May 31, 1932. M. ANDIS 1,861,043

HAIR CLIPPER

Filed June 16, 1930 2 Sheets-Sheet 1

Fig. 1

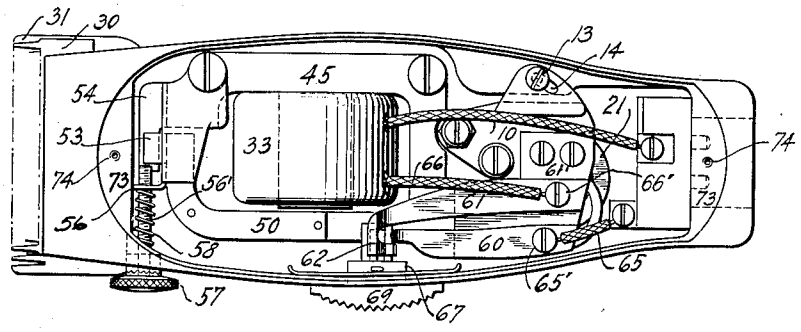


Fig. 2

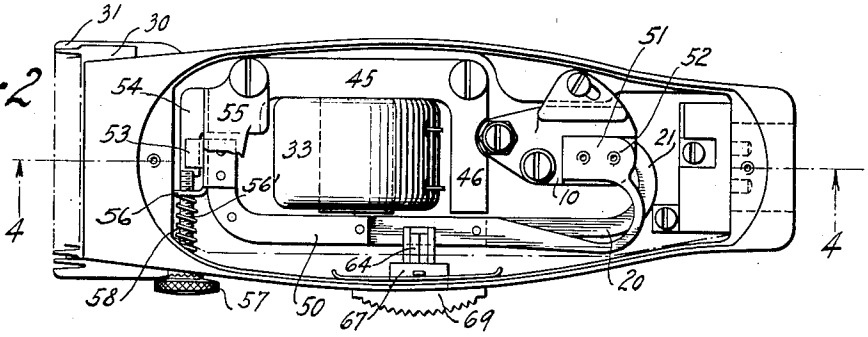


Fig. 3

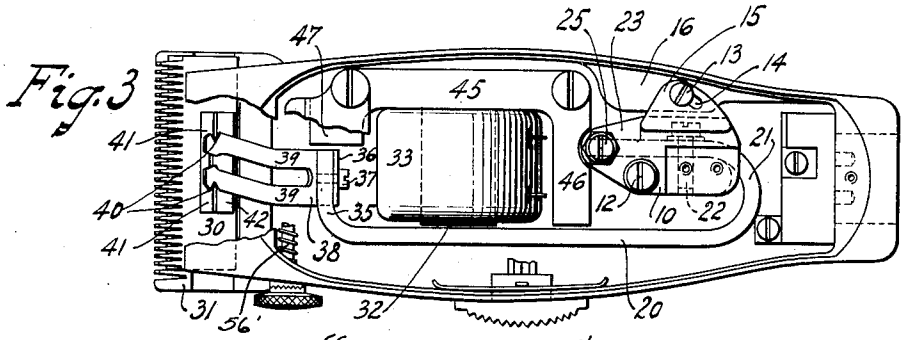


Fig. 6

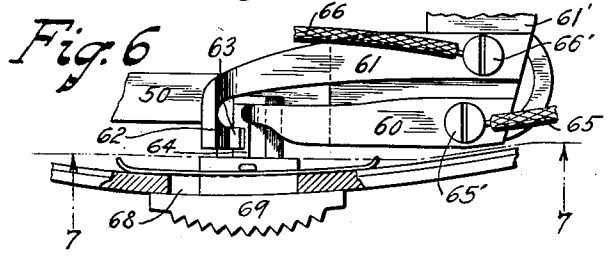
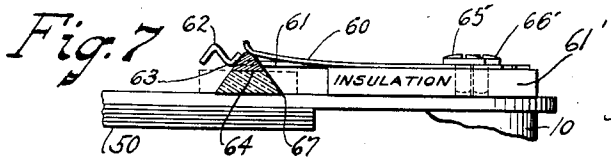


Fig. 7



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Fig. 4

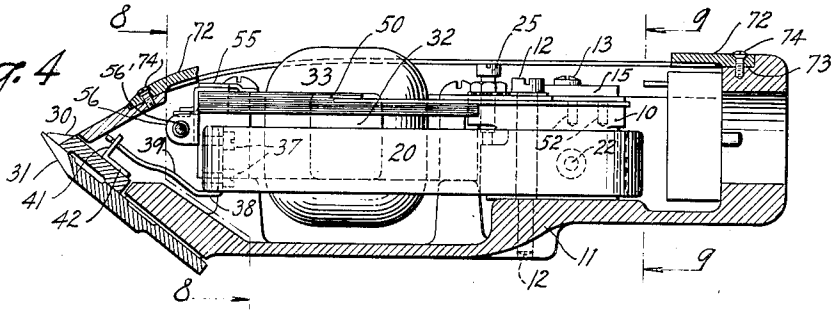


Fig. 5

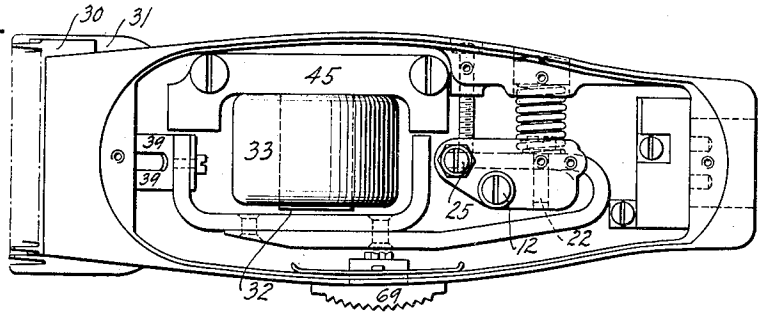
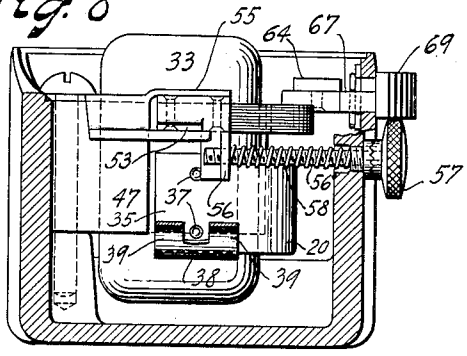


Fig. 8



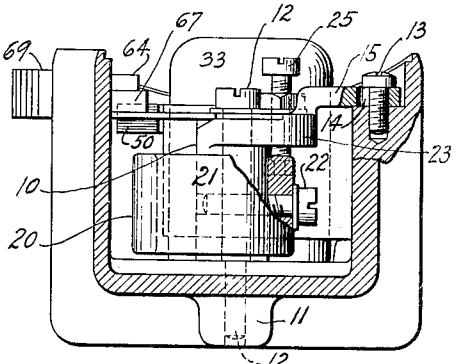


Fig. 9

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UNITED STATES PATENT OFFICE

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HAIR CLIPPER

Application filed June 16, 1930. Serial No. 461,605.

My invention relates to improvements in electro-magnetic hair clippers of the general type disclosed in my former United States Letters Patent No. 1,504,595, dated August 12, 1924 for Electrically operated hair clipper and in United States Letters Patents to L. J. Wahl, No. 1,487,189, dated March 18, 1928 for Clipper and No. 1,556,654, dated October 6, 1925 for a Blade mounting for clippers.

In such hair clippers the movable blade is vibrated with great rapidity the vibrating frequency corresponding with that of an alternating current where such a current is employed. In modern hair clippers the blades occupy oblique planes at an angle of about 45° to the plane in which the driving armature moves. The movable blade is necessarily held to the shear plate, or comb plate, under uniform resilient pressure and owing to its oblique position, a resilient or yielding coupling between the armature and the blade is necessary.

Heretofore, couplings have been employed which not only yield, but have relatively movable members, and usually independent means are employed to hold the movable blade to the comb plate at the proper pressure because with any ordinary coupling the pressure and relative position of the armature connection is different at the ends of the stroke than it is at the middle of the stroke, due to the oblique position of the blade. Accordingly there is rapid wear due to the friction of the relatively movable parts, and structural complications have resulted from the supposed necessity of providing independent pressure applying means.

The primary objects of my present invention are to solve the above indicated problems and to provide a more efficient and durable clipper at less cost than that incurred in the manufacture of clippers of the aforesaid type as heretofore made.

More specifically stated, my objects are to eliminate friction, to provide means for regulating the intensity of the magnetic field, to provide more effective means for regulating the stroke of the movable blade, to provide an improved armature mounting, and in general, to provide an electro-magnetic hair clipper which can be constructed at minimum cost, easily adjusted to the requirements of any given installation and used continuously for long periods of time without being repaired.

In the drawings:

Figure 1 is a plan view of a hair clipper embodying the invention herein disclosed, the cap plate being removed.

Figure 2 is also a view, in plan, of a portion of the clipper, with the switches, lead wires and insulation plate removed to more clearly show the armature and shunt bar mounting.

Figure 3 is a plan view with the shunt bar and associated parts also removed, and with the front end of the casing partially broken away to show the connection between the armature and the movable blade.

Figure 4 is a sectional view drawn generally to line 4—4 of Figure 2.

Figure 5 is a view similar to Figure 3 showing a modified form of construction for the armature and armature mounting.

Figures 6 and 7 are enlarged detail views of the switch mechanism, in plan and side elevation respectively.

Figures 8 and 9 are cross sectional views drawn generally to lines 8—8 and 9—9 of Figure 4.

Like parts are identified by the same reference characters throughout the several views.

Referring to Figures 3 and 4 wherein the general organization of the armature and associated parts can be most clearly seen, it will be observed that the armature mounting 10 comprises a block of metal which has a pivotally adjustable connection with the bottom portion 11 of the casing to which it is attached by means of the pivot screw 12. This mounting is held rigidly in its adjusted position by means of a set screw 13 which passes through a slot 14 in a suitable projecting plate 15 carried by the mounting and has threaded engagement with a relatively thick portion 16 of the side of the casing.

The armature bar 20 is reversely bent or formed into a hook shaped loop 21 at its rear end which passes around the lower portion

of the mounting, with the short leg of the loop secured thereto by a screw 22, the head of which is underneath an overhanging ledge 23 on the mounting. An adjusting screw 25 passes through this ledge 23 and its inner end bears upon the extremity of the short leg of the armature, whereby the armature may be adjustably swung upon its connecting screw 22 to raise or lower its front end. By this means the pressure of the movable blade 30 upon the comb plate 31 may be regulated as hereinafter explained. The plate 15 is preferably an upwardly offset extension of the ledge 23.

The connection between the armature and its mounting is at the opposite side of the mounting from that occupied by the body of the armature, the latter being extended along one side portion of the casing in close proximity to one pole face of the core 32 and then laterally toward the center line of the handle. This inwardly extending portion 35 of the armature is secured to the movable blade by a forked connector having a flange 36 secured to the portion 35 by a screw 37. The fork arms 39 of the connector extend obliquely forwardly and upwardly in general correspondence with the inclination of the clipper blades but with an intermediate downward and also a lateral offset as clearly appears from a comparison of Figures 3 and 4.

Near their ends, the outer margins of these arms are provided with V shaped notches 40 in which upwardly projecting flanges 41 of a connecting bracket 42 may be engaged by pressing the extremities of the fork arms 39 toward each other in the planes of their flat surfaces until they can be passed between said flanges 41 and then releasing them to allow them to separate and engage the inner ends of said flanges in the notches 40. The bracket 42 is rigidly secured to the movable blade 30 and the arrangement is such that at the center of its stroke the center of the blade and the center of the space between the fork arms will be in a position near the longitudinal center line of the clipper handle.

The fork arms 39 press downwardly upon the clipper blade to hold the same resiliently in pressure contact with the comb plate 31, the degree of such pressure being determined by the adjustment of the screw 25 at the other end of the armature bar. The fork arms 39 are sufficiently narrow to allow them to yield torsionally and permit independent conformity to the arc in which the front end of the armature bar swings and also to the movable blade, which is continuously held to the comb plate with substantially uniform pressure during the stroke, and tends to move in a straight line. The intermediate offset in the fork arms, and their resilience, allows their outer ends to flex with considerable freedom in planes perpendicular to the blade, but the intermediate lateral offset in the arms tends to stiffen them except at their outer ends, and facilitates actuation of the movable blade with a slight push and pull effect, whereby its inertia may be overcome with less tendency to twist the arms than would otherwise be encountered at the ends of the stroke.

I have found that the above described connection between the armature bar and the movable blade 30 enables me to avoid all frictional movement of the parts upon each other. The notched margins of the fork arms maintain an absolutely fixed relation to the bracket flanges 41, whereby there is no friction and no wear upon these parts during the operation of the clipper. I also find that the armature bars 20 may be made of sufficient resilience to allow the arm to vibrate in strokes of the required length and that it is therefore unnecessary to allow the mounting 10 to swing upon the connecting screw 12. Friction is, therefore, eliminated at the rear end of the armature bar as well as at the front end.

To regulate the intensity of the magnetic field, notwithstanding variations in potential, I provide an electro-magnetic shunt bar 50, Figure 2, which is preferably laminated and supported at its rear end by a connecting plate 51 secured to the mounting block 10 at 52. This shunt bar is located generally above the armature bar 20 in spaced relation thereto and its inwardly turned front end is provided with a projection 53 supported by a bracket 54 formed of brass or other non-magnetizable material. This bracket 54 preferably has an arm 55 which extends over the upper surface of the end of the shunt bar to hold the projection 53 loosely in sliding relation to the bar portion of the bracket 54 as best shown in Figure 2.

In order that this end of the shunt bar may be adjusted to vary the gap between it and the pole piece 47, it is provided with an arm 56 into which a screw 56′ is threaded, the outer end of this screw being extended through an aperture in the casing and provided with a head 57. A coiled compression spring 58 is interposed between the casing wall and the arm 56 to urge the arm and the associated end of the shunt bar in the direction of the pole piece 47, the screw being rotatively adjusted to retract the shunt bar in the opposite direction. When the intensity of the magnetic field is found to be excessive it may be weakened by shortening the gap between the shunt bar and the pole 47. In this manner the violence of the electro-magnetic pull upon the armature bar may be modified in accordance with varying current loads upon the magnet, or in accordance with varying loads under which the clipper operates due to coarseness, toughness, or thickness of the hair that is being cut. The clipper is thus made adaptable to installation conditions

and the duty requirements of each hair clipping operation.

I have designed my improved switch mechanism conformably to the space limitations imposed by a casing designed to be used as a handle for the clipper. The switch terminal arms 60 and 61, preferably formed of resilient sheet brass, are supported from the mounting 10 with an intervening insulating plate 61′ to which the terminal arms are directly attached by the binding screws 65′ and 66′ to which the lead wires 65 and 66 extend. The switch terminal arm 61 carries a laterally projecting hook shaped end portion which is provided with an upwardly extending corrugation 62 and a contact lip 63, whereby a rib shaped circuit closer 64, the surface of which preferably has the form of an inverted V, may be normally received within the upwardly extending corrugations 62 but movable, for circuit closing purposes, into a position with its apex carried slightly beyond the lip 63. The circuit closer 64 extends inwardly far enough to also engage and move under the arm 60 when its apex is moved past the lip 63, as above explained, thus bridging the gap between these terminals.

This circuit closer 64 is supported by an operating arm 67 of insulating material which projects through a slot 68 in the wall of the casing and carries the thumb piece 69. The operating arm 67 is adapted to slide in the slot 68 to carry the circuit closer 64 to the above described circuit closing position in which its inner end has slidingly engaged and lifted the terminal arm 60. Both terminal arms are sufficiently resilient to maintain pressure contact with the circuit closer when in this position. The free extremity of the arm 60 may be slightly up turned, to facilitate the movement of the circuit closer 64 underneath it, although its sloping sides facilitate its movement with a lifting effect under either terminal.

It will, of course, be understood that when the contact piece 64 is in its normal position, the terminal arm 60 will move downwardly until its extremity occupies the open space within the hook shaped extremity of the arm 61 but out of contact with either leg of the hook. It will also be understood that while the contact member 64 is normally beyond the end of the terminal member 60, its length will permit it to engage and lift said terminal member 60 when it is shifted to the position indicated in Figure 7.

The form of the circuit closer 64 and its organization in association with the flat surfaced terminal arms not only provides a compact switch mechanism which can be installed in the handle of a hair clipper without increasing space requirements but by this organization I also obtain a non-arcing sliding contact switch of unusual durability and reliability as compared with switches heretofore employed for similar purposes. I also provide a switch which can be easily manipulated by the thumb of the operator while the clipper is in use and without requiring any shifting of the hand upon the clipper casing.

The top of the clipper casing body is open throughout nearly its entire length and is provided with shouldered margins to receive a cap plate 72. At the ends of this opening the casing is provided with ledges 73 whereby the cap plate may be secured in position by screws 74 as best indicated in Figure 1.

I claim:

1. In an electro-magnetic hair clipper having a vibratory armature bar and a clipper blade obliquely disposed across the plane of bar vibration, the combination therewith of a driving connection comprising a pair of flat thin sheet metal resilient arms having their respective ends connected with the armature bar and with the blade, and intermediately offset transversely of the oblique plane occupied by the blade, said arms being adapted to yield torsionally and to lengthen and shorten by flexion in said offset portion, whereby to hold the blade under uniformly resilient pressure in a substantially straight line of vibratory movement.

2. In an electro-magnetic hair clipper having a vibratory armature bar, a comb plate and clipper blade adapted to reciprocate upon the comb plate, the combination therewith of a driving connection between the armature bar and the reciprocatory clipper blade, comprising spaced flanges on said blade extending longitudinally thereof and a plurality of flat thin sheet metal resilient arms in substantially fixed connection with the armature bar and having notched outer margins receiving the associated ends of the flanges in pressure engagement therewith, said arms being adapted to yield longitudinally and torsionally in the end portions which are connected to the clipper blade.

3. In an electro-magnetic hair clipper having a vibratory armature bar, a comb plate and a clipper blade adapted to reciprocate upon the comb plate, the combination therewith of a driving connection between the armature bar and the reciprocatory clipper blade, comprising a set of upwardly extending projections on the blade, a plurality of flat thin sheet metal resilient arms having fixed connection with the armature bar and having yielding end portions substantially parallel with said blade and in edge contact, under pressure, with said projections, said arms being sufficiently narrow and resilient to enable them to yield longitudinally and torsionally in the end portions which are connected to the clipper blade, and means for adjusting the armature bar to place said arms under a desired resilient tension to regulate

the pressure of said blade upon the comb plate.

4. In a hair clipper having a hollow handle provided with enclosed actuating mechanism and relatively fixed and movable blades at one end of the handle obliquely disposed across the axis thereof, the combination with the movable blade, of a vibratory actuator within the handle, connected with the blade by a plurality of flat thin strips of resilient sheet metal disposed generally along planes substantially parallel to the oblique plane occupied by the blade and having ends in inter-locking pressure engagement with the blade.

5. In a hair clipper having a hollow handle provided with enclosed actuating mechanism and relatively fixed and movable blades at one end of the handle obliquely disposed across the axis thereof, the combination with the movable blade, of a vibratory actuator within the handle, connected with the blade by a plurality of flat thin strips of resilient sheet metal disposed generally along planes substantially parallel to the oblique plane occupied by the blade and having ends in inter-locking pressure engagement with the blade, said connector strips being intermediately offset transversely of their flat surfaces.

6. In a hair clipper having a hollow handle provided with enclosed actuating mechanism and relatively fixed and movable blades of one end of the handle obliquely disposed across the axis thereof, the combination with the movable blade, of a vibratory actuator within the handle, connected with the blade by a plurality of flat thin strips of resilient sheet metal disposed generally along planes substantially parallel to the oblique plane occupied by the blade and having ends in interlocking pressure engagement with the blade, said connector strips being intermediately offset transversely of their flat surfaces and also having portions obliquely offset in the planes of some of said surfaces.

7. In an electro-magnetic hair clipper having a hollow handle provided with actuating mechanism, relatively fixed and movable blades obliquely disposed across one end of the handle, spaced projections on the movable blade and a vibratory actuator within the handle having torsionally yielding resilient connector strips interlocked with said projections under resilient pressure exerted in the direction of the projections and also in the direction of the blade, said strips being adapted to yield both longitudinally and torsionally in accommodation with movements of the blade which do not precisely conform with those of the actuator.

8. In an electro-magnetic hair clipper a vibratory armature bar and a reciprocatory clipper blade obliquely disposed across the plane of bar vibration, in combination with a connector having fixed connection with said bar, and resiliently yielding bent arms having substantially fixed lateral pressure connections with the blade and being adapted to yield torsionally, and to also flex in a common plane to allow movements of the blade not in strict conformity to those of the connected end of the bar.

9. In an electro-magnetic hair clipper having a vibratory armature bar and a reciprocatory clipper blade obliquely disposed across the plane of bar vibration in combination with a connector having substantially fixed connections with said blade and bar and intermediate resiliently yielding bent arms adapted to yield torsionally and having a bias toward a straight line connection, and an adjustable shunt bar for regulating the intensity of the magnetic field occupied by the armature bar.

10. In an electro-magnetic hair clipper having a hollow handle provided with an enclosed electro-magnet and associated armature bar and also having an obliquely disposed comb plate and a superposed movable blade at one end of the handle, in combination with a mounting for the armature bar at the end of the handle distant from the movable blade, and a resilient connection between the other end of the armature bar and the movable blade adapted to actuate the latter while holding it in uniform pressure relation to the comb plate, said armature bar having its opposite end looped about the mounting and pivotally secured thereto substantially in a central plane of the handle transverse to the blades, means associated with the mounting for varying the pressure of the armature upon said resilient connections, and means for adjusting the mounting to vary the relation of the armature bar to the magnet poles.

11. In an electro-magnetic hair clipper having a hollow handle containing a magnet and a vibratory armature bar, the combination, with the handle, of an armature mounting in pivotally adjustable connection with the handle and means for locking the mounting to the handle in various positions of pivotal adjustment.

12. In an electro-magnetic hair clipper having a hollow handle containing a magnet and a vibratory armature bar, the combination, with the handle, of an armature mounting in pivotally adjustable connection with the handle and means for locking the mounting to the handle in various positions of pivotal adjustment, said mounting being also provided with means for pivotally connecting an armature thereto and for utilizing the armature to apply adjustable resilient pressure to a movable clipper blade, said handle having a removable cap plate and said mounting connection locking means and pressure applying means being exposed by removal of the cap plate.

13. In an electro-magnetic hair clipper having a hollow handle provided with an obliquely disposed comb plate and superposed movable blade at one end of the handle, in combination with an electro-magnet having three substantially aligned polar faces, a resilient armature bar in normally fixed relation to the handle and extending along said polar faces, a resilient connection between the armature bar and the movable blade in substantially fixed connection with the bar and blade respectively and having end portions adapted to conform to the movement of the blade in all portions of its stroke.

14. In an electro-magnetic hair clipper having a hollow handle, provided with an obliquely disposed comb plate and superposed movable blade at one end of the handle in combination with an electro-magnet having three substantially aligned polar faces, a resilient armature bar in normally fixed relation to the handle and extending along said polar faces, a resilient connection between the armature bar and the movable blade in substantially fixed connection with the bar and blade respectively and having end portions adapted to conform to the movement of the blade in all portions of its stroke, and means for regulating the intensity of that portion of the magnetic field which includes said bar.

15. In an electro-magnetic hair clipper having a hollow handle provided with an obliquely disposed comb plate and superposed movable blade at one end of the handle in combination with an electro-magnet having three substantially aligned polar faces, a resilient armature bar in normally fixed relation to the handle and extending along said polar faces, a resilient connection between the armature bar and the movable blade in substantially fixed connection with the bar and blade respectively and having end portions adapted to conform to the movement of the blade in all portions of its stroke, and means for regulating the intensity of that portion of the magnetic field which includes said bar, together with means for varying the magnetic gap between the bar and polar faces, and means for varying the pressure transmitted by the bar to the movable blade.

16. In an electro-magnetic hair clipper, the combination with a hollow handle provided with obliquely disposed fixed and removable clipper blades at one end thereof, of an electro-magnet mounted in the handle with its core extending transversely and having polar faces of opposite polarity substantially aligned along one side of the handle, a fixed armature mounting in one end portion of the handle, a resilient armature bar pivoted to the mounting for swinging adjustment in a plane substantially at the central axis of the handle and transverse to the blades, said armature bar being looped about the mounting and extending along the side of the handle in proximity to the pole faces, with its extremity inturned between the magnet and the blades and resiliently connected with the movable blade.

17. In an electro-magnetic hair clipper, the combination with a hollow handle provided with obliquely disposed fixed and removable clipper blades at one end thereof, of an electro-magnet mounted in the handle with its core extending transversely and having polar faces of opposite polarity substantially aligned along one side of the handle, a resilient armature bar pivoted to the mounting for swinging adjustment in a plane substantially at the central axis of the handle and transverse to the blades, said armature bar being looped about the mounting and extending along the side of the handle in proximity to the pole faces, with its extremity inturned between the magnet and the blades and resiliently connected with the movable blade by a plurality of resilient actuating arms having V shaped notches in their extremities in pressure engagement with projections on the blade, said arms being adapted to yield torsionally and in planes transverse to the blade.

18. In an electro-magnetic hair clipper, the combination with a hollow handle provided with obliquely disposed fixed and removable clipper blades at one end thereof, of an electro-magnet mounted in the handle with its core extending transversely and having polar faces of opposite polarity substantially aligned along one side of the handle, a resilient armature bar pivoted to the mounting for swinging adjustment in a plane substantially at the central axis of the handle and transverse to the blades, said armature bar being looped about the mounting and extending along the side of the handle in proximity to the pole faces, with its extremity inturned between the magnet and the blades and resiliently connected with the movable blade by a plurality of resilient actuating arms having V shaped notches in their extremities in pressure engagement with projections on the blade, said arms being adapted to yield torsionally and in planes transverse to the blade, and being located on opposite sides of said mounting plane.

19. In an electro-magnetic hair clipper having a hollow handle and a handle contained armature mounting in pivotally adjustable connection with the handle in combination with means for locking the mounting to the handle at a point distant from its pivotal connection to hold it in a desired position of adjustment.

20. In an electro-magnetic hair clipper having an electro-magnetic pole piece and an associated armature bar, the combination therewith of an adjustable shunt bar extending along one side of the gap between the armature bar and pole piece, said shunt bar being movable along the face of the arma-

ture bar toward and away from said pole piece.

21. An electro-magnetic hair clipper provided with a pole piece and a vibratory armature bar associated therewith, in combination with means for variably shunting a portion of the magnetic field around the gap between the pole piece and armature to regulate the intensity of the magnetic field.

22. The combination with an electrically driven hair clipper blade, of means for varying the violence of the blade movement, comprising a manually adjustable shunt armature controlling the energy to be applied to the blade, said shunt being adapted during adjustment for continuous variation in the applied energy while the magnetic energy remains constant.

23. An electro-magnetic hair clipper adapted to manipulate under a varying load, and provided with means for maintaining a magnetic field of an intensity suited to installation conditions and duty requirements, said means being adapted during adjustment for continuously varying the energy applied to the clipper blade while maintaining the magnet at constant energy.

24. In a device of the described class, the combination with a hollow handle, of a vibratory armature bar therein, an electro-magnet having one pole in proximity to the intermediate portion of the armature bar and the other pole provided with extensions in corresponding proximity to the armature bar at opposite sides of the first mentioned pole, and a shunt bar adjustable into and out of proximity with said poles to regulate the intensity of the magnetic field occupied by the armature bar.

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