May 16, 1939. J. SONNE 2,158,439

ADJUSTABLE SERVICE PENCIL

Filed Dec. 28, 1936

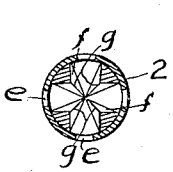


Fig. 3

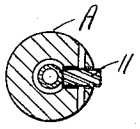


Fig. 4.

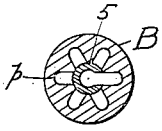


Fig. 6

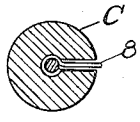


Fig. 7.

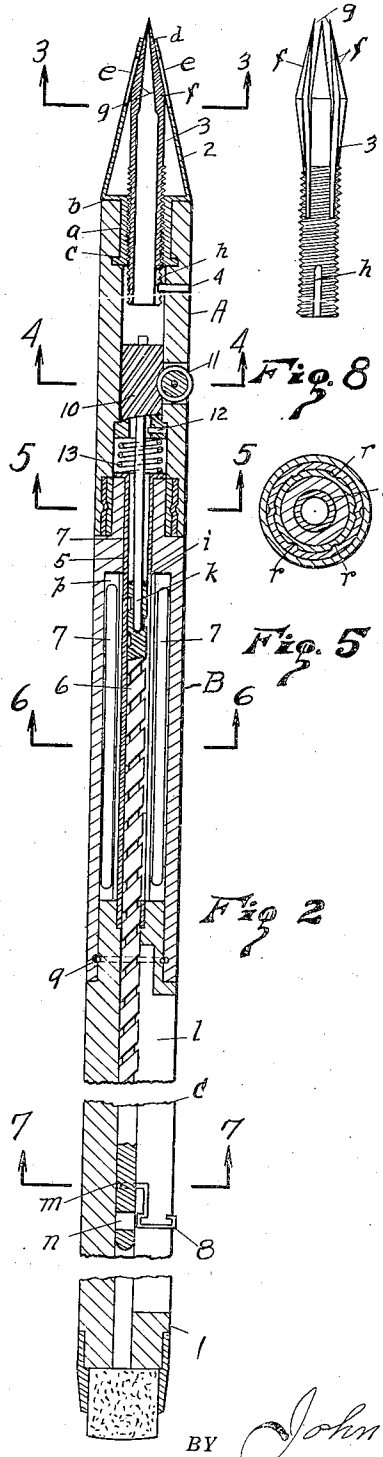


Fig. 2

Fig. 8

Fig. 5

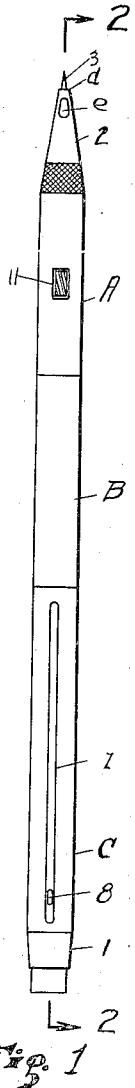


Fig. 1

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ADJUSTABLE SERVICE PENCIL

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4 Claims. (Cl. 120—15)

The object of my invention is to produce an adjustable pencil provided with automatic lead sharpening means mounted therein, adapted for sharpening the lead to any desired point by rotation of one of the casing sections.

Another object is to produce an adjustable service pencil with lead advancing and sharpening means therein and provided with special finger operating unit near the pencil point, for automatically sharpening the lead point.

A further object is to provide an automatic service pencil formed with separated lead chambers in one of the casing sections, adapted for depositing said leads, successively, in the pencil chamber when empty, and as the casing section is rotated.

A still further object is to produce an automatic service pencil that is simple in construction, easily and efficiently operated and that can be manufactured at a very low cost.

These several objects are attained in the preferred form by the construction and arrangement of parts more fully hereinafter set forth.

Similar parts on the drawing are marked by similar numerals or letters.

Fig. 1 is an assembled view of my automatic pencil showing the exterior arrangement of the casing sections and sharpener operating means.

Fig. 2 is a longitudinal sectional view lengthwise of the pencil taken on the line 2—2 of Fig. 1 showing the general arrangement of the various operating parts.

Fig. 3 is a cross-sectional view through the pencil point taken on the line 3—3 of Fig. 2 showing the relative position of the lead sharpening segments.

Fig. 4 is a cross-sectional view taken on the line 4—4 of Fig. 2 showing the special finger operating means.

Fig. 5 is a cross sectional view taken on the line 5—5 of the Fig. 2.

Fig. 6 is a cross-sectional view taken on the line 6—6 of Fig. 2.

Fig. 7 is a cross-sectional view taken on the line 7—7 of the Fig. 2.

Fig. 8 is a detail view of the sharpener cone unit showing the spring segments in their open position.

In general, my pencil comprises a hollow cylindrical casing pointed at one end, and formed of sections pivotally mounted together at adjoining ends, and is provided with lead advancing and sharpening means mounted therein. The pencil is designed to sharpen the lead sections to any desired point as the same is advanced within the casing chamber, either by rotation of one of the casing sections or by the special finger mechanism mounted near the pencil point.

I will now describe more specifically the detail construction of my automatic pencil, referring to the drawing and the marks thereon.

The casing 1 may be made of any desired material, such as metal, hard rubber, shell, or similar suitable materials, and is formed of hollow cylindrical sections A, B and C, joined together at their respective ends by suitable pivot means, herein illustrated as plug and socket end joints.

The end section A carries a conical metal point casing 2 pivotally mounted on the outer end thereof. The point 2 is formed with a cylindrical neck *a* and adjoining shoulders *b* and *c* for rotatably engaging the casing walls, moulded or mounted therein, but free to turn. The casing point 2 is also formed with an open apex *d*, and is provided with side apertures *e* for discharging lead trimmings therefrom. The inner surface of the neck section *a* is threaded and carries mounted therein the threaded end of a hollow spring metal sharpener cone 3, shaped and fitted within the point casing chamber and projected through the apex opening *d* when in its closed position. The sharpener cone 3 is slotted in sections lengthwise of the conical end, as indicated in Fig. 8, and with the tapered segments *f* beveled and sharpened along their respective inner edges *g*. The cone 3 is also provided with a wall slot *h* along the inner portion thereof for receiving the pin 4 fixedly mounted in the casing wall, for preventing rotation of the cone.

The casing sections B and C are firmly retained together in the pivot joint by a spring ring 9 fitted within opposed grooves formed in both sections, allowing free rotation of the section C, and capable of receding within its recess sufficiently to allow the sections to be pulled apart.

Rotatably mounted within the casing section B is the flanged thimble 5 which extends the entire length of the section and with its flanged edge engageable with the walls of section A. The thimble 5 is formed with a wall slot opening *i* in one side thereof, and carries rotatably mounted therein a spiral grooved lead operating screw 6 which is extended into both casing sections B and C and formed with a thread open at the inner end thereof. The inner end of the operating screw 6 is formed with a cylindrical recess *k* for receiving a pencil lead 7 tightly fitted therein. The opposite end of the screw 6 is formed with an annular groove *m* which carries a special thumb spring 8 rotatably mounted thereon and positioned to slide in the wall slot *l* of the casing section C. The thumb spring 8 is formed with a boss for engaging the recess *n* in the end of the operating screw 6, which, when the spring is depressed, connects the same non-rotatably therewith, providing turning means for the screw through rotation of the casing section C, when so properly engaged.

Within the casing section A is rotatably mounted a hollow cylindrical spiral gear unit 10 of suitable pitch, shouldered and fitted within the casing chamber but free to turn therein. The spiral gear 10 engages a corresponding counterspiral gear 11 pivotally mounted in the casing wall and projected slightly outside thereof. The gear unit 10 is provided with an operating pin 12 positioned to engage the spiral groove of the lead operating screw 6 when same is advanced thereto forming a finger engageable means, the screw passing through the hollow gear opening and without causing rotation thereof when advanced by rotation of the casing section C. However, if the finger spiral gear 11 is caused to rotate by pressure applied thereon, the engaged operating screw 6 will also rotate therewith and cause the same advancement of the pencil lead 7 as though the rotations were produced by the casing section. The finger gear means is designed for convenient adjustment for slight advancing and sharpening of the lead, it being a more delicate adjustment. By this means the lead 7 may be advanced, or retracted, within the sharpener cone 3, and automatically sharpen the lead 7 to any desired point. The sharpener edges *g* may be varied in position by rotation of the inclosing cone point 2 and when slightly opened, will allow the pencil point to be projected therethrough ready for use.

To prevent overcrowding of the lead 7 on the sharpener edges *g*, a light compression coil spring 13 is mounted in back of the spiral gear 10, and which will allow the lead advancing units to recede slightly when under pressure caused by the engaging sharpener blades. The position and type of spring may be varied as desired.

When desired, the sharpener cone 3 may be withdrawn within the conical point casing 2, and then becomes inoperative.

Within the central casing section B is formed a series of parallel, radially positioned cells *p*, arranged opposite the lead slot *i* formed in the tubular thimble 5. Each cell *p* is designed to receive a reserve lead 7 therein, and capable of depositing same into the empty casing chamber, successively, as the respective chambers are rotated thereover, and when the lead operating screw 6 is withdrawn to its extreme rearward position. The newly deposited lead 7, within the casing chamber, can be then pressed into the screw recess *k* by advancing the screw 6 until the lead engages the edges of the sharpener cone 3. A slight turning will then engage the lead. When desired to remove a stub lead 7 from the screw recess *k*, the screw 6 is advanced sufficiently to insert the lead end between the opened sharpener segments *f* and which are then closed thereon by rotation of the cone point casing 2, and the screw then pulled back until the lead is withdrawn from the recess *k*.

To more easily adjust the casing section B and the respective lead cells *p*, so that each cell will successively coincide with the thimble opening *i*, special spring ratchet notches *r* are formed in the plug and socket joint walls as illustrated in Fig. 5 of the drawing, although any other suitable means may be substituted therefor when desired.

It is to be understood that my automatic service pencil is subject to various modifications in both mechanical details and design arrangement of the various units and sections without departing from the spirit of my invention, and I claim not only the design herein illustrated, but any modification thereof that is substantially a substitution of parts and sections herein shown.

Having fully described my device, what I claim as my invention and desire to secure by Letters Patent is:

1. An adjustable pencil adapted for replaceable leads and used therewith, comprising an elongated tubular casing, a hollow conical point section rotatably mounted on one end thereof, a lead sharpener cone adjustably mounted within said conical point section, a lead advancing screw rotatably mounted within the tubular casing, finger engageable means mounted near the casing point for rotating the lead advancing screw within the casing, and spring adjusting means mounted behind the finger engageable means.

2. An adjustable pencil adapted for replaceable leads and used therewith, comprising an elongated tubular casing formed of sections pivotally connected together, a hollow conical point section pivotally mounted on one end of said casing, a hollow adjustable lead sharpening cone threadably mounted within said conical point section, means mounted on the casing for preventing rotation of said sharpener cone and adjusting same within the conical point section, a lead advancing screw with lead attached rotatably mounted within said casing, a thumb operated spiral gear unit rotatably mounted in the forward casing end for engaging and rotating the lead advancing screw with attached lead, against said lead sharpening cone and means for connecting same to one of the rotatable casing sections.

3. An adjustable pencil adapted for replaceable leads and used therewith, comprising an elongated tubular casing formed of pivotally connected sections, a hollow point section pivotally mounted on one of said tubular casings, a slotted adjustable lead sharpener cone threadably mounted within said conical point section, means mounted on the casing wall to prevent rotation of said sharpener cone, a lead advancing screw rotatably mounted within the tubular casing, means mounted on said screw for optionally connecting same with one of the pivoted casing sections for rotation therewith, a finger rotating unit mounted near the casing point capable of engaging and rotating the lead advancing screw, and spring adjusting means mounted behind said finger rotating unit.

4. An adjustable service pencil adapted for replaceable leads and used therewith, comprising a tubular casing formed of sections pivotally joined together, a hollow conical point section mounted on one end of the tubular casing, a slotted adjustable lead sharpener cone threadably mounted within said conical point section, said sharpener cone being connected to the tubular casing walls by pin and slot means, a lead advancing screw rotatably mounted within the casing, a finger engageable spring latch mounted on the advancing screw for connecting same with one of the pivoted casing sections, a pair of spiral gears rotatably mounted in the casing near the point section, one of said gears being hollow and positioned concentrically with the lead advancing screw and engageable therewith, and an adjusting spring mounted behind the hollow spiral gear.

JOHN SONNE.