

March 27, 1945.

J. SONNE

2,372,401

MECHANICAL RAZOR

Filed Feb. 7, 1944

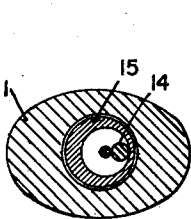


Fig. 5

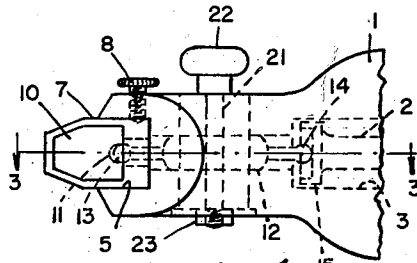


Fig. 1

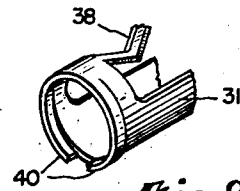


Fig. 9

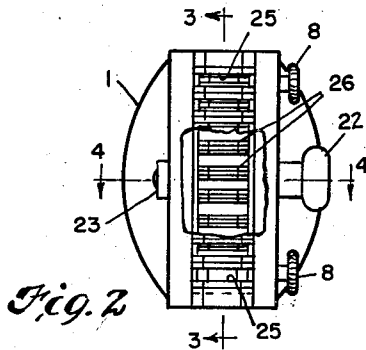


Fig. 2

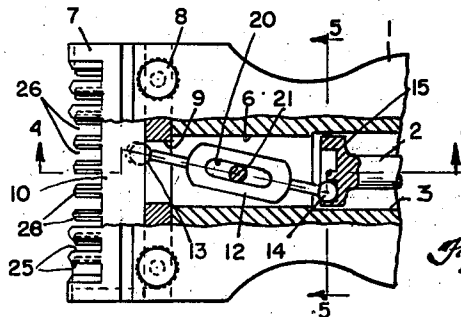


Fig. 3

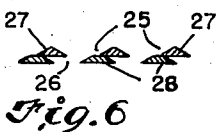


Fig. 6

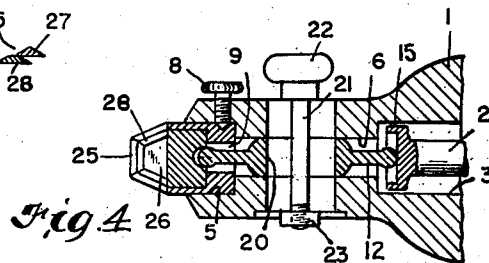


Fig. 4



Fig. 10

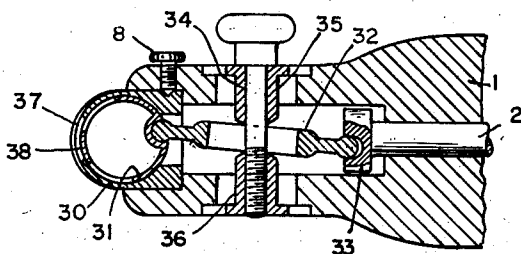


Fig. 8

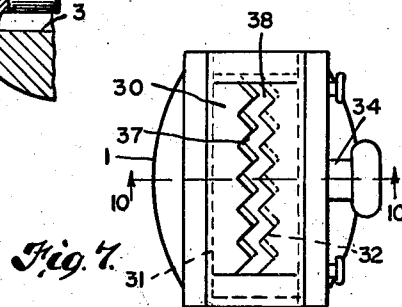


Fig. 7

INVENTOR.
JOHN SONNE

BY

Oberlin, Limbach & Day.
ATTORNEYS

UNITED STATES PATENT OFFICE

2,372,401

MECHANICAL RAZOR

John Sonne, Cleveland, Ohio

Application February 7, 1944, Serial No. 521,312

11 Claims. (Cl. 30—43)

The present improvements relate to hair clippers or mechanical razors of the type characterized by having two members, one movably mounted within the other, wherein the inner member is reciprocable, or reciprocable and oscillatory, in order to cause the cutting edges wherewith said members are respectively provided to coact.

One principal object is to provide means whereby the cutting stroke of the inner reciprocable, or reciprocable and oscillatory, member may be adjusted or varied. Another object is to provide means whereby such inner shell or cutting member will be held with its cutting edges at all times in close contact with the complementary cutting edges of the outer shell or member. Still another object is to provide cutting edges of an improved and more effective form than heretofore found in mechanical razors of the type in question.

To the accomplishment of the foregoing and related ends, said invention, then, consists of the means hereinafter fully described and particularly pointed out in the claims.

The annexed drawing and the following description set forth in detail certain mechanism embodying the invention, such disclosed means constituting, however, but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawing:

Fig. 1 is a side elevation of a device embodying my present improvements;

Fig. 2 is a front elevation thereof;

Fig. 3 is partly a plan view and partly a section taken on the plane indicated by the line 3—3 Figs. 1 and 2;

Fig. 4 is a central vertical section taken on the plane indicated by the line 4—4 Figs. 2 and 3;

Fig. 5 is a transverse section of a portion of the device taken on a plane indicated by the line 5—5 Fig. 3;

Fig. 6 is a sectional view more or less diagrammatic in character of the cutting elements, the plane of the section corresponding with that of Fig. 3;

Fig. 7 is an end view showing a modification in construction;

Fig. 8 is a sectional view of such modification;

Fig. 9 is a broken perspective view of certain parts of such modification; and

Fig. 10 is a sectional view, taken on the plane indicated by the line 10—10 Fig. 7, showing the form of the cutting elements in such modified construction.

Referring first to the construction illustrated in Figs. 1 to 6, incl., the several operative parts of

the device are housed within a suitable casing 1 (shown in part only) which may be made of metal or plastic material and will be so shaped as to be conveniently grasped by the hand of the user. The main driving element of the device is a spindle 2 which is suitably journaled in a central longitudinally extending bore 3 in the housing. The means whereby spindle 2 is driven form no part of the present invention; thus such spindle may be the forward end of a flexible shaft or the spindle of an electric motor where the device is designed to be directly motor driven.

The forward end of casing 1 is of flattened form and is provided with an open outwardly facing recess 5 that intersects the rectangular slot 6 which is an extension of bore 3, and in which certain operative parts presently to be described are housed. Detachably fitted in recess 5 is the outer cutting member 7 which in this form of the device is a shell of polygonal cross section, as best shown in Figs. 1 and 4. Such outer shell is held in place in the recess by means of two set screws 8 and is provided in its rear wall with an opening 9 that communicates with the rectangular slot or chamber 6 in the casing.

Reciprocably fitted within outer cutting member or shell 7 is a second cutting member 10 of similar cross section that is provided in its rear wall with a socket-like recess 11 which, when the parts are assembled, is disposed opposite the opening 9 in such outer shell. Pivotally mounted in chamber 6 is a lever 12, the forward end 13 of which is rounded to enter such recess 11 in shell 10, while its rear end 14 is similarly rounded to enter a cam slot in a disk 15 which constitutes an extension of a drive shaft 2.

Lever 12 is formed with an intermediate longitudinally extending slot 20 and the pivotal mounting for the lever comprises a pin 21 adjustably secured in the casing 1 so as to be shiftable in such slot and thus correspondingly shift the pivotal axis of the lever. Various means for thus shiftable mounting pin 21 may be provided. As shown, one end of the pin is provided with a knurled head 22 and the other end is threaded in a nut 23, so that by turning such head the pin may be readily loosened, moved to desired position within slot 20 in the lever and then tightened so as to stay in such position. As a result of the construction just described, it will be seen that by shifting the position of pin 21 the stroke or throw of the outer end of lever 12 and thus the extent of the reciprocatory movement of the inner shell 10 may be varied within limits.

To form the cutting elements in the outer shell

the forward face thereof is intersected by a series of transverse slots 25, the intervening portions constituting cutting elements 27 and the inner cutting member, the body of which is solid, is provided on its forward face with a similar series of transverse slots 26, the intervening ribs constituting cutting elements 28. These have the cross sectional form best shown in Fig. 6, where the elements of the reciprocable inner shell are shown in their active position, i. e. the position they occupy when the actuating lever 12 occupies the angular position shown in Fig. 3. The effect of shifting the pivotal axis of lever 12 will be to cause the cutting elements 28 of inner member 10 to pass across the opposed edges of elements 27 of the outer shell to a greater or lesser extent. Accordingly, the openings left between the cutting elements whereby the hair is permitted to enter the shells will be correspondingly varied.

As will be seen upon inspection of Fig. 6, the cutting edges in the case of the outer shell are sharply acute, and in the case of the opposed edges of the inner shell are obtuse in cross section. As a result the openings between the cutting elements are of outwardly-facing V-shape and as the elements are passed across the skin the latter may bend into such openings and the hairs caused to project between such cutting edges with a minimum of irritation to the skin. Furthermore, by adjusting the stroke of the inner cutting member to vary the degree of the openings presented between such cutting edges the width of such V-shaped spaces and the distance between the cutting edges when separated may be correspondingly varied to accommodate the cutting action to the varying texture and elasticity of the skin of different persons.

The principal modification presented by the second form of the device, illustrated in Figs. 7, 8 and 9, consists in the change in the form of the outer and inner cutting members and in the means for actuating such inner member. Thus such outer shell 30 is of general cylindrical form and the inner member 31 likewise has the general form of a cylindrical shell which is capable of oscillatory as well as reciprocable movement within the outer shell. To impart such compound movement to the inner shell a lever 32 connects the same with the drive shaft 2 in much the same manner as in the first described construction, except that disk 33, which corresponds with disk 15, receives the corresponding rounded end of the lever in a socketed recess instead of in a cam slot. Furthermore, in order to permit the lever to have universal pivotal movement about its axis, the adjustable pin 34 carries two sleeves 35 and 36, of the inner opposed faces of which are rounded so that the slotted portion of the lever which lies between such rounded ends is free to be rocked in all planes. The second such sleeve, as shown in Fig. 8, also serves as the nut by means of which the pin is secured in longitudinally adjusted position; accordingly, by shifting the pin the amplitude of movement of the outer rounded end of the lever which, as before, engages a socket recess in the rear wall of inner shell 31, may be correspondingly varied.

A further modification incorporated in the second form of the device involves the cutting elements which, as best shown in Fig. 7, are provided by forming a zig-zag or saw-tooth slot 37 in the forward wall of the outer shell and a complementary contacting cutter bar 38 in the inner shell. As before the cutting edges of the elements in the case of the outer shell are prefer-

ably sharply acute and in the case of the opposed edges of the inner shell are obtuse in cross section as shown in Fig. 9. Accordingly, by adjusting the stroke of the inner member the same variation in skin contact may be obtained as described in connection with the first form of my device.

In order to ensure close fitting contact between the cutting elements of the two shells, the inner shell is provided (see Fig. 9) at its respective ends with arcuate resilient members 40 struck up from the body of the shell and disposed so as to press against the inner wall of the outer shell at points opposite to the slot 37 therein. As a result the complementary cutting bar 38 is at all times held in close fitting contact with the cutting edges of such slot. It will be understood that similar or equivalent resilient means may, if desired, be incorporated in the first described form of my device in order to maintain close fitting contact between the cutting members thereof.

It will be observed that in this second form of my device, due to the combined reciprocatory and oscillatory movement of the inner shell, the cutting edges provided therein will partake of a circular motion relatively to the cutting edges provided in the outer shell. As a result, inasmuch as such cutting edges in the case of both members are disposed in zig-zag relation, the cutting action when they are brought together will be substantially at right angles, i. e. will not involve any shearing action. As best shown in Fig. 10 the cutting elements on the inner shell in effect constitute a zig-zag bar or rib which extends longitudinally of the forward face of the shell, the latter being cut away for some distance to either side of such bar. In Fig. 7 the latter is shown at the end of the upward stroke of the inner shell and at the end of its oscillatory movement to the right.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the mechanism herein disclosed, provided the means stated by any of the following claims or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention:

1. In a device of the character described, the combination of a shell having a series of longitudinally spaced cutting edges adapted to be brought in contact with the skin of a person to permit hair to enter said shell; of a member reciprocably mounted within said shell and having complementary cutting edges; and actuating means for said cutting member including a rotary driving member and a lever oscillatory about an axis intermediate of its ends, the latter being respectively connected with said members, and means for shifting the axis of said lever.

2. In a device of the character described, the combination of a shell having a series of longitudinally spaced cutting edges adapted to be brought in contact with the skin of a person to permit hair to enter said shell; of a second shell mounted for both reciprocable and oscillatory movement within said first shell and having complementary cutting edges; and actuating means for said second shell including a rotary driving member and a lever mounted for universal pivotal movement about an axis intermediate of its ends, the latter being respectively connected with said member and shell.

3. In a device of the character described, the combination of a shell having a series of longitudinally spaced cutting edges adapted to be

brought in contact with the skin of a person to permit hair to enter said shell; of a second shell mounted for both reciprocable and oscillatory movement within said first shell and having complementary cutting edges; and actuating means for said second shell including a rotary driving member and a lever mounted for universal pivotal movement about an axis intermediate of its ends, the latter being respectively connected with said member and shell, and means for shifting the axis of said lever.

4. In a device of the character described, the combination of a shell having a series of longitudinally spaced cutting edges adapted to be brought in contact with the skin of a person to permit hair to enter said shell; of a second shell reciprocably mounted within said first shell and having complementary cutting edges, such edges being in the form of an obtuse angle in cross section.

5. In a device of the character described, the combination of a shell having a series of longitudinally spaced cutting edges adapted to be brought in contact with the skin of a person to permit hair to enter said shell; of a second shell reciprocably mounted within said first shell and having complementary cutting edges, such edges in the case of said outer shell being sharply acute, and in the case of the opposed edges of said inner shell being obtuse in cross section.

6. In a device of the character described, the combination of a shell having a series of longitudinally spaced cutting edges disposed in zig-zag relation and adapted to be brought in contact with the skin of a person to permit hair to enter said shell; of a second shell reciprocably mounted within said first shell and having complementary cutting edges disposed in similar zig-zag relation.

7. In a device of the character described, the combination of a shell having a series of longitudinally spaced cutting edges disposed in zig-zag relation and adapted to be brought in contact with the skin of a person to permit hair to enter said shell; of a second shell reciprocably mounted within said first shell and having complementary cutting edges disposed in similar zig-zag relation, such edges in the case of said outer shell being sharply acute, and in the case of the opposed edges of said inner shell being obtuse in cross section.

8. In a device of the character described, the combination of a casing formed with an open recess having opposed side walls, said casing further having a chamber communicating at one end with such recess; an outer shell removably secured in such recess, the exposed face of such shell having a series of longitudinally spaced cutting edges adapted to be brought in contact with the skin of a person to permit hair to enter such shell; a member reciprocably mounted within said shell and having complementary cutting edges; and actuating means for said cutting member including a rotary shaft entering such chamber opposite such recess and a lever in such chamber oscillatorily about an axis intermediate of its ends, the latter being respectively connected

with the end of said shaft and with said cutting member.

9. In a device of the character described, the combination of a casing formed with an open recess having opposed side walls, said casing further having a chamber communicating at one end with such recess; an outer shell removably secured in such recess, the exposed face of such shell having a series of longitudinally spaced cutting edges adapted to be brought in contact with the skin of a person to permit hair to enter such shell; a member reciprocably mounted within said shell and having complementary cutting edges; and actuating means for said cutting member including a rotary shaft entering such chamber opposite such recess, a lever in such chamber having a longitudinal slot intermediate of its ends, the latter being respectively connected with said shaft and cutting member, and a pin adjustably secured to said casing and passing through such recess and such slot in said lever.

10. In a device of the character described, the combination of a casing formed with an open recess having opposed side walls, said casing further having a chamber communicating at one end with such recess; an outer shell removably secured in such recess, the exposed face of such shell having a series of longitudinally spaced cutting edges adapted to be brought in contact with the skin of a person to permit hair to enter such shell; a second shell mounted for both reciprocable and oscillatory movement within said first shell and having complementary cutting edges; and actuating means for said second shell including a rotary shaft entering such chamber opposite such recess, a lever mounted for universal pivotal movement in such recess and having a longitudinal slot intermediate of its ends, the latter being respectively connected with said shaft and shell, and a pin adjustably secured to said casing and passing through such recess and such slot in said lever.

11. In a device of the character described, the combination of a casing formed with an open recess having opposed side walls, said casing further having a chamber communicating at one end with such recess; an outer shell removably secured in such recess, the exposed face of such shell having a series of longitudinally spaced cutting edges disposed in zig-zag relation and adapted to be brought in contact with the skin of a person to permit hair to enter such shell; a second shell mounted for both reciprocable and oscillatory movement within said first shell and having complementary cutting edges disposed in similar zig-zag relation; and actuating means for said second shell including a rotary shaft entering such chamber opposite such recess, a lever mounted for universal pivotal movement in such recess and having a longitudinal slot intermediate of its ends, the latter being respectively connected with said shaft and shell, and a pin adjustably secured to said casing and passing through such recess and such slot in said lever.

JOHN SONNE.