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ELECTRIC PENCIL SHARPENER

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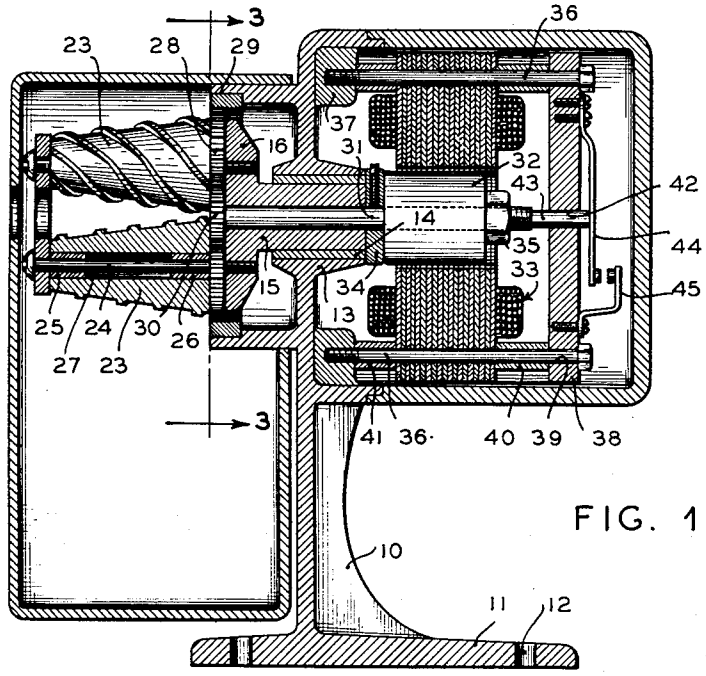
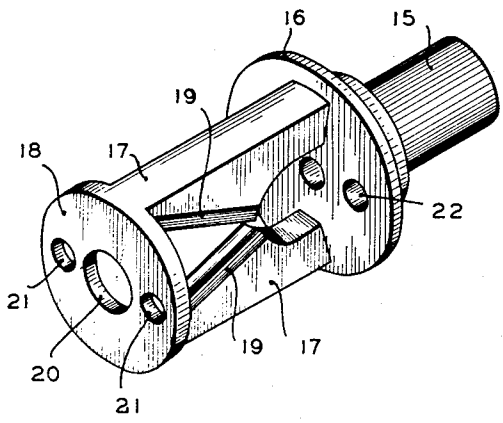


FIG. 1

FIG. 2



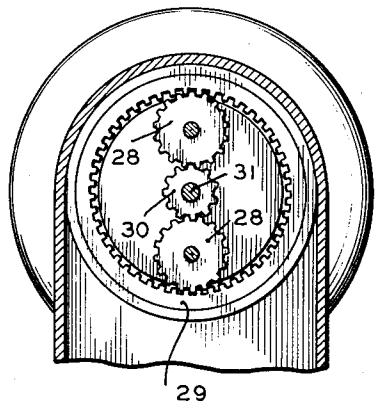


FIG. 3

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ELECTRIC PENCIL SHARPENER

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4 Claims. (Cl. 120—96)

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This invention relates to cutting devices, particularly automatic pointers, and specifically to an electrically driven pencil sharpener in which a pencil can be inserted and quickly sharpened.

Mechanical pencil sharpeners previously in use have been operated ordinarily by hand, although some have been driven from a source of power. These latter devices have been almost all electrically operated but they have usually involved complicated, expensive mechanisms which greatly limited their sale as they were priced far above other mechanical sharpeners. Many were so designed that they were difficult to operate without cutting away or consuming an excess length of the pencil, and therefore they did not satisfactorily fulfill the need for which they were produced.

It is an object of the invention to provide a relatively inexpensive, simple, and practical pencil sharpener which will automatically begin operating when a pencil is inserted and discontinue operation when the pencil is sharpened, whether the pencil is removed or not.

Further objects and advantages of the invention will be apparent from the following specification taken in conjunction with the accompanying drawings, wherein:

Fig. 1 is a vertical section of a sharpener in accordance with the present invention;

Fig. 2, a perspective of the sharpening blade carrier; and

Fig. 3, a vertical section of the simple planetary gearing on line 3—3 of Fig. 1.

With continued reference to the drawings, the device of the present invention comprises a base or mounting bracket 10 having a foot portion 11 with apertures 12 for securing the device on a support by screws or other fastening means, not shown. The base is provided with a bearing 13 and an anti-friction bushing or sleeve 14 in which is journalled a cutter carrier including a cylindrical portion 15 having an enlarged head 16. The head 16 is connected by guiding and spacing members 17 with an end support 18 disposed parallel to the adjacent surface of the head 16. Inclined edges 19 serve to assist in guiding a pencil inserted into the device through the receiving opening 20 in the end member 18. The end support 18 is provided with a pair of openings 21 aligned with corresponding threaded openings 22 in the head 16, the openings in the support and head being diametrically opposed.

Between the support and the head are disposed frusto-conically shaped cutters 23 held in the proper positions by means of bolts or pintle

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pins 24 which extend through the aligned openings 21 and 22 threading into the latter. Bearings 25 and 26 are pressed into opposite ends of an axial opening 27 in each of the cutters 23 so that the cutters may rotate freely on the bolt 24.

The inner enlarged ends of the cutters are provided with gears 28 which engage a ring gear 29 rigidly attached to the stationary base 10. Rotation of the cutters about their axes will cause them to travel in a circular path about the axis of the cylindrical portion of the cutter carrier 15.

In order to drive the cutters tre gears 28 associated therewith are engaged by a pinion 30 mounted on a shaft 31 on which is also mounted an armature 32 located within field coil 33 and which is caused to rotate when the coil is energized. The armature 32 may be mounted on the shaft 31 by a shrink fit or in any other desired manner, as for example, by a set collar 34 and a nut 35 threaded on the end of the shaft 31. Thus when the shaft 31 is rotated the pinion 30 drives the gears 28 fixed to the cutters 23; as gears 28 are in engagement with the ring gear 29, the cutters travel in a circular path about the axis of the shaft 31 and each cutter rotates about its bolt 24 as an axis.

The above described arrangement provides a planetary gear system which serves to reduce the speed of rotation of the cutters and carrier considerably below the speed of rotation of the armature shaft. Such a speed reducing system is necessary since in order for the motor to have sufficient power to drive the cutters it must operate at a relatively high speed, which speed would be entirely impractical for the cutters and carrier, since these parts have considerable mass, and prohibitive centrifugal forces therein would be developed.

Field coil 33 is secured by means of bolts 36 which thread into bosses 37. A disc 38 of insulating material is provided with openings 39 for receiving the bolts 36, the heads of the bolts engaging the outer surface of the disc or plate and due to spacing sleeves 40 and 41 the field windings are secured in fixed position.

The disc or plate 38 is also provided with an opening 42 for receiving an extension 43 of the shaft 31 and the entire rotatable assembly can move laterally. The reduced portion 43 is adapted to project beyond the outer surface of the disc or plate 38. This outward movement beyond the surface is produced when a pencil is inserted through the opening 20 between the cutters for sharpening, with enough effort to

axially move the rotatable assembly. This movement is employed to energize the motor for causing rotation of the armature and associated parts, such utilization being through the medium of contact arms 44 and 45, forming part of the motor circuit, the arm 44 being moved into contact with the arm 45 when the shaft 31 is moved in that direction. When the pencil is fully sharpened and therefore no longer urged inwardly, pressure on the spring 44 will be released, resulting in a breaking of the contact and stopping the operation the spring arm 44 moving the shaft 31 and associated parts to their original position. It is apparent that removal of the pencil at any time will likewise break the contact immediately. As will be seen from an inspection of Fig. 1, the ring gear 29 is sufficiently wide to remain in mesh with gears 28 during relative longitudinal movement thereof.

It will be obvious to those skilled in the art that various changes may be made in the invention without departing from the spirit and scope thereof and therefore the invention is not limited by that which is shown in the drawings and described in the specification but only as indicated in the appended claims.

What is claimed is:

1. A pencil sharpener comprising a base, a bearing carried by said base, a cutter carrier journalled in said bearing, cutters rotatably mounted in said cutter carrier, a gear on the inner end of each cutter, a ring gear mounted on said base and constructed and arranged to engage the gears on said cutters, a motor secured to said base and including an armature, an axially movable drive shaft supporting said armature, said drive shaft being journalled in an aperture in said cutter carrier, a driving pinion on the end of said shaft, said pinion engaging the gears on said cutters thereby providing a speed reducing planetary gearing system, a fixed contact secured to the frame of said motor, a movable contact fixed to the frame of said motor in engagement with the end of said drive shaft remote from said pinion and normally out of engagement with said fixed contact, said drive shaft, cutter carrier and armature being constructed and arranged to be moved axially upon insertion of a pencil between the cutters to close said contacts, thus energizing said motor, said contacts being constructed to automatically open to de-energize said motor upon removal of said pencil, or release of pressure thereon.

2. A pencil sharpener comprising a base, a bearing carried by said base, a cutter carrier journalled in said bearing, cutters rotatably mounted in said cutter carrier, a gear on the inner end of each cutter, a ring gear mounted on said base and constructed and arranged to engage the gears on said cutters, a motor secured to said base and including an armature, an axially movable drive shaft supporting said armature, a driving pinion on said shaft, said pinion engaging the gears on said cutters thereby providing a speed reducing planetary gearing system, and contacts for making and breaking the circuit to said motor a portion thereof being disposed in the line of movement of said drive shaft whereby insertion of a pencil between said cutters with sufficient force to axially move said shaft will close said circuit and upon the release of said force the circuit will be broken.

3. A pencil sharpener comprising a cutter carrier, cutters rotatably mounted in said cutter carrier, a gear on each cutter for driving the same, a ring gear engaging the gears on the cutters, an intermediate gear engaging the gears on the cutters rotating the cutters and by means of the ring gear causing the cutters to revolve in a circular path, a rotatably mounted axially movable shaft supporting said intermediate gear, an armature on said shaft, a field coil about said armature for producing rotation of the shaft upon energization of the same, and circuit making and breaking means having a portion thereof disposed in the line of movement of said shaft and operable in response to axial movement of said shaft upon introduction and removal of a pencil relative to said cutters whereby to control the operation of said pencil sharpener.

4. A pencil sharpener comprising a frame, a cutter carrier rotatably and slidably mounted in said frame, cutters rotatably mounted on said carrier, a drive shaft rotatably mounted in said carrier, means on said drive shaft engaging means on said cutters for driving the same, an armature mounted on said drive shaft, a field coil mounted on said frame and surrounding said armature, a spring contact arm engaging said shaft, a fixed contact normally out of engagement with said spring contact, said cutter carrier, shaft and armature being longitudinally movable upon insertion of a pencil between said cutters, such movement causing the closing of said contacts and energization of said motor, said cutter carrier, shaft and armature being moved to original position and said contacts being opened by said spring contact arm upon removal of said pencil.

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