United States Patent

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[54] **MOTORIZED DRAWING LEAD SHARPENER**
8 Claims, 9 Drawing Figs.

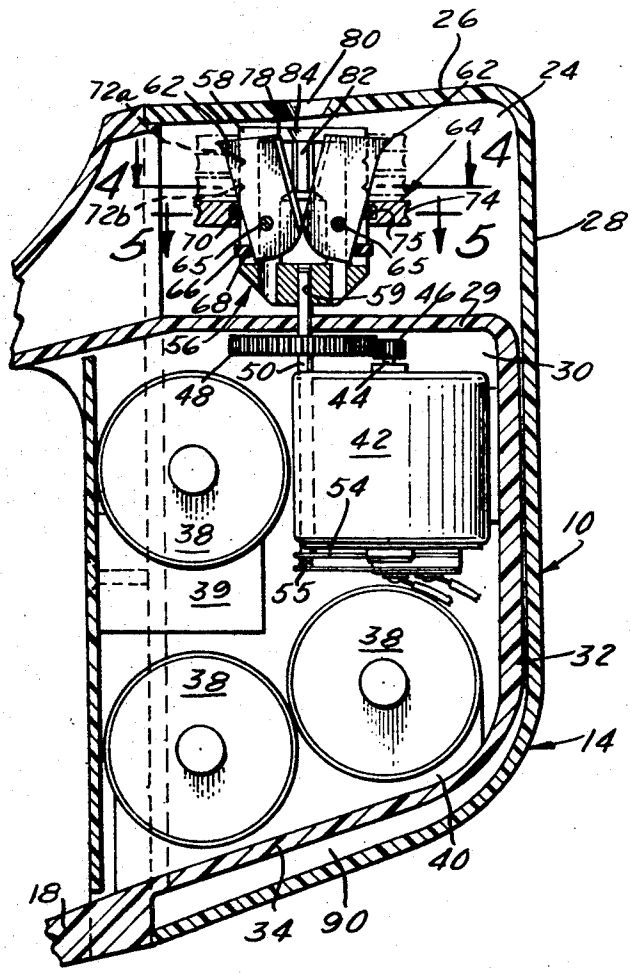
[52] **U.S. Cl.** **144/28.5**, 144/28.72
[51] **Int. Cl.** **B43l 23/02**
[50] **Field of Search** 144/28.4, 28.5, 28.6, 28.72, 28.1, 28.3, 30; 145/3.8

[56] **References Cited**
UNITED STATES PATENTS

3,026,848	1962	Green	144/28.5
3,289,641	1966	Ginsberg	144/28.5
3,405,747	1968	Dennison	145/3.8

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ABSTRACT: A motorized drawing lead sharpener used in conjunction with mechanical type lead pencils, such as used by engineers and draftsmen. Said sharpener includes a cutting assembly, wherein the cutting blades of the assembly are adjustable to provide the necessary tapered point for a particular form of drafting. Said assembly is rotatably driven by a motor.



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SHEET 1 OF 2

Fig. 1.

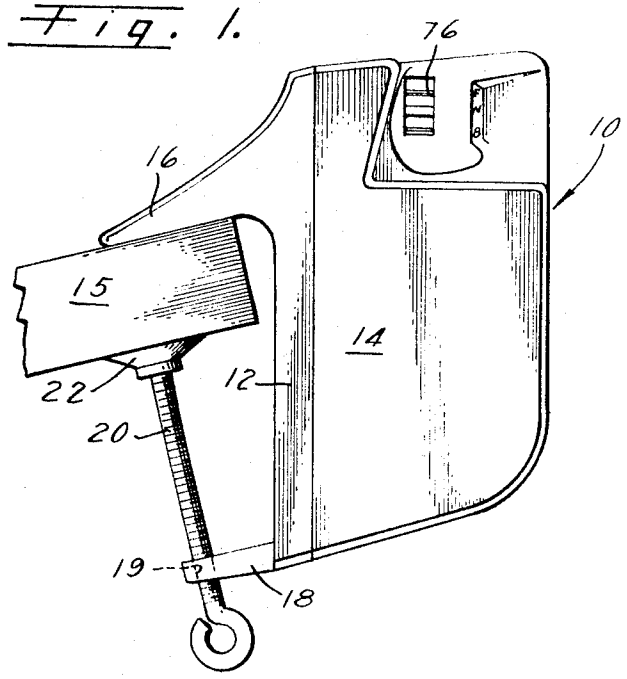


Fig. 2.

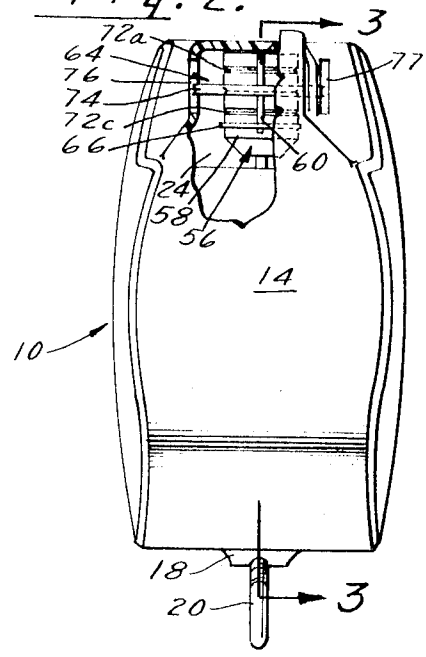


Fig. 3.

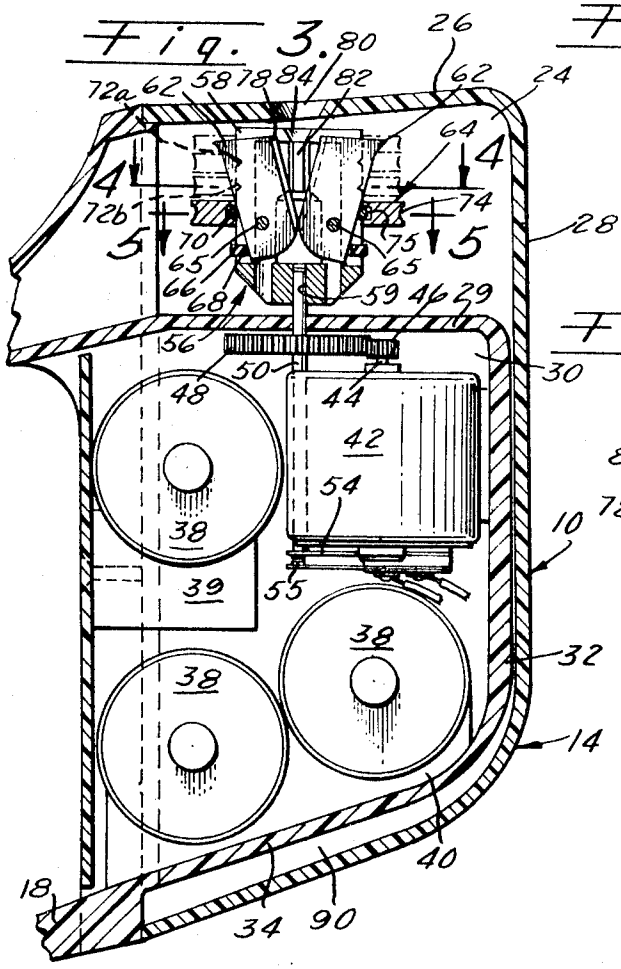


Fig. 4.

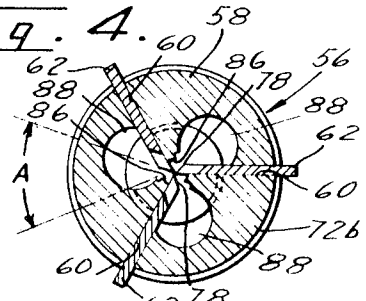
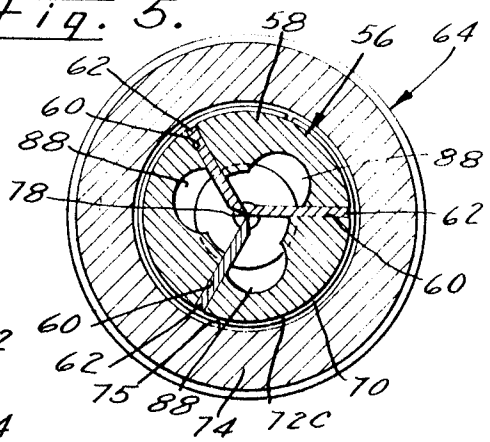


Fig. 5.



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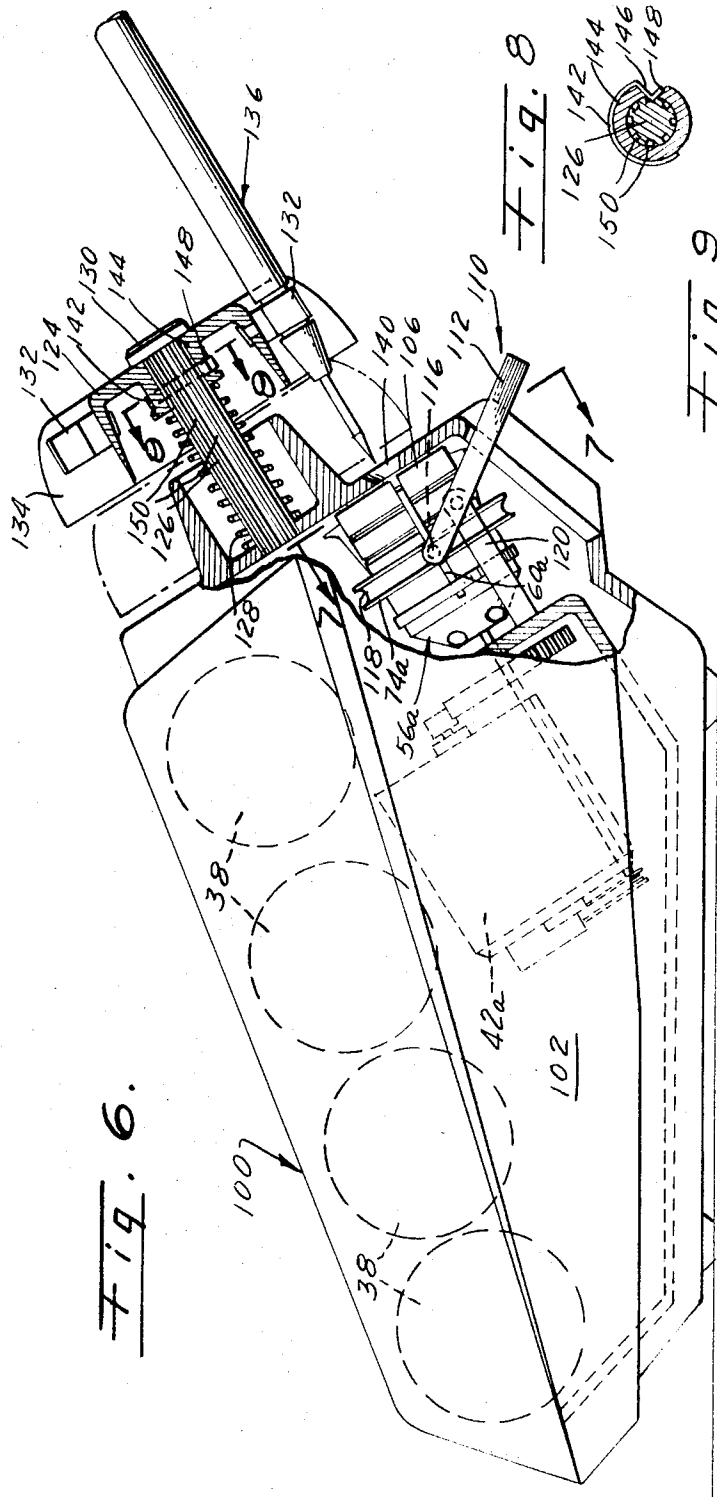


Fig. 6.

Fig. 8

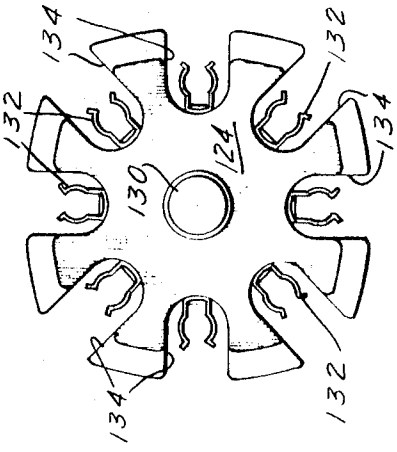


Fig. 9

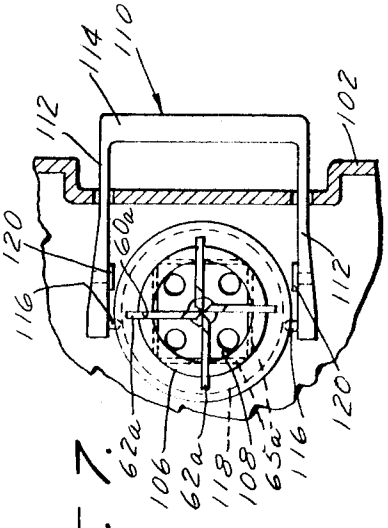


Fig. 7.

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MOTORIZED DRAWING LEAD SHARPENER

BACKGROUND OF THE INVENTION

There are various known types of pencil sharpeners, the use of which is generally determined by the type of lead pencil that is used by the individual. The draftsman and engineer of today prefers a drawing instrument wherein the lead is separate from the lead encasement. The lead filler is received in a holder which is adapted with a chuck for mechanically holding the lead. The drawing lead requires frequent sharpening or pointing to insure that the drawing lines may be sharply defined.

The present day draftsman is called upon to make drawings on many different types of paper, from the ordinary drafting paper to polyester type film. Under these circumstances, the lead requirements are different and the points thereon are sharpened to varying degrees. The prior art discloses many power operated pencil sharpeners for pencils, including both the wood-encased type as well as the mechanically held drawing leads. Generally, the desired drawing point is placed on the drawing lead by manually rotating the holder with the lead held against a sharpening device, such as a file or sandpaper sheet. Some power-operated sharpeners include a motor-operated apparatus, having a vibrating action, and here, too, the drawing lead and its holder are regulated by the angle at which the draftsman holds the pencil. Therefore, during frequent sharpening there is no insurance that the angle of the point made on the lead is always the same as before or as required for best results. It has also been noted that there are power-operated sharpening devices of the type having rotary cutters but these, too, lack the features necessary for changing the angle of the point of the drawing lead.

Accordingly, it is an object of my invention to provide an electrical power-operated sharpener having a plurality of cutter blades mounted in a rotary cutting head wherein the blades are adjustable to different degrees, so as to control the shape of the drawing lead point.

Another object of my invention is to provide a power operated sharpener that is simple to work; that is, the operator of the sharpener may change the angle of the cutting blades without the use of extra tools.

A still further object of my invention is to provide a sharpener so constructed as to improve reliability and control of the sharpening of points on all types of drawing leads.

SUMMARY OF THE INVENTION

In carrying out the principles of the invention, in accordance with the disclosed embodiments thereof, there is provided an electric pencil sharpener, so designed as to receive a mechanical pencil for sharpening various types of drawing leads used by draftsmen and engineers. The electric sharpener comprises a housing having means to support said housing to a draftsman's desk or board. The housing includes a supporting portion and a removable cover whereby the interior thereof may be readily accessible for cleaning and adjusting. The supporting portion of the housing has an enclosed compartment for accommodating ordinary flashlight type dry cell batteries, along with a motor and switch control means. Supported above the compartment wall is a cutting or sharpening assembly, which is rotatably linked to said motor. The cutter assembly comprises a plurality of pivotably adjustable cutting blades. These blades are adjustable to four positions or settings by a point selector, whereby the positioning of the selector will permit the pencil lead to obtain a fine point, normal point, or a blunt point. The fourth position is to accommodate cleaning of the device.

Other characteristics, advantages and objects of my invention can be more readily appreciated from the following description and appended claims. When taken in conjunction with the accompanying drawings, this description forms a part of the specification wherein like references and characters designate corresponding parts in several views which are as follows: BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevational view showing my invention supported along an edge of a drafting table;

FIG. 2 is a front elevational view with a portion broken away;

FIG. 3 is a sectional view taken substantially through line 3–3 of FIG. 2;

FIG. 4 is a sectional view taken on line 4–4 of FIG. 3;

FIG. 5 is an enlarged sectional view taken along line 5–5 of FIG. 3;

FIG. 6 is a side elevational view of another embodiment with portions thereof broken away for clearer illustration;

FIG. 7 is a sectional view taken on line 7–7 of FIG. 6;

FIG. 8 is a sectional view taken on line 8–8 of FIG. 6; and

FIG. 9 is a plan view showing the pencil-positioning turret.

DESCRIPTION OF THE PRESENT EMBODIMENT

Referring to the drawings in detail and more particularly to FIGS. 1 through 5, which show one embodiment of my invention, there is shown in FIG. 1 a drawing lead sharpener, having a housing or casing generally indicated by 10, which may be made of any suitable material. The housing is comprised of supporting structure 12 and a removable cover 14 to facilitate ease of access for cleaning excess graphite from the sharpened drawing lead. The rear portion of said support structure 12 is adapted with means for securing said housing 10 which would most likely be attachment to the drawing board as indicated at 15. Said securing means comprises an outwardly extending lip member 16, said lip member being an integral part of said support structure 12 and formed at the upper portion thereof. At the lower portion of said structure is an extending leg 18 adapted with a threaded opening 19 to receive a clamp screw 20. The upper free end of said screw 20 rotatably supports a hub member 22 whereby said housing 10 can be demountably secured by the rotation of said screw.

When the cover 14 is latched into place, there is formed an upper compartment 24 defined by a top wall 26, front wall 28 of the cover 14 and by the upper wall 29 of the support structure 12. This compartment houses a cutting assembly which will hereinafter be described in detail.

Below the compartment 24 is a second compartment 30. As illustrated in FIG. 3, said compartment 30 is defined by the upper wall 29, a sidewall 32, an integral bottom wall 34 and a removable rear panel 36. Compartment 30 is designed to accommodate a plurality of ordinary flashlight-type dry cell batteries 38 and supported by battery brackets 39 and 40, respectively.

The brackets 39 and 40 also serve as conventional contacts and conductor elements to provide the batteries with electrical interconnections whereby a source of current is provided. The current from the batteries 38 is to supply the power to operate a small, lightweight and relatively high-speed electric motor 42.

The motor 42 is attached to the upper portion of wall 32 just under the upper wall 29 of the structure 12. The shaft 44 of the motor 42 extends beyond the motor housing, whereby spur gear 46 is secure for rotation with said shaft. Said spur gear 46, therefore, becomes the driving gear of a drive means having a larger gear 48 slidably engaging said spur gear 46.

The larger spur gear 48 is secured to a centrally located shaft 50. The upper end of said shaft 50 is received and slidably supported in opening 52 which is centrally located in wall 29. The opposite free end of shaft 50 is supported and in contact with an electrical springlike conducting element 54, which overlies an electrical contact pin 55, the purpose of which will be hereinafter explained. The upper free end of the shaft 50 is adapted to receive a cutting assembly generally indicated at 56.

The cutting assembly 56 comprises a cutting body or head 58 having a small bore 59 wherein the upper free end of shaft 50 is secured. The body or head 58 is cylindrical in shape and is provided with radially extending slots 60, as shown in FIGS. 4 and 5, respectively. Within each slot 60 there is pivotally mounted a cutting blade 62, said cutting blades being held in

selected positions within the slots **60** by an adjusting means generally indicated at **64**. The blades **62** are pivoted about pins **65** by vertical movement of the adjusting means **64**. The cutting body **58** is adapted to receive a biasing means in the form of a rubber band **66** which is held in place by a circular groove **68**, located at the lower end of the body **58**, whereby said rubber band biases the lower portion of blades **62** in an inward rotation. This force, acting on the blades at this point, causes the upper portion of the blades to rotate outwardly and engage a snap ring **70** which limits further movement of the blades.

As shown in FIG. **3**, there is a group of V-shaped notches **72***a*, **72***b* and **72***c* which accommodate the snap ring in three positions. In order to assure the ease of adjusting the snap ring from one notch to another, there is provided an adjusting member **74**. Member **74** is, therefore, adapted with an internal groove or channel **75**, in order to support and move the snap ring **70** from one position to another. Manual adjustment is needed in the embodiment shown in FIGS. **1** through **5**; that is, openings **76** and **77** in cover **14** accommodate movement of the adjusting means or selector **64** by finger manipulation.

It is to be noted that cutting blades **62** have leading cutting edges **78** and each edge thereof is set at the same angle in relationship to the central axis of the cutting head **58**.

The top wall **26** of the cover **14** is provided with a beveled opening **80** which is axially aligned with bore **82** of the cutting head, said bore having at its upper end a beveled opening **84**. The bore **82** is located directly beneath said opening **80** whereby the drawing lead of a pencil may be inserted for sharpening engagement with the cutting edges **78** of the blades **62**. When contact is made by the lead with the blades, the force causes the entire cutting assembly **56**, along with the shaft **50** and gear **48**, to move vertically downward. At this time, downward pressure is applied to the spring like conducting element **54** by the lower free end of the shaft **50**. Since the conducting element **54** and the contact pin **55** are closely deposed one below the other, contact is made between them, thereby, closing the circuit and causing the batteries to feed current to the motor **42** to operate same. As soon as the switch is closed, the rotation of the motor will cause the cutter assembly to revolve about the drawing lead to be sharpened. Since the cutting edges of the blades are contacting the unsharpened lead, the graphite is removed from the lead in a neat, tapered condition leaving a needlelike shaped point on the tip end of the drawing lead. Due to the rotational speed of the cutting blades **62**, the downward feeding of the lead is of a very short duration and, therefore, excess removal of graphite is held to a minimum. As soon as the downward feeding movement of the drawing lead is stopped, the operator removes the lead from within the cutting head **58**. When this is done, the contact between the spring element **54** and the contact pin **55** is broken causing the motor **42** to stop.

Referring now to FIGS. **4** and **5**, there can be seen surfaces **86** of bore **80** which are used as guides for inserting the drawing lead, as well as for holding the lead during sharpening thereof. A clearance angle is also shown in FIG. **4** designated as A. This clearance provides for graphite cuttings to exhaust into outlet ports **88**, whereby the graphite is collected on the wall **29**. Excess cuttings of graphite will tend to collect in a lower reservoir or compartment **90**, whereby the graphite can be removed when the cover **14** is lifted from the supporting structure **12**.

Cleaning of the cutting assembly is more readily facilitated by adjusting member **74** upwardly above notch **72***a*. The cutting edges come into parallel engaging alignment with each other and thereby aid the cutting edges **78** to lose excess graphite whereby said graphite may fall out through the outlet ports **88** provided in the cutting head **58**.

Referring now to FIGS. **6** through **9**, there is shown a second embodiment having a housing generally indicated at **100**. The housing comprises two sections, a lower supporting structure **102** and an upper portion or cover **104**. The cover **104** is removable for access to batteries **38***a*, motor **42***a* and cutting assembly **56***a*.

The cutting assembly **56***a*, as shown in FIGS. **6** and **7** comprises a head **106**, said head having a hollow portion **108** to receive cutting blades **62***a*. Said blades **62***a* are pivotally supported in slots **602** by pins **65***a* in the cutting head **106**. It should be understood at this time that any number of blades can be used for sharpening the drawing lead. For illustration purposes, four are shown in FIG. **7**.

As shown in FIGS. **6** and **7**, the adjusting means comprises an additional element referred to as an advancing lever, generally indicated at **110**. The lever **110** is substantially U-shaped in configuration and has extending arms **112** and a supporting member **114**. There are pins **116**, inwardly deposed on each arm **112**, which are adapted to be received within a radial groove **118** in the circumference of member **74***a*. The arms **112** are pivotally mounted to support arms **120**. In this arrangement the operator shifts lever **110** in either direction to change the adjustment of the blades **62***a* for selection of the proper angled point on the drawing lead.

Centrally located in the face of the housing **100** is a turret **124**. This turret **124** is both rotatably and slidably supported on a spline shaft **126**. The turret is biased in an extended position by a spring **128** as shown in FIG. **6**. A screw **130** having an enlarged head retains the turret **124** on shaft **126**. The screw **130** is removably secured in the free end of the shaft **126**.

Turret **124** comprises a plurality of clips **132** secured to complimentary apertures **134**, as illustrated in FIG. **9**. Several mechanical type pencil lead holders, as generally indicated at **136** in FIG. **6**, may be held in place about the turret so that any one pencil can be selected for use, as well as for sharpening of the lead. As for the selection of the lead to be sharpened, all that is required is to rotate the turret so that the proper lead is in line with the opening **140** in the housing **100**. When a selection is made the particular clip **132** and corresponding aperture is held in place by a spring latch **142** mounted about a depending sleeve **144** of the turret **124**. The spring latch **142** is provided at one free end with an inwardly projecting keeper **146** which is received in an opening **148** of the sleeve **144**. It is to be noted that the keeper **146** registers with a groove **150** of the splined shaft **126** and each groove **150** is positioned to correspond to a particular aperture **134**. Therefore, any aperture may be selected to be aligned with opening **140** by a counterclockwise rotation of the turret which allows the spring latch to disengage the grooves **147** as it is rotated about the shaft **126** and reengaged in a selected groove.

I claim:

1. An electrical pencil sharpener adapted to sharpen drawing lead comprising:

a housing having a supporting structure and a removable cover;

a motor supported within said supporting structure;

a cutting assembly including a plurality of adjustable cutting blades;

a pivot pin for pivoting each of said cutting blades within said cutting assembly;

a blade adjusting means slidably positioned on said cutting assembly whereby said cutting blades may be adjusted to various cutting positions; and

a biasing means for rotating said cutting blades about said pivot pins to a limited degree in one direction and wherein said blade-adjusting means comprises a snap ring slidably adjustable along the vertical axis of said cutting assembly for limiting the rotation of said biased cutting blades.

2. An apparatus as recited in claim **1**, including a disc shaped member having an internal radial groove to accommodate said snap ring for selectively positioning said ring about said cutting assembly.

3. An apparatus as recited in claim **2**, wherein said cutting assembly comprises:

a cutting head, said head having an outer circular wall;

a plurality of radially extending slots equally spaced vertically about said wall and adapted to receive said cutting blades.

4. An apparatus as recited in claim 3, including a plurality of external grooves transversely spaced from each other along the outer surface of said circular wall of said cutting head, whereby each of said grooves will accommodate the selective positioning of said snap ring.

5. An apparatus as recited in claim 3, including an advancing lever means, said means being pivotally connected to said support structure and having free ends movably engaged with said disc-shaped member, whereby adjustment of said disc member is positioned on said cutting head by movement of said lever means.

6. An apparatus as recited in claim 5, including a turret slidably supported on said supporting structure and having a retaining means for retaining said pencil in alignment with said cutting blades.

7. An apparatus as recited in claim 6, wherein said turret comprises:

a plurality of clips secured in complimentary apertures located about the periphery of said turret, whereby said clips releasably hold said pencils; and

a biasing means for biasing said turret into an inactive position.

8. An apparatus as recited in claim 7, including a splined shaft secured to said supporting structure and adapted to slidably support said turret; and a latch disposed in said turret for selectively engaging said splined shaft whereby said pencil held in said clip may be selectively positioned so that said drawing lead to be sharpened may be received in said cutting head.