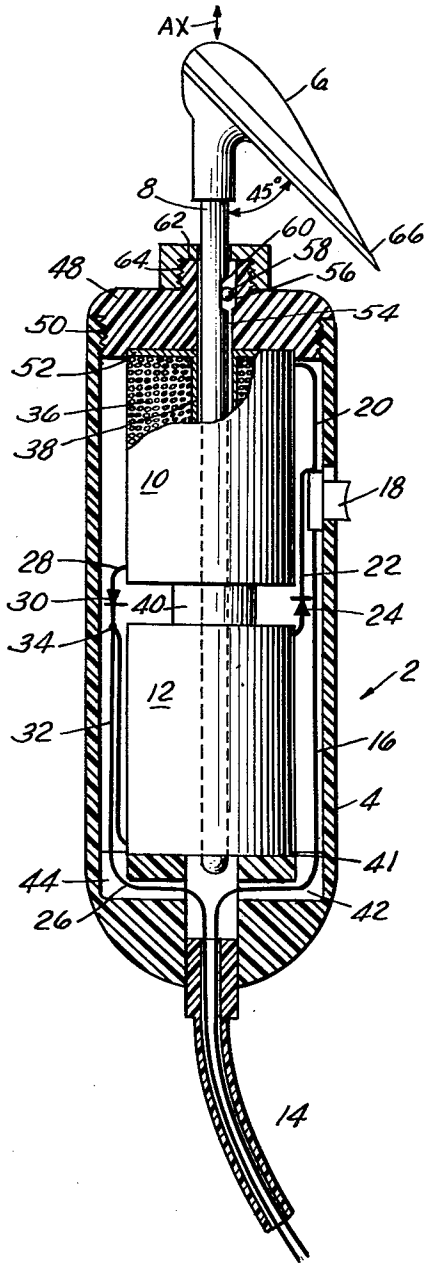
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VIBRATORY ELECTRIC SAFETY RAZOR

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VIBRATORY ELECTRIC SAFETY RAZOR

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1 Claim. (Cl. 30—45)

This invention relates to electric safety razors and, more particularly, to a vibrating razor with a straight line hoeing action.

The primary object of this invention is to provide a vibrating electric safety razor in which the razor head reciprocates along a straight line in the direction of the handle axis, and in which the cutting edge of the blade is disposed at an angle of 45° with respect to the direction of vibrating motion of the head. Heretofore, in the design of vibrating safety razors, comparatively elaborate mechanism have been devised to achieve an oscillating or reciprocating motion lengthwise of the blade edge. In order to avoid the danger of cutting the skin of the user, and to obtain a clean cutting chopping motion through the whiskers, it is intended now to provide a vibrating razor wherein the razor head is supported on a lengthwise reciprocating rod, and with the blade disposed to provide a vibratory hoeing action.

Other objects are the provisions of a simple structure, easy and inexpensive to manufacture and assemble, and having only one major moving part.

These and other objects will be apparent from the following specification and drawing, in which the sole figure is a broken away sectional view.

Referring now to the drawing in which like reference numerals denote similar elements, the vibrating electric razor denoted generally by the reference numeral **2** has a hollow tubular handle **4** formed of "Bakelite" or the like insulating plastic, and the safety razor head **6** is of conventional design except for the angle of the blade **66** described hereinbelow. For purposes of simplifying the disclosure, conventional details, such as the blade guard, and the mechanism whereby the razor head may be taken apart to replace the blade have not been illustrated, it being understood that these details are well known in the art, and may be selected at will so long as the angle between the blade, as measured in the direction from its rear edge towards its cutting edge, is substantially 45° from the direction of reciprocation of its shaft **8**.

Blade shaft **8**, formed of suitable ferrous metal, is, in effect, the armature for a pair of D.C. solenoids **10** and **12**, respectively, which are energized from a suitable source of alternating current such as the two-wire conductor cord **14**. One of the wires **16** from cord **14** is connected to a switch **18** of conventional design suitably mounted in handle **4**. From switch **18**, one lead **20** is connected to one end of solenoid **10**. Another lead **22** from switch **18** is connected through a rectifier **24** to one end of solenoid **12**. The other conductor **26** from cord **14** is connected to the lower end of solenoid **10** through a rectifier **30**. The lower end of solenoid **12** is connected to conductor **26** through a lead **32**, as at **34**. Thus, when switch **18** is closed, solenoids **10** and **12** are alternately energized by the opposite phases of alternating current.

Each of the solenoids includes a winding **36** and a hollow core **38**, the hollow cores of the solenoids constituting cylindrical guideways through which shank **8** slidably extends. Solenoids **10** and **12** are held apart by a hollow spacer **40** and the lower end of solenoid **12** is engaged in a shallow socket **41** formed in the lower end of handle **4**. Suitable passages **42** and **44** are provided through the lower end of the handle for conductors **16** and **26**.

The upper end of handle **4** is provided with a closure

48 threadedly engaged as at **50** in the upper end of the handle. The shallow socket **52** on the inner side of closure **48** engages around the upper end of solenoid **10**, it being apparent that the solenoids **10** and **12** are thus firmly held in alignment within handle **4**. Closure **48** is formed with a cylindrical bore **54** through which shaft **8** reciprocates, the side of the bore being suitably milled or otherwise shaped to provide a keyway **56** in which a ball **58** engages. An opposite keyway **60** in shaft **8**, in which ball **58** also engages, serves to prevent rotation of shaft **8** with respect to handle **4** while permitting limited relative actual movement therebetween. A cap **62** threaded as at **64** to the upper end of closure **48** holds the parts together and provides an end stop for ball **58**, it being apparent that the upper and lower ends of keyway **60** in shaft **8**, and the lower end of keyway **60** in shaft **8**, and the lower end of keyway **56** also constitute end stops, and that the limits of axial movement of shank **8** may be predetermined by forming keyways **56** and **60** of appropriate length.

While the blade **66** in razor head **6** may be slightly arched or flexed, in accordance with standard blade mounting practices, it will be apparent that the angle of attack of the blade is substantially 45° with respect to the axis AX along which the razor head **4** reciprocates. In operation, when switch **18** is closed so as to energize solenoids **10** and **12** alternately with direct current, shaft **8** reciprocates along a straight line in the directions AX. The windings of solenoids **10** and **12** and the polarities of rectifiers **24** and **30** are such that one solenoid, when energized, moves shaft **8** outwardly with respect to handle **4**, and the other solenoid, when energized during the alternate half-cycle of alternating current, moves shaft **8** inwardly. The straight line hoeing motions which blade **66** thus undergoes cause the blade to chop through the whiskers with very rapid reciprocating strokes. The vibratory blade motions are only small fractions of an inch, but nevertheless enough, when the user manipulates the razor over his face with normal shaving strokes, as he would an ordinary safety razor, to chop through the whiskers without gashing the user's epidermis.

The invention is not limited to the details illustrated and described hereinbefore, but is intended to cover all substitutions, modifications and equivalents within the scope of the following claim.

I claim:

A safety razor comprising a handle, a shaft having an elongate straight portion, guide means in said handle slidably supporting the straight portion of the shaft for reciprocatory movement lengthwise of the straight portion of the shaft, anti-rotation means engaging between said handle and shaft for preventing rotative movement of the shaft with respect to the handle, means in said handle for vibrating the shaft with rapid reciprocatory movements lengthwise of the straight portion of the shaft, said antirotation means including means for restricting said reciprocatory movements to predetermined limits, said shaft having a free end portion projecting beyond one end of said handle, a razor head, means rigidly mounting said head on the free end of said shaft for movement therewith, said head including clamping surface means for rigidly supporting for movement with the head a razor blade having a flat body with a cutting edge along one side thereof, said clamping surface means being disposed at 45° with respect to the straight portion of said shaft and providing a support for the blade whereby the cutting edge thereof is directed generally towards the handle and off to one side thereof.

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