Sept. 9, 1924. 1,507,716

W. H. REDMAN

ELECTRIC HAIR CLIPPER

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Fig. 1.

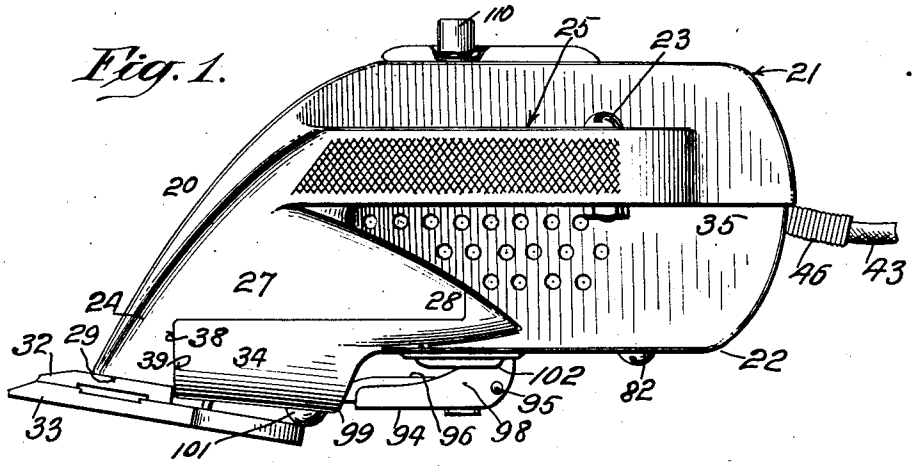


Fig. 2.

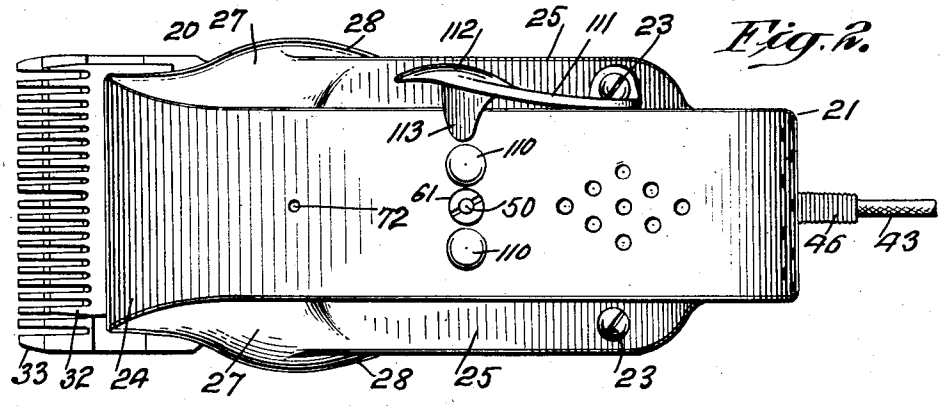
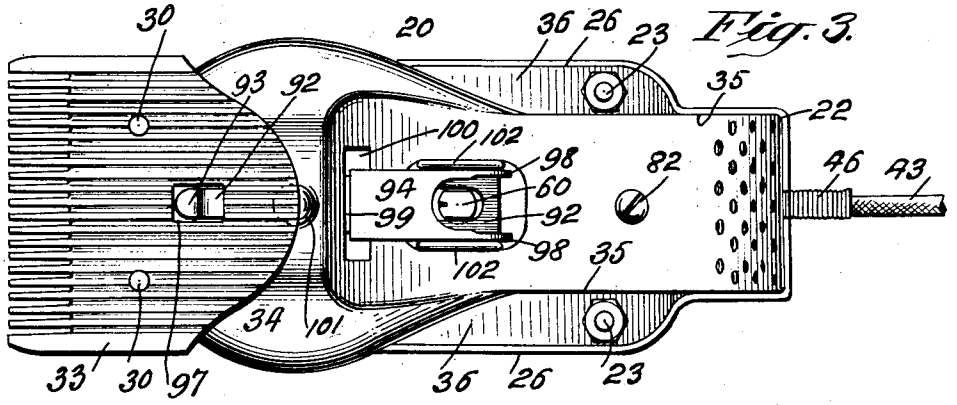


Fig. 3.



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Fig. 4.

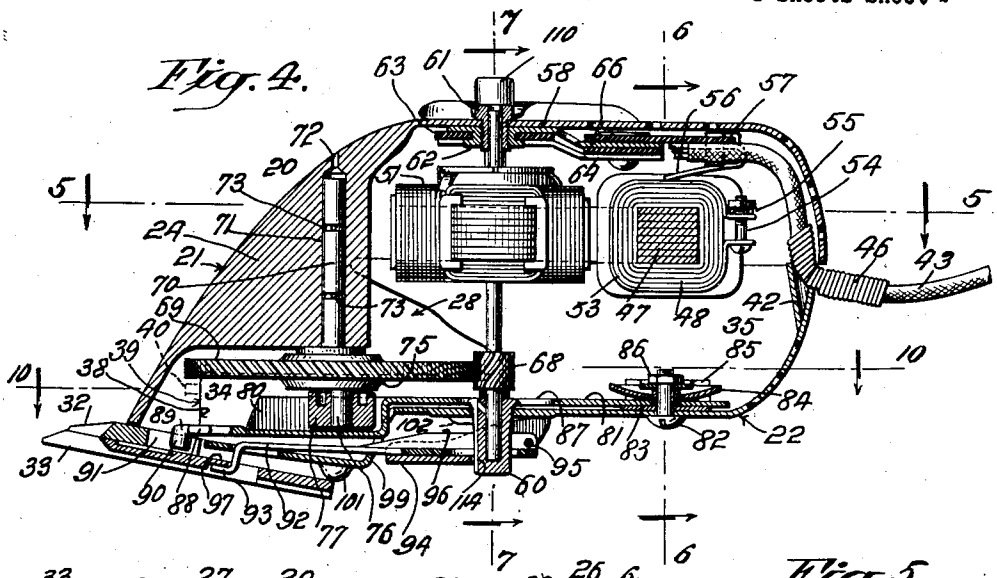


Fig. 5.

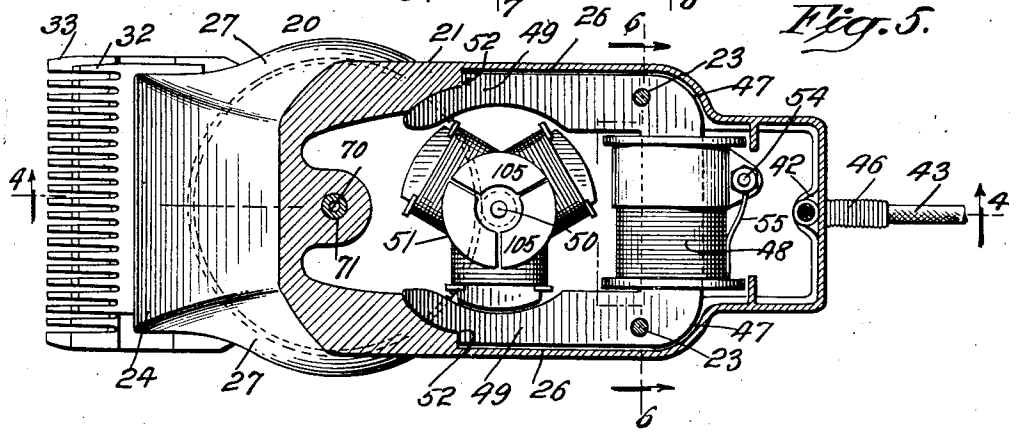


Fig. 6.

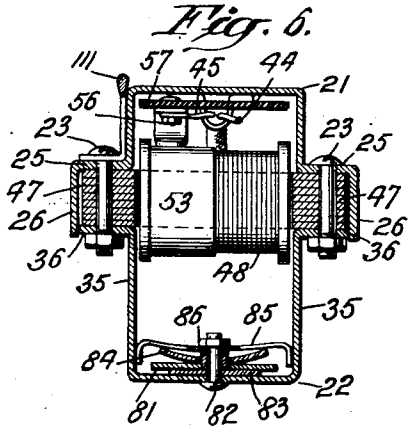
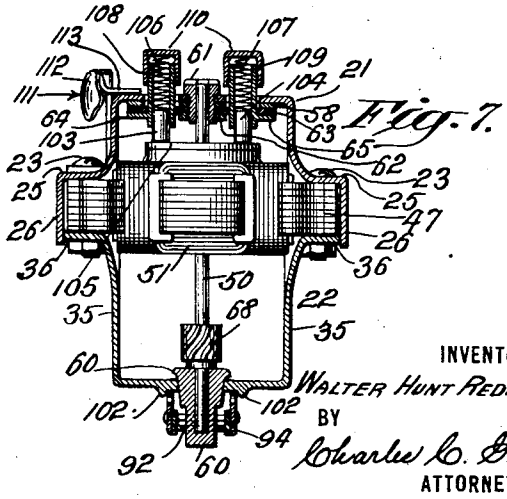


Fig. 7.



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Fig. 8.

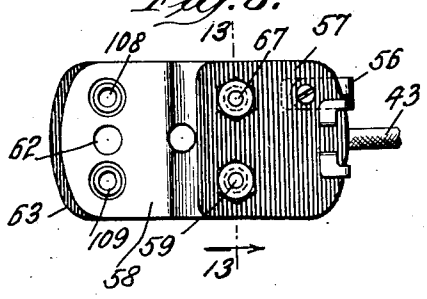


Fig. 9.

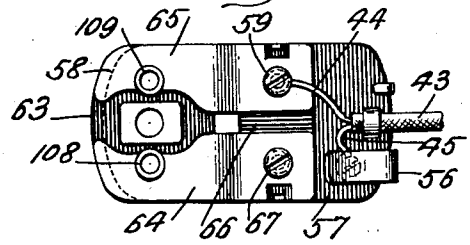


Fig. 10.

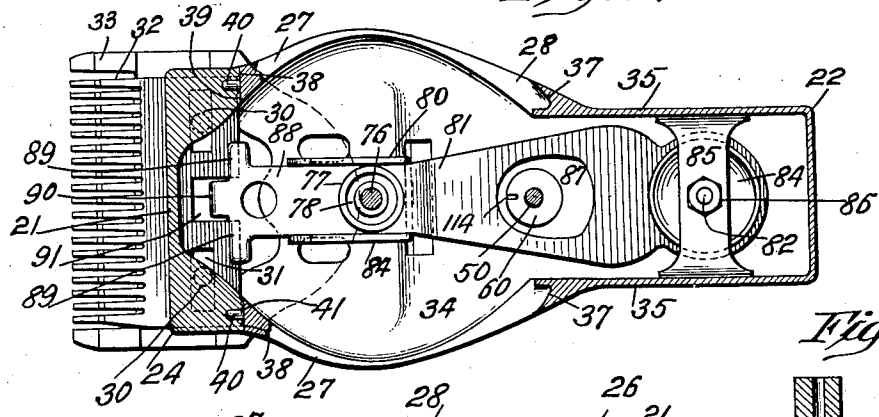


Fig. 14.

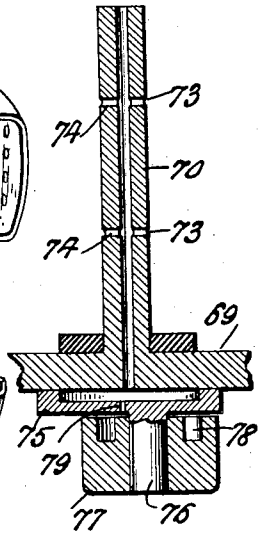
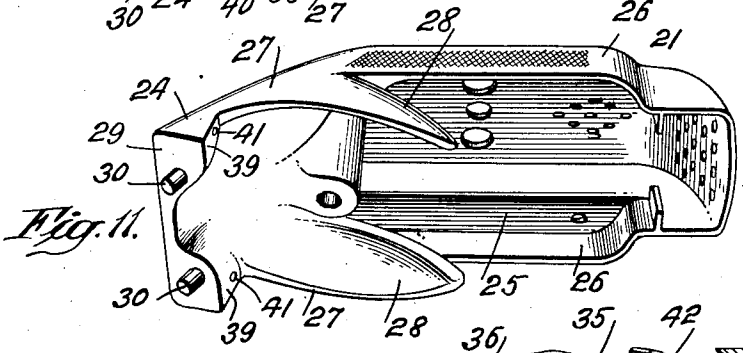


Fig. 11.



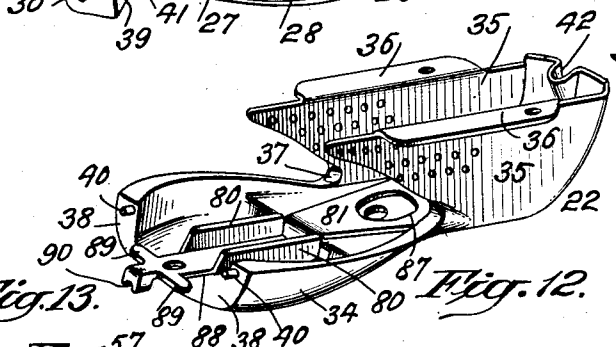


Fig. 13.

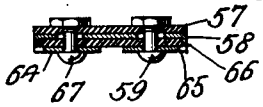


Fig. 12.

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UNITED STATES PATENT OFFICE.

WALTER HUNT REDMAN, OF EAST ORANGE, NEW JERSEY.

ELECTRIC HAIR CLIPPER.

Application filed December 31, 1920. Serial No. 434,232.

To all whom it may concern:

Be it known that I, WALTER HUNT REDMAN, a citizen of the United States, and a resident of East Orange, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Electric Hair Clippers, of which the following is a specification.

The invention pertains more especially to motor driven hair clippers, and it resides in the novel features of construction, arrangement and combinations of parts hereinafter described, and more particularly indicated in the claims.

The object of my invention is to provide a hair clipper of greater durability, efficiency and compactness than those heretofore known to me, and in carrying out my invention I secure important advantages by my special arrangement, hereinafter described, of the field-magnet, armature and driving mechanism whereby the upper cutter plate is given its transverse reciprocatory movements. I provide an exterior casing for the operative mechanism which is in two separable interlocking parts and of such special construction as to adapt it to be readily held and guided by the hand and to properly enclose the operative mechanism and permit said mechanism to be arranged in the manner and for the purposes designed by me as a part of my invention. A further feature of my invention resides in the switch mechanism whereby the operator may conveniently start and stop the machine at will and with the slightest effort, this feature of the invention placing the hair clipper under the immediate and absolute control of the operator and permitting the operator to exercise considerable judgment in the manipulation of the machine during the cutting of the hair. The invention involves a number of novel features of construction, arrangement and combinations of parts, all of which will be described in detail hereinafter and are illustrated in the drawings, in which:

Fig. 1 is a side elevation of an electric hair clipper constructed in accordance with and embodying my invention;

Fig. 2 is a top elevation of the same;

Fig. 3 is a bottom view of the same;

Fig. 4 is a central vertical longitudinal section through the hair-clipper of my invention, the section being taken on the dotted line 4—4 of Fig. 5;

Fig. 5 is a horizontal section through the same taken on the dotted line 5—5 of Fig. 4;

Fig. 6 is a vertical transverse section through the same taken on the dotted lines 6—6 of Figs. 4 and 5;

Fig. 7 is a vertical transverse section through the same taken on the dotted line 7—7 of Fig. 4;

Fig. 8 is a detached top view of the brush holder and parts associated with the leading-in current conductors;

Fig. 9 is a bottom view of the same;

Fig. 10 is a horizontal section through the hair-clipper of my invention taken on the dotted line 10—10 of Fig. 4;

Fig. 11 is a perspective view of the upper section of the casing of the machine taken partly from the lower side thereof;

Fig. 12 is a perspective view of the lower section of the casing of the machine taken at an angle from the front thereof, the casing sections shown in Figs. 11, 12 being adapted to be associated in matched relation to each other and constitute the entire exterior casing of the machine;

Fig. 13 is a sectional view of a portion of the machine taken on the dotted line 13—13 of Fig. 8; and

Fig. 14 is a vertical section, on an enlarged scale, through the vertical driven shaft which carries the eccentric for driving the upper cutter plate, the gear wheel on the lower end of said shaft being indicated in section and shown as partly broken away.

In the drawings 20 designates the exterior casing of the machine as a whole, 21 the upper section of said casing and 22 the lower section thereof. The sections 21, 22 are of interengaging construction and finally secured together by bolts or screws 23 to form a casing 20 which affords a convenient handle and houses the field magnet, armature and other operative parts of the mechanism. The casing 20 has been specially designed as a handle to be conveniently grasped in the hand of the operator and as a housing or frame to correctly receive and support the operative mechanism of the machine.

The upper casing section 21 has a downwardly inclined forward end 24, outwardly offset side portions affording horizontal flanges 25 and vertical flanges 26, and forward side portions which bulge outwardly, as at 27, and then curve inwardly and rearwardly in the form of arms 28. At its for-

ward end the casing section 21 terminates in a flat foot 29 from which two fixed studs 30 project downwardly through transverse slots 31 in the upper or reciprocatory cutter plate 32 (Fig. 10) and into close fitting holes in the lower cutter plate 33 (Fig. 3).

The lower casing section 22 is shown in detail in Fig. 12, and it has a forward bowl-shaped portion 34 and side portions 35 which have outwardly extending flanges 36 on their upper edges and are undercut at their forward edges to receive the arms 28 of the upper casing section 21, as shown in Fig. 1, said forward edges at their lower ends being recessed, as at 37, to receive the rear ends of said arms with an interlocking effect, as shown in Fig. 10. The aforesaid flanges 36 are adapted to fit within the lower edges of the vertical flanges 26 of the upper casing section 21, as shown in Figs. 6 and 7, and they lie below and are spaced from the horizontal flanges 25 of said casing section 21. The front end of the forward portion 34 of the casing section 22 is flat and vertical, as at 38, to match against corresponding surfaces 39 at the inner side of the forward end of the casing section 21, and said portion 38 of the casing section 22 is provided with studs 40 to enter close-fitting sockets 41 in said portion 39 of the casing section 21 and thereby aid in securing the casing sections together. In its rear end the casing section 22 is provided with a plate having an inwardly set vertical groove or recess 42 which opens upwardly within the rear end of the casing section 21 (Figs. 4, 5, 11) and receives the cable 43 containing the two conducting wires 44, 45 respectively (Fig. 9) and which cable is protected, in respect to its insulating covering, against abrasion where it enters the casing 20 by means of an exterior wrapping of wire 46 or other suitable armor.

Within the casing 20 is secured the field-magnet 47 which is built up of plates, or laminated, as shown, and has a transverse rear member or core on which is wound the field-magnet coil 48 and forwardly extending horizontal corresponding side members or poles 49 (Fig. 5) between whose forward portions is mounted, on a vertical shaft 50, the armature 51. The pole-members 49 of the field-magnet 47 are recessed in their facing inner sides to as snugly as possible embrace the armature 51, and said pole-members 49 have flat upper and lower sides and are held between the flanges 25, 36 and at the inner sides of the flanges 26 of the casing 20, as shown in Figs. 6 and 7, the screws 23 which finally secure the sections of the casing 20 together being passed through said pole-members and utilized for securing the field-magnet in position. The forward ends of the pole-members 49 are of special formation in that at their outer sides they are angularly recessed, as at 52 (Fig. 5), and then curve inwardly and engage matching surfaces formed on the upper inner sides of the forward portion of the casing section 21, the casing formation and that of the pole-members 49 being such that the field-magnet becomes very securely housed and rigidly held without occupying undue space. The pole-members 49 lie mainly within the side projections on the casing created by the flanges 25, 26, 36, and said side projections being horizontal contribute to the convenience with which the machine may be grasped in the hand of the operator. If desired the exterior surface of the flanges 26 may be roughened, as indicated in Fig. 1, to facilitate the firm gripping of the machine by the hand of the operator.

The field-magnet coil 48 is encompassed in part by a conducting band 53 which is clamped on the coil by a screw 54 (Figs. 4 and 5) which serves as a binding post for one end 55 of the wire of said coil 48. The band 53 is in electrical connection with the conducting wire 45 through a spring strip 56 to which said wire is connected and which is secured to a plate 57 of insulating material (Figs. 4, 6, 8, 9) carried at the rear end of a metal plate 58 to be referred to hereinafter and to which the other conducting wire, 44, is connected by a screw 59 (Fig. 9).

The armature 51 is of known commercial type and its relation to the field-magnet is clearly indicated in Figs. 4, 5 and 7. The armature 51 is rigid on and drives the vertical shaft 50 whose lower end is mounted in an inverted thimble or plug bearing 60 (Figs. 4 and 7), while the upper end of said shaft has a bearing within a hollow screw 61 which is extended down through the top of the main casing, as shown in Figs. 4 and 7, and is externally threaded and engages a bushing 62 formed on the brush-holder plate 58 and extended through a fibre or other insulating plate 63, said bushing also serving to secure said plates 58, 63 together. The lower end of the bushing 62 is disposed between two brush-holder plates 64, 65 (Fig. 9), whose forward portions are against the lower surface of the fibre plate 63 and whose rear portions are below the rear portion of the plate 58 and separated therefrom by a fibre piece or plate 66. The plates 57, 58, 64 and 66 are fastened together by a screw 67 and the plates 57, 58, 65 and 66 are secured together by the aforesaid screw 59. Further details of the brush-holder plates 58, 64 and 65 will appear hereinafter in connection with the description of the armature brushes.

The lower bearing 60 for the armature shaft 50 is inserted downwardly through a hole in the bottom of the lower casing section 22, and just above the bearing 60 the shaft 50 has a worm pinion wheel 68 (Figs.

4 and 7), which is in mesh with a worm wheel 69 rigid on a vertical shaft 70 (Figs. 4 and 14) rotatably mounted in a vertical recess 71 formed in a thickened forward portion of the casing-section 21 and which recess is open at its upper end, as at 72, to afford means for introducing a lubricant to said recess and shaft. The shaft 70 is hollow, as shown in Fig. 14, to admit oil from the opening 72 and is annularly grooved, as at 73, and at said grooves transversely apertured, as at 74 (Fig. 14), said grooves and apertures serving to receive and hold oil and facilitate the lubrication of the shaft 70 in its bearing 71. On the lower side of the gear wheel 69 is rigidly secured a cup 75 which may receive oil from the hollow shaft 70 and is formed with a vertical eccentrically disposed pin 76 on which is mounted a roller 77 which is utilized to, through intermediate connections presently to be described, drive the upper cutter plate 32. The roller 77 is formed with an annular groove 78 to hold a lubricant, and the cup 75 has a small hole 79 in its bottom to permit the passage of oil from said cup to the top of the roller 77, whence the oil may pass to the groove 78 and also to and around the pin 76, it being highly desirable not only that the shaft 70 be lubricated but also that the lubricant introduced at the opening 72 may effectively reach the roller 77 and pin 76, which together constitute a driving eccentric receiving motion from the gear wheel 69. The gear wheel 69 receives its motion from the armature shaft 50 and pinion wheel 68.

The eccentric roller 77 is disposed between and engages two parallel vertical flanges 80 formed on an elongated oscillatory lever 81 shown in Figs. 4, 10 and 12. The lever 81 is of plate formation and its rear portion extends along the floor or bottom of the casing-section 22 and is pivotally secured on a vertical screw 82 (Fig. 6) whose head is exposed at the bottom of said section 22. The screw 82 passes upwardly through a washer 83, a hole in the lever 81, a cup spring-washer 84 placed on said lever and a transverse cross-bar 85 which bears upon the cup washer 84 and is firmly held down thereupon by means of a nut 86 applied on the upper end of the screw 82. The ends of the bar 85 are bent downwardly and engage the opposite facing sides of the casing-section 22, as shown in Fig. 6, and said downwardly bent ends become flexed outwardly against said sides as the nut 86 is worked downwardly against said bar to press the same against the cup washer 84 and bind the inverted apex of said washer against the lever 81. The washer 84 creates a minimum amount of friction against the lever 81 and at the same time holds said lever with sufficient firmness; the bar 85 and nut 86 serve to permit a proper regulation of the pressure the washer 84 shall exert against the lever 81, and the bar 85 by reason of its end formation acts as a spring to bind the nut 86 firmly on the screw 82. The rear portion of the lever 81 has an opening 87 (Figs. 4, 10, 12), which admits the upper end of the bearing 60 and permits said lever to perform its oscillatory movements without striking said bearing.

The forward portion of the lever 81 sets downwardly from the rear portion thereof into the forward bowl-shaped part 34 of the casing-section 22, as shown in Figs. 4 and 12 and it has the aforesaid flanges 80 and beyond said flanges a tongue 88 having two oppositely extending lateral arms 89 and a forwardly projecting and downwardly extending finger 90, which enters a recess 91 in the upper cutter plate 32, while the arms 89 rest on the rear portion of said plate at opposite sides of said recess, as shown in Figs. 4 and 10. The lever 81 is oscillated by the roller 77 and its finger 90 imparts reciprocatory motion to the cutter-plate 32. In my construction, the lever 81 is long and has a very limited movement in its rear portion so that the lever offers very little frictional resistance to the driving roller 77. The manner hereinbefore described of mounting and securing the inner or rear end of the lever 81 is also of importance in avoiding friction and adjusting the tension to be placed on said lever at its pivot 82.

The brushes for the motor are numbered, respectively, 103, 104, and as clearly shown in Fig. 7, are two short rods pressed against the commutator 105 by small springs 106, 107 held within metal tubes 108, 109 upon which are closing caps 110. The tube 108 is secured to the metal plate 64 and the tube 109 to the metal plate 65 (Figs. 7 and 9), and both tubes are insulated from the plate 58 and extend upwardly through holes in the top of the casing-section 21 and are spaced from the edges of said holes, thus being normally insulated from the main casing. The leading in conducting wire 44 is through the plate 65 in electrical connection with the tube 109, which represents one terminal of the circuit. The other terminal of the circuit is grounded in the main casing 20, and to complete the circuit the casing must be placed in electrical connection with the tube 108, and when this is done the motor becomes active and its rotation is communicated to the shaft 50 and thence through the pinion 68 and wheel 69 to the eccentric 77, whose rotation imparts oscillatory motion to the lever 81 and thereby effects the reciprocatory motion of the top cutter plate 32.

The means for completing the circuit at the brush tube 108 and thereby setting the

machine in operation, is of importance and as shown consists of a switch lever 111 (Figs. 2, 6 and 7), which is of general right-angular formation and has a vertical leg secured by one of the screws 23 to the casing section 21 and a forwardly extending spring arm normally inclining outwardly in a lateral direction, as shown in Fig. 2, and formed on one side of its forward end with a finger-piece 112 and on the other side of said end with a circuit make-and-break blade 113, whose free end is adapted when the lever is pressed inwardly to pass into electrical engagement with the brush-tube 108 to complete the circuit, the point of the blade then passing inwardly between the top of the casing section 21 and the lower edge of the adjacent cap 110 which is on the upper end of said tube 108. When the pressure of a finger of the hand holding the machine is exerted against the finger-piece 112 to cause the blade 113 to engage the brush-tube 108 and complete the circuit, the lever 111 becomes flexed and when said pressure is released from said finger-piece the lever automatically recedes to its normal position, breaking the circuit and consequently cutting off power from the motor, and this operation of the lever 111 is very important in that it places the operation of the machine under the immediate, convenient and absolute control of the operator and permits him while grasping the machine in his hand to start and stop the machine at will. In accordance with my invention, the machine need not be set into action until the barber is ready to apply the cutters to the hair and may be stopped from time to time during the cutting operation as new or different strokes over the head are contemplated by the barber and without the barber releasing his usual operative-grasp on the machine. The switch lever 111 is located on one side of the machine and at a point at which one finger of the barber will lie over it when the machine is held in the hand for operation. The main casing has been designed with a view of being conveniently grasped in the hand and held in operative position and the location of the switch lever 111 has been selected for the purpose of permitting it to be conveniently operated without any requirement of a change in the position of the hand holding the machine. The automatic breaking of the circuit by the lever 111 is of great advantage as a convenience to the barber and in enabling him to absolutely control the operation of the machine, and it is also important in the assurance it affords that the machine will not remain in action except when in use and in the hand of the barber. I do not confine my invention to the special construction of switch 111 shown, since I am aware that like results may be obtained with the use of modified forms of said switch.

The oiling or lubrication of the parts of the operative mechanism may be performed in various ways. I provide the opening 72 and hollow shaft 70 and associated features hereinbefore described for receiving oil, preferably while the mechanism is in motion, and with respect to the bearing or bushing 60 it may be seen on reference to Fig. 4 that I provide a narrow groove 114 in one vertical side of said bearing and connect the same by a downwardly inclined port leading to within said bearing, so that oil applied at said groove will by capillary attraction pass up the same and then enter said port, for lubricating the lower end of the shaft 50. The upper end of the shaft 50 may be oiled at the nut 61. Oil should also be applied between the cutter plates and to the brushes 103, 104 as occasion may require. When the caps 110 are unscrewed from the tubes 108, 109 oil may easily be fed to the brushes.

I preferably provide the casing 20 with numerous holes or perforations, disposed preferably as shown, for air circulation and for the purpose of keeping the interior mechanism cool and creating air currents which will prevent hair from accumulating within the machine.

The method of operation of the clipper will largely be understood from the foregoing description. The conduit or cable 43 may be connected with the usual lighting system in a barber shop, and the clipper as a whole will be grasped in the hand of the barber who will place one finger over the finger-piece 112 of the switch-lever 111. When it is desired to operate the machine against the hair of a customer, the barber will press on the lever 111 so as to set the mechanism in motion and will operate the clipper in the usual way so far as moving it through the hair is concerned. The upper cutter-plate 32 will be driven by electric power instead of by hand power, and the operation of cutting a person's hair is thus rendered rapid.

The special disposition of the mechanism within the exterior casing 20, hereinbefore explained, is of importance in providing a hair clipper capable of efficient use and of withstanding the handling that a hair clipper receives in a barber shop. The positioning of the field magnet 47 and motor armatures or motor is important in the matter of economizing space, securing efficiency in operation and providing adequate driving mechanism leading to the upper cutter-plate 32. The transmission from the vertical shaft 50 to the lever 81 for driving the cutter-plate 32 is direct and lacking in complication and is efficient. All the parts of the mechanism are of durable character, readily assembled, and capable of ready replacement in the

event that any of said parts should require repair or become worn. The method of making and breaking the circuit, as embraced within my invention, avoids excessive heating of or wear on the several parts of the mechanism, since the mechanism is not in motion, except when in actual use, the circuit being automatically broken as soon as the pressure of the hand is released from the switch lever 111. The method hereinbefore described of operating the clipper also avoids waste of current, which is an item of importance. In the organization of the mechanism presented by me, the clipper may be run by a current of low voltage in lieu of the high voltage current required for electric clippers of the character heretofore known to me, and this feature of my invention is one of great importance in that in the use of the current of low voltage the heating up of the various parts of the mechanism and sparking are avoided and the life of the machine is increased. A further important result of the use of a current of low voltage is that the barber may grasp the casing of the machine in his hand and not be liable, through accidental cause or otherwise, to receive a shock from the electric current, such shock being disastrous when a hair clipper receives the high voltage of an electric lighting system. My machine is to be connected with electric lighting systems, having, say, one hundred and ten volts, but I interpose a dynamotor or other type of transformer between the socket of the lighting system and my machine, and this transformer reduces the voltage at my machine to about six or eight volts, which is amply sufficient for operating my machine and at the same time is too low to prejudicially affect the machine or render it necessary to provide an insulated casing.

I do not limit my invention to all of the details of form, construction and arrangement hereinbefore described and illustrated in the accompanying drawings. I have presented in the drawings the preferred construction as designed and studied out by me for attaining the highest degree of efficiency and durability, but I do not wish to be limited to all of the details shown and described, since I am aware that many of these details are capable of modification within the scope and spirit of my invention, as claimed.

What I claim as my invention and desire to secure by Letters Patent, is:—

1. Mechanism of the character described for driving a tool comprising an exterior enclosing casing having laterally disposed longitudinal interior recesses, a horizontally disposed field magnet having longitudinal pole members located in said recesses and a coil on its transverse portion, a rotary armature secured on a vertical shaft and disposed between said pole members, means for driving the tool from said vertical shaft, brushes for the armature, an electric current conductor leading to the field magnet coil, an electric current conductor leading to one of said brushes, and a manually operative switch adapted to complete the circuit at the other brush.

2. Mechanism of the character described for driving a tool comprising an exterior enclosing casing to be grasped within the hand of the operator, a horizontally disposed field magnet therein, a horizontally rotatable armature secured on a vertical shaft, suitable electric current conductors, means for driving the tool from said shaft, and a make and break switch mounted on said casing, said casing having in its top a hollow screw affording a bearing for the upper end of said shaft and in its bottom a removable thimble bushing affording a bearing for the lower end of said shaft.

3. Mechanism of the character described for driving a tool comprising an exterior enclosing casing, a field magnet and rotary armature therein, suitable electric current conductors, and means intermediate the shaft of said armature and said tool for driving said tool with a reciprocatory movement from said shaft comprising an elongated lever pivotally secured at its rear end and detachably connected at its front end with said tool, a vertical shaft mounted in said casing and carrying a gear wheel in mesh with a pinion on the armature shaft and an eccentrically mounted roll at the lower side of and carried by said gear wheel and confined between opposing portions of said lever, said vertical shaft being hollow and said gear wheel having an oil cup at its lower side in communication with the opening through said shaft and discharging at the upper end of said roll.

4. Mechanism of the character described for driving a tool comprising an exterior enclosing casing in two longitudinal matching sections adapted for interlocking engagement with each other and having side extensions forming interior side recesses, a field magnet horizontally disposed within said casing and having its pole members seated in said recesses, bolts extending through said pole members and the adjacent portions of the sections of said casing and securing said sections together and said field magnet in position, said casing being of a form to be grasped within the hand, a horizontally rotatable armature secured within said casing and having its shaft supported from the upper and lower sections thereof, suitable electric current conductors, means for driving the said tool with a reciprocatory movement from said shaft and a make and break switch mounted on said casing.

5. Mechanism of the character described for driving a tool comprising an exterior

horizontally elongated casing, of a form to be grasped within the hand and having thereon a make and break switch in position to be engaged by the fore finger while said casing is held in and guided by the hand, a horizontally disposed field magnet secured within said casing with the pole members of the magnet extending at opposite sides thereof, a horizontally rotatable armature between said pole members and secured on a vertical driving shaft having a small pinion wheel on its lower portion within said casing, a vertical driven shaft forward of said driving shaft and having on its lower portion a comparatively large gear wheel in mesh with said pinion wheel, said driven shaft and said gear wheel being confined within said casing, and means intermediate the lower end of said driven shaft and said tool for driving said tool with a reciprocatory motion from said shaft comprising an elongated lever pivotally secured at its rear end and detachably connected at its front end with said tool and an eccentric on the lower end of said driven shaft confined between opposing portions of the forward part of said lever.

6. Mechanism of the character described for driving a tool comprising an exterior horizontally elongated casing, of a form to be grasped within the hand and having thereon a make and break switch in position to be engaged by the fore finger while said casing is held in and guided by the hand, a horizontally disposed field magnet secured within said casing with the pole members of the magnet extending at opposite sides thereof, a horizontally rotatable armature between said pole members and secured on a vertical driving shaft having a horizontal gear wheel on its lower portion within and adjacent to the bottom of the casing, a vertical driven shaft forward of said driving shaft and having on its lower portion a horizontal gear wheel in line and in mesh with the gear wheel on the armature shaft, said driven shaft and the gear wheel thereon being confined within said casing, and means intermediate the lower end of said forward vertical shaft and said tool for driving said tool with a reciprocatory motion from said shaft comprising an elongated lever pivotally secured at its rear end in rear of said armature shaft and detachably connected at its front end with said tool and a horizontal eccentric on the lower end of said driven shaft confined between opposing portions of the forward part of said lever.

Signed at New York city, in the county of New York and State of New York, this 29th day of December A. D. 1920.

WALTER HUNT REDMAN.