Sept. 24, 1963 A. H. KENT 3,104,535

FLOATING MOUNTING FOR PENCIL SHARPENER BLADE

Filed July 19, 1960

FIG. 1.

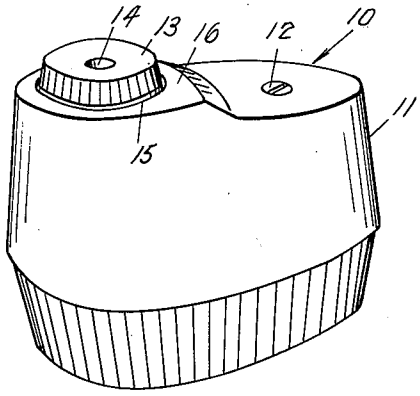
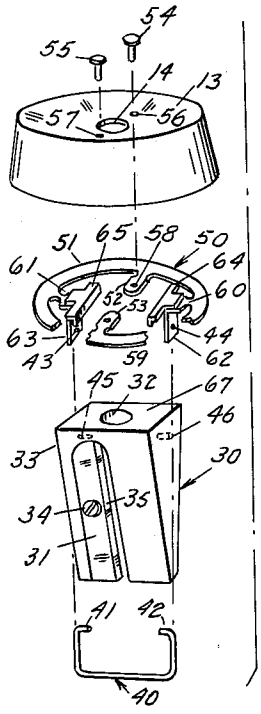


FIG. 2.



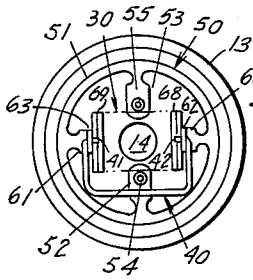


FIG. 3.

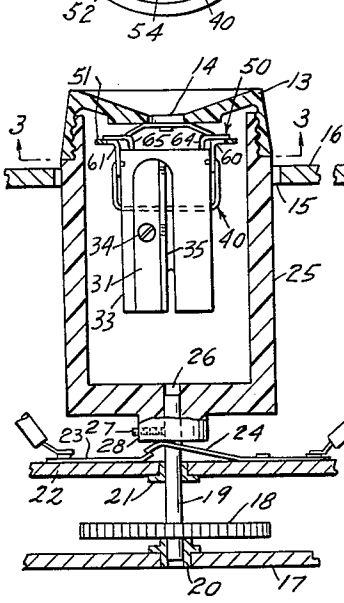


FIG. 4.

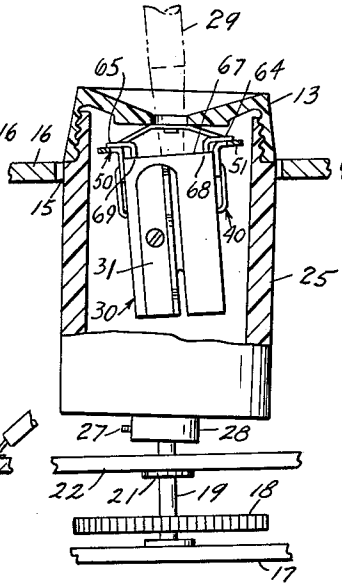


FIG. 5.

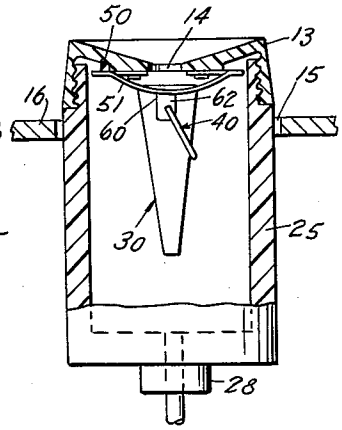


FIG. 6.

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FLOATING MOUNTING FOR PENCIL SHARPENER BLADE

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1 Claim. (Cl. 64—15)

This invention relates to an improvement for the battery operated pencil sharpener disclosed in my copending application (M–614) Serial No. 833,065, filed August 11, 1959, now Patent 3,004,522 issued October 17, 1961. More particularly, this application relates to a means whereby the cutting blade is floatingly mounted with respect to the means driving same.

My aforesaid copending application 833,065 discloses a battery operated pencil sharpener which includes a rotatable receptacle to receive the pencil shavings. A movable cover is provided for the rotable receptacle and secured to the cover is a block having a tapered guide means formed therein. The cutting blade is secured to the block and operatively positioned with respect to the tapered guide means by having the cutting edge entered into the guide means for sharpening of a pencil which is inserted into the guide means as the receptacle is rotated. The connections between the cutting blade and the block, the block and the receptacle cover, as well as between the cover and receptacle are all rigid.

With this construction as previously outlined, it has been found that because of manufacturing tolerances the axis of rotation for the receptacle is not vertically aligned. It has also often been found that a pencil inserted into the tapered guide means is not aligned with the axis of rotation for the receptacle. Under these conditions, if the person holding the pencil being sharpened does not permit the pencil to wiggle as directed by the rotating receptacle, the pencil point is often broken. If the point is not broken high frictional forces are set up between the pencil and the surface defining the tapered guide means. The increased frictional forces result in the rapid deterioration of the batteries.

In order to overcome this undesirable effect the instant invention provides a construction wherein the block is floatingly mounted to the receptacle cover. Thus, the person sharpening the pencil may hold same in a rigid position and the block will wiggle as required thereby compensating for any misalignment between the pencil and the axis of rotation for the receptacle. This construction virtually eliminates points being broken in the sharpener and also results in a lower operating force being required so that the life of the batteries is materially extended.

The floating mounting is in the form of a ring-shaped spring member having four equally spaced inwardly extending arms. The first pair of arms, which are in line with one another, are fixedly secured at the free ends thereof to the receptacle cover. The other arms forming a second pair are more or less rigidly secured to the block which carries the cutter blade.

The first pair of arms forms a pivotal axis for the block while the second pair of arms also forms a pivotal axis for the block with the latter axis being at right angles to the former axis. These axis are generally located in a plane disposed substantially at right angles to the axis of rotation for the receptacle. The combination of axis provided by the ring member enables the block to have limited universal movement with respect to the receptacle cover with the spring nature of the ring member returning the block to a centered position after a pencil is withdrawn for the tapered guide means. Thus, the cutting blade is free to float and in this manner compensates for any misalignment between the pencil and the axis of rotation for the receptacle.

Accordingly, a primary object of the instant invention is to provide a pencil sharpener which requires low operating forces.

Another object is to provide a novel battery operated pencil sharpener wherein the batteries need not be changed very frequently.

Still another object is to provide the battery operated pencil sharpener having a rotatable receptacle to which the cutting blade is floatingly mounted.

A further object is to provide a novel construction for a power operated pencil sharpener whereby the likelihood of broken points is virtually eliminated.

A still further object is to provide a novel resilient floating mounting.

These as well as other objects of the instant invention shall become readily apparent after reading the following description of the accompanying drawings in which:

FIGURE 1 is a perspective view of a battery operated pencil sharpener which embodies the teachings of the instant invention.

FIGURE 2 is an exploded view showing the receptacle cover and the parts mounted thereto.

FIGURE 3 is a plan view of the receptacle cover looking in the direction of arrows 3—3 of FIGURE 4.

FIGURES 4–6 are fragmentary views, partially sectioned, of the pencil sharpener of FIGURE 1 illustrating the receptacle thereof in various angular positions about the rotative axis thereof as well as illustrating the cutting head assembly substantially misaligned with respect to the axis of rotation of the receptacle.

Now referring to the figures, pencil sharpener 10 comprises a casing 11 removably held in place with respect to base 17 by screw means 12. Receptacle cover 13, having pencil openings 14, extends through opening 15 in the raised portion 16 at one end of casing 11. As described in detail in my aforesaid copending application 833,065, but not illustrated in the instant case, pencil sharpener 10 includes a D.C. motor, batteries for the operation of the motor, and a speed reducing gear train driven by the motor.

The low speed output of the gear train drives spur gear 18 which is keyed to shaft 19 journalled for rotation as well as limited axial movement in bearing 20 of base 17 and bearing 21 of intermediate insulating plate 22. Stationary contact 23 as well as movable contact 24 are secured to plate 22. Movable contact 24 is a resilient member self-biased away from stationary contact 23.

When engaged cooperating contacts 23, 24 complete a circuit from the batteries through the motor for energization thereof which causes the gear train to drive gear 18. This causes shaft 19 to rotate with shaft 19 defining an axis of rotation for receptacle 25 which receives pencil shavings. The bottom of receptacle 25 is provided with an aperture 26 within which the upper end of shaft 19 is disposed. Set screw 27, passing through an extension 28 at the bottom of receptacle 25, engages shaft 19 to fixedly secure same to receptacle 25.

The upper end of receptacle 25 is provided with external threads which cooperate with internal threads of cover 13 to removably secure cover 13 to receptacle 25. Cutter head assembly 30 is secured to receptacle cover 13 with floating type mounting means 50 being interposed therebetween as will be hereinafter explained in more detail.

Thus, the rotation of receptacle 25 causes the rotation of blade 31 which is part of cutter head assembly 30 for sharpening of a pencil 29 inserted into tapered guide opening 32 in block 33 of assembly 30. Blade 31 is removably secured to block 33 by retaining screw 34 and

is operatively positioned with cutting edge 35 extending into tapered guide 32. U-shaped spring 40, having inwardly turned ends 41, 42, secures cutter head assembly 30 to mounting 50 by the passage of ends 41, 42 through apertures 43, 44, respectively, of mounting 50 into apertures 45, 46, respectively, of block 33.

Floating type mounting means 50 comprises a member of resilient sheet material which includes a ring portion 51 having aligned inwardly extending arms 52, 53. Rivets 54, 55 passing through cover apertures 56, 57, respectively, and apertures 58, 59, respectively, at the free ends of arms 52, 53, respectively, secure mounting means 50 to cover 13. Mounting means 50 also includes aligned inwardly extending arms 60, 61 whose downwardly turned ends 62, 63, respectively, are provided with the previously mentioned apertures 44, 43, respectively. Angle brackets 64, 65 are welded or otherwise secured to arms 60, 61, respectively, and are positioned to extend more inwardly than downwardly turned ends 62, 63.

Arms 52, 53 form a first pivotal axis for ring portion 51 while arms 60, 61 form a second pivotal axis for ring 51. As best seen in FIGURE 6 through the deformation of ring portion 51 the axis defined by arms 52, 53 lies above the axis defined by arms 60, 61. When a pencil 29 is inserted into tapered guide 32 and positioned so as to force ring 51 to pivot about the axis defined by arms 60, 61, the top surface 67 of block 33 abuts the edges 68, 69 at the downwardly turned ends of brackets 64, 65, respectively.

With the mounting construction hereinbefore described, even if pencil 29 is badly misaligned with respect to the axis of rotation for receptacle 25 formed by shaft 19, cutter head assembly 30 readily assumes a convenient cutting position. It is to be noted that under these conditions the position of assembly 30 with respect to cover 13 changes for various angular positions of receptacle 25. Mounting means 50 by providing pivotal axes positioned at right angles to one another enables assembly 30 to have limited universal movement with respect to cover 13. When pencil 29 is removed from guide 32, the resilient nature of the material comprising most of mounting means 50 causes block 33 to return to a position wherein surface 67 is positioned substantially at right angles to shaft 19.

Thus, this invention provides a novel floating type mounting for the cutter blade of a power operated pencil sharpener. The floating mounting permits the blade to readily assume a convenient cutting position even if the pencil being sharpened is not carefully placed in the sharpener or is moved during the sharpening operation.

Further, the frictional forces which develop between the pencil being sharpened and the guide means directing the pencil into engagement with the cutting edge of the blade are materially reduced, thereby materially reducing the power requirements of the pencil sharpener.

While the floating type mounting has hereinbefore been described as comprising a ring having inwardly extending arms, it is to be understood that this invention also contemplates a ring having arms which extend radially outward. Two of the arms will be secured to the receptacle cover, and the other two arms will be secured to the cutter head assembly.

Although I have here described preferred embodiment of my novel invention, many variations and modifications will now be apparent to those skilled in the art, and I therefore prefer to be limited, not by the specific disclosure herein, but only by the appending claim.

I claim:

A universal mounting means including a ring portion, a first means extending inwardly from said ring portion for securement to a first member and a second means extending inwardly from said ring portion for securement to a second member, said first and said second means respectively defining a first and a second pivotal axis for said ring portion, said first axis being angularly displaced from said second axis; said first pivotal axis being disposed in a first plane and said second pivotal axis being disposed in a second plane displaced from said first plane; said first and said second planes being positioned parallel to a plane generally describing said ring portion; said first means and said second means each comprising two aligned spaced apart arms; said second means arms having the free ends thereof extending away from said first plane; said mounting means also including third means extending away from said first plane; said third means being positioned more toward the center of said ring than the free ends of said second means arms; said third means being positioned to prevent movement with respect to said second means of a member mounted thereto.

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