Nov. 13, 1934. M. ANDIS 1,980,312

POWER DRIVEN VIBRATOR

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Fig. 1.

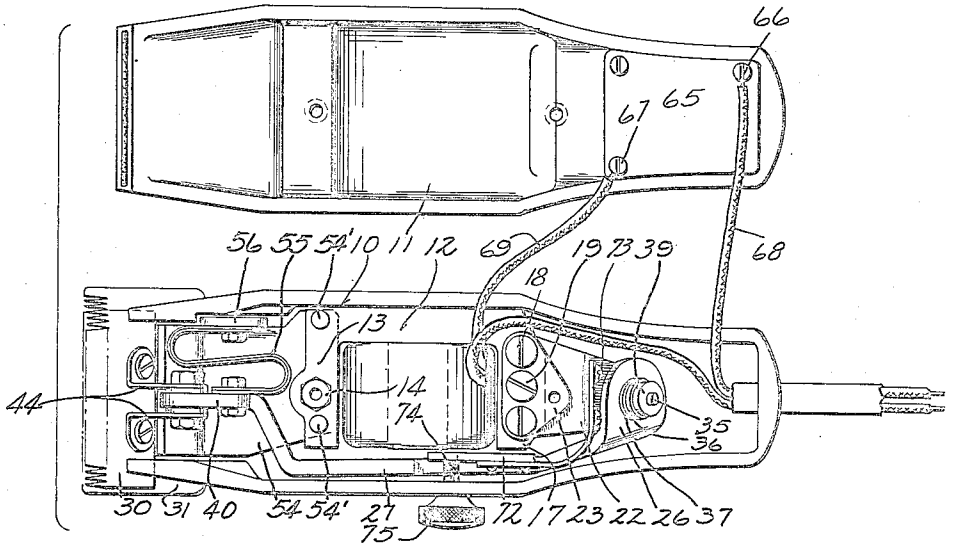


Fig. 2.

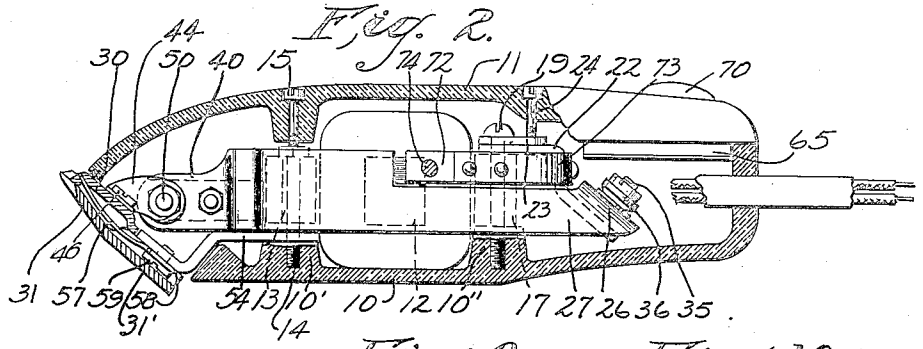


Fig. 9.

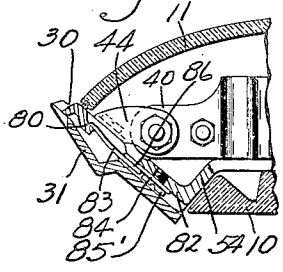


Fig. 10.

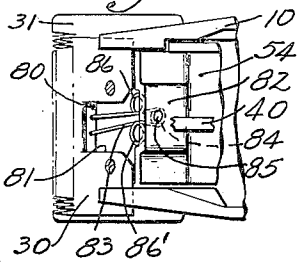


Fig. 7.

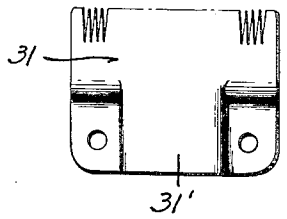
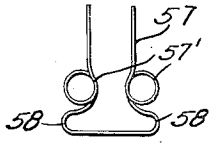


Fig. 8.



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POWER DRIVEN VIBRATOR

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Fig. 5.

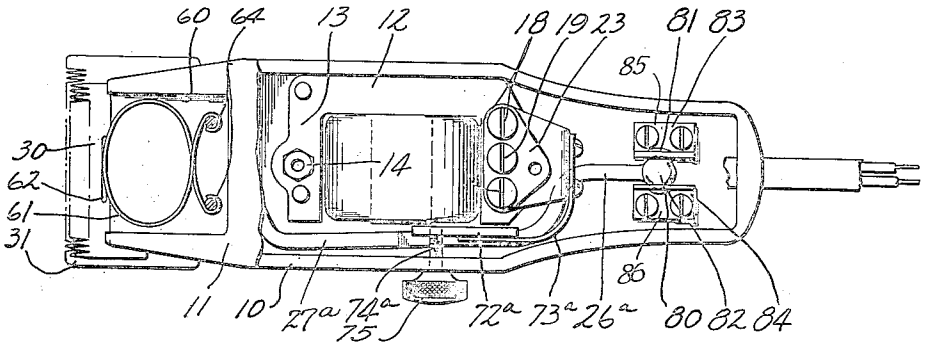


Fig. 6.

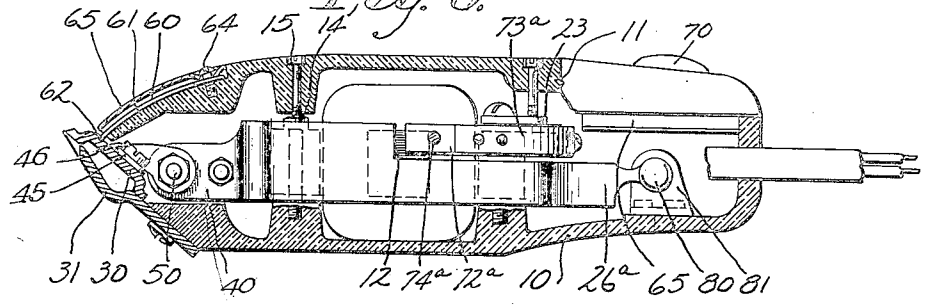


Fig. 4.

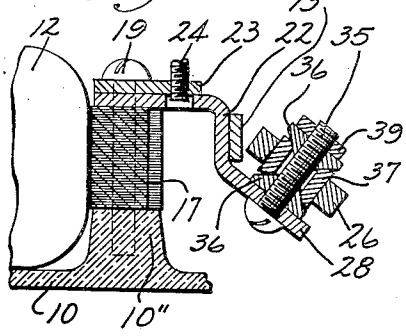
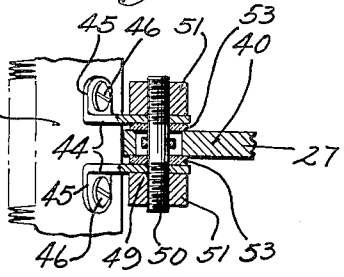


Fig. 3.



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UNITED STATES PATENT OFFICE

1,980,312

POWER DRIVEN VIBRATOR

Mathew Andis, Racine, Wis.

Application April 9, 1934, Serial No. 719,801

23 Claims. (Cl. 30—1)

My invention relates to improvements in power driven vibrators, such as hair clippers.

In the construction of power driven hair clippers it is common practice to vibrate the cutter blade upon a shearing comb plate which is set obliquely to the plane in which the actuating arm reciprocates. This makes possible the mounting of driving mechanism in a casing which serves as a handle for the tool, and where the tool is to be electrically driven the driving motor may also be mounted in such a casing, electromagnetic motors being usually preferred, whereby driving armatures may be vibrated at extremely high speed in correspondence with the frequency of an alternating current.

In such vibrators it has heretofore been thought necessary to resiliently connect the armature with the tool or vibratory clipper blade in such a manner as to permit the blade to travel along the surface of the obliquely disposed comb plate in a substantially straight line and in uniform pressure contact with the comb plate throughout its stroke notwithstanding the fact that the armature was being vibrated in a plane to which the comb plate was obliquely positioned.

In electromagnetically operated hair clippers it has always been customary to mount the armature upon a resilient arm connecting one end of the armature with the casing, whereby the armature could be swung toward and from the electromagnetic pole piece without having positive pivotal connection with the casing or with an armature support mounted therein. Such a spring provided for a retraction of the armature during reversals of magnetic flux or motor control during deenergizing periods. Such a spring also allowed the armature to have a slight floating movement of accommodation to avoid cramping tendencies.

It was also thought necessary to utilize the armature connections to apply the desired tension to the vibratory cutter blade to hold it in pressure contact with the shearing comb plate. These features were incorporated in hair clippers as heretofore made in order to solve the problem of vibrating the cutter blade in a plane oblique to that in which the armature or driving arm vibrated, and while the features above mentioned solved that problem sufficiently to permit an extensive manufacture of electromagnetic hair clippers of the type here discussed, it has been found necessary to provide for extremely nice adjustments, frequent readjustments, and to carefully design and proportion the various parts, all of which involved considerable expense in addition to the expense of manufacturing vibratory tools, such as hair clippers, in which the tool or cutter blade vibrates in a plane corresponding with or parallel to the plane in which the armature vibrates.

The primary object of the present invention is to provide means whereby a vibratory arm or armature may have a positive pivotal connection with an enclosing casing or handle for swinging movement about an axis perpendicular to the plane in which the tool or clipper blade vibrates, and which pivotal connection is of such a character, (including location), as to make possible a direct unyielding connection between the armature and the blade.

It is a second important object of the present invention to provide a tool in which the casing performs solely the function of a handle and an enclosure, and does not fix the relative positions of the parts with respect to each other. For the purposes of the present invention the hair clipper illustrating the embodiment thereof is so designed that all of its mechanical parts are physically positioned with respect to each other by means wholly independent of the casing, whereby the clipper is wholly operable in the absence of the casing. This arrangement ensures the maintenance of proper adjustment of the parts, facilitates manufacture on a production basis, and faciltates assembly, disassembly, and repair.

Further objects are to provide improved tension means for holding the movable blade to the shearing comb plate; to provide improved means for initially adjusting the vibratory blade with reference to the armature; to provide means in one embodiment for adequately insulating the movable blade from the armature as a safeguard against accident in case the electric current should become short-circuited to the armature; to provide an improved pivotal connection between the armature and its mounting, whereby the pivotal axis may be accuretely maintained in a line perpendicular to the plane in which the cutter blade vibrates; and to provide means whereby the controlling switch may be mounted upon a removable cap adapted to afford access to all the working parts without disturbing the electrical connections.

This application is a continuation in part of my application Serial No. 624,191, filed July 23, 1932, and entitled Power driven vibrators.

In the drawings:

Figure 1 is a plan view of an electromagnetically operated hair clipper embodying my invention, showing the cap in an inverted position, removed from the body of the casing.

Figure 2 is a side elevation, portions of the casing and of the blades being shown in vertical section.

Figure 3 is a detail view, partly in horizontal section, showing the connection between the armature and the vibratory blade.

Figure 4 is an enlarged detail view, partly in

vertical section, showing the pivotal connection between the armature and its mounting.

Figure 5 is a plan view of the lower portion of the casing and the modified embodiment of a power driven vibrator housed therein, a portion of the casing cover being shown in top plan view, with the name plate removed to expose the tension spring.

Figure 6 is a view similar to Figure 2, showing partially in side elevation and partially in section the vibrator mechanism of Figure 5 and the casing therefor.

Figure 7 is a detail view in plan of the shear plate used in the device shown in Figures 1 and 2.

Figure 8 is a detail view in plan of the tension spring used in the device shown in Figures 1 and 2.

Figure 9 is a fragmentary view similar to Figure 2, showing a modified disposition of the tension spring with reference to the blades and bracket.

Figure 10 is a fragmentary plan view of the parts shown in Figure 9, with the casing capping removed.

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

The casing body 10 and its cap plate 11 of my improved vibrator mechanism are preferably composed of non-conducting material, hard rubber composition, fibrous or otherwise, being preferred. The product commercially known as bakelite will be found serviceable. For electromagnetic clippers I preferably employ a three-pole magnet 12 having its forward pole piece 13 connected with the casing body by a single screw 14 which extends through the pole piece 13 into a mounting boss 10' projecting upwardly from the base of the casing body. The screw 14 is preferably socketed at its headed end to receive the cover screw 15, as best shown in Figure 2.

The rear pole piece 17 of the electromagnet is similarly secured to a mounting boss 10'' by a screw 19. In the construction shown in Figures 1 to 4, inclusive, a mounting plate 22 will be clamped to the pole piece 17 by the screws 18, and a rigid metal plate 23 will preferably be interposed between the mounting plate 22 and the heads of the screws 18, this plate 23 having a threaded socket to receive the cap screw 24, thus protecting the mounting plate 22 from being shifted in position when the cap screw 24 is being tightened.

To the mounting plate 22 is pivotally connected the rear end portion 26 of the armature bar 27. Portion 26 of the armature bar and the associated portion 28 of the mounting plate 22 are parallel to the plane in which the cutter blade 30 vibrates, and also parallel to the bearing surface of its associated shearing comb plate 31, whereby the portion 26 of the armature may be pivotally connected with the armature mounting for swinging movement about an axis perpendicular to the plane in which the cutter blade 30 vibrates.

To accurately center this pivotal connection of the armature I provide the pivot pin or screw 35 with opposing centering cones 36, and I also mount a bushing 37 in the armature bar aperture through which the pivot pin 35 passes. The margins of the bushing 37 are slightly beveled to receive the centering cones 36, as best shown in Figure 4. The bushing 37 is rigidly connected with the armature, being pressed into position therein. The centering cones 36 are threaded to the pivot pin 35 during adjustment to bearing relation with the beveled faces of the bushing. The upper cone is locked by the nut 39, whereby, when the armature vibrates, the bushing will oscillate upon the cone surfaces against which it bears.

This pivotal connection will preferably be located substantially in the longitudinal central plane of the casing 10, and the central portion of the armature bar will be offset to extend along one side of the casing adjacent the pole faces of the electromagnet 12, a three-pole magnet being preferably employed. The forward end portion 40 of the armature 27 is aligned with the pivot pin 35 along the central plane of the clipper and is connected with the central portion of the blade 30, preferably near its rear margin, by two brackets 44 having laterally extending lips or flanges 45 secured to the blade by the screws 46.

In order that the portion 40 of the armature may be accurately positioned with reference to the blade 30 the arms 44 of the bracket are provided with apertures 49 to receive a clamping screw 50 having clamping nuts 51 threaded to its respective ends.

The portion 40 of the armature is apertured to receive loosely the screw 50. Clamped by the nuts 51 between the bracket members 44 and the armature portion 40 are dielectric washers or gaskets 53 of fiber, rubber, or the like. The connection made thereby is sufficiently rigid to maintain permanently the adjustment of armature and blade within the limits made possible by the loose fit of screw 50 in the aperture of the armature. Should the electric current become short circuited to the armature it will not reach the cutter blade inasmuch as the latter is insulated from the armature by the non-conducting washer members 53.

With the above described construction the swinging movement of the armature is a true swinging movement about the axis of the pivot pin 35, and the blade 30 vibrates about the same axis as if it were a part of the armature, no yielding movement of accommodation being necessary.

The movable blade does not move rectilinearly upon the comb or shear plate, but swings in an arc about the center of its armature fulcrum at 38. Within this short range of movement, however, the arcuate deviation is insufficient to interfere with the cutting efficiency of the blade.

An important feature of the invention consists in the arrangement whereby the shearing comb plate 31 is mechanically positioned with reference to the rest of the apparatus independently of the casing. It will be noted that the comb plate is screwed to a bracket 54, riveted at 54' to the frame or core of the electromagnet.

The armature 27 is normally centered by means of reversely curved spring 55 which resiliently opposes vibratory displacement of the armature and movable blade 30 in either direction. One end of the spring is anchored to an upstanding flange 56 on bracket 54, while the other end of the spring is bolted directly to the armature extension 40.

In order to hold the vibratory clipper blade to the shear plate with proper tension, I provide a tension spring 57 of the form shown in Figure 8, the eye portions 58 of which are held by screws 59 to the bracket 54 upon which the shear plate 31 is mounted. Loops at 57' give increased flexibility to the arms of the tension spring in the direction in which the arms oscillate with the blade 30.

The shear plate 31 is channeled at 31', as shown in Figures 2 and 7, to receive the tension spring 57 and the screws 59, the spring being ren-

dered immediately accessible by the mere removal of the shear plate. The free ends of the tension spring are engaged in holes in the vibratory blade 30, as clearly shown in Figure 2, and the form of the spring is such as to bias the vibratory blade toward the fixed shearing comb plate 31.

It is to be observed that in the preferred embodiment of the invention shown in Figures 1 to 4, 7 and 8, the clipper mechanism is complete and operative independently of the casing. The magnet core comprises a frame to which all other parts are directly or indirectly connected. Bracket 28 fulcrums the pivoted end of the armature, and bracket 54 supports the shear plate, the tension spring, and the centering spring. The movable blade 30 is fixed to the free end of the armature, and hence its path of movement is determined by a mechanical connection through the magnet from the very shear or comb plate upon which it operates, the connection between the parts being entirely rigid save for the specific movement accommodated by the armature fulcrum.

Also included in the unitary assembly is a shunt bar 72, preferably supported at one end from the mounting 22 by a spring 73, its other end being adjustably held in the desired spaced relation to one or more of the magnet poles by an adjusting screw 74 having an exterior operating knob 75.

This armature bar is held with substantial rigidity in the desired position of adjustment, but by turning the screw the gap between it and the associated pole piece or pole pieces may be varied and the strength of the magnetic field of the armature may thus be correspondingly varied to suit the requirements for any given installation. The intensity of the current may vary at different locations or points of installations, but by tuning the armature for operation under a predetermined minimum strength of current the shunt bar may be utilized to regulate the intensity of the magnetic field accordingly.

A switch box 65 is socketed in the rear portion of the cap or cover plate 11 and provided with clamping screws 66 and 67 which are respectively connected with the electrical conductors or leads 68 and 69 the latter being of sufficient length to allow the cap plate to be removed and inverted, as shown in Figure 1, without disengaging these leads. The switch may be operated by a sliding thumb piece 70 having a shank projecting through a slot in the cap plate and connected with the switch mechanism. The particular structure of the switch is not material to the invention herein disclosed, and as any ordinary switch may be used, further description thereof is deemed unnecessary.

In Figures 5 and 6 I have illustrated a modified form of construction in which a portion 26*a* of an armature bar 27*a*, otherwise similar to that disclosed in Figures 1 to 4, inclusive, is provided with a spherical knob 80 at its rear end which is seated in spherically rounded sockets 81 and 82 formed in the mounting plates 83 and 84, respectively. These mounting plates have base flanges 85 and 86 which are secured to the bottom of the casing by suitable screws, as best shown in Figures 5 and 6.

The use of the spherical knob 80, socketed as above described, provides a universal joint connection with the casing which avoids the necessity for precise accuracy in positioning the pivot pin disclosed in the other views, although when the adjustment has been made the armature bar 27*a* will vibrate about a pivotal axis perpendicular to the plane in which the cutter blade vibrates in substantially the same manner as in the structure disclosed in Figures 1 to 4.

A shunt bar 72*a* is supported from one of the magnet pole pieces by a spring 73*a*, and at its other end is pressed from the casing by a screw 74*a*. This shunt bar is similar to the shunt bar disclosed in Figures 1 to 4, inclusive.

In the construction shown in Figures 5 and 6 the cap plate 11 of the clipper casing body 10 is recessed at 60 to receive a tension spring 61 formed into a loop, as clearly shown in Figure 5, with its intermediate portion bearing in a groove 62 in the top of the vibratory blade 30. The free ends of the spring are crossed and provided with eyes which encircle the screws 64 used to position the name plate 65 on the outside of the casing cover 11.

In this location the tension spring 61, like that shown at 57, is freely accessible without opening the casing or exposing the clipper mechanism. Both tension springs are so designed as to provide the required tension without requiring adjustment, changes being made by replacement when necessary. Neither form of spring offers any substantial resistance to the vibration of the blade, being formed to resist only the separation of the vibratory blade from the comb plate. Obviously, either form of spring may be used in the different embodiments of the invention, there being nothing peculiar in either tension spring which requires its use in the specific embodiment in which it is shown.

Another construction which may be preferred because of its simplicity and which has all of the advantages of the construction shown in Figures 1 to 4, 7 and 8, is to be found in Figures 9 and 10. The shear plate 31 omits the channel 31′ and is therefore identical with that shown in Figure 6. The movable blade 30 is provided between ears 44 with a downwardly formed seat at 80, beyond which the blade is notched or cut away as shown 81 in Figure 10. The bracket 54, rather than shear plate 31, is provided with a channel, designated by reference character 82, and providing a space sufficiently large to receive the form of tension spring shown at 83. The intermediate portion of this spring has a single eye 84 engaged by screw 85′ threaded into the channel portion 82 of bracket 54. The free end portions of the tension spring each have a single coil at 86′ so that they will move with great flexibility when engaged with the shoulder or flange 80 of the vibratory clipper blade 30.

In this embodiment of the invention, like those above described, the tension spring is immediately accessible for replacement by removing the shear plate without opening the casing or disturbing or exposing the clipper mechanism or its electrical connections.

While the constructions shown in Figures 1 to 4, inclusive, 9 and 10 have the advantage of unitary assembly of the mechanism, independently of the casing, the construction shown in Figures 5 and 6, wherein the shear plate is mounted on the casing, has the advantage that the cutting mechanism which comes in contact with the patient is completely insulated, so that the patient will be protected from such short circuits as may occur within the device. The casing itself is dielectric, thereby insulating from the magnet and the armature and the switch, the shear plate and the tension. The movable blade is insulated

as above noted by the dielectric washers interposed between the armature and the blade.

While I have illustrated my invention as applied to a hair clipper of the vibratory type it will be understood that my invention is applicable to any type of tool to be electromagnetically vibrated or otherwise power driven, and therefore I do not limit the scope of all of my claims to hair clippers, since any other tool may be substituted for the cutter blade shown in the drawings, insofar as such tool may be operable under similar conditions.

Therefore, in some of the appended claims I employ the term "actuating arm" in substitution for the word "armature", and I refer to the tool as a vibratory tool in order that the scope of such claims may not be limited to armature bars and cutter blades of a hair clipper.

I claim:

1. A vibratory tool having a vibratory actuating arm secured to the tool at one end and pivotally supported at the other end for movement about an axis perpendicular to the plane in which the tool vibrates, said tool being movable in a plane oblique to the plane in which the arm vibrates, and the pivoted portion of the arm being substantially parallel to the plane in which the tool vibrates, whereby the tool may be positively guided in a plane oblique to that in which the intermediate portion of the arm vibrates.

2. A vibrator having in combination with a support for actuating mechanism, a tool mounted at one end of the support for vibratory movement in a plane oblique to the axis of said support, and an actuating arm connected with the tool at one end and having its other end pivotally connected with the other end portion of the support for movement about an axis perpendicular to said oblique plane and also oblique to the plane in which the intermediate portion of the arm moves.

3. A vibrator mechanism including the combination with a casing adapted to serve as a handle, of a tool supporting member at one end of the casing, positioned in a plane oblique to the axis of the handle, and a tool actuating arm adapted to operate a tool along said oblique tool support and pivotally mounted within the casing at a sufficient distance from said support to permit vibratory movement of the tool in an arc of negligible curvature within the range of its vibratory movement, said arm having its pivotal axis perpendicular to the plane of the supporting member, whereby a tool may be made to conform thereto and positively guided by the actuating arm.

4. A hair clipper comprising the combination of an enclosing casing adapted to serve as a handle, a toothed comb plate obliquely positioned at one end of the casing, a cutter blade vibratory upon the comb plate and having teeth in shearing relation to the comb plate teeth, an actuating arm having one end connected with the cutter blade and its opposite end pivotally supported for movement about an axis perpendicular to the plane of the face of the comb plate upon which the cutter blade vibrates and at a sufficient distance from the comb plate teeth to maintain the teeth of the cutter blade in shearing relation to those of a comb plate having a straight shearing line along its forward margin.

5. A hair clipper having, in combination, a handle, a comb plate obliquely positioned with reference to the axis of the handle, a cutter blade vibratory upon the comb plate, and an actuating arm having one end secured to the cutter blade and another portion pivotally supported for movement about an axis substantially perpendicular thereto, said blade being dependent upon said arm for its guidance in the course of its vibratory movement upon the comb plate, and means for applying power to an intermediate portion of said arm to move it along an arcuate path transverse to the axis of the handle.

6. In a hair clipper, the combination with a vibratory blade, an operating mechanism operatively connected with said blade for the actuation thereof, and a casing for said operating mechanism; a mounting for the operating mechanism removable from the casing and provided with a shear plate support, a removable shear plate connected with said support and normally forming therewith a spring receiving recess extending between the side margins of the shear plate rearwardly with reference to the shearing margins of said plate and blade, said shear plate and vibratory blade having spaced portions, and a tension spring disposed in said recess, connected with said plate support, and having a portion bearing on said vibratory blade and exerting biasing pressure thereon in the direction of said shear plate.

7. An electromagnetic hair clipper comprising the combination with a handle-like casing adapted to contain driving mechanism, an electromagnet mounted in said casing and provided with a vibratory armature, a comb plate connected with the electromagnet in a plane oblique to the plane in which the central portion of the armature vibrates, a cutter blade mounted for vibratory movement upon the comb plate and having clamping engagement with one end of the armature, the other end of the armature having a portion in a plane parallel to the plane in which the cutter blade vibrates, and a support for said portion pivotally connected therewith, said support having adjustable cone bearings for maintaining the blade in accurate shearing relation to the comb plate while vibrating thereon.

8. In a power driven hair clipper, a cutter blade in combination with an actuating arm vibratory in a plane to which the cutter blade is oblique, said arm having at one end a substantially unyielding connection with the blade and at its other end a supporting portion parallel with the blade and fulcrumed for movement about an axis perpendicular to the plane in which the blade vibrates.

9. In a hair clipper having a handle-like casing and a comb plate positioned at one end of the casing obliquely to the axis of the casing, an electromagnet and a vibratory armature within the casing, a cutter blade fixedly secured to one end of the armature and movable upon the comb plate, a mounting for the armature secured to one of the magnet pole pieces and having an extension in a plane substantially parallel with the comb plate and pivotally connected with the armature to permit armature vibration in a swinging movement about an axis perpendicular to the face of the comb plate upon which the cutter blade vibrates.

10. The combination with a hair clipper casing having at one end a vibratory blade supported in a plane oblique to the axis of the casing, of an actuating arm connected with said blade and provided with a fixed fulcrum point remote from the blade and adjacent to the other end of the casing, said arm having its fulcrumed portion offset in a plane substantially parallel with the blade and supported for movement about an

axis perpendicular to said offset portion, whereby the blade may be vibrated upon a shearing plate and held by said arm in continuous conformity thereto and with uniform pressure of all portions of the blade thereon.

11. In an electromagnetically operated hair clipper, the combination with an electromagnet, of a vibratory armature having one end obliquely pitched and pivotally supported for oscillation about an axis which is fixed with reference to the electromagnet, and a cutter blade secured to the other end of the arm and similarly obliquely pitched substantially at right angles to said axis.

12. In a hair clipper the combination of an elongated casing adapted to serve as a handle, an electromagnet mounted in the casing, a vibratory armature bar having an obliquely pitched end portion pivotally supported at one end portion of the casing, a shear plate mounted at the other end of the casing in a plane substantially parallel with the obliquely pitched end portion of said arm, a vibratory cutter blade mounted on the shear plate and rigidly connected with the armature bar, and means for adjusting the connections of said bar with its pivotal support and with the vibratory cutter blade to position the cutter blade in accurate shearing relation to the shear plate.

13. In a hair clipper having an elongated casing provided with an obliquely positioned shear plate at one end provided with shearing teeth, the combination with the casing and shear plate of a toothed vibratory cutter blade adapted to cooperate with the shearing plate for substantially straight line shearing, a blade actuating arm having one end rigidly connected with the cutter blade and the other end pivotally supported adjacent to the opposite end of the casing for movement about an axis perpendicular to the plane in which the blade lies, and means for adjusting the connections of the arm with the casing and with the blade to accurately position the blade for vibratory shearing movements of its teeth along the teeth of shear plate, said casing having an electromagnet associated with an intermediate portion of said arm for vibrating the same in a plane to which the blade is oblique.

14. A hair clipper comprising the combination with a shear plate and a handle extending obliquely with reference to the shear plate, of a vibratory cutter blade co-acting with said shear plate and movable in a plane parallel therewith, an actuating arm rigidly connected to said cutter blade and upon which said blade is dependent for its position, said arm being extended longitudinally of said handle and provided at a point remote from said shear plate with a pivotal support within said handle permitting vibratory movement of the arm upon an axis at right angles to the plane of said shear plate, together with means intermediate said shear plate and said axis for vibrating said arm and cutter blade, said arm being unitary from the pivotal connection to the blade.

15. In a hair clipper, the combination with a handle having a removable cap plate, of a shear blade connected with said handle, a vibratory cutting blade movable upon the face of the shear blade, and tension means carried by said cap plate and comprising a single piece of wire having a resilient portion bearing directly upon the blade to urge it in the direction of the shear blade.

16. In a hair clipper, the combination with a grooved blade, of a tension spring comprising a coil bearing at an intermediate portion in the groove of said blade, and means engaging another portion of said spring for the anchoring thereof.

17. In a hair clipper, the combination with a shear plate and a vibratory blade, of a support and a tension spring comprising a loop of spring wire with crossed ends, the ends being connected with the support and the intermediate portion of the loop bearing on the vibratory blade in a direction biasing it into operative engagement with the shear plate.

18. In a hair clipper, the combination with a shear plate, a vibratory blade provided with a groove and mechanism for vibrating said blade, of a casing housing said mechanism and externally provided with a recess, a plate applicable over said recess, means for holding said plate to the outside of the casing, and a tension spring interposed between said plate and casing having crossed end portions engaged by said means, and an intermediate loop portion centrally engaged in the groove of said blade and exerting thereon a biasing pressure toward said shear plate.

19. In a hair clipper, the combination with a pair of relatively movable blades, of means interposed therebetween and biasing one of said blades toward the other.

20. In a hair clipper, the combination with a pair of blades having toothed portions in contact and other portions spaced to provide an intervening recess, of a spring housed within said recess fixed at one point with reference to one of said blades and bearing elsewhere upon the other of said blades with a biasing pressure tending to hold said blades together.

21. In a hair clipper, the combination with a shear plate and a support therefor connected with said shear plate and having an intermediate portion spaced therefrom, of a vibratory blade mounted on the shear plate, and a tension spring disposed in the space between said plate and support, connected with said support, and engaged with the vibratory blade.

22. A hair clipper comprising the combination with a casing, of an operating unit mechanically independent of said casing comprising a shear plate, magnet core and armature mounting in rigid connection, a magnet winding upon said core, an armature carried by said mounting, an armature cushioning and centering spring connected between said armature and core, and a vibrating blade connected with said armature and operative upon said shear plate irrespective of the presence of said casing.

23. A hair clipper comprising the combination with an enclosing casing adapted to serve as a handle, of an operating mechanism within the casing and having members relatively fixed with reference thereto, of a shearing comb plate supported from said members in a position oblique to the axis of the casing, a cutter blade mounted upon said plate in shearing relation thereto, an actuating arm supported in the other end portion of the casing for swinging movement about an axis perpendicular to said comb plate, means for fixedly securing the other end of said arm to the cutter blade, arm actuating means in the central portion of the casing, and means associated with the front end portion of the casing for resiliently pressing together the cutter blade and comb plate.

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