Jan. 11, 1938. L. C. NICHOLL 2,105,223

HAIR CLIPPER

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Fig. 1

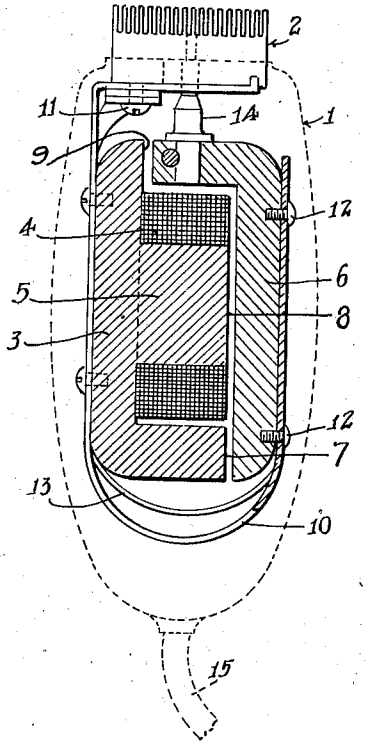
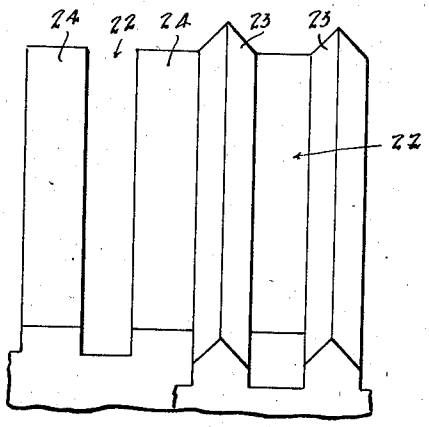


Fig. 4



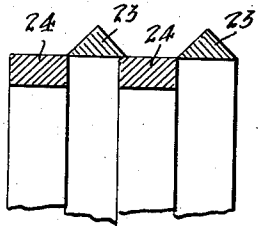


Fig. 5

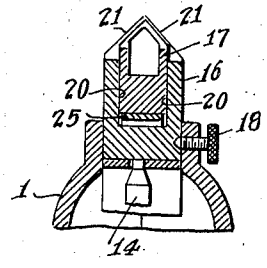


Fig. 3

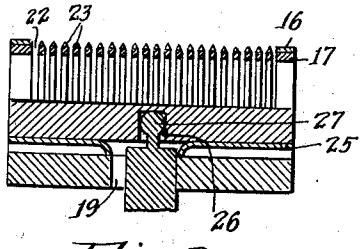


Fig. 2

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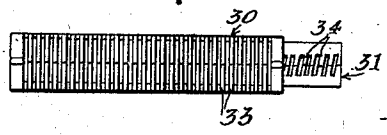
Fig. 6



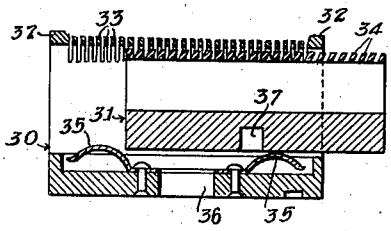
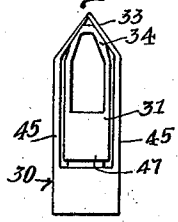


Fig. 7

Fig. 8



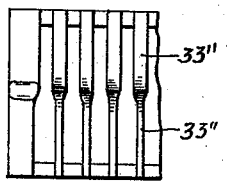


Fig. 11

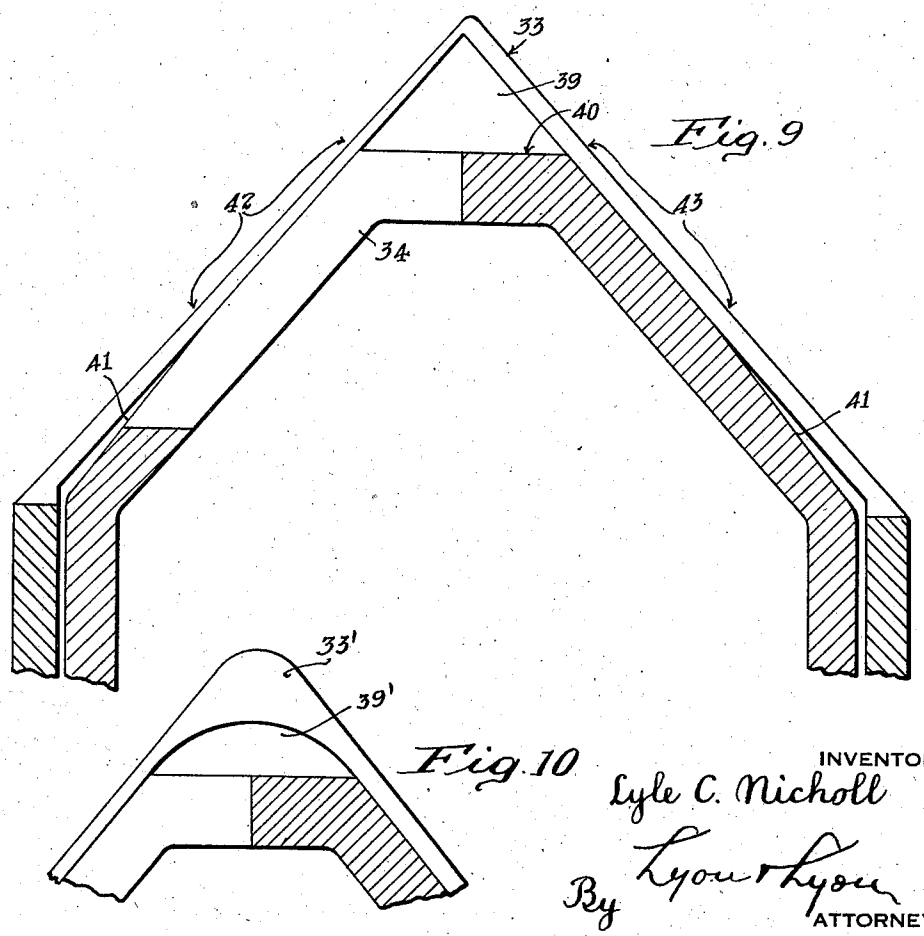


Fig. 9

Fig. 10

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2,105,223

UNITED STATES PATENT OFFICE

2,105,223

HAIR CLIPPER

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Application February 5, 1937, Serial No. 124,210

2 Claims. (Cl. 30—43)

This invention relates to hair clippers and particularly to cutting heads therefor.

A broad object of the invention is to provide a simple and practicable cutting head for a hair clipper which is capable of cutting either long or short hair smoothly and rapidly and cutting it very close to the skin without danger of injury to the skin so that it can be used for shaving in place of a razor.

A particular specific object of the invention is to provide a dual purpose cutting head having two skin-contacting faces one of which is dimensioned to cut hair more closely to the skin than the other.

The manner in which the foregoing objects are achieved, together with various more specific objects and features of the invention, will be explained by describing in detail with reference to the drawings some specific embodiments of the invention.

In the drawings:

Fig. 1 is a side view of a complete clipper incorporating the invention, the actuating mechanism being shown in section and the exterior of the case being indicated in dotted lines;

Fig. 2 is a central section taken longitudinally through the clipper head disclosed in Fig. 1;

Fig. 3 is a detailed cross section through the head of the clipper shown in Fig. 1, taken at right angles to the sectional view of Fig. 2;

Fig. 4 is a greatly enlarged detail side view of the clipper head shown in Figs. 1 to 3;

Fig. 5 is a detail sectional view of a portion of the head taken in the same plane as Fig. 2 but greatly enlarged;

Fig. 6 is an end view of a modified cutting head with the reciprocating cutter partially withdrawn to show its shape;

Fig. 7 is a central longitudinal sectional view of the head disclosed in Fig. 6, the inner cutter being shown partly withdrawn from the outer cutter;

Fig. 8 is an edge view of the head disclosed in Fig. 6;

Fig. 9 is a greatly enlarged cross section taken through the tip portion of the head shown in Figs. 6, 7, and 8; and

Fig. 10 is a detailed enlarged cross section showing an alternative construction to that shown in Fig. 9; and

Fig. 11 is a detail enlarged end view of a portion of a clipper head differing from that shown in Fig. 6.

Referring first to Figs. 1 and 2, the simplest form of my clipper comprises a case 1 adapted to support on one end a clipper head indicated generally at 2, and adapted to contain therewithin an electric driving mechanism for actuating the head. Various forms of driving mechanism may be employed but the particular one disclosed comprises an electro-magnetic device consisting of a core 3 of magnetic material having an energizing winding 4 mounted on a pole piece 5 of the core 3 with a cooperating armature 6 which is normally positioned in spaced relation with respect to faces 7, 8, and 9 of the core 3, the armature serving to complete a magnetic circuit between the faces 7 and 8, and 8 and 9, respectively. The core piece 3 is rigidly attached to a spring steel supporting strip 10 which in turn is secured to the case 1 at one end as by a screw 11.

The other end of the spring member 10 extends around the pole 3 and is secured to the armature 6 as by screws 12, the member 10 serving to resiliently support the armature 6 in spaced relation with respect to the core 3. To increase the spring tension urging the armature 6 away from the core piece, an auxiliary spring 13 may be provided. The armature 6 has attached thereto at its forward end a pin 14 which extends out beyond the limits of the case 1 and engages with the movable portion of the head 2. When the coil 4 is energized with alternating current supplied thereto from a light socket over a cord 15, the armature 6 is vibrated at the frequency of the supply current.

The head 2 comprises a stationary element 16 and a reciprocable element 17. The stationary element 16 preferably consists of a substantially rectangular base portion adapted to fit into a socket provided therefor in the end of the case 1 and may be secured in position by a thumb nut 18. This element is provided with a central slot 19 in the base to receive pin 14 and permit the latter to vibrate. The interior of the element 16 is smoothly machined to provide a pair of juxtaposed parallel walls 20 which slidably receive and support the vibrating element 17. The outer end of element 16 is beveled to provide a pair of substantially flat faces 21 which intersect each other at an angle. The interior of the element 16 is also machined away to form relatively thin walls below the faces 21 and parallel thereto. The tip of the element also has slots 22 therein extending transversely thereacross and uniformly spaced to subdivide the tip portion of the wall into a plurality of bars or teeth 23 which are anchored at their opposite ends to the main portion of the element 16, thereby rigidly supporting them.

The vibrating element 17 constitutes a cutter

bar cooperating with the teeth 23 and is similar in general shape to the element 16, having slots therein defining teeth 24 which reciprocate back and forth below the stationary teeth 23. The inner surfaces of the teeth 23 and the outer surfaces of the teeth 24 on the reciprocable element are machined to fit snugly together to provide a shearing action and the element 17 is constantly urged outwardly to maintain its teeth 24 in contact with the teeth 23 of the stationary element by a flat spring 25 positioned between the bottom face of the element 17 and the bottom of the chamber in element 16 in which it is positioned, the element 17 sliding on the spring 25 when it is reciprocated.

The element 17 is provided with a slot 26 in its lower surface to receive a ball 27 on the extreme outer end of the driving pin 14. The teeth 24 on the vibrating member are slightly wider than the slots between teeth 23 on the stationary member to maintain the cutting surface of the teeth in the same planes at all times. The outer teeth 23 are preferably tapered or rounded on their outer surfaces, as shown in Fig. 5, to permit the skin to be forced close to the cutting edges of the teeth and thereby cut hair closely.

By virtue of the fact that the two faces 21 are inclined at an angle to each other as in the manner described and the teeth 23 are also rigidly supported at their opposite ends, they may be made relatively thin and still be self-supporting. It is advantageous to make the outer stationary teeth 21 thin in order to permit close clipping. As a matter of fact, these teeth can be made thin enough to clip hair so close that the device may be used as a substitute for a razor.

The V construction of the cutting head has a further distinct advantage over devices in which the cutting teeth lie in a single flat plane, in that it will readily cut hair of almost any length. Thus in use the device is so positioned that one or the other of the surfaces 21 lies substantially flat against the skin. Therefore, when the device is advanced over the skin long hairs can penetrate freely into the slots 22 and be cut. Obviously, very long hairs will be cut twice; once close against the skin by the face lying against the skin and again by the other face at a distance therefrom. This, however, is no disadvantage. That portion of the cut hair which lies within the movable element 17, of course, accumulates there but may be readily removed by blowing through the device since it is open at both ends.

The modified head construction shown in Figs. 6, 7, 8, and 9 comprises a stationary outer member 30 of the same general shape as the stationary member 16 in Figs. 2 and 3 and an inner reciprocable member 31 of the same general shape as the inner member 17 in Figs. 2 and 3. The outer member 30 is adapted to be supported in the case 1 shown in Figs. 1 and 3 and in fact the whole head construction shown in Figs. 6 to 9 can be substituted for that shown in Figs. 1 to 5.

The essential differences between the head construction shown in Figs. 6 to 9 and that shown in Figs. 1 to 5 is that the outer member 30 has cutting bars which are thinner on one face than on the other and the inner member 31 is so shaped as to bear against the outer cutting bars of the member 30 only along restricted areas on opposite sides of the apex, has its slots and bars disposed at an angle relative to the slots and bars of the outer member and has wider slots and bars than the outer member so that all of the bars on the inner member do not simultaneously move into shearing position with respect to the outer bars. The outer member 30 also differs from the outer member 16 in that the end bars are thicker than the intermediate bars to increase the strength of the member and reduce the possibility of damage thereto from being dropped or struck.

Thus referring to Fig. 7, it will be observed that the end bars 32 of the outer stationary shearing member 30 are much thicker than the intermediate bars 33 and project beyond the outer surfaces of bars 33. With this construction if the head should be dropped onto a hard floor or other object the heavy end bars 32, since they project out beyond the intermediate bars 33, are most likely to receive the force of the impact and prevent contact of the floor or other object with the bars 33. By reason of their greater thickness the bars 32 are able to withstand substantial blows without deformation. When the device is in operation and is pressed against the skin, the skin yields sufficiently to permit contact of the outer surfaces of the intermediate bars 33 with the skin so that the greater thickness of the bars 32 does not interfere with the operation of the device.

As shown in Fig. 7, the stationary member 30 has 28 intermediate teeth 33 whereas the reciprocable member 31 has 24 teeth or bars 34, the bars 34 being accordingly wider (in the direction of motion) and more widely spaced than the bars 33. As a result of this construction, different bars 34 successively move into shearing engagement with the bars 33 as the member 31 is reciprocated, thereby distributing the load over a substantial part of each cutting stroke of the inner member instead of having the total shearing load occur at the same instant during each stroke. This assures much smoother operation because when shaving tough coarse hair the force required is relatively great to move the inner member when all the slots are filled with hair and the shearing edges of all the bars cut the hair simultaneously. In fact, the load may suddenly increase to such a value as to stall the device unless a relatively powerful motor is employed. However, by employing different numbers of and differently spaced teeth on the inner and outer members as described, only a small number of the bars are in shearing engagement at any instant so that the maximum load on the motor is greatly reduced and the possibility of the device stalling is correspondingly reduced.

By extending the outer bars 33 straight across the head perpendicular to the direction of movement of the inner cutter and extending the inner bars 34 at an oblique angle to the direction of motion, the load is further distributed over each stroke by virtue of the fact that only a small portion of each shearing edge on each bar 34 contacts with the cooperating outer bar at any instant, the point of shearing contact on each bar moving from one side of the head across to the other. The angling of the teeth or bars 34 also promotes more free sliding motion between the inner and outer bars.

As shown in Fig. 7, the spring construction for pressing the inner member 31 outwardly against the outer end of the stationary member 30 is slightly different from that disclosed in Fig. 2. In the construction shown in Fig. 7, two curved leaf springs 35 are employed, each anchored at one end adjacent the central aperture 36 in the base of the member 30 and extending outwardly therefrom. The aperture 36 corresponds to the aperture 19 in the embodiment shown in Fig. 2 and the inner member 31 is provided with a

hole 37, corresponding to the hole 26 in Fig. 2, for receiving the end of the driving arm.

Referring now to Figs. 8 and 9, it will be observed that the cutting bars 33 on the stationary member are relatively thick and substantially uniform in thickness from end to end on one face (the right face in Fig. 9) and are thinner and tapered in thickness from the base toward the apex on the other side (the left side in Fig. 9). In general, the closeness with which hair can be cut in a device of the type described depends upon the thickness of the outer bars. The thinner these bars are made, the closer the hair can be cut. However, if the bars are made too thin, there is a possibility of irritating the skin and it is easier to irritate some skins than others. Thus some individuals can employ a clipper having much thinner outer blades without discomfort than can others. By making the blades or bars on the two skin-contacting faces of the outer member of different thicknesses as shown in Fig. 9, I provide a dual purpose instrument capable of shaving with two different degrees of fineness.

For extremely close shaving I also find it desirable in the construction described to taper the thickness of the outer bars from the base ends toward the apex as shown on the left side of Fig. 9. This provides extreme thinness at the leading ends of the bars where most of the hair shearing takes place while providing stiffer bars than if they were made uniformly thin from end to end.

It will be observed from Fig. 9 that the bars 34 of the inner cutter are ground off or truncated at the apex so that they do not contact the outer bars 33 at the extreme end, a space 39 being left between the outer faces 40 of the truncated bars 34 and the angle defined by the apical ends of the bars 33. The bars 34 are also preferably beveled off at their outer edges as indicated at 41 so that shearing contact between the plates 33 and 34 is limited to the areas 42 and 43 on the respective skin-contacting faces, the width of each area (measured longitudinally along the bars) being substantially less than the total width of each skin-contacting face.

The construction described with reference to Fig. 9 has several advantages. It is found that in the hands of the average user there is less likelihood of the device irritating the skin if the inner and outer bars are not in shearing engagement at the apex, it being easier to force the skin through the slots between the outer bars at the apex than at a distance from the apex.

I also find that there is no real need of extending the shearing surfaces over a substantial distance along the outer bars 33 for the reason that practically all hairs entering the slots are cut off before they move any appreciable distance along the slots. In other words, practically all cutting takes place within a very short distance of the upper edges of the shearing surfaces 42 and 43.

There is a positive advantage in reducing the area of the shearing surfaces. In the first place, less spring pressure is required to maintain the inner and outer bars in shearing engagement which reduces the amount of power required to reciprocate the inner member. In the second place, it is easier to maintain perfect shearing contact over the narrow shearing areas 42 and 43 of Fig. 9 than over the wide shearing areas in the construction shown in Fig. 3, in which the inner bars are in shearing engagement with the outer bars over the entire length of the inner bars. In practice the inner member 31 is fitted quite snugly between the parallel walls 45 of the outer member so that relatively little lateral motion of the base of the inner member with respect to the outer member can take place. However, any slight lateral motion of the base tends to unseat portions of the shearing surfaces of the inner member from the shearing surfaces of the outer member and this effect is greater where the shearing areas 42 and 43 are relatively wide than when they are relatively narrow. Thus it will be apparent that if the widths of the shaving areas 42 and 43 were reduced to a line, then shearing engagement would always be maintained on each side of the head regardless of lateral movement of the base portion 47 of the inner member 31. It is not desirable, however, to restrict the shearing areas to lines and I have found that in a commercial device it is not necessary to so restrict them in order to maintain substantially perfect shearing contact.

It is not essential that the outer bars 33 be extended straight toward the apex past the shearing surfaces 42 and 43 as shown in Fig. 9. Thus the apical ends of the bars 33 may be rounded off as indicated at 33' in Fig. 10 and the bars may be thickened at the apex as shown in Fig. 10, thereby decreasing the size of the free space 39', without in any way interfering with the shearing action of the bars. The thickening of the bars at the apex as indicated in Fig. 10 is desirable in that it increases the strength and rigidity of the bars.

The closeness of shaving can be varied by varying the width of the slots between the outer bars, as well as by varying the thickness of the outer bars. Wider slots allow the skin to come closer to the inner cutter and permit closer shaving than narrow slots, even though the thickness of the outer bars be unchanged. Fig. 11 shows a dual purpose clipper construction in accordance with the invention in which the outer bars 33'' are narrower on one skin-contacting face than on the other, thereby providing one face with wide slots between the outer bars for close shaving and another face with narrower slots for coarser shaving. It is to be understood that if desired the bars may differ both in thickness (as shown in Fig. 9) and in width (as shown in Fig. 11) on the two sides of the head.

The closeness of shaving can also be varied to a certain extent by varying the extent to which the apex of the inner member is cut off. With slots and bars of fixed dimensions, closest shaving will be obtained when the inner cutter is not truncated at all (Fig. 3) and coarser but safer shaving when a substantial portion of the apex of the cutter is ground off as shown in Fig. 9.

Although the invention has been explained by describing certain specific modifications thereof, it is to be understood that various changes from the specific structures shown may be made without departing from the invention which is to be limited only as set forth in the appended claims.

I claim:

1. A hair clipper head comprising a stationary shearing member in the shape of a V trough, the exterior of which defines two skin-contacting faces angularly positioned relative to each other and intersecting substantially at the apex of the V, said member having slots extending

across said apex and a substantial distance therebeyond on either side whereby the end of said member is divided into V-shaped cutting bars, and a cooperating reciprocating shearing member having teeth seating against the inner surfaces of said V-shaped cutting bars of the stationary member, said teeth having two juxtaposed shearing surfaces contacting said V bars over two shearing areas on the opposite sides of the V, each shearing area having its inner edge spaced from the apex of the V and its outer edge spaced a substantial distance from the outer end of the adjacent side of the V.

2. A hair clipper head comprising a stationary shearing member in the shape of a V trough, the exterior of which defines two skin-contacting faces angularly positioned relative to each other and intersecting substantialy at the apex of the V, said member having slots extending across said apex and a substantial distance therebeyond on either side whereby the end of said member is divided into V-shaped cutting bars, and a cooperating reciprocating shearing member having teeth seating against the inner surfaces of said V-shaped cutting bars of the stationary member, said reciprocating member having opposite angularly disposed plane side surfaces in shearing contact with the inner surfaces of said V trough stationary member over juxtaposed areas spaced from and on opposite sides of the apex of the V, the outer end surface of said reciprocating member intermediate said plane surfaces being spaced from the inner surface of the stationary member and the lateral surfaces of said reciprocating member rearwardly of said plane surfaces being also spaced from the juxtaposed inner surfaces of the stationary member.

LYLE C. NICHOLL.