July 4, 1939. J. H. RAND, JR., ET AL 2,164,424

CUTTER BAR FOR DRY SHAVERS

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Fig. 1

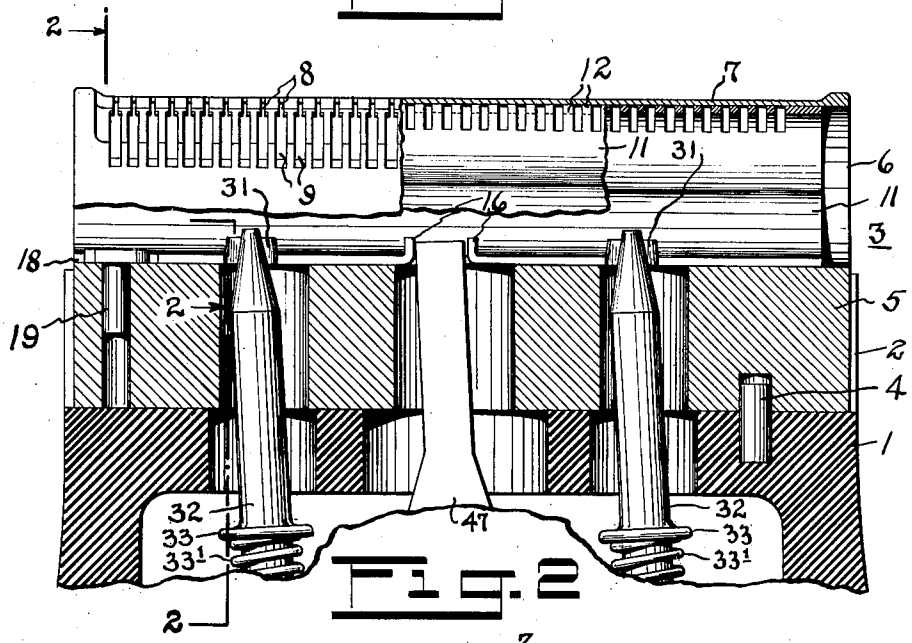
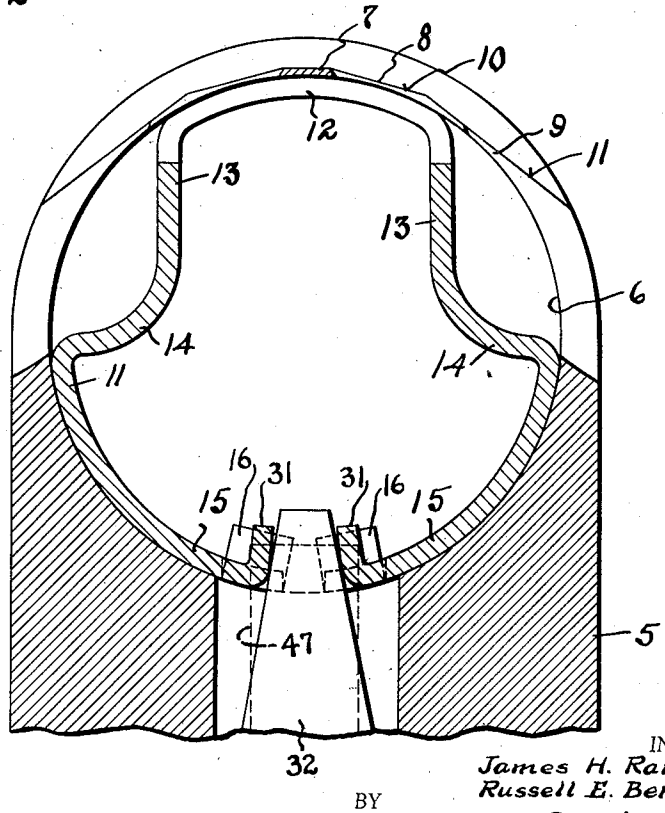


Fig. 2



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Fig. 3

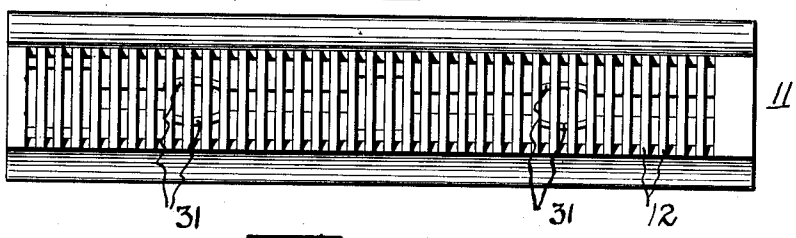


Fig. 4

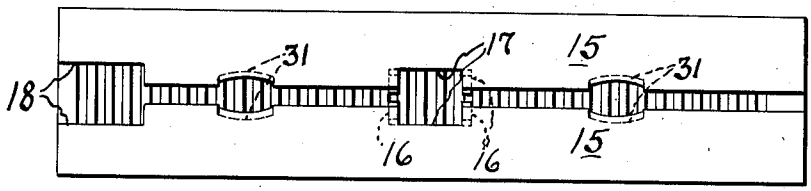


Fig. 5

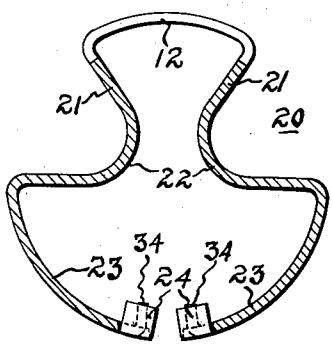


Fig. 6

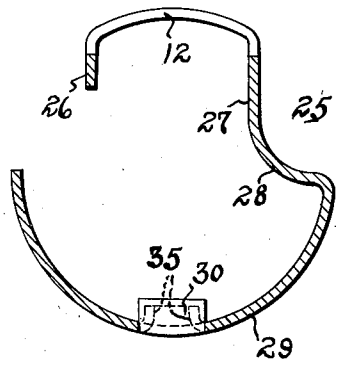
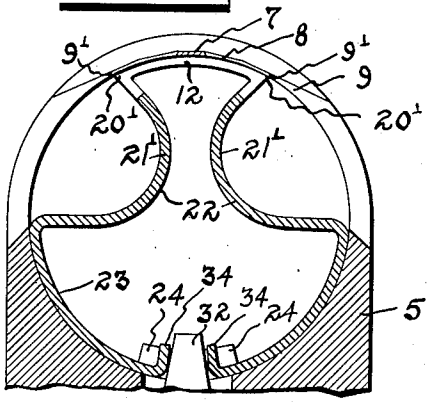


Fig. 7



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CUTTER BAR FOR DRY SHAVERS

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Application July 2, 1937, Serial No. 151,650

5 Claims. (Cl. 30—43)

This invention relates to improvements in clipping devices or dry shavers with particular relation to the construction of the inner cutter.

An object of this invention is to provide an inner cutter made of thin sheet steel of suitable characteristics formed and shaped for the intended purposes herein disclosed.

Another object of this invention is to provide an inner cutter for a dry shaver which by reason of its yielding construction provides, with means for exerting resilient forces thereon, cooperation between it and the outer shear plate.

These and many other objects, as will appear from the following disclosure, are secured by means of this invention.

This invention resides substantially in the combination, construction, arrangement and relative location of parts, all as will be described in greater detail in the following specification.

In the accompanying drawings:

Fig. 1 is a side elevational view with some parts broken away of a shaving head employing the inner cutter of this invention;

Fg. 2 is a cross sectional view taken on the line 2—2 of Fig. 1;

Fig. 3 is a top plan view of the inner cutter of Fig. 1;

Fig. 4 is a bottom plan view thereof;

Fig. 5 is a vertical, cross-sectional view through a modified form of inner cutter in accordance with this invention;

Fig. 6 is a similar form of a still further modification; and

Fig. 7 is a cross-sectional view similar to that of Fig. 2 showing another form of inner cutter.

Dry shaving devices of the type to which this invention relates as now in commercial use employ an inner cutter operating in back of the outer shear plate held in the necessary cooperative relation therewith by means of some form of spring pressure mechanism. The general object of this invention, in addition to securing advantages by way of reduction in the cost of manufacture, is to provide an inner cutter so constructed as to facilitate the application of a yielding pressure between it and the outer shear plate throughout the active cutting areas thereof.

Referring to the drawings, there is shown a portion in cross-section at 1 of a suitable form of housing commonly employed with devices of this type in which the motor, not shown, is mounted and on the end of which the shaving head itself is secured. In accordance with common practice, the shaving head, which is generally indicated by the reference numeral 3, is mounted in a groove on the end of the housing formed by the extending side walls, of which one is indicated by the reference numeral 2. In accordance with the illustration herein employed the shaving head includes an outer shear plate illustrated as comprising a block or body portion 5 of suitable steel which has a substantially semi-circular end and is longitudinally bored, as indicated at 6, to form a thin wall 7. In accordance with the illustration, this thin wall is provided with two series of slots extending transversely of the longitudinal axis of the bore at the thin wall portion and disposed in a pair of rows arranged on opposite sides of a longitudinally extending central strip of metal, as is clear from Fig. 2. As illustrated, each slot comprises a relatively narrow portion 8 of uniform width and a relatively wide portion 9 of uniform width which together define the cutter bars of the outer shear plate. The outer faces of the cutter bars thus formed are ground away or otherwise made flat on planes, as indicated at 10 and 11, which intersect at acute angles with a plane common to their line of intersection. This reduces the thickness of the cutter bars, as is clear from Fig. 2, to facilitate close shaving.

The inner cutter is formed up from a sheet or strip of suitable steel, of a thickness of the order of 0.020 of an inch, so as to have an end wall which is transversely slotted to provide the cutter bars 12. These cutter bars are longitudinally curved to ensure proper mating with the rear faces of the cutter bars of the outer shear plate. The end wall sharply curves into a pair of side walls 13 which extend downwardly and merge into the curved wall portions 14. The terminal ends 15 are sharply and reversely curved with respect to the walls 14 and terminate close to each other to define a parallel sided slot, as is clear from Fig. 4. After the sheet or strip is formed up as shown and the slots formed therein, the slotted end may be hardened to properly temper the cutter bars. It is, of course, apparent that other procedure and sequence of steps may be employed in the formation of this cutter bar. The normal position of the terminal ends 15 is such that they require some separation to expand the cutter bar in the bore 6 to urge the end wall, that is the cutter bars 12, against the rear faces of the cutter bars of the outer shear plate. Of course, as is shown in Fig. 2, the bar portions have a curvature to ensure proper mating with the bore 6. The formation of the cutter bars 12 so weakens the structure that the inherent resiliency of the bar is not sufficient to provide the necessary cooperating pressure between it and the outer shear plate. External

means described below provided this required pressure.

Near the longitudinal center of the bar on the bottom are the notches 17 which provide a recess for the end of the motor operated lever 47 which effects reciprocation of the inner cutter. The notches 17 are formed by striking up the wings 16 which provide bearing surfaces for the end of the operating lever. To ensure that this reciprocation be strictly rectilinear, a pair of notches 18 are formed at one end of the cutter bar in which the head of a pin 19, mounted in the body portion 5 of the outer shear plate, lies.

In view of the fact that the wall portions 13 of the inner cutter occupy the position shown, there is provided a considerable space in back of the portions 9 of the slots in the outer shear plate which permits the hairs to project thereinto in erect position as the device is moved so that the hairs pass into the portions 8, at which region the cutter bars 12 are active. The cutter head 3 is illustrated as being positioned on the end of the housing by means of a pin molded therein and received by a recess in the head.

Two additional pairs of ears 31 are struck up along the terminal edges of the portions 15 to form seats for the conical ends of the plungers 32. These plungers are provided with collars 33 which engage the ends of springs 33' which rest at their other ends on the bottoms of the recesses in which they are mounted. These plungers provide spring pressed members which because of their conical ends and the formation of the ears 31, expand the hollow cutter or separate the terminal edges so as to cause a uniform pressure engagement of the outer surfaces of the cutter bar against the surface of the bore 6. In addition these plungers force the inner cutter upwardly against the rear faces of the cutter bars and the outer shear plate to ensure the proper cooperating pressure between the two pairs of cutter bars.

In the modification of Fig. 5, a sheet of suitable steel is formed up to provide the end wall which may be slotted to provide the cutter bars 12 as before. The strip is then sharply bent at the ends of the cutter bars to form the converging wall portions 21 which extend into the uniformly outwardly curved portions 22, the terminal ends of which extend horizontally and then are sharply reversely curved into the longitudinally curved terminal ends 23. The wings 24 are formed by striking them up from the terminal ends to provide bearing surfaces and the operating lever receiving notch as described in connection with the structure of Fig. 4. In this modified form of cutter pairs of ears 34 are formed similar to the ears 31 of the previous construction and for the same purpose.

By converging the wall portions 21 of the cutter 20 the hair receiving spaces referred to above are enlarged so that even the longest hairs normally encountered meet no obstruction in passing through the portions 9 of the slots.

The modified form of cutter shown generally at 25 in Fig. 6 comprises the slotted end wall as before to provide the cutter bars 12. At one end of the cutter bars the wall portion 26 is relatively short, while at the other end it is longer, as indicated at 27. The wall 27 runs into the smoothly curved portion 28 and then is sharply bent around into the more or less semi-circular terminal end portion 29 which is provided with the wings 30, the formation of which leaves an opening to receive the end of the motor operated lever 47. In the case of this modification the ears 35 are struck up to receive the resiliently urged plungers 32 similar to the ears 31 of the construction of the first form described.

The constructions of Figs. 5 and 6 provide the advantages of the construction of the first figures in different form with respect to the inner cutter. After formation, the cutter end wall may be hardened to ensure their wearing and cutting qualities. It may be noted that the pin 19, in addition to ensuring rectilinear movement, prevents any angular or rotative displacement of the inner cutter with respect to the outer shear plate. Of course, the cutters of Figs. 5 and 6 will be arranged to cooperate with the pin 19 for the same purpose.

In the arrangement of Fig. 7 the inner cutter is substantially of the same form as that illustrated in Fig. 5 with the exception that the curved cutter bar portion 12 is connected to the inwardly curved portions 21' in a manner to form the sharp corners 20' at the ends of the cutter bars 12. These sharp corners are so positioned as to lie directly under the shoulders 9' formed by the union of the narrow and wide slots 8 and 9 respectively (see Fig. 1). With this arrangement a combing and cutting action which is very efficient is secured. The acute angle corners of the inner cutter at the end of the cutter bars 12 permit of the ready entry of the hairs into the narrow portions 8 of the slots. The shoulders 9' act to comb and guide the hairs in arcuate position into the narrow portion of the slots which action is facilitated by the presence of the corners 20' which hug closely to the rear faces of the outer cutter bars permitting of shearing action to the free ends of the inner cutter bars.

It will be apparent that the construction illustrated is capable of economical manufacture by machine methods in quantity without sacrificing accuracy.

We are, of course, well aware that those skilled in the art will appreciate the different modifications of the novel features herein disclosed, and we do not, therefore, desire to be strictly limited to the disclosure, but rather to the attached claims.

What we claim is:

1. The combination comprising an outer shear plate having a passage therethrough and transversely slotted to form cutter bars, a hollow thin-walled inner cutter having cutter bars formed therein and being narrower in the region of the cutter bars than at the remainder thereof in cross-section, said inner cutter being longitudinally split to form relatively movable sides adjacent the split, and spring pressed plungers engaging the inner cutter in the longitudinal slot to expand the cutter in the outer shear plate.

2. The combination comprising a hollow outer shear plate having cutter bars formed therein, an inner thin-walled cutter within the shear plate slotted to form cutter bars, the inner cutter being longitudinally slotted, and resilient pressure members engaging the inner cutter at the longitudinal slot to expand the cutter and force it against the rear faces of the cutter bars of the outer shear plate.

3. The combination comprising a hollow outer shear plate having cutter bars formed therein, an inner thin-walled cutter within the shear plate slotted to form cutter bars, the inner cutter being longitudinally split to form arms and notched intermediate its ends to receive an operating member, and a pair of spring pressed tapered end members engaging the inner cutter

at its longitudinal slot to expand it in the outer shear plate.

4. A dry shaver head comprising a hollow outer shear plate having cutter bars formed therein, a hollow inner cutter therein being longitudinally separated opposite the cutter bars, and an expander to place the cutter bars of the inner cutter under tension and press them against the rear faces of the cutter bars of the shear plate.

5. A dry shaving device as described comprising an outer member having a passage therethrough to form a thin wall which is transversely slotted to provide cutter bars, an inner hollow cutter mounted in said bore formed of a thin sheet of suitable steel into a hollow section which is longitudinally split, and spring pressed members engaging the inner cutter in the split to expand the inner cutter in said bore and force it against the rear faces of the outer cutter bars, said inner cutter being slotted to form cutter bars adjacent the outer cutter bars.

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