

Sept. 1, 1942.

J. W. BOERGER

2,294,713

ELECTRIC HAIR CLIPPER

Filed March 23, 1940

2 Sheets-Sheet 1

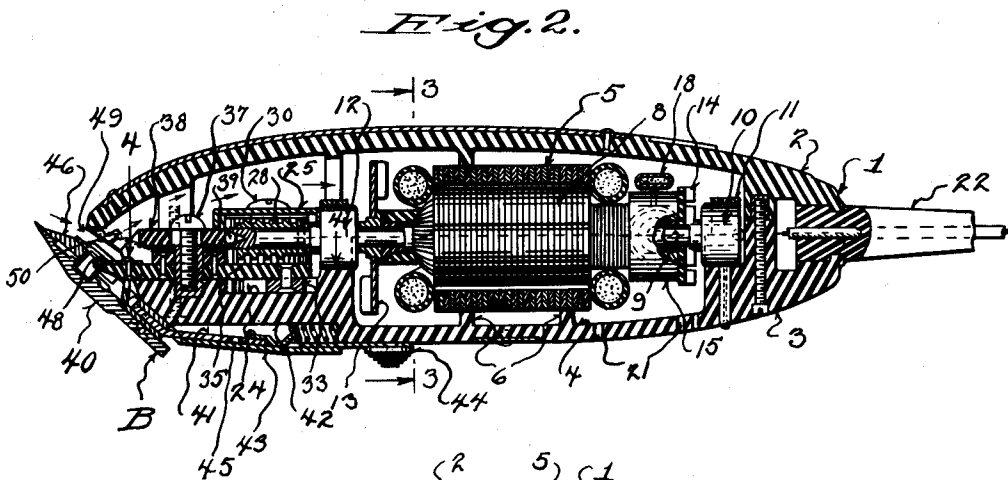
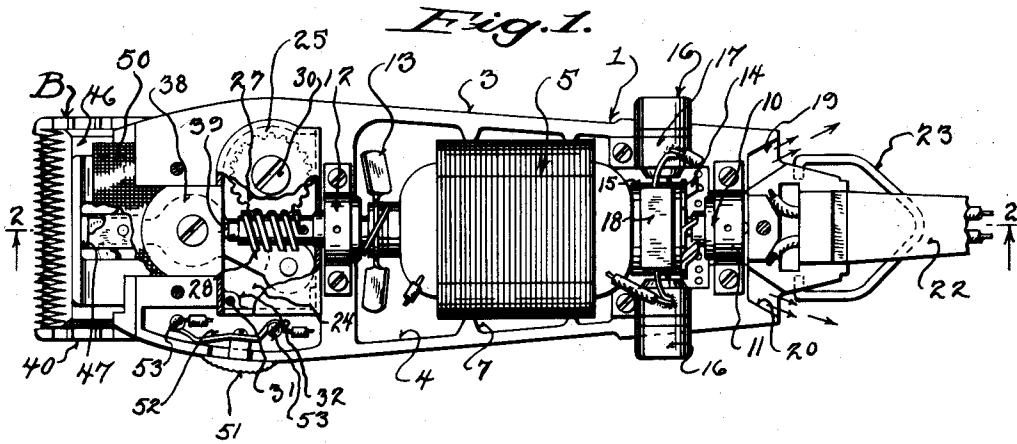


Fig. 3.

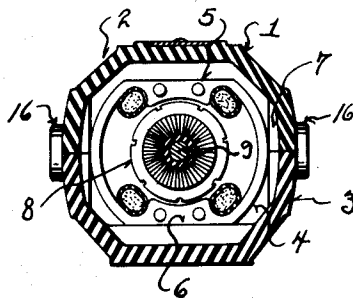
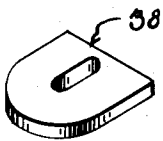


Fig. 4.



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Fig. 4.

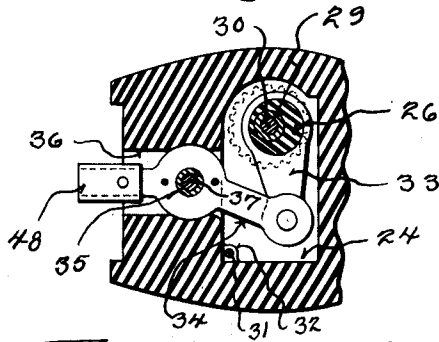


Fig. 5.

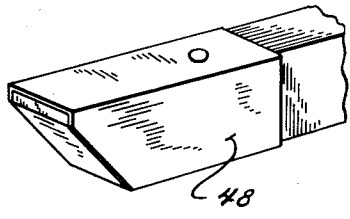


Fig. 6.



Fig. 7.

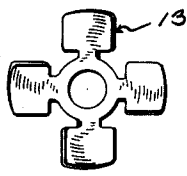


Fig. 8.

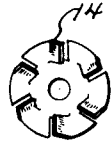


Fig. 10.

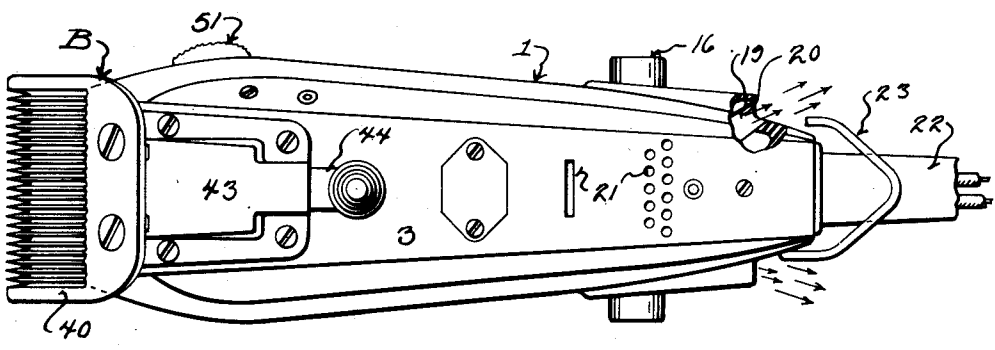
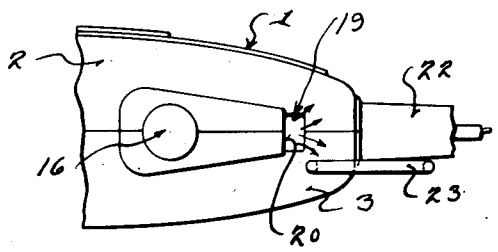


Fig. 11.



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UNITED STATES PATENT OFFICE

2,294,713

ELECTRIC HAIR CLIPPER

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Application March 23, 1940, Serial No. 325,557

4 Claims. (Cl. 30—195)

This invention pertains to improvements in electric hair clippers, and has primarily for its object to provide an exceedingly light and compact clipper of maximum power, and attractive and convenient contour.

Incidental to the foregoing, a more specific object resides in the provision of a novel arrangement for cooling all operable parts of the clipper, whereby overheating is eliminated, not only in the actuating mechanism, but also in the blade unit, thus insuring maximum efficiency and avoiding possible discomfort to the patron.

A further object is to provide a cooling system for clippers comprising a pair of impellers mounted upon opposite ends of the motor armature shaft, to draw air through the front of the clipper casing around the blade unit, and expel the same through the rear end of the casing, which not only cools the operable parts, but also removes carbon dust from the brushes to prevent fouling of the commutator.

Another object of the invention is to provide an electric clipper having an elongated split housing with all operable parts being carried by the lower section.

Another object resides in the provision of simple, adjustable means for regulating end play of the armature shaft during assembly, and for taking up subsequent wear.

Another object resides in mounting the blade actuating mechanism in a closed well formed in the lower casing, whereby leakage of lubricant is reduced to a minimum.

A still further object is to provide a non-metallic, oscillatory lever for actuating the movable clipper blade, and provided at its outer end with a metallic cap for engagement in a recess in the movable blade, whereby wear upon the end of the arm is reduced to a minimum, and its life materially prolonged to eliminate the necessity of frequent replacement.

With the above and other objects in view, which will appear as the description proceeds, the invention resides in the novel construction, combination, and arrangement of parts, substantially as hereinafter described, and more particularly defined by the appended claims, it being understood that such changes in the precise embodiment of the herein disclosed invention may be made as come within the scope of the claims.

In the accompanying drawings is illustrated one complete example of the physical embodiment of the present invention constructed according to the best mode so far devised for the practical application of the principles thereof.

In the drawings:

Figure 1 is a plan view of the lower section of an electric clipper embodying principles of the present invention, the upper section of the housing being removed and parts being broken away and in section to better illustrate structural details;

Figure 2 is a longitudinal section, taken on the line 2—2 of Figure 1;

Figure 3 is a transverse section, taken on the line 3—3 of Figure 2;

Figure 4 is a fragmentary detail section, taken on the line 4—4 of Figure 2, and illustrating the blade-actuating mechanism;

Figure 5 is an enlarged fragmentary, perspective view of the capped end of the blade-actuating lever;

Figure 6 is a detail illustration of the eccentric and worm gear for actuating the oscillating lever;

Figure 7 is an elevation of the forward impeller;

Figure 8 is a similar view of the rear impeller;

Figure 9 is a perspective of the adjustable block for regulating end play of the armature shaft;

Figure 10 is a bottom plan view of the clipper partially broken away and in section to illustrate the rear discharge openings in the housing; and

Figure 11 is a fragmentary side elevation of the housing, further illustrating the rear discharge openings.

Referring now more particularly to the accompanying drawings, the numeral 1 designates generally an elongated split housing, comprising upper and lower sections 2 and 3, respectively, the casing being preferably cast from plastic composition material having insulating characteristics, thus avoiding possibility of short circuiting the electric wiring within the casing and the blade unit, with resultant injury to the operator or patron. Obviously, a casing of the foregoing type is comparatively light and inexpensive, and enables suitable bushings and bearings to be cast into the material, thus eliminating machine work and materially reducing the cost of manufacture.

As best shown in Figures 1 and 2, the lower section 3 is provided rearwardly of its forward end with an elongated recess 4, for reception of a conventional electric motor 5, the field core of which is supported upon spaced transverse ribs 6 formed in the bottom of the recess. Vertical webs 7 formed on the inner side walls of the sections engage the sides of the motor to longitu-

dinally center and hold the field core against transverse movement.

The motor 5 is provided with the usual armature 8 mounted on an armature shaft 9, the rear end of which is journaled in a bearing 10 secured to the lower section 3 by a strap 11. The forward end of the armature shaft is journaled in a bearing 12 similarly mounted upon the lower section.

As best shown in Figures 1 and 2, an impeller 13 is fastened upon the armature shaft 9 forwardly of the motor, while a second impeller 14 is secured upon the armature shaft rearwardly of the motor commutator 15. Conventional brushes 16 engaging the commutator are held in position on the split face of the lower section 3, by clips 17 to which the motor wires are soldered, as shown in Figure 1. A resistance 18 may be connected to the brushes for the purpose of reducing radio interference.

The purpose of the impellers 13 and 14 is to draw air into the housing through its forward end, and discharge the same at the rear end of the housing. Therefore, the split edges of the upper and lower sections are notched at 19 adjacent their rear ends to provide discharge openings 20; and to further facilitate discharge of air circulated through the housing by the impellers, the bottom of the lower section 3 is provided with a plurality of spaced openings 21.

A plug 22, which carries the motor wires is clamped between the rear ends of the housing sections, as best shown in Figures 1 and 2, while a wire yoke 23 fastened to the lower section serves as a hanger for the clipper.

As best shown in Figures 1, 3 and 4, the forward end of the lower section 3 is provided with a well 24, in which the actuating mechanism for reciprocating the movable clipper blade to be hereinafter described, is housed. A plate 25 serves as a closure for the top of the well. The actuating mechanism referred to, which is more or less conventional, comprises an eccentric 26 having formed integral therewith a worm gear 27, meshing with a worm 28 secured on the forward end of the armature shaft 9. The eccentric and worm gear are journaled on a stud 29 cast or otherwise secured in the lower section within the well, while the plate 25 is secured in position by a screw 30 threaded into the top of the stud 29, and another screw 31 threaded into a boss 32 formed within the well.

Mounted on the eccentric 26 is a link 33 connected to the inner end of a lever 34, pivotally mounted on a stud 35 for oscillatory movement. As best shown in Figure 4, the stud is positioned within a longitudinal recess 36 through which the lever 34 extends, and secured upon the top of the stud 35 by a screw 37 threaded into the stud, is a slotted block 38, which projects through the edge of the plate 25 to engage a thrust ball 39 mounted in a recess in the forward end of the armature shaft. Obviously, by means of the slotted connection, the block 38 may be readily adjusted to regulate end play of the armature shaft 9, both in assembly and during subsequent wear.

Considering now the movable blade unit designated generally as B, the same is more or less conventional structure of the general type disclosed in United States Letters Patent No. 2,077,034, and includes a stationary comb blade 40, secured to an elongated anchor plate 41 inserted into a recess 42 formed in the bottom of the lower section and held by a retainer

plate 43 fastened to the section. A slidable spring-urged latch 44 serves to releasably hold the anchor plate 41 upon a stud 45 carried by the retainer plate.

Slidably mounted on the stationary comb blade is a movable cutter blade 46 having a recess 47 formed therein for reception of the outer end of the oscillatory lever 34.

As stated in the objects, the auxiliary lever is preferably formed of non-metallic, non-conductive material to avoid possible short circuit between the wiring and clipper unit. Therefore, in order to prevent wear upon the outer end of the auxiliary lever, which extends into the recess 47 in the movable cutter blade for reciprocating the same on the stationary blade, it is proposed to cap the outer end of the arm with a metallic hood 48, such as best shown in Figures 4 and 5, the hood serving to engage the sides of the recess 47.

As best shown in Figure 2, the forward ends of the upper and lower sections are spaced from the removable blade unit B, to provide a mouth 49 extending along the sides and over the top of the unit, and through which air is drawn around the blade unit into the front end of the housing, as indicated in arrows in Figure 2. To avoid the entrance of hair and other matter through the mouth 49, a screen mesh 50 extending across the opening of the clipper and secured in position under the thrust block 38, provides a closure for the opening to admit air and at the same time collect hair, or other matter. Inasmuch as access to the screen is readily had upon removal of the blade unit B, the same can be readily cleaned to prevent undue accumulation and clogging of the screen 50.

Slidably positioned within a notch formed in one of the side edges of the lower section, and conveniently located for actuation by the operator's thumb, is a conventional switch 51 provided with a contact 52 engaging fixed terminals 53, to which the motor wires are secured.

From the foregoing explanation considered in connection with the accompanying drawings, it will be seen that an exceptionally compact and relatively light clipper structure has been provided, in which all of the operable parts are assembled upon one section of the split housing. Obviously, the foregoing arrangement facilitates assembly and insures more accurate alinement of the operable parts.

In connection with the present cooling system, an important feature of the invention resides in drawing air through the front of the housing around the blade unit, to cool the same. This novel feature is accomplished primarily by a large impeller placed ahead of the motor. However, due to the necessarily limited size of the front impeller, and the length and restricted passage through the housing, an auxiliary rear impeller is provided to maintain effective circulation throughout the entire length of the casing, and discharge air at the rear end to insure efficient cooling and remove carbon dust from the brushes.

Mounting the blade-actuating mechanism in an upright well formed in the bottom of the casing affords obvious advantages over the present practice of installing the actuating mechanism in a compartment formed in the top of the casing, and opening downwardly.

In use, clippers of the present type are usually held in a substantially horizontal position, and naturally lubricant will leak from a downwardly opening compartment; whereas, in an upright well, this is avoided.

Reinforcement of the driving end of the non-metallic oscillating lever, and the provision of simple means for regulating end play of the armature shaft, present advantages lacking in conventional clippers now on the market.

Lastly, although an exceedingly light and compact clipper has been provided, it has been established that the same develops greater power than larger and heavier clippers of the same type now on the market.

I claim:

1. In an electric hair clipper of the type including, an elongated casing, a blade unit carried by the forward end of the casing, and an electric motor mounted in the casing for actuating the blade unit; the forward end of said casing being spaced from said blade unit to provide an air inlet, discharge openings formed in the rear end of said casing, a screen covering said inlet to prevent the entrance of hair and foreign matter into said casing, an impeller mounted upon the forward end of the motor for drawing air through said inlet, and a second impeller mounted upon the rear end of the motor for removing air introduced into the casing by the forward impeller.

2. In an electric hair clipper of the type including, an elongated casing, a blade unit carried by the forward end of the casing, an electric motor mounted in the rear end of said casing, and a driving mechanism interposed between the forward end of said motor and the blade unit; the forward end of said casing being spaced from said blade unit to provide an air inlet, discharge openings formed in the rear end of said casing, a screen covering said inlet to prevent the entrance of hair and foreign matter into said cas-

ing, an impeller mounted upon the forward end of the motor for drawing air into said inlet over said blade unit and driving mechanism to cool the same, and a second impeller mounted upon the rear end of the motor for removing air introduced into the casing by the forward impeller.

3. In an electric hair clipper of the type including, an elongated longitudinally split casing consisting of upper and lower sections, a blade unit carried by the forward end of the casing, an electric motor mounted in the casing, and a driving connection between said motor and blade unit for actuating the latter; said blade unit, motor, and driving connection being connected solely to the bottom section of said casing.

4. In an electric hair clipper of the type including an elongated longitudinally split casing consisting of upper and lower sections, a blade unit carried by the forward end of the casing, an electric motor mounted within the casing, and a driving mechanism interposed between the motor and blade unit for actuating the latter; the forward end of said casing being spaced from said blade unit to provide an air inlet, discharge openings formed in the rear end of said casing, a screen covering said inlet to prevent the entrance of hair and foreign matter into said casing, an impeller mounted upon the forward end of the motor for drawing air through said inlet over said blade unit and driving connection, and a second impeller mounted upon the rear end of the motor for removing air drawn into the casing by the forward impeller, said motor blade unit, and driving connection being secured solely to the lower section of the casing.

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