An object of my present invention is to provide a hair clipper which can be inexpensively manufactured and parts thereof readily assembled to provide a complete cutter head or hair clipper assembly, the device being intended primarily for clipping hair on the face and therefore used in connection with a clipper of the type commonly termed a "dry shaver" and a present application being a continuation in part of my copending application, Serial No. 131,149 filed March 16, 1937.

Another object of my invention is to provide a cutter head assembly in which the inner and outer cutters consist of relatively thin plates of spring steel or the like formed to the desired shape, the outer cutter plate being effectively reinforced by a plurality of relatively thick plates or blocks of metal which, together with the thin plate form the outer cutter, all the plates being riveted together to thereby form a rigid outer cutter unit.

Another object is to form the outer plate substantially U-shape, preferably with the corners of the U displaced beyond the planes of the arms thereof and the plate being slotted across the projecting corners which give a comb action during shaving operations to pick up the hair preparatory to clipping it.

Another object is to provide an inner cutter formed of a plate of metal shaped to fit the inside of the outer cutter plate or which has at least the teeth portion thereof fitting the teeth portion of the outer cutter plate, the shape of the inner cutter being comparatively open so that a cleaner (brush or the like) can be inserted therethrough and will readily clean out hair without necessitating disassembly of the cutters. The open center construction also facilitates removing the hair by blowing therethrough and minimizes the possibility of clogging because the hair clippings can readily fall or be jarred out during operation.

Still another object is to provide an inner cutter which has teeth spaced sufficiently far enough apart to prevent clogging thereof with waste skin tissue or sebaceous material during operation.

A further object is to provide a dry shaver cutter head which may be operated with a maximum of efficiency and a minimum of friction made possible by the use of a novel blasing means for the inner cutter to resiliently cause the clipper teeth thereof to maintain shearing contact with the clipper teeth of the outer cutter and the mechanism therefor consisting of slidable and oscillatable rods contacting with the inner cutter and spring urged into such contact, the oscillatable feature of the rods permitting them to oscillate with the sliding movement of the inner cutter so that friction between the rod and the inner cutter is eliminated.

A further object is to provide an outer cutter which includes a shear plate that can be formed inexpensively of sheet metal bent substantially U-shape and having its end edges rolled to reinforce the plate and at the same time provide an edge for the cutter head which prevents gouging of the cutter head into the skin of the user.

Still another object is to provide the outer cutter plate with a centrally located rib which serves as a reinforcement for the bottom part of the plate where it engages the face during hair clippings, the inner cutter being formed with an open center to clear the rib.

Still a further object is to provide an inner cutter which is formed of sheet steel or the like and which can be formed in a number of different shapes yet accomplish the same result of rigidity against torsional strain and pressure on the shearing teeth thereof, the inner cutter being capable of actuation by an actuating element of a dry shaver motor or the like.

With the foregoing and other objects in view, as will become evident as the description of my cutter head proceeds, my invention consists in the construction, arrangement and combination of the various parts thereof whereby the contemplated objects are attained as set forth in my specification, pointed out by my claims and illustrated in my drawings. With specific reference to the various views in the drawings:

Figure 1 is an enlarged sectional view through a dry shaver cutter head embodying my invention and showing the cutter head assembly mounted in a dry shaver casing.

Figure 2 is a side elevational view of the cutter head assembly, parts thereof being broken away and other parts being shown in section to illustrate details of construction.

Figure 3 is a plan elevational view of the inner cutter.

Figure 4 is an enlarged sectional view on the line 4–4 of Figure 2.

Figure 5 is an enlarged sectional view on the line 5–5 of Figure 2.

Figure 6 is a perspective view of the inner and outer cutters with the ends thereof cut off and shown in section.
Figures 7, 8, 9 and 10 are sectional views as taken on the line 7-7 of Figure 2, showing modified shapes of the inner and outer cutters.

On the accompanying drawings I have used the reference numeral 10 to indicate a dry shaver motor housing. A cutter head reception member 12 is mounted in the end of the motor housing for receiving the cutter head assembly indicated generally as H. The usual dry shaver includes an actuating arm or the like 13. By way of explanation, the arm 13 is shown as being pivoted on a shouldered screw 14 so that it may be oscillated by the dry shaver motor (not shown). The screw 14 is supported by a bracket plate 15 and a spring clip 16 serves the purpose of retaining the cutter head H in a normal position relative to the dry shaver motor housing.

My improved dry shaver cutter head assembly H comprises a plate 17 bent substantially U-shape and serving as an outer cutter, the arms of the plate 17 being indicated at 17a. These arms have diverging portions 17b and a bottom cross member or connecting portion 17c. The plate arms 17a are spaced by a pair of relatively thick plates 18, while outside the arms relatively thick plates 19 are provided. The arms 17a and the plates 18 and 19 are held rigidly assembled relative to each other as by rivets 17, 18 and 19. Two of the plates 18 are provided longitudinally spaced from each other with a space 21 between them for the actuating arm 13. Notches 17d are provided in the plate 17 and extend across the bends thereof between the diverging portions 17b and the connecting portion 17c. These provide spaced clipper teeth for the outer cutter and, due to the diverging character of the portions 17b, provide comb-like teeth to pick up the hair as the cutter head is moved across the face of the user so as to facilitate clipping of the hair by the outer cutter.

An inner cutter is provided which is also formed of a plate of sheet spring steel or the like. This plate is indicated generally at 22 and includes a back 22a. The back 22a has a perforation 23 through which the portion 17c is visible. These provide spaced clipper teeth for the inner cutter and, due to the diverging character of the portions 17b, provide comb-like teeth to pick up the hair as the inner cutter head is moved across the face of the user so as to facilitate clipping of the hair by the inner cutter.

The connecting portion 17c of the plate 17 is provided along its center with a rib 24, the notches 17d terminating short of the rib 24. The inner cutter plate 22 has flanges 22c also terminating short of the rib 24 so as to clear it. The rib 24 serves as reinforcement against bending or inward bowing of the relatively thin connecting portion 17c of the plate 17 which in actual practice is slightly thinner than the remaining portion of the plate due to a lapping operation of the inner and outer cutters to secure accurate fitting of the inner and outer cutter teeth together in shearing relationship to each other.

By constructing the outer cutter of the plate 17 as disclosed, I am able to use a comparatively thin plate so that the hair on the face can be clipped quite close to the skin, yet due to a number of features already described, the relatively thin plate is amply reinforced against any undesirable distortion during use. These features specifically consist in reinforcement by the plates 18 and 19, the diverging arrangement of the portions 17b of the plate 17 and the reinforcing rib 24. The plate 17 is further reinforced by rolling the end edges thereof as indicated at 25. The rolled edges 25 extend from the extremity of the ends of the plate and along the connecting portion 17c thereof, which construction serves as a protection against gouging of the edge of the plate into the skin of the user while using the cutter head.

Although I have shown the inner and outer cutters as being of one shape in Figures 5 and 6, they may be formed in other shapes as illustrated in Figures 7, 8, 9 and 10. The shape in Figure 7 is similar to that in Figure 1 with the exception that the diverging portions of the plate 17 are of a different angle and of less extent as indicated at 17b'. The head of the outer cutter indicated at 24' is of greater extent while the inner cutter plate has substantially parallel side flanges 22b' and the flanges 22c' thereof extend away from each other instead of toward each other.

The inner cutter is substantially centered by the bead 24'. The other elements of Figure 7 are similar to those of Figure 1 and accordingly bear the same reference characters.

Referring to Figure 8 the bead 24'' is of less extent than illustrated in Figure 1, while the sides 22b'' of the inner cutter converge downwardly instead of being parallel to each other.

In Figure 9 the converging side flanges 22b''' are connected together as by rivets 26. The inner cutter in this figure is illustrated as being made of substantially thinner metal and the rivets 26 connecting the sides thereof together serve the purpose of permitting one side to reinforce the other.

In Figure 10 the arms 17a' are substantially parallel throughout their extent and the connecting portion 17c' of the outer cutter 17''' omits the bead 24. The inner cutter is substantially rectangular in shape and the side flanges 22b''' thereof are rigidly connected together as by shouldered rivets 26'. The various modifications of the inner and outer cutters as heretofore mentioned are carried out as suggested yet the various advantages due to the construction in general of the cutter head assembly is retained with the various forms of cutter illustrated. The several shapes of outer cutter 17, 17', 17'' and 17''' are illustrated respectively in Figures 7, 8, 9 and 10.

It has been customary to urge the inner cutter into shearing contact with the outer cutter by
means of spring-pressed balls engaging the inner cutter, such balls necessarily imposing a certain amount of friction to resist free movement of the inner cutter relative to the outer cutter. I provide a means which urges the teeth into shearing contact yet minimizes the degree of friction involved. My mechanism for accomplishing this result consists of a pair of rods 27, slidably and oscillatably mounted relative to sleeve nuts 28. The sleeve nuts 28 are mounted in the plates 18 which are cut away so as to provide spaces 29 in which the rods 27 may oscillate (see Figures 2 and 4). Springs 30 are mounted on the rods 27 and are interposed between the nuts 28 and rounded heads 31 on the lower ends of the rods 27. The rounded heads 31 contact with the back 22a of the inner cutter to urge the teeth thereof into shearing contact with the teeth of the outer cutter. The rods 27 are provided with enlargements or heads 32 which, when the inner cutter is assembled in the outer cutter, are slightly spaced from the nuts 28 so that the springs 30 are free to act. When the inner cutter is removed from the outer cutter, however, these heads limit sliding movement of the rod 27 inwardly so that they do not become dislocated and are in position to properly coat with the inner cutter after it is assembled in the outer cutter. In operation the rods 27 will oscillate inasmuch as enlarged or tapered bosses 33 are provided in the nuts 28. In Figure 2 the inner cutter is illustrated as being moved slightly to the right of a central position and the rods 27 as swung slightly toward the right to illustrate the action thereof. As the movement of the inner cutter is slight, it is obvious that the oscillating movement of the rods 27 will also be slight and their sliding movement relative to the nuts 28 practically negligible. This results in reduction of friction to a minimum yet effective biasing of the inner cutter to shearing contact with the outer cutter is secured. Some changes may be made in the construction and arrangement of the parts of my device without departing from the real spirit and purpose of my invention, and it is my intention to cover by my claims, any modified forms of structure or use of mechanical equivalents which may be reasonably included within their scope.

I claim as my invention: 1. In a dry shaver cutter head, an outer cutter and an inner cutter, said outer cutter comprising a plate bent substantially U-shape, means for rigidly connecting the arms thereof in spaced relation to each other, said plate, across the bends thereof, having notches formed therein whereby to provide cutter teeth to coat with said inner cutter, and an imperforate rib formed along the center of the connecting portion of said U-shaped plate of metal having the same thickness as the plate, said teeth terminating short of said rib.

2. In a dry shaver cutter head, an outer cutter and an inner cutter, said outer cutter comprising a plate bent substantially U-shape, means for rigidly connecting the arms thereof in spaced relation to each other, said plate across the bends thereof having notches providing cutter teeth to coat with said inner cutter, and an inwardly directed bend extending longitudinally along the cross member of said U-shaped plate forming a rib, said rib being centrally located and projected toward the inner cutter a distance not greater than the thickness of the inner cutter and said inner cutter being formed to receive said rib.

3. In a dry shaver cutter head, an outer cutter and an inner cutter, said outer cutter comprising a plate bent substantially U-shape, means for rigidly connecting the arms thereof together, said plate across the bends thereof having notches formed therein whereby to provide cutter teeth to coat with said inner cutter, an inwardly directed bend extending longitudinally along the cross member of said U-shaped plate forming a rib, said teeth terminating short of said rib, said rib projecting toward the inner cutter a distance substantially equal to the thickness of the plate and said inner cutter having an open center receiving said rib.

4. In a dry shaver cutter head, an outer cutter and an inner cutter, said outer cutter comprising a plate of substantially U-shape, said plate having notches formed therein whereby to provide cutter teeth to coat with said inner cutter, said inner cutter comprising a plate bent, a pair of side flanges and a pair of terminal end flanges extending toward each other, said end flanges having notches formed therein to provide teeth to coat with the teeth of said outer cutter, said end flanges terminating spaced from each other to provide a space therebetween, and a rib formed on said U-shaped plate and located between said end flanges when the inner cutter is assembled relative to the outer cutter.

5. In a dry shaver cutter head, an outer cutter and an inner cutter, said outer cutter comprising a plate of substantially U-shape, means for connecting the arms thereof together in spaced relation to each other, said plate having notches formed therein whereby to provide cutter teeth to coat with said inner cutter, said inner cutter comprising a plate having a back, a pair of side flanges and a pair of terminal coplanar end flanges, said end flanges having notches formed therein to provide teeth to coat with the teeth of said outer cutter, said end flanges terminating spaced from each other to provide a space therebetween and a rib formed on said U-shaped plate and located between said end flanges when the inner cutter is assembled relative to the outer cutter.

6. In a dry shaver cutter head, an outer cutter and an inner cutter, said outer cutter comprising a plate bent substantially U-shape, said plate having notches formed therein whereby to provide cutter teeth to coat with said inner cutter, said inner cutter comprising a plate bent to form a back and a pair of side flanges bent downwardly therefrom, the lower ends of said side flanges being brought into contact with each other adjacent the cutting edge and being bent outward from the area of contact to diverge from each other and notches therein to provide teeth for cooperation with the teeth of the outer cutter.

7. A dry shaver cutter head assembly comprising an outer cutter and an inner cutter, said outer cutter comprising a plate bent U-shaped, the bends between the cross member and the arms of said U-shaped plate being displaced outwardly so that the axes of said projected bends lie in the direction of travel of the inner cutter, beyond the planes of the arms of the plate, slots in said U-shaped plate, said inner cutter comprising a plate bent to form a back and a pair of terminal flanges extending outwards from the center and having slots therein to form teeth, and an inwardly projecting portion on the outer cutter inter-
mediate the inside ends of the flange to provide a guide.

8. A dry shaver cutter head assembly comprising an outer cutter and an inner cutter, each of said cutters having teeth, an inside wall for the cutter, a cutter hub, a pair of apertures, means urging the teeth into shearing contact comprising a pair of headed rods secured one in each of said apertures slidable and swingable relative to said outer cutter and carried by said head assembly, the heads of said rods engaging the inner cutter, and a spring surrounding each rod carried by the head assembly having ends interposed between the head thereof and the outer cutter to urge the inner cutter toward shearing contact therewith, said rod having an enlargement positioned externally with respect to the aperture to limit sliding movement of the rod toward the inner cutter, said enlargement, when the inner cutter is within the outer cutter, being spaced from the outer cutter.

9. In a dry shaver cutting head assembly an outer cutter having a slotted closed outer end portion providing cutter teeth and an inner cutter comprising relatively thin sheet material spread to a flat surface at the inside face, provided with complementary side portions extending by side to the outside face and in contact with each other at a point adjacent said outside face and secured to each other in the form of a reinforcing plate, and an outside portion for the inner cutter extending outwardly from the plate provided with slots forming teeth therein co-operative with the teeth in the outer cutter to provide a shearing action therebetween.

10. In a dry shaver cutter head, an outer cutter and an inner cutter, said outer cutter comprising a plate of substantially U-shape, said plate having notches formed therein whereby to provide cutter teeth to coact with said inner cutter, said outer cutter having an outer plate having notches formed therein whereby to provide cutter teeth to coact with said inner cutter, the outer cutter comprising a plate having a back, sides and a pair of terminal end flanges spaced one from the other on each side of the center, outer and inner flanges having notches formed therein to provide teeth to coact with the teeth of said outer cutter, and a rib impressed inwardly on the surface of said U-shape plate and located between said end flanges when the inner cutter is assembled relative to the outer cutter.

13. In a dry shaver cutter head, an outer cutter and an inner cutter, said outer cutter comprising a plate bent substantially U-shape having rounded corners extending lengthwise of the plate, said corners bulging a substantial distance beyond a normal U-shape, means for rigidly connecting the arms thereof in spaced relation to each other, said plate having notches formed so as to extend around the projected rounded corners whereby to provide cutter teeth to coact with said inner cutter having a plate bent substantially U-shape extending portions in contact with the outer cutter and spaced from the interior of said rounded corners, the rounded notched corners of the U-shaped plate providing thereby a comb-like action during operation free from the inner cutter.

14. In a dry shaver cutter head, an outer cutter and an inner cutter, said outer cutter comprising a plate bent substantially U-shape with rounded bends at the corners thereof projecting a substantial distance outward beyond the walls to give a comb-like action during operation, a spacer between the arms thereof, means for securing said arms to said spacer, said plate having notches formed therein across said rounded bends from one side to the other whereby to provide continuous cutter teeth, said inner cutter having a plate bent substantially U-shape extending portions in contact with the flat inner side of the outer cutter only and spaced from the rounded bends.

15. In a dry shaver cutter head, an outer cutter and an inner cutter, said outer cutter comprising a plate bent substantially U-shape and having notches formed therein whereby to provide cutter teeth to coact with said inner cutter, and an imperforate reinforcing rib comprising a central portion of the outer plate of uniform thickness throughout substantially equal in thickness to said plate, bent inwardly from the face of said outer plate.

16. In a dry shaver cutter head, an outer cutter and an inner cutter, said outer cutter comprising a plate of substantially U-shape, said plate having notches formed across the corners thereof, whereby to provide cutter teeth at the closed portion of the U-shape to coact with said inner cutter, said inner cutter comprising a plate formed with a back and a pair of side flanges extending downwardly therefrom, the lower ends thereof being bent so that the outer surfaces thereof lie in substantially the same plane and wherein said plate is parallel to and in contact with the inside surface of the closed portion of the U-shaped outer cutter, said inner cutter having notches to provide teeth for cooperation with the teeth in the said U-shaped plate.

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