

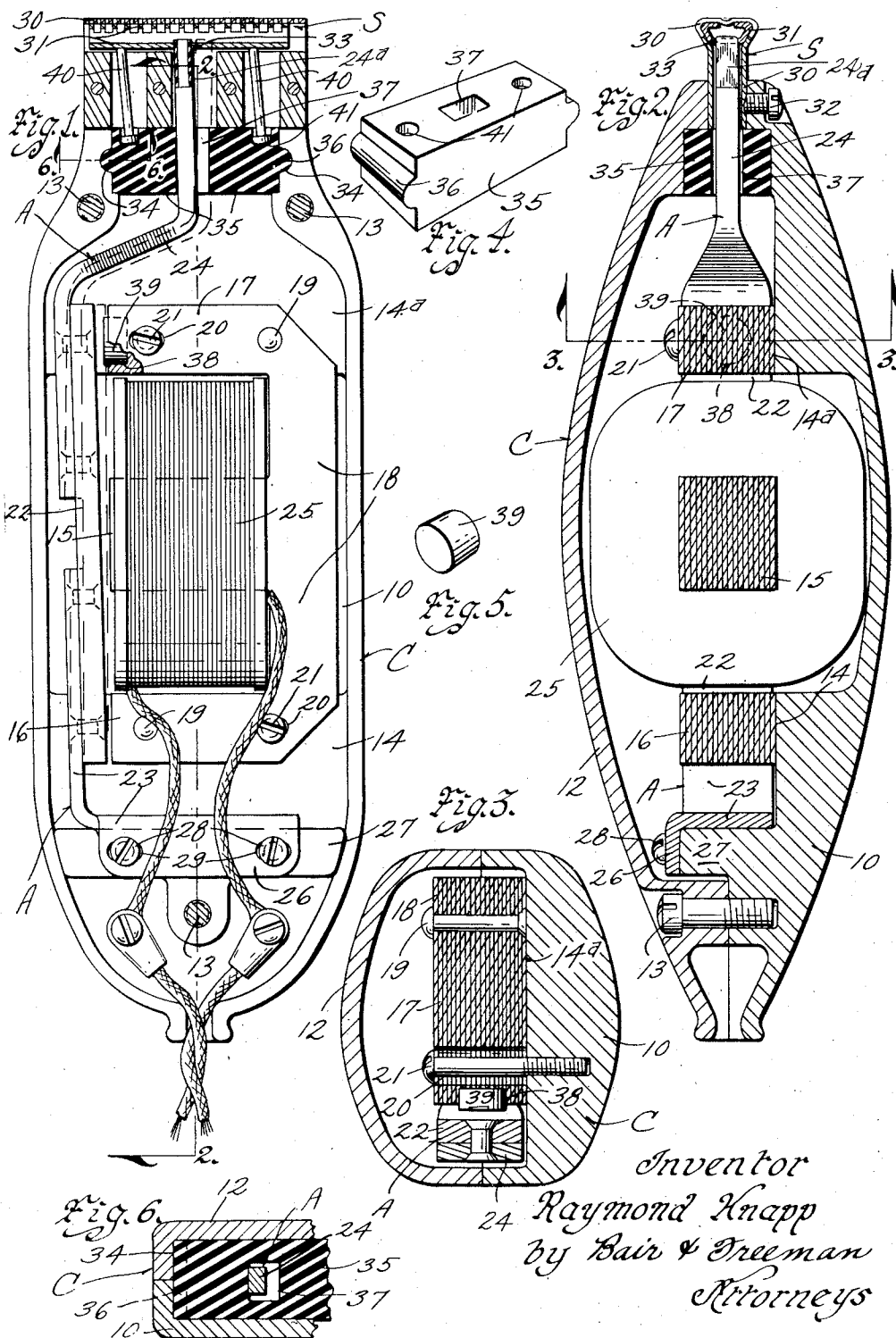
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ALTERNATING CURRENT MOTOR FOR DRY SHAVERS OR THE LIKE

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ALTERNATING CURRENT MOTOR FOR DRY
SHAVERS OR THE LIKE

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3 Claims. (Cl. 172-126)

An object of my present invention is to provide a vibratory motor for dry shavers and the like adapted for silent operation on alternating current, the motor being comparatively simple and inexpensive to manufacture.

A further object is to provide a motor which eliminates all electrical contacts and which eliminates all possibility of metallic parts of the motor striking each other thus making the motor entirely silent in operation.

A further object is to provide a motor comprising a casing, an alternating current vibratory motor therein, blocks of rubber or the like being strategically arranged relative to the operating arm of the motor and so shaped and arranged relative thereto that all clattering noise is eliminated and likewise vibrations intermediate the ends of the arm are damped out thus causing a very satisfactory and economically operated motor for operating shearing heads of dry shavers or similar devices calling for reciprocating operation.

Still a further object is to provide a block of rubber or the like for eliminating noise of the operating arm of the motor and also serving as a means to bias thrust pins against an inner shearing element to cause it to shearingly engage the outer shearing element.

Still another object is to provide an operating arm and an electromagnet so mounted within the casing that they may be relatively adjusted by an ordinary screw driver to secure most efficient operation and to secure satisfactory operation at different voltages.

With these and other objects in view my invention consists in the construction, arrangement and combination of the various parts of my motor, whereby the objects above contemplated are attained, as hereinafter more fully set forth, pointed out in my claims and illustrated in the accompanying drawing. Although the invention is susceptible of a variety of embodiments, it is unnecessary to fully describe and illustrate more than one in order to give a full understanding of the invention both from its structural and functional standpoints. Accordingly, I have illustrated a preferred and desirable embodiment thereof on the accompanying drawing, in which:

Figure 1 is a plan view of an alternating current motor for dry shavers or the like embodying my invention, the device being shown on an enlarged scale, the cover member therefor being omitted and the upper end of the motor and shearing element associated therewith being shown in section.

Figure 2 is a sectional view on the line 2-2 of Figure 1.

Figure 3 is a sectional view on the line 3-3 of Figure 2.

Figures 4 and 5 are perspective views of rubber blocks or inserts used in my motor; and

Figure 6 is a sectional view on the line 6-6 of Figure 1.

In the accompanying drawing I have used the reference character C to indicate generally a casing for my motor. The casing C is formed in two parts indicated as 10 and 12 in the drawing. The parts 10 and 12 are each substantially one-half of the casing C and are suitably secured together by three screws 13.

Within the part 10 I provide a pair of shoulders or bosses 14 and 14a on which is mounted a core comprising three legs 15, 16 and 17. The core has a connecting portion 18 and is preferably formed of laminations as shown in Figures 2 and 3 held together by rivets 19. The legs 16 and 17 are provided with slots 20 through which screws 21 extend into the shoulders 14 and 14a.

An operating arm A is provided comprising an armature portion 22, an L shaped bracket portion 23 and an armature extension 24. The armature 22 is adapted to be periodically attracted toward the poles 15, 16 and 17 of the electromagnet when a coil 25 on the center pole 15 thereof is energized with alternating current. This will cause vibration of the armature 22 since the bracket 23 being formed of resilient metal such as brass or the like tends to return the armature 22 to the full line position illustrated as the alternating current recedes to the zero of its sine wave.

The bracket 23 is provided with a flange 26 which is secured to a shoulder or boss 27 of the casing part 10 by screws 28. The screws 28 extend through slots 29 in the flange 26.

In one end of the casing C, I mount a shearing head S comprising an outer cutter or shearing element 30 and an inner cutter or shearing element 31. These are preferably formed of sheet metal, the outer element being held stationary as by a screw 32 (see Figure 2) and the inner cutter being adapted for reciprocating movement. The shearing head S is preferably formed of sheet metal stampings as disclosed in my co-pending application Serial No. 173,104, filed November 6, 1937 and accordingly will not be described in further detail in this application.

The armature extension 24 operatively connects with the inner cutter 31 by extending into an opening 33 thereof and a rubber sleeve 24a eliminates noise at their particular point.

Each part 10 and 11 of the casing C is provided with a recess 34 which cooperate with each other as shown in Figure 6 to provide sockets for the ends of a block of rubber 35. The rubber block is provided with beads 36 at its ends to fit snugly in the sockets and the sockets retain the block 35 assembled therein when the two parts 10 and 12 of the casing are secured together.

The block 35 is provided with an opening 37 through which the armature extension 24 extends. The opening 37 is of such size that it will permit oscillation of the operating arm A and limit its travel with the arm engaging opposite sides of the opening as the arm swings in opposite directions. The rubber block 35 serves as a bumper for limiting motion of the arm and makes the arm operate silently as there are no metal parts clattering against each other.

As an additional feature to prevent noise of the armature during operation, I provide a socket 38 in the core leg 17 in which is mounted a second block of rubber 39. The block 39 is adapted for the armature 22 to engage thereagainst so that the bending tendency of the arm A during operation caused by the armature 22 being attracted toward the core pole 17 and resulting in vibration within the arm itself intermediate the ends thereof is eliminated by the bumper 39 which damps out such vibration thus further reducing noise. The bumper 39 also prevents the armature from striking the poles 15, 16 and 17 during operation of the motor.

In connection with the inner cutter 31, I provide thrust pins 40 for holding it in shearing contact with the outer cutter. Heretofore, it has been customary to use springs for this purpose and the vibration set-up in the springs results in noise which I eliminate by my construction which will now be described. In the block 35, sockets 41 are formed and the thrust pins 40 are interposed between the bottoms of these sockets and the inner cutter. The pins are of such length that when the inner cutter is in position in the outer cutter, the portions of the block adjacent the bottoms of the sockets will be under slight compression thus biasing the thrust pins toward the inner cutter. This eliminates all metallic springs and at the same time the single block 35 serves the double purpose of silencing the arm A and providing resilient shearing engagement between the cutter elements.

Throughout my structure I have provided for elimination of noise as experienced with alternating current vibrating motors now in general use. The blocks 35 and 39 being made of rubber or other suitable resilient material and mounted as disclosed effectively reduce the noise of operation to a minimum. The noise is further reduced by having the thrust pins 40 engage the block 35 and thus eliminate the necessity of providing metallic springs at this point in the dry shaver.

The casing part 12 can be removed by removing the three screws 13 and thereupon by using an ordinary screw driver, the screws 21 and 28 can be loosened for permitting readjustment of the relative positions between the armature and the electromagnet. This makes it possible to adjust the device for different voltages and to secure efficient operation by changing the relative positions of the parts. After such change has been made, the screws can be retightened for retaining the armature and core in their new positions.

Some changes may be made in the construction and arrangement of the parts of my motor without however departing from the real spirit and purpose of my invention. I, therefore, intend to cover by my claims, any modified forms of structure or use of mechanical equivalents, which may be reasonably included within their scope.

I claim as my invention:

1. An alternating current motor device for operating a driven member comprising a casing formed in two parts having each a recess at one end, said recesses together forming a pocket when the casing is assembled, an electromagnetic means mounted within the casing, a vibrating arm having one end secured to the casing, a mid-portion overlying the electromagnetic means and an operating end for said member extending through said pocket outwardly from the casing, having a predetermined amplitude of vibration at said operating end, and a block of resilient material secured in said pocket having a central passage therethrough surrounding the operating end of said arm, said passage having a dimension in one direction slightly less than the amplitude of vibration and a dimension in another direction slightly greater than the width of said operating end, to permit restricted vibration of the operating arm therein, the opposite ends in said one direction providing a cushioned stop for the operating end at substantially the position of maximum amplitude of vibration and being independent of contact with said operating end at intermediate positions of vibration.

2. An alternating current motor device for operating a driven member comprising a casing formed in two parts having each a recess at one end, said recesses together forming a pocket when the casing is assembled, an electromagnetic means mounted within the casing, including a core and a winding around said core, a vibrating arm having one end secured to the casing, a mid-portion overlying the electromagnetic means and an operating end for said member extending through said pocket outwardly from the casing, having a predetermined amplitude of vibration at said operating end, a socket in said core adjacent the mid-portion of the arm and a resilient element in the socket engaging the arm when said arm is drawn toward the core forming thereby an intermediate cushion separating said mid-portion from direct contact with the core, and a block of resilient material secured in said pocket having a central rectangular passage therethrough surrounding the operating end of said arm, said passage having a dimension in one direction slightly less than the amplitude of vibration and a dimension in another direction slightly greater than the width of said operating end, to permit restricted vibration of the operating arm therein, the opposite ends in said one direction providing a second cushioned stop for the arm at the operating end at substantially the position of maximum amplitude of vibration and being independent of contact with said operating end at intermediate positions of vibration.

3. In a motor driven tool, a casing, a core therein, a current coil for magnetizing said coil, an arm mounted in said casing to be attracted by said core when magnetized and a tool adapted to be rapidly reciprocated by said arm, a triple cushion device for said arm comprising a bumper element for contact with said arm to stop it in a position spaced from contact with said core, a resilient block mounted in said casing, said arm extending through said resilient block, and a resilient connection between said arm and said tool comprising a sleeve of resilient material on said arm and received in an aperture formed in the tool.

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