

July 13, 1943.

G. DALKOWITZ

2,324,070

SHAVING DEVICE

Filed June 22, 1937

2 Sheets-Sheet 1

Fig. 1

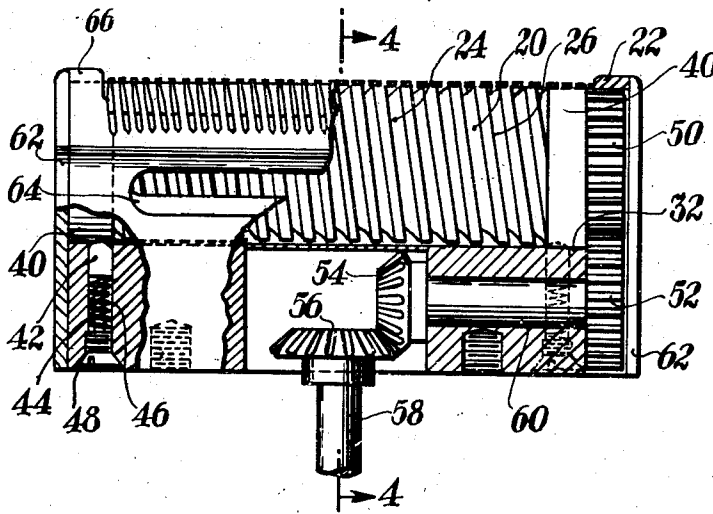


Fig. 2

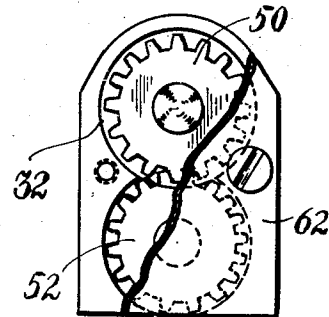


Fig. 4

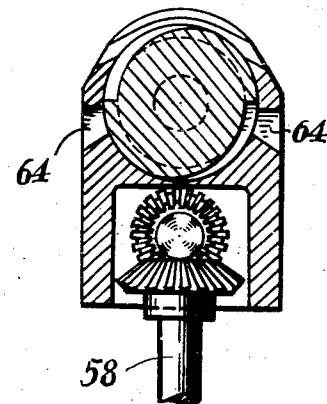


Fig. 3

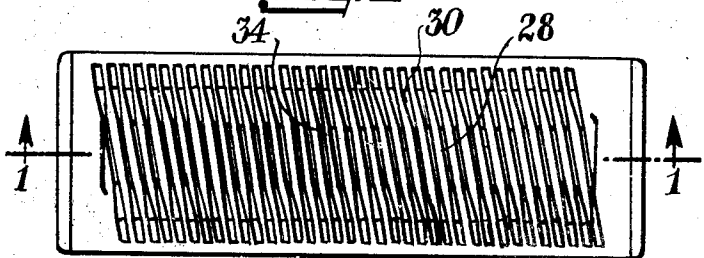


Fig. 5

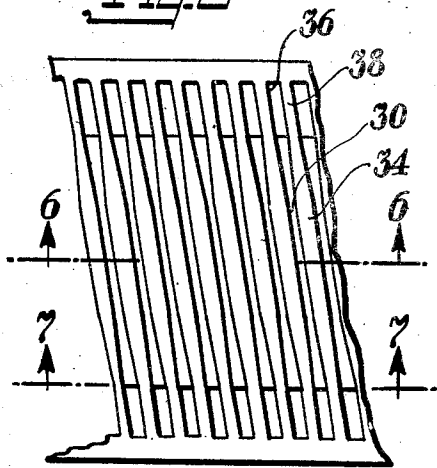
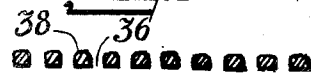


Fig. 6



Fig. 7



INVENTOR
Godfrey Dalkowitz
BY *William Bluck*
ATTORNEY

July 13, 1943.

G. DALKOWITZ

2,324,070

SHAVING DEVICE

Filed June 22, 1937

2 Sheets-Sheet 2

Fig. 8

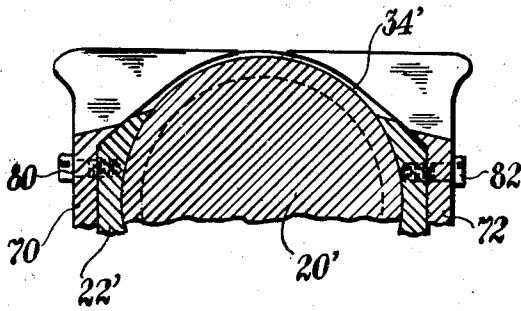


Fig. 9

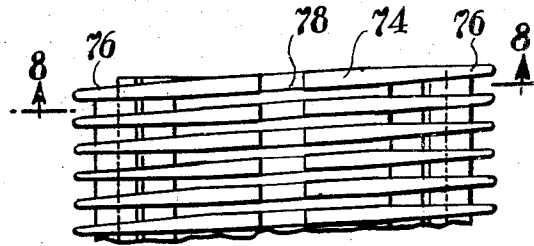


Fig. 10

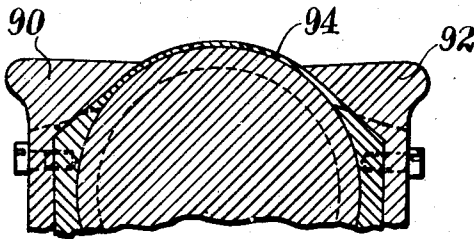


Fig. 11

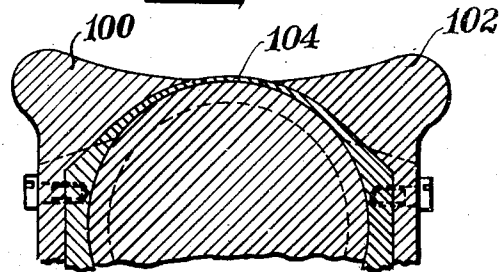


Fig. 12

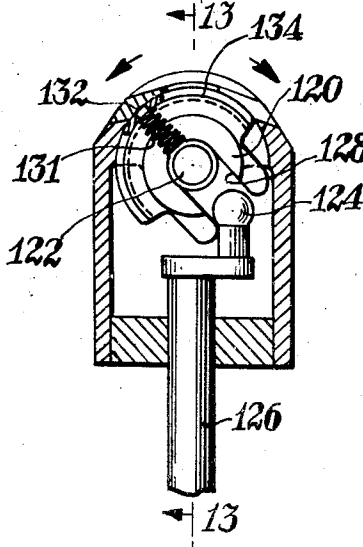
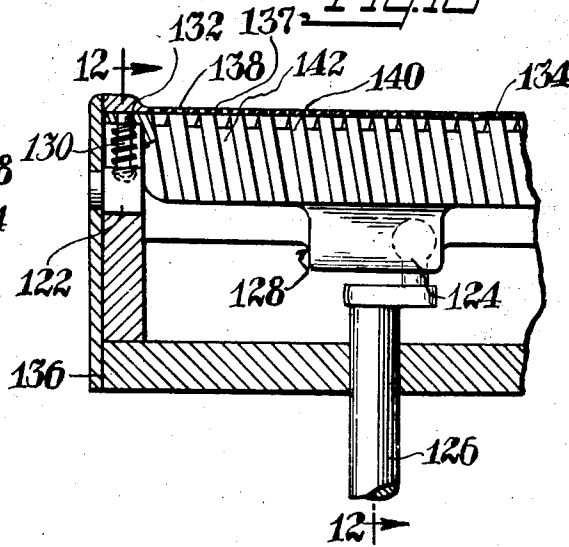


Fig. 13



INVENTOR
Godfrey Dalkowitz
BY
William Blum
ATTORNEY

UNITED STATES PATENT OFFICE

2,324,070

SHAVING DEVICE

Godfrey Dalkowitz, Brooklyn, N. Y., assignor to
American Safety Razor Corporation, Brooklyn,
N. Y., a corporation of Virginia

Application June 22, 1937, Serial No. 149,570

3 Claims. (Cl. 30—43)

This invention relates to dry shavers of the type in which the shaving operation is effected by the interaction of relatively movable cutting edges and without the use of detergents to prepare the hair.

Among the objects of my invention are the provision in a shaving device of a pair of cutting edges and means for moving said cutting edges diagonally toward each other; the provision in a shaving device of a pair of cutting edges and means for imparting relative movement to said cutting edges said movement having a component moving them directly toward each other and another component at right angles thereto moving them laterally of each other; the provision in a shaving device of opposed parallel cutting edges and means for moving said edges diagonally toward each other; the provision in a dry shaving device of opposed parallel cutting edges and means for imparting relative movement to said edges, said movement having a component perpendicular to said edges and a lateral component at right angles thereto; the provision in a dry shaving device of opposed parallel cutting edges and means for imparting relative movement to said edges, said movement having a component perpendicular to said edges and a lateral component at right angles thereto and said lateral component exceeding the perpendicular component; the provision in a shaving device of relatively movable coaxial spiral cutting edges; the provision in a shaving device of relatively movable coaxial spiral cutting edges and means for moving said edges into positions in which they are always parallel to each other; the provision in a shaving device of relatively rotatable coaxial spiral cutting edges; the provision in a shaving device of relatively movable coaxial spiral cutting edges formed on spirals identical in diameter and pitch; the provision in a shaving device of relatively rotatable coaxial spiral cutting edges formed on spirals identical in diameter and pitch; the provision in a shaving device of relatively oscillatable coaxial spiral cutting edges; the provision in a shaving device of a shear plate of cylindrical configuration and a relatively movable cutter of similar cylindrical configuration and spirally contoured cutting edges on the shear plate and on the cutter; the provision in a shaving device of a shear plate of cylindrical configuration and a relatively rotatable cutter of similar cylindrical configuration and spirally contoured cutting edges on the shear plate and on said cutter; the provision in a shaving device of a shear plate of cylindrical

configuration and a relatively oscillatable cutter of similar cylindrical configuration and spirally contoured cutting edges on the shear plate and on the cutter; the provision of a shear plate of cylindrical configuration having slots therein the end portions of which are wider than the middle portions, cutting edges formed on the side walls of the middle portions of said slots, and a cutter adapted to cooperate with said cutting edges on the shear plate to effect a cutting action; and the provision of a shear plate of cylindrical configuration having slots therein and the walls of said slots being provided with cutting edges and guard means associated with said shear plate having slots adapted to register with the slots of said shear plate and having widened portions adapted to receive hair and means to guide it toward the cutting edges of the slots of the shear plate.

For the attainment of these objects and such other objects as will hereinafter appear or be pointed out I have illustrated several embodiments of my invention in the drawings in which:

Figure 1 is a longitudinal sectional view through one embodiment of my invention taken substantially on the line 1—1 of Figure 3, looking in the direction of the arrows;

Figure 2 is an end view thereof;

Figure 3 is a plan view thereof;

Figure 4 is a sectional view taken substantially on the line 4—4 of Figure 1, looking in the direction of the arrows;

Figure 5 is an enlarged view of a detail of the embodiment of Figure 1;

Figures 6 and 7 are sectional views taken respectively on the lines 6—6 and 7—7 of Figure 5 looking in the direction of the arrows;

Figure 8 is a sectional view of a portion of a modified form of the embodiment of Figure 1 taken substantially on the line 8—8 of Figure 9 looking in the direction of the arrows;

Figure 9 is a plan view of a portion of the modified form of Figure 8;

Figures 10 and 11 illustrate further modifications, these views being similar to Figure 8;

Figure 12 is a transverse sectional view of another embodiment of my invention, this view being taken substantially on the line 12—12 of Figure 13; and

Figure 13 is a longitudinal sectional view of the embodiment of Figure 12 taken on the line 13—13 of Figure 12, and looking in the direction of the arrows.

Before proceeding with the detailed description of the various embodiments of my invention

I will premise that in all of them the cutting is effected by cutting edges relatively movable toward each other and laterally of each other so as to effect a "slicing" cut. In all of the illustrated embodiments these cutting edges are at all times parallel to each other so that the area of cutting is a distributed one instead of taking place successively at various points as in the ordinary scissors, and in all of them the cutting edges are spirally contoured and the relative movement is a rotational movement about the axis of the spirals and without any axial movement.

On referring particularly to Figures 1 to 4 inclusive it will be observed that I there show a shaving device comprising a cylindrical cutter 20 surrounded by a casing 22 and rotatably mounted therein. The cutter 20 is shown as provided with a pair of spiral threads 24 running around it and one edge portion 26 of each of these threads is formed into a continuous helical or spiral cutting edge that is adapted, conjointly with a plurality of cutting edges 28 formed on the side walls of ribs 34 separated by slots 30 provided in the upper wall of the casing and forming what may be termed a shear plate, to effect a cutting action. While I have shown two such spiral cutting edges 26, it is to be understood that more than this number or only one such spiral cutting edge may be used, the exact number not being essential.

The cutting edges 28 of the ribs lie in the cylindrical surface forming the walls of the bore 32 within which the cutter is positioned, and the cutting edges 28 also are helically or spirally pitched. While they may be part of one helix this is not necessarily so. In the drawings I have shown the cutting edges 28 as being parts of a plurality of helices, the exact number of helices indicated being four. However the exact number used is not essential to my invention and may be greater or less than four.

The pitch of the helices along which the cutting edges of the shear plate and of the cutter are formed are however identical, whereby they are always parallel to each other.

When the cutter 20 is rotated it will be obvious that the cutting edge 26 approaches the cutting edges 28 in a diagonal direction while always remaining parallel to said cutting edges in all positions thereof. As it crosses a cutting edge 28 there will be simultaneous engagement of all portions of the cutting edge 28 with a section of the cutting edge 26.

By referring to Figures 5, 6 and 7 which illustrate the shear plate on a larger scale it will be observed that the ribs 34 are shown as having their side walls at their mid-portions parallel, and the same is true of the slots. It will also be observed by referring to Figure 6 that the ribs at this point are shown as relatively thin so that the cutting edges 26 and 28 are located relatively near the surface to be shaved, and a close shave may therefore be effected. It will further be observed that the slots are shown as relatively narrow at this point, while the ribs are relatively wide. At their end portions however the slots are shown at 36 as relatively wide, while the ribs are relatively narrow as shown at 38. Intermediate their mid portions and their end portions, the slots are shown as gradually changing in width so as to merge respectively into the end portions and into the middle portions, and the same is true of the ribs. I have found in practice that a slot width of the order of between twelve one-

thousandths and twenty one-thousandths of an inch at the narrow portions of the slots and a corresponding rib thickness of four one-thousandths of an inch give very satisfactory results.

It will also be observed from Figure 7 that the ribs are shown as thicker near their end portion. This is for the purpose of strengthening the ribs and to compensate for the reduction in their width and is unobjectionable because at this point no shaving takes place and it is unnecessary for the ribs to be thin.

Consideration of what takes place during the shaving operation will indicate the desirability of this construction. The shaver when in use is intended to be moved transversely to its longitudinal extent that is to say, substantially in the direction of the slots and the wide entrance portion of the slots will serve to catch a great proportion of the hairs encountered by the shaver, and as the shaver is moved further these hairs will be guided into the narrow cutting portions of the slots. If the entrance portions were made narrow a much smaller proportion of the hairs would enter the slots. Such hairs as do not enter the slots would pass under the ribs and escape the shaving action.

The cutter is shown as provided with journalled portions 40 and against these journalled portions press plungers 42 actuated by helical springs 44 both plungers and springs being positioned within bores 46 provided in the casing 22 these bores being closed by set screws 48. As a result of the resilient pressure of the plungers 42 the cutter is at all times kept in contact with the shear plate portion of the casing, so that the proper cutting action will be obtained.

Suitable means for rotating the cutter are shown by way of example in the form of a train of gears comprising a gear 50 fastened directly to the cutter, a gear 52 in mesh therewith, and the intermeshing gears 54 and 56, the latter positioned on the drive shaft 58, while the gears 52 and 54 are on an arbor 60 journalled in the casing 22.

The bore 32 of the casing is shown as closed by end pieces 62 held in place in any suitable or preferred manner and vent openings 64 are shown as positioned in the sides of the casing for the purpose of permitting the shaving waste to escape.

At the ends of the shear plate portion the casing 22 may be thickened as indicated at 66 thereby serving to reinforce said shear plate portion, which, as has already been mentioned, should be made relatively thin to effect close shaving.

In Figures 8 and 9 I have shown a modification of the embodiment of Figure 1 in which guard members 70 and 72 are shown superposed over the shear plates. Each guard member is shown as provided with ribs 74 positioned so as to register with the ribs 34' of the shear plate, and these ribs are shown as having tapered end portions, as indicated at 76, whereby the slots between the ribs flare outwardly. The outer surfaces of the ribs 74 of both members 70 and 72 are shown as lying in a single plane, so that they present a substantially flat surface intended to be placed in contact with the surface to be shaved when the shaver is in use. It will be noted that the slots between the ribs are shown as of maximum depth at their outer portions and decrease in depth inwardly to a point at which a portion 78 of the ribs of the shear plate is exposed. It is at this latter portion that the

close shaving is effected, although the cutting action is not confined thereto.

While the ribs 74 have been shown as of uniform width in a vertical direction, that is, passing from their outer surfaces downward, it may be found desirable for certain purposes to vary the width so that it is least at their outer surfaces, whereby the slots between the ribs will be widest at their outer portions and narrowest where they meet the ribs of the casing.

It would be superfluous to describe the other details, such as the cutter 20' and the casing 22', since these are intended to be similar to the correspondingly numbered parts of the embodiment of Figure 1. It may be mentioned however that while I have indicated the guard members 70 and 72 as removably fastened to the shear plate by screws 80 and 82 it is understood that they may be formed as integral portions of the casing 22' or that they may be permanently rather than removably secured thereto.

A modification in which the shear plate 94 is shown as projecting beyond the upper surfaces of the guard members 90 and 92, which are otherwise similar to the guard members 70 and 72 of Figures 8 and 9, is shown in Figure 10.

A construction in some respects the reverse that of Figure 10 is shown in Figure 11. In this case the projecting portions 104 of the shear plate are situated at the lowest point of a concavity formed by the peculiarly shaped guard members 100 and 102, which have the side portions of their outer surfaces raised above their inner portions.

In Figures 12 and 13 I have shown a construction in which while the cutting edges both of the shear plate and of the cutter are formed on similar coaxial spirals, their relative motion is an oscillatory one instead of a rotating one. This enables a double cutting action to take place and for this purpose both side walls of the ribs in the shear plate as well as both sides of the ribs of the cutter are provided with cutting edges. Since the oscillation takes place through a limited arc and not through a complete circumference the cutter need not be made in the form of a cylinder, but may comprise only a portion of a cylindrical surface.

In the illustrative embodiment of Figures 12 and 13 I have shown a yoke 120 mounted for oscillation about trunnions 122 journaled in the casing 136 and actuated by a crank 124 carried by a rotating drive shaft 126 slidable in the slot 128 provided on the yoke. A pin 130 is shown as projecting from each trunnion 122 and as having its end fitting into an opening or slot 132 provided in a slotted cutter plate 134, which is shaped so as to contact with the inner wall of an arched shear plate forming part of the casing 136, this shear plate having its inner surface constituting a portion of a cylinder. A

coiled compression spring 131 is shown as positioned on each pin 130, and as abutting against the trunnion 122 at one end and against the cutter plate at its other end, so as to press the cutter plate 134 against the shear plate.

The shear plate proper is constituted by ribs 137 having slots 138 between each pair of ribs and the cutter is similarly constituted by ribs 140 having slots 142 intermediate each pair of ribs. The cutting edges are formed on both side walls of the ribs and as the cutter is oscillated the respective cutting edges of the cutter and the shear plate effect a cutting action as in the other embodiments heretofore described, except that in said other embodiments the cutter moves in one direction, while in the present instance the cutter moves backwards and forwards and is active in both directions. It will be understood that other features mentioned in the preceding embodiments and not in connection with this embodiment may also be incorporated therein.

While I have shown and described several illustrative embodiments of my invention it will be understood that the same may be embodied in many other forms as will be obvious to those skilled in the art, and that the disclosure herein is intended to be by way of illustration only and is not to be interpreted in a limiting sense, and that I do not limit myself other than as called for by the prior art.

Having thus described my invention and illustrated its use, what I claim as new and desire to secure by Letters Patent is:

1. A shaving device having a rotatable cutting member with a pair of similar coaxial spiral cutting edges thereon, and complementary stationary cutting edges that are segments of four spirals similar to and coaxial with the spirals along which the cutting edges of said cutting member are formed, and means for rotating said cutting member relatively to said stationary cutting edges.

2. A shaving device having a rotatable cutting member provided with cutting edges thereon in the form of double screw threads and complementary stationary cutting edges that are segments of quadruple screw threads coaxial with and having the same pitch and diameter as said screw threads on said cutting member, and means for rotating said cutting member.

3. A shaving device having a rotatable cutting member provided with cutting edges thereon in the form of double screw threads and complementary stationary cutting edges that are segments of quadruple screw threads coaxial with and having the same pitch and diameter as said screw threads on said cutting member, means for rotating said cutting member, and resilient means for pressing said rotatable member against said stationary cutting edges.

GODFREY DALKOWITZ.