Sept. 16, 1947. H. M. FARRINGTON 2,427,648

PROPELLING PENCIL

Filed Nov. 27, 1940

Fig.2.

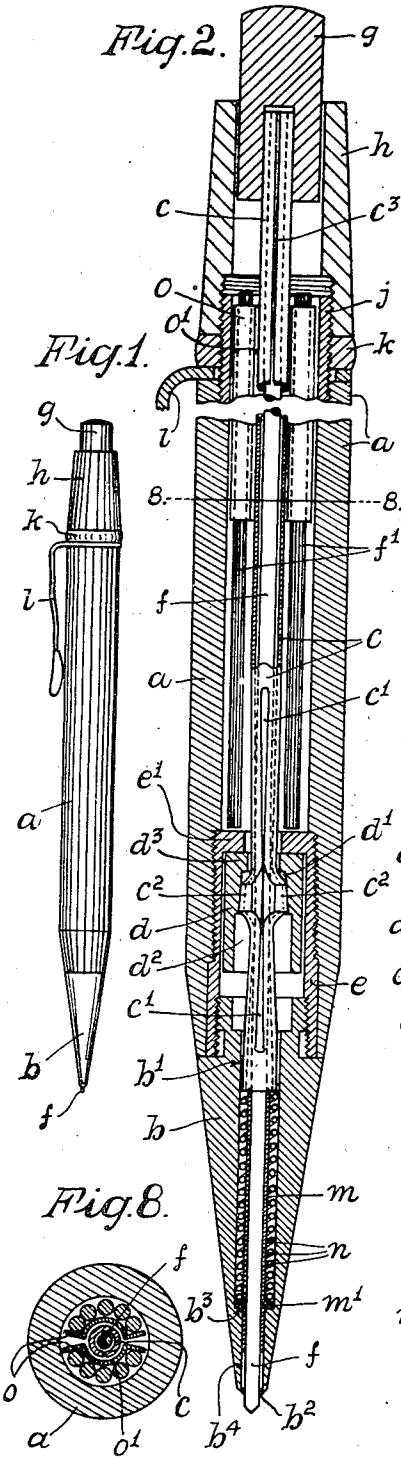


Fig.3.

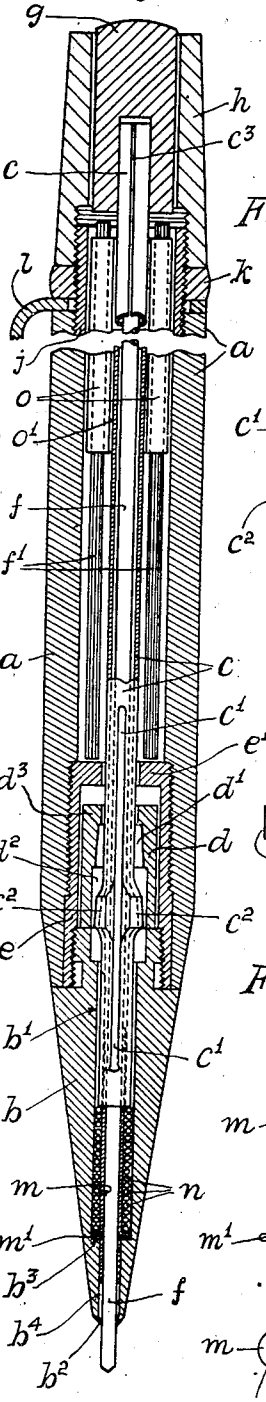


Fig.1.

Fig.6.

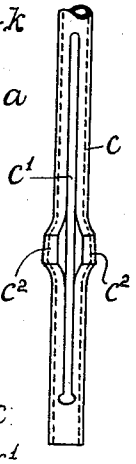


Fig.9.

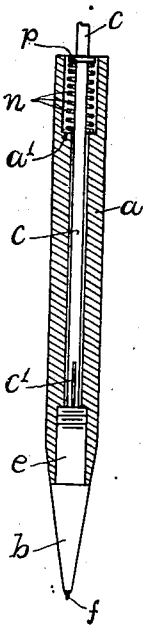


Fig.7.

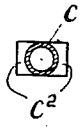


Fig.10.

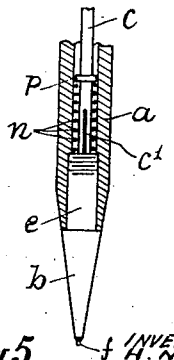
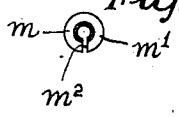


Fig.8.

Fig.4.

Fig.5.



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UNITED STATES PATENT OFFICE

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PROPELLING PENCIL

Hastings Macleod Farrington, London W. C. 1, England

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5 Claims. (Cl. 120—17)

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This invention relates to propelling pencils, and aims to obviate necessity for the provision in the point section or tip of the customary radial slits or slots and at the same time ensure that the lead shall be prevented from such angular or sidewise displacement as will tend to cause or permit of its fracture during use.

According to my invention, a mechanical pencil of the type in which an internal lead carrying member is pressed forwardly by hand within a casing and is returned by spring pressure, wedging or clamping means being provided for gripping the lead during each feeding stroke to impart a step-by-step forward motion to the lead and for holding same preparatory to writing, is characterised in that a guide tube situated within the pencil casing and constituting said lead carrying member is provided with a forward extension in the form of a telescopic sleeve which is in constant engagement with said lead guide tube during up and down movement of the latter so that the lead is wholly supported in its step-by-step travel to the pencil point.

In a preferred form of my invention and in its application to that type of mechanical pencil in which a guide tube slidably disposed within an outer casing has a forward part intermediate its ends formed with longitudinal slots so as to provide non-slotted portions above and below the slotted portion, a part of such slotted portion being provided with projections with which co-act an abutment member disposed within the pencil casing so that when said abutment member engages with said projections of the slotted portion of the guide tube, said slotted portion is caused to contract and clamp the lead for a substantial part of its length, I provide said guide tube with a forward extension in the form of a telescopic sleeve which is in constant engagement with said lead guide tube during up and down movement of the latter, thus providing in conjunction with the slotted portion of the guide tube a lead guide structure which is both longitudinally and diametrically contractile.

Other features appertaining to my invention are hereinafter described, these features being within the scope of the appended claims.

I will further describe my invention with the aid of the accompanying sheet of explanatory drawings which illustrate, by way of examples only, three modes of carrying the invention into effect.

In said drawings:

Fig. 1 is a side elevation, and

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Fig. 2 an enlarged longitudinal section of a mechanical pencil embodying my improvements and showing the mechanism of the pencil in normal position for writing, the lead being gripped by its guide tube or carrier.

Fig. 3 is a longitudinal section similar to Fig. 2 but showing the guide tube or carrier, with lead, projected as in a feeding stroke.

Fig. 4 is an elevation, and

Fig. 5 a plan view of the tubular liner or sleeve which constitutes a forward telescopic extension of the lead guide tube or carrier.

Fig. 6 is an elevation of the forward lead-clamping portion of the lead guide tube or carrier, and

Fig. 7 is a plan view of Fig. 6.

Fig. 8 is a cross-section taken as on the line 8—8, Fig. 2.

Figs. 9 and 10 are part-sectional elevations illustrating alternative positions for the spring return.

In the several views like characters of reference denote like or equivalent parts wherever they occur.

The pencil shown in the drawings is of a type which includes an outer barrel or casing, such as *a*, a tapered member or point section, such as *b*, and a guide tube or lead carrier *c* which is disposed within and extends throughout the length of casing *a* with its forward end extending into a central passage b^1 of the tapered point section *b*.

In such a pencil, the guide tube or lead carrier *c* has had a forward or intermediate portion provided with diametrically opposed longitudinal slits or slots c^1, a midway part of such slotted portion being provided with integral and similarly opposed projections or enlargements, each designated c^2, which are disposed within to co-act with a collar abutment or sleeve member *d*, d^1, d^2 situated in casing *a* and slidable on guide tube *c* by way of a central aperture formed in the closed rear end d^3 of the collar *d*.

Collar *d*, which provides a rear bore passage d^1 and a forward larger bore passage d^2, is confined but movable within a bush *e* which engages, at its rear end, within an internally screw-threaded end of casing *a*, and, at its front end, around an externally screwthreaded shank of point section *b*, whereby the latter is secured to casing *a*. Guide tube *c*—which may be split, as shown at c^3, for convenience of manufacture—also slidably extends through a central aperture formed in the closed end e^1 of bush *e*.

When the pencil is in its normal position of

use as shown in Fig. 2, the projections c^2 of guide tube or lead carrier c are engaged by the smaller bore passage d^1 of collar d, the diameter of passage d^1 relative to projections c^2 being such that the slotted portion c^1 of guide tube c is caused to yield inwardly or contract against its inherent resilience and grip or clamp the lead f in guide tube c for a substantial part of its length, thus affording adequate anchorage of lead f without danger of breakage. When, however, the projections c^2 of guide tube c are in register with the larger bore passage d^2 of collar d, the binding effect on lead f ceases: the operation of the pencil is hereinafter more fully described.

The rear end of guide tube c is closed by a removable plunger-like knob g by the aid of which guide tube c is pressed forwardly within casing a during a lead-feeding stroke, knob g being slidable within a guide sleeve h removably attached to the rear of casing a by a screw-threaded bush j fixed in this end of the casing. A lock ring-like nut k for a clip l is also fitted on bush j.

According to my invention, I provide a tubular liner or sleeve m, shown detached in Figs. 4 and 5, of thin metal which has its rear end registering with and entering the forward end of the lead guide tube or carrier c in such manner as to constitute, in effect, a forward telescopic extension of same, said liner or sleeve m being located within the lead passage b^1 of point section b and terminating adjacent to the aperture b^2 in the pencil point. With this arrangement it is ensured that the lead f is wholly supported against lateral movement in its step-by-step travel to the pencil point due to the constant engagement between the liner or sleeve m and the lead guide tube c during up and down movement of the latter. Further, said liner or sleeve m, in conjunction with the movable lead guide tube c, provides a telescopic tube which, together with the slotting c^1 of guide tube c as before described, provides a lead guide tube structure which is both longitudinally and diametrically contractile.

A coiled spring n for returning the lead guide tube c to normal position after each feeding stroke is, in this example, conveniently situated around said liner or sleeve m with its opposed ends in respective abutment with the forward end of guide tube c and a flange or shoulder m^1 formed on the liner or sleeve m in such manner as to maintain said liner shoulder m^1 in stationary abutment with a ledge b^3 formed by a reduced part b^4 of the point section passage b^1. Thus said spring n also maintains guide tube c in its normal uppermost position, and at the same time the lead is gripped due to the guide tube projections c^2 being held in operative contact with the smaller bore passage d^1 of collar d, d^1, d^2 and the stopping engagement of the top of said collar with the closed end e^1 of bush e. It will be obvious, however, that said coiled spring n may be fitted in any other position within the pencil body or casing a in order to effect the return of the lead guide tube c, two such alternate positions for spring n are later described with reference to Figs. 9 and 10.

Said liner or sleeve m is longitudinally split at m^2 (the split extending through the liner collar m^1) so that, being now of a springy nature, it will accommodate itself to the reception of and grip leads (i e. the portion of the lead then in the point section b) of varying diameters within a wide tolerance and this in such manner as to obviate likelihood of the lead becoming jammed in the action and broken; this advantage may, however, be attained by splitting only the lower portion of the sleeve. Moreover, said liner m retains the appropriate grip on the lead f in lieu of the passage b^4 in point section b, thus obviating slitting the tip of the latter, as before referred to, and at the same time preventing angular movement of the lead then in the tip.

Upon guide tube c being pushed inwardly by hand relative to casing a, as in Fig. 3, by its plunger knob g, it (the guide tube) moves forward over stationary liner m (against the resistance of spring n) with lead f and with collar d, d^1, d^2 (the latter still squeezing tube c to clamp lead f and force it through the stationary liner m) until the front edge of collar d moves into contact with the rear end of point section b, the extent of its stroke or travel controlling the length of lead f projected at each pressing action. On the continued pressing of plunger knob g by the user, the projections c^2 of guide tube c move into register with the larger bore passage d^2 of collar d, d^1, d^2, thus permitting this part of tube c to spring open to resume its normal diameter and release the lead f in its newly projected position; said lead, however, due to its frictional contact in liner m does not move further outwardly.

On the user releasing pressure on knob g, guide tube c returns to its normal position under pressure of spring n, in which movement the tube projection c^2 return collar d, d^1, d^2 until the back of the latter engages against the closed end e^1 of bush e. In this movement lead f is not gripped, being left in its newly projected position, but when the rearward motion of collar d, d^1, d^2 is arrested by closed end e^1 of bush e, the spring pressure completes its backward stroke by forcing the projections c^2 of tube c into the smaller bore passage d^1 of the collar, thus lead f is re-clamped ready for writing and also ready for a further projectory stroke as and when required.

A refill lead may be inserted and dropped through the rear end of the guide tube c—when the knob g is removed—and automatically retained in position without any adjustment by engagement of the adjacent restricted passage of the slotted portion c^1 of the guide tube preparatory to being fed towards the liner m in point section b.

Casing a may be adapted to hold a suitable number of refill leads f^1 by the fitment of opposed partition members o which are so shaped as to combine to provide a central guide passage o^1 for lead-tube or carrier c. Access to the refill leads f^1, which are supported by the closed end e^1 of bush e, is effected by removal of knob g and, if more convenient, sleeve h.

As before stated coiled spring n may be fitted in any other position within the pencil body or casing a in order to effect the return of the lead guide tube c and to maintain it in normal position, and in the modification shown in Fig. 9, spring n is situated around an upper portion of guide tube c and has its opposite ends in respective abutment with a ledge a^1 provided in casing a and a stop flange p affixed to guide tube c, thus the latter is maintained in its normal uppermost position. Fig. 10 illustrates a similar modification in which the forward end of the spring n abuts against the rear end e^1 of bush e, and the stop flange p is fixed lower down the guide tube c.

In these and other modifications in which the spring n may be situated in any position other than in the point section b, an alternative meth-

od will be provided for retaining the liner n stationary in point section b, such as by the fitment of a further spring or a retaining washer either of which will be to maintain the liner shoulder m^1 in abutment with the ledge b^3 of point section b.

What I claim as my invention and desire to secure by Letters Patent is:

1. A mechanical lead pencil comprising in combination a casing, a guide tube arranged within said casing for at times engaging the lead of the pencil whereby the latter may be propelled through said casing, a point section secured to one end of said casing, a split sleeve arranged within said point section and having one end thereof telescopically engaged with said guide tube whereby the lead from said guide tube may be fed through said split sleeve and be frictionally retained therein, a collar formed with said split sleeve and a coil spring arranged between said collar and said guide tube.

2. A mechanical lead pencil comprising in combination a casing, manually operable means for imparting a step-by-step movement to the lead within said casing comprising a guide tube arranged within said casing for at times engaging the lead of the pencil whereby the latter may be propelled through said casing, a point section secured to one end of said casing, a split sleeve arranged within said point section and having one end thereof telescopically engaged with said guide tube whereby the lead from said guide tube may be fed through said split sleeve and be frictionally retained therein, a collar formed upon said split sleeve, and a coil spring arranged between said collar and the proximate end of said guide tube.

3. A mechanical pencil of the type in which an internal lead carrying member is pressed forwardly by hand within a casing and is returned by spring pressure, wedging or clamping means being provided for gripping the lead during each feeding stroke to impart a step-by-step forward motion to the lead and for holding same preparatory to writing, comprising a casing with stepped bore providing a rearward facing ledge near its forward end a guide tube situated within the pencil casing and constituting said lead carrying member is provided with a forward extension in the form of a spring sleeve telescopic therewith at least the lower portion whereof is longitudinally split, said sleeve being in unbroken engagement with said lead guide tube during up and down movement of the latter so that the whole lead is supported against lateral movement or displacement in its step-by-step travel to the pencil point, and that portion of the lead then in the point section is also spring-gripped by said telescopic sleeve, said sleeve having a lateral projection formed thereon, a coiled spring situated around said telescopic sleeve and having its opposite ends in respective abutment with the front end of said guide tube and said projection formed on said sleeve and which projection is in stationary abutment with said ledge formed by a reduced part of the point section passage.

4. In a mechanical lead pencil, an upper casing, a bored terminal section mounted on the end of said casing, a guide tube within said casing engageable with the lead of said pencil, a split sleeve mounted in the bore of said terminal section and having a lateral abutment and adapted to receive the portion of the lead of said pencil extending beyond said tube, said split sleeve being mounted to telescopically engage said tube, and resilient means mounted between said abutment and the adjacent end of said tube engageable therewith for urging the same apart.

5. In a mechanical lead pencil, an upper casing, a bored terminal section mounted on the end of said casing, the tip portion of said terminal section having a bore of slightly smaller diameter than the upper portion of said terminal section forming an annular shoulder, a guide tube within said casing engageable with the lead of said pencil, a split sleeve mounted in the bore of said terminal section and having a lateral abutment and adapted to receive the portion of the lead of said pencil extending beyond said tube, said split sleeve being mounted to telescopically engage said tube, and resilient means mounted between said abutment and the adjacent end of said tube for urging the same apart and urging said abutment against said shoulder.

HASTINGS MacLEOD FARRINGTON.

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