Dec. 20, 1932. L. J. WAHL 1,891,486

ELECTROMAGNETIC CLIPPER REGULATION

Filed Sept. 21, 1931

Fig. 1

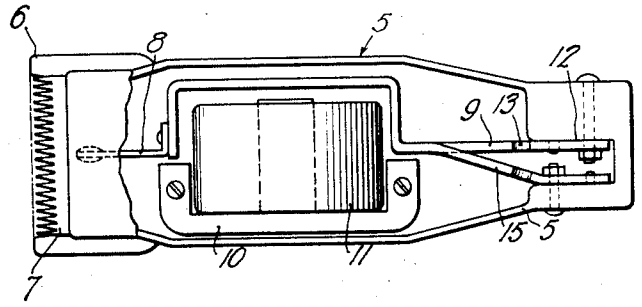


Fig. 5

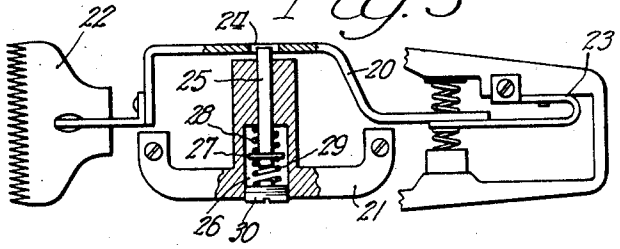


Fig. 3

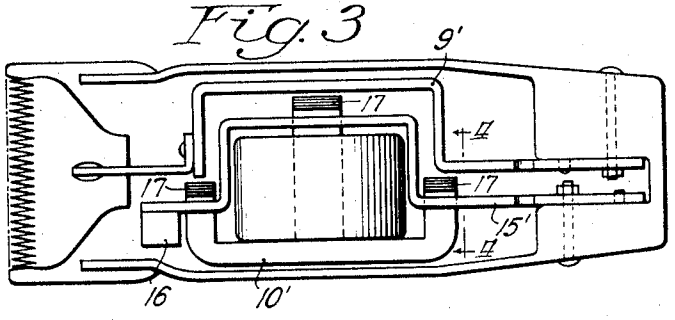


Fig. 4

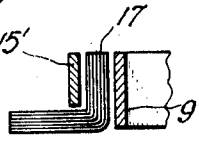


Fig. 2

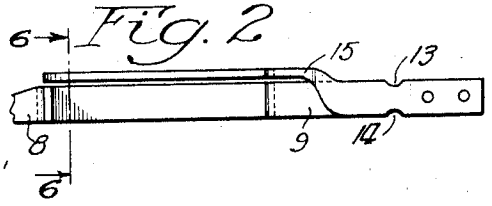




Fig. 6

Inventor
Leo J. Wahl
By Fabert & Banning
Attys

Patented Dec. 20, 1932 1,891,486

UNITED STATES PATENT OFFICE

LEO J. WAHL, OF STERLING, ILLINOIS, ASSIGNOR TO WAHL CLIPPER CORPORATION, OF STERLING, ILLINOIS, A CORPORATION OF ILLINOIS

ELECTROMAGNETIC CLIPPER REGULATION

Application filed September 21, 1931. Serial No. 564,061.

My invention relates to electromagnetic vibrating devices such as hair clippers. In these devices the energy is supplied usually from a 60 cycle source of alternating current so that the tool or work piece is moved to and fro at a very rapid rate.

In such rapidly vibrating devices, it is essential to have proper regulation so that the usual variations in line voltage of the power source will not cause so great a change in the amplitude of vibration as to injure the device or cause it to operate so poorly as to cause trouble.

If the voltage at its higher values causes too great amplitude of vibration, the device becomes very noisy due to the armature hitting the pole pieces of the magnet or other stationary parts of the device.

It is the purpose of this invention to provide means for automatically regulating the device so as to eliminate the foregoing difficulty without making adjustments by the operator necessary.

It is also the purpose of this invention to provide means to automatically limit the increase in amplitude of vibration of the work piece in response to increased voltage which means cooperates with the work piece carrying armature to act as a counterbalance and thus effect smoother operation.

I will describe the preferred form of my invention by reference to the accompanying drawing wherein—

Fig. 1 is a top plan view of the electromagnetic clipper embodying my invention;

Fig. 2 is a side view of the armature elements of the clipper;

Fig. 3 is a top plan view similar to Fig. 1 but with parts of the casings broken away illustrating a modification;

Fig. 4 is a section substantially on the line 4—4 of Fig. 1;

Fig. 5 illustrates a further modification.

Fig. 6 is a sectional view on line 6—6 of Fig. 2.

Referring now in detail to the drawing, I show a clipper casing at 5 having the stationary blade 6 upon which a movable blade 7 is adapted to move in a well known manner. This movable blade is driven by an arm 8 which is mounted upon the armature 9. Suitable core 10 and coil 11 are used for causing armature 9 to vibrate in the usual manner when the coil is energized from a source of alternating current. The armature 9 has a fixed mounting at 12. That is to say, no provision is made for manually adjusting this armature to take care of variations in its amplitude of vibration due to different voltages impressed upon the device. In other words, it has what I term a fixed tune mounting. The armature is tuned originally to the proper value for example by grinding out portions as indicated at 13 and 14.

Now in order to make the operation of the armature steady under varying voltages, I find that, if I use a second arm 15 which as shown is also fixedly mounted and ground so as to be properly tuned and pass this arm 15 across the faces of the core 10, I can by the proper construction of the arm cause this arm to operate as a shunt to deprive the armature 9 of part of the attraction from the core and thus make it operate more steadily. That is to say, this lighter arm responds more readily to the changes in magnetic pull and as the voltage increases it moves closer to the core and operates as a shunt to shunt part of the magnetic circuit around the main armature 9 thus reducing the effective proportionate force applied to the main armature. In this manner the main armature is prevented from excessive vibration due to increases in the voltage above that for which it is normally set. The lighter arm 15 may in some cases desirably be slightly out of tune, that is, tuned lower in which case I find it works better as the current gets stronger.

Referring now to Figs. 3 and 4, in this form of the invention the regulating arm 15′ operates substantially the same so far as the regulation is concerned as the arm 15 in Fig. 1. In this construction, however, arm 15′ is made to operate so as to vibrate in the opposite direction to the vibrations of armature 9′ which drives the work piece or clipper blade. The purpose of so operating arm 15′ is to cause it not only to operate as a regulator but also as a counterbalance

device so as to more or less counterbalance the vibrations of the main armature and thus make the implements less tiring on the operator and easier to hold. The weight of the arm 15′ may be increased as for example by adding weight thereto as indicated at 16.

In order to obtain the vibrations in opposite directions for the armature 9′ in arm 15′, I preferably provide the core 10′ with upturned portions as indicated at 17 on the faces thereof so that this upturned portion attracts arm 15′, at the same time it attracts armature 9′ to cause them both to move toward the upturned portion 17 and thus in opposite directions with respect to each other. With this exception the modification shown in Figs. 3 and 4 functions substantially the same as that shown in Figs. 1 and 2.

The modification in Fig. 5 illustrates another method of accomplishing certain desired results similar to those obtained by the structures disclosed in Figs. 1–4. In this form the core 21 and armature 20 are mounted in the usual manner, the armature being secured at 23 and carrying the blade 22. An opening is provided at 24 in the armature and a control bar 25 mounted in the core is arranged to project into the opening more or less as the armature approaches and recedes from the core. This bar is yieldingly positioned by springs 28 and 29 on opposite sides of the collar 27 in recess 26. The screw plug 30 holds the springs in place and serves as a means for changing the effect of the bar 25 by causing it to project more or less from the core.

The operation of the device shown in Fig. 5 is very similar to that shown in the other figures. This bar 25 will as the voltage increases project farther through the opening 24 and, as it is effectively a part of the core, will naturally cut down the attractive number of lines of force that are effective upon the armature.

From the above description, it is thought that the construction and operation of this device will be clear to those skilled in this art and the advantages thereof readily apparent.

Having thus described one specific form of my invention, what I claim as new and desire to secure by Letters Patent is:

1. An electromagnetic vibrating device comprising an electromagnet having means whereby it may be energized by pulsating electric current, an armature movable relative thereto in response to the pulsations of the energizing current and adapted to carry a work piece, and a regulating arm mounted to vibrate in response to energization of said electromagnet, said arm being attracted more as the voltage increases whereby to shunt more of the magnetic field around the work piece carrying armature and reduce the effect of the increased voltage thereon.

2. An electromagnet vibrating device comprising an electromagnet having means whereby it may be energized by pulsating electric current, an armature movable relative thereto in response to the pulsations of the energizing current and adapted to carry a work piece, and a regulating arm mounted to vibrate in response to energization of said electromagnet, said arm being attracted more as the voltage increases whereby to shunt more of the magnetic field around the work piece carrying armature and reduce the effect of the increased voltage thereon, said arm being lighter than said armature.

3. An electromagnetic vibrating device comprising an electromagnet having means whereby it may be energized by pulsating electric current, an armature movable relative thereto in response to the pulsations of the energizing current and adapted to carry a work piece, and a regulating arm mounted to vibrate in response to energization of said electromagnet, said arm being attracted more as the voltage increases whereby to shunt more of the magnetic field around the work piece carrying armature and reduce the effect of the increased voltage thereon, said arm extending substantially parallel to the armature.

4. An electromagnetic vibrating device comprising an electromagnet having means whereby it may be energized by pulsating electric current, an armature movable relative thereto in response to the pulsations of the energizing current and adapted to carry a work piece, and a regulating arm mounted to vibrate in response to energization of said electromagnet, said arm operating to reduce the proportionate effective attraction upon said armature as the voltage increases.

5. An elecromagnetic vibrating device comprising an electromagnet having means whereby it may be energized by pulsating electric current, an armature movable relative thereto in response to the pulsations of the energizing current and adapted to carry a work piece, and a regulating arm mounted to vibrate in response to energization of said electromagnet, said arm operating to reduce the proportionate effective attraction upon said armature as the voltage increases, said arm and armature being attracted in opposite directions whereby the arm operates as a counterbalance..

6. An electromagnetic vibrating device comprising an electromagnet having means whereby it may be energized by pulsating electric current, an armature movable relative thereto in response to the pulsations of the energizing current and adapted to carry a work piece, and a regulating arm mounted to vibrate in response to energization of said electromagnet, said arm being attracted

more as the voltage increases whereby to shunt more of the magnetic field around the work piece carrying armature and reduce the effect of the increased voltage thereon, said arm and armature being attracted in opposite directions whereby the arm operates as a counterbalance.

7. An electromagnetic vibrating device comprising an electromagnet having means whereby it may be energized by pulsating electric current, an armature movable relative thereto in response to the pulsations of the energizing current and adapted to carry a work piece, and a regulating arm mounted to vibrate in response to energization of said electromagnet, said arm being attracted more as the voltage increases whereby to shunt more of the magnetic field around the work piece carrying armature and reduce the effect of the increased voltage thereon, said arm being lighter than said armature, said arm and armature being attracted in opposite directions whereby the arm operates as a counterbalance.

8. An electromagnetic vibrating device comprising an electromagnet having means whereby it may be energized by pulsating electric current, an armature movable relative thereto in response to the pulsations of the energizing current and adapted to carry a work piece, and a regulating arm mounted to vibrate in response to energization of said electromagnet, said arm being attracted more as the voltage increases whereby to shunt more of the magnetic field around the work piece carrying armature and reduce the effect of the increased voltage thereon, said arm extending substantially parallel to the armature, said arm and armature being attracted in opposite directions whereby the arm operates as a counterbalance.

9. An electromagnetic vibrating device comprising an electromagnet having means whereby it may be energized by pulsating electric current, an armature movable relative thereto in response to the pulsations of the energizing current and adapted to carry a work piece, and a regulating arm mounted to vibrate in response to energization of said electromagnet, said arm operating to reduce the proportionate effective attraction upon said armature as the voltage increases, said arm extending substantially parallel to the armature.

10. An electromagnetic vibrating device comprising an electromagnet, an armature movable relative thereto and adapted to carry a work piece, and a regulating arm mounted to vibrate in response to energization of said electromagnet, said arm operating to reduce the proportionate effective attraction upon said armature as the voltage increases, said electromagnet having a portion of its core lying between the arm and armature.

11. An electromagnetic vibrating device comprising an electromagnet, an armature movable relative thereto and adapted to carry a work piece, and a regulating arm mounted to vibrate in response to energization of said electromagnet, said arm being attracted more as the voltage increases whereby to shunt more of the magnetic field around the work piece carrying armature and reduce the effect of the increased voltage thereon, said electromagnet having a portion of its core lying between the arm and armature.

12. An electromagnetic vibrating device comprising an electromagnet, an armature movable relative thereto and adapted to carry a work piece, and a regulating arm mounted to vibrate in response to energization of said electromagnet, said arm being attracted more as the voltage increases whereby to shunt more of the magnetic field around the work piece carrying armature and reduce the effect of the increased voltage thereon, said electromagnet having a portion of its core lying between the arm and armature, and said arm having a weight adjacent the free end thereof.

In witness whereof, I hereunto subscribe my name this 25th day of August, A. D. 1931.

LEO J. WAHL.