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MULTIHEAD DRY SHAVER

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Fig. 1

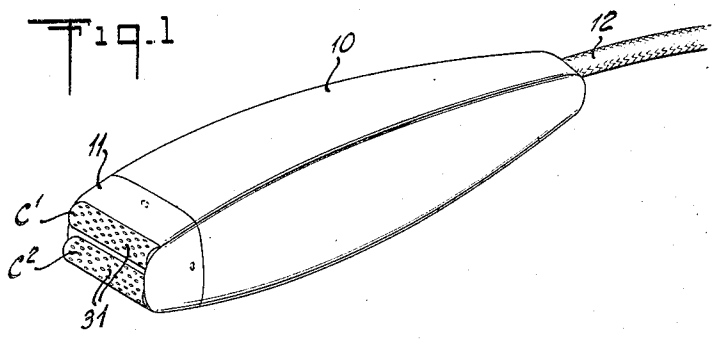


Fig. 2

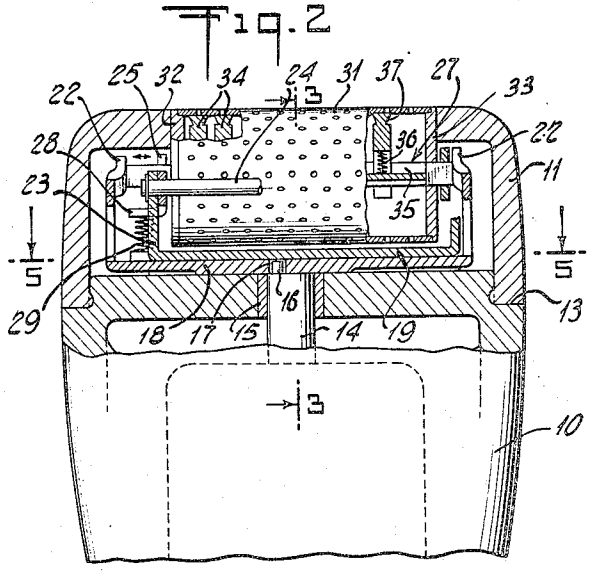
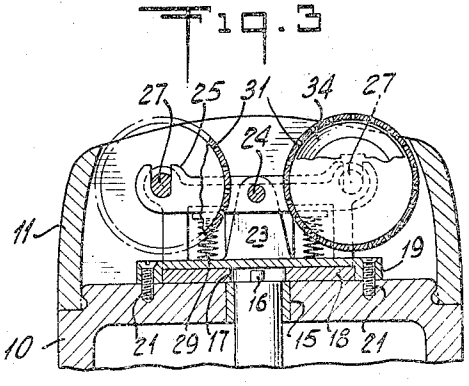


Fig. 3



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MULTIHEAD DRY SHAVER

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Fig. 4

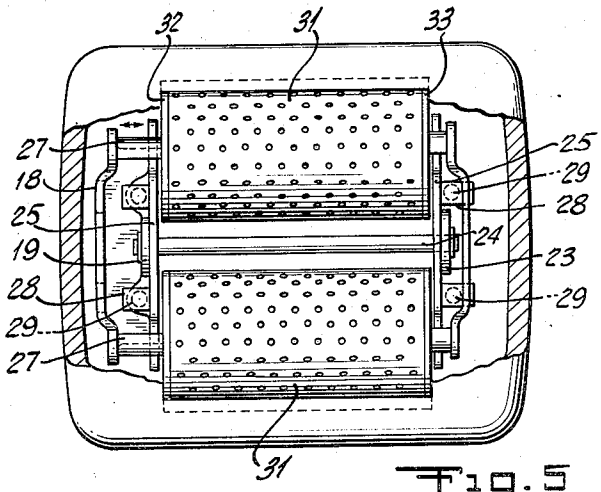


Fig. 5

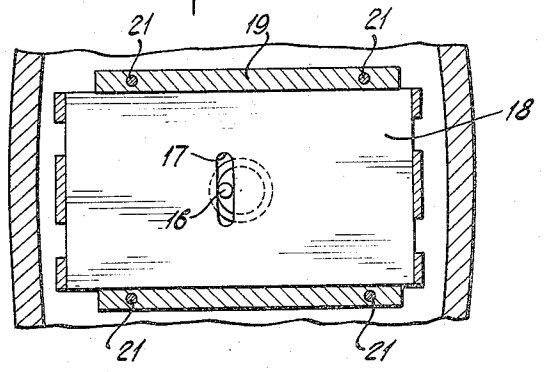


Fig. 6

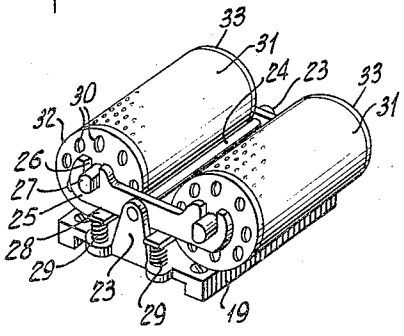


Fig. 8

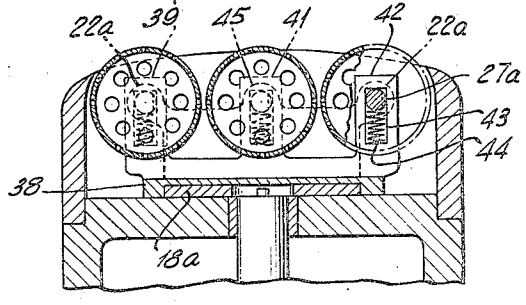
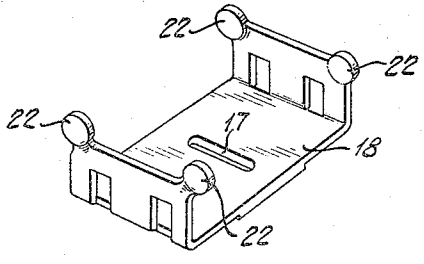


Fig. 7



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Patented Oct. 17, 1950 2,526,153

UNITED STATES PATENT OFFICE

2,526,153

MULTIHEAD DRY SHAVER

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Application November 20, 1946, Serial No. 711,143

9 Claims. (Cl. 30—43)

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This invention relates generally to dry shavers, and has particular although not limited reference to devices of this class in which the cutter assembly is characterized by a freely rotatable outer shear plate.

An object of the invention is to incorporate the freely rotatable outer shear plate principle in a multi-head shaver.

Another object of the invention is to interpose a yield in the mounting of the cutter assemblies whereby they may be caused to follow or to conform to the surface over which they may be moved.

A further object of the invention is to obtain a multi-head shaver of simple, durable construction and one of improved operating efficiency.

Other objects and structural details of the invention will appear from the following description, when read in connection with the accompanying drawings, wherein:

Fig. 1 is a view in perspective of a dry shaver constructed in accordance with the present invention;

Fig. 2 is a fragmentary view of the shaver in side elevation, being partly broken away to show details of the operating mechanism of the head;

Fig. 3 is a view in side longitudinal section, taken substantially along the line 3—3 of Fig. 2;

Fig. 4 is a top plan view of the shaver, the closure cap being partly broken away;

Fig. 5 is a view in cross section taken substantially along the line 5—5 of Fig. 2;

Fig. 6 is a detailed view, in perspective, of the cutter assemblies and the mounting therefor;

Fig. 7 is a detailed view, in perspective, of the cutter actuator;

Fig. 8 is a view in side longitudinal section, similar to Fig. 3, showing a second embodiment of the invention.

Referring to Fig. 1, in the embodiment of the invention there illustrated the dry shaver comprises a casing composed of two parts, namely, a housing 10 shaped to fit within the hand of the user and a removable cap 11 surrounding the cutting head. Within the housing 10 is a rotary electric motor which is not here shown since any motor conventional with this class of device may be used. An electrical conduit 12 enters the housing 10 at one end thereof and is adapted for connection to an electric current outlet. At its opposite end the housing 10 is closed, as shown in Fig. 2, and is formed with a peripheral shelf 13 on which cap 11 rests. Complementary elements on the cap and on housing 10 provide detenting means for yieldingly holding the cap

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upon shelf 13. The cap 11 is open at its outer end to expose the cutter assemblies, there being two such assemblies, indicated respectively at C^1 and C^2.

The motor within housing 10 drives in a rotary direction a shaft 14. The upper end of shaft 14 has a bearing in a bushing 15 mounted in the closed end wall of housing 10. Projecting upward from the end of shaft 14, and offset from the longitudinal axis thereof, is a pin 16 extending into a slot 17 in a U-shaped actuating member 18 (see also Figs. 5 and 7). Actuator 18 is mounted on the closed end wall of housing 10 for sliding motion in the direction of the longitudinal axis of the cutter assemblies C^1 and C^2. The slot 17 therein is rectangular in shape, the lengthwise dimension thereof being at right angles to the direction of motion of actuator 18. The construction and arrangement accordingly is such that in response to rotation of shaft 14, pin 16 thereon moves within slot 17 and acts as a cam, causing member 18 to slide back and forth in a reciprocating action. The actuator 18 is guided in its motion by a fixed bracket 19 which overlies the base portion thereof and rests on the closed end of housing 10 on opposite sides of the reciprocating member. Bracket 19 is secured to housing 10 by screws 21 or the like.

The upstanding end portions of actuator 18 have a generally square formation with the outer corners thereof shaped as disc-like projections 22. The fixed bracket 19 is formed with upstanding ears 23 rigidly connected by a rod 24. The rod 24 provides a pivotal mounting for a pair of arms 25 (see also Figs. 3, 4 and 6) one of which is supported adjacent each ear piece 23. Rod 24 is passed through the arms 25 at approximately mid-points thereof. In the opposite ends of each arm is formed a slot 26 receiving one end of a shaft 27 comprised in the cutter assemblies. Each arm 25 further is formed with turned over lugs 28 on opposite sides of the ear pieces 23. Between each lug 28 and the base of fixed bracket 19 is a coiled compression spring 29. The springs 29 exercise opposed thrusts on each arm 25 so that the arm normally is maintained in an intermediate horizontal plane, but may be rocked therefrom in response to the application of unequal pressures at the ends thereof.

The cutter assemblies C^1 and C^2 are generally similar in their construction to that disclosed in the now abandoned application of Louis Wozar, Serial No. 633,328, filed December 7, 1945, for Dry Shaver. Thus, each comprises a perforate freely rotatable outer cylinder 31, the ends of which

are closed by plates 32 and 33 rotatably mounted on a shaft 27. The outer opening in cap 11, through which the cylinders 31 normally slightly project, closely surrounds the cylinders in a manner preventing endwise motion thereof but permitting them free rotation about the shafts 27. Within cylinder 31 is a shearing unit including the shaft 27. The shaft 27 is longitudinally disposed within cylinder 31 and extends through and beyond the plates 32 and 33. Within the cylinder the shaft has a generally square formation and has mounted thereon in spaced relation a series of cutter blades 34 of flat coin-like shape. The blades 34 have cut-away portions fitting over the shaft 27, the shaft 27 being radially grooved at spaced points to receive the blades and to prevent endwise relative motion thereof. The shaft 27 further is formed with a longitudinal groove 35. Within the groove 35, at positions of registry with the cutter blades 34, are compression springs 36 adapted and arranged to urge the blades outward toward contact with the inner peripheral surface of the cylinder 31. The outer edge of each blade 34 is flat and smooth for close sliding engagement with the cylinder 31, and in circumferential outline is curved in conformance with the cylinder. Further, each blade may be undercut adjacent its outer edge to form knifelike portions 37.

The opposite ends of the shafts 27, which lie within the slots 26 in arms 25, are flattened to prevent turning motion of the shearing assembly. Also, the engagement of the shafts in such slots may be accomplished by a press fit inhibiting accidental dislodgement of the cutter assemblies. The shafts further project through and beyond the slots 26 into cooperative relation with respective disclike projections 22 of the actuator 18. Accordingly, the reciprocating motion of the actuator 18 effects a corresponding and synchronous motion of the shafts 27 and of the blades 34 mounted thereon. Such motion of the blades within and relative to the cylinder 31 provides a cutting action for shearing hair projecting into the cylinder through the perforations, slots or other openings which may be formed in the cylinder. For simplified cleaning, the cylinder end plates 32 and 33 may have openings 30 formed therein.

It will be observed that the present invention provides a multi-head shaver which because of the feature of freely rotating outer cylinders, and because of the feature of a yielding mounting of the cutter assemblies possesses significant features of advantage. In use, the shaver head rolls over the face due to traction and an automatic adjustment of the angle of inclination of the cutter assemblies takes place as the shaver encounters the chin line and other facial irregularities. The construction and arrangement of the upstanding end portions of the actuator 18 are such as to permit operation of the shafts 27 in any position of adjustment the arms 25 may assume.

While the embodiment of the invention shown in Figs. 1 to 7 inclusive shows but two cutter assemblies, it is possible, without departing from the spirit of the invention, to incorporate three or more heads in one unit. Referring to Fig. 8, a three assembly head is shown. According to this construction, the fixed bracket 19 of the first embodiment takes the form of a bracket 38 having three turned up ears 39, 41 and 42, each provided with an opening 43 through which the cutter shaft 27a is passed. Also within each opening 43 is a spring 44 bearing on the shaft 27a, the separate springs cooperating to hold the cutter assemblies normally in a common horizontal plane, but yielding to unequal pressure to permit such assemblies to move as units independently of one another. It further will be understood that in this embodiment of the invention, the upstanding end portions of actuator 18a will be provided with a third disc-like projection 45 intermediate projections 22a.

What is claimed is:

1. A multi-head dry shaver, comprising a casing, a motor in said casing, actuating means driven by said motor, a plurality of cutter assemblies arranged in parallel relation with respect to each other, each said assemblies comprising a perforate outer shear plate, and inner shearing means movable relatively to said shear plate, means for transmitting the motion of said actuating means to said inner shearing means, and a mounting for said cutter assemblies providing motion thereof simultaneously as individual units relative to said casing, said mounting being further arranged to cause movement of each of the assemblies relative and in response to movement of the remainder of the assemblies.

2. A multi-head dry shaver, comprising a casing, a motor in said casing, actuating means driven by said motor, a pair of cutter assemblies arranged in parallel relation with respect to each other, each said assemblies comprising a perforate outer shear plate and relatively movable inner shearing means, means for transmitting the motion of said actuating means to said inner shearing means, and a mounting for said cutter assemblies providing simultaneous rocking motion of both thereof relative to each other and relative to said actuating means and said casing.

3. A multi-head dry shaver, comprising a casing, a motor in said casing, a reciprocable member driven by said motor and formed with upstanding end portions, a plurality of cutter assemblies arranged in side by side relation with their ends embraced by the end portions of said reciprocable member, each said assemblies comprising a perforate outer shear plate and relatively movable inner shearing means, said shearing means including a reciprocable shaft the ends of which extend into cooperative relation with the upstanding end portions of said reciprocable member, and a yielding mounting for said cutter assemblies permitting motion thereof as units relatively to said reciprocable member and said casing, the shafts of said cutter assemblies and the upstanding end portions of said reciprocable member retaining a cooperative relation in all relative positions of said assemblies.

4. A multi-head dry shaver, comprising a casing, a motor in said casing, a reciprocable member driven by said motor and formed with upstanding end portions, a pair of cutter assemblies arranged in side by side relation with their ends embraced by the end portions of said reciprocable member, each said assemblies comprising a perforate outer shear plate and relatively movable inner shearing means, said inner shearing means including a reciprocable shaft the ends of which extend into cooperative relation with the upstanding portions of said reciprocable member, a support for said cutter assemblies including a bracket fixed to said casing, rocker arms pivotally mounted on said bracket and arranged in supporting relation to the shafts of said cutter assemblies, and springs urging said arms to a normal position from which they may be rocked

in opposite directions relative to said fixed bracket.

5. A multi-head dry shaver, comprising a casing, a motor in said casing, a reciprocable member driven by said motor and formed with upstanding end portions, a pair of cutter assemblies arranged in side by side relation with their ends embraced by the end portions of said reciprocable member, each said assemblies comprising a perforate freely rotatable outer cylinder and relatively movable shearing means within said cylinder, said shearing means including a shaft reciprocable longitudinally of the axis of said cylinder and the ends of which extend outside said cylinder into cooperative relation with the upstanding end portions of said reciprocable member, each said shafts providing a bearing for rotation of its respective outer cylinder, a support for said cutter assemblies including a bracket fixed to said casing, rocker arms pivotally connected at their center points to said bracket and having their ends arranged in supporting relation to the shafts of said cutter assemblies, and opposed springs urging said arms to a normal desired plane.

6. A head for dry shavers, comprising a plurality of cutter assemblies arranged with their longitudinal axes in parallel relation, each said assemblies comprising a perforate outer shear plate and relative movable inner shearing means, each said shearing means including a shaft reciprocable in the direction of the longitudinal axis of said shear plate, said shaft constituting the principal support of the cutter assembly, a resilient mounting for each said shaft interposing a yield whereby said cutter assemblies may assume different angles of inclination as said head is moved over the face, and power driven means for imparting reciprocable motion simultaneously to said shafts.

7. A head for dry shavers, comprising a plurality of cutter assemblies arranged with their longitudinal axes in parallel relation, each said assemblies comprising a perforate outer shear plate and relatively movable inner shearing means, each said shearing means including a shaft reciprocable in the direction of the longitudinal axis of said shear plate, said shaft constituting the principal support of the cutter assembly, a resilient mounting for each said shaft interposing a yield whereby said cutter assemblies may assume different angles of inclination as said head is moved over the face, a common actuator for said shafts, said actuator comprising portions embracing the opposite ends of said shafts in all angular positions of said cutter assemblies, and power driven means for imparting reciprocable motion to said actuator.

8. A head for dry shavers, comprising a pair of cutter assemblies arranged with their longitudinal axes in parallel relation, each said assemblies comprising a perforate freely rotatable cylinder and relatively movable shearing means within said cylinder, each said shearing means including a shaft reciprocable in the direction of the longitudinal axis of its associated cylinder and having its ends extending through and beyond the ends of said cylinder, rocker arms at the opposite ends of said cutter assemblies, the ends of said arms being operatively engaged with respective ends of said shafts, a mounting for said arms providing for rocking motion thereof about a point intermediate said cutter assemblies, spring means maintaining said arms yieldingly in a normal desired plane, said arms being permitted to rock in response to unequal pressure on said cutter assemblies whereby said assemblies may assume different angles of inclination as the head is moved over the surface to be shaved, and power driven means for imparting reciprocable motion to said shafts.

9. A multi-head dry shaver, comprising a casing, a motor in said casing, a reciprocable member driven by said motor and formed with upstanding end portions, a plurality of cutter assemblies arranged in side by side relation with their ends embraced by the end portions of said reciprocable member, each said assemblies including a perforate freely rotatable outer cylinder and relatively movable inner shearing means, each said shearing means including a shaft reciprocable in the direction of the longitudinal axis of its associated cylinder and extending through and beyond the ends of said cylinder and providing a rotatable bearing therefor, supports for said cutter assemblies, and means independent of said supports on the upstanding end portions of said reciprocable member cooperative with said shafts to impart thereto the motion of said member.

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