Nov. 7, 1950 J. H. MASON 2,528,839

MECHANICAL PENCIL

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FIG. 1.

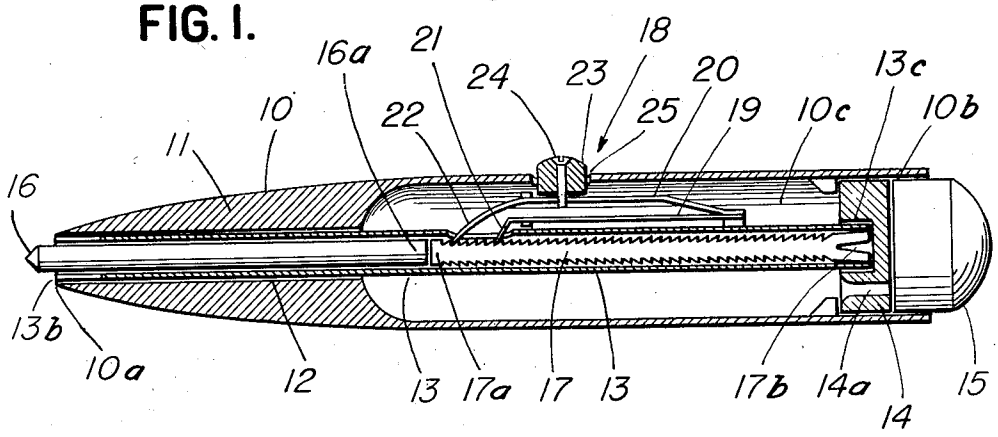
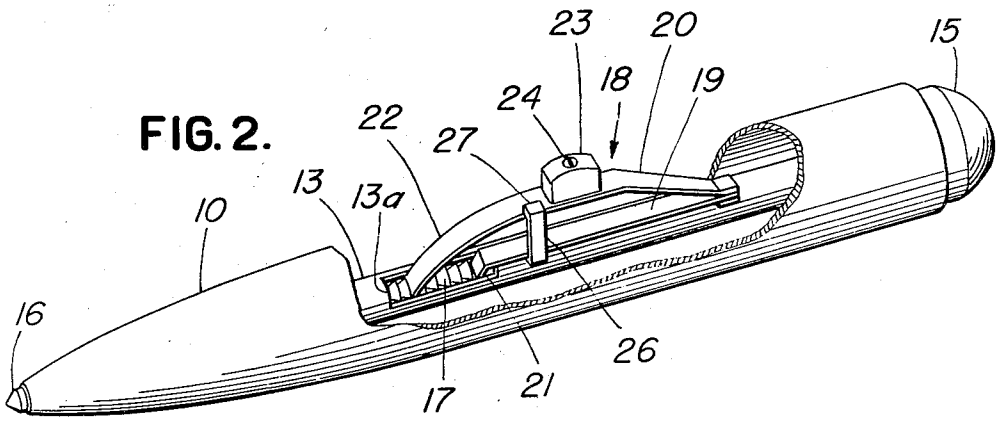



FIG. 2.



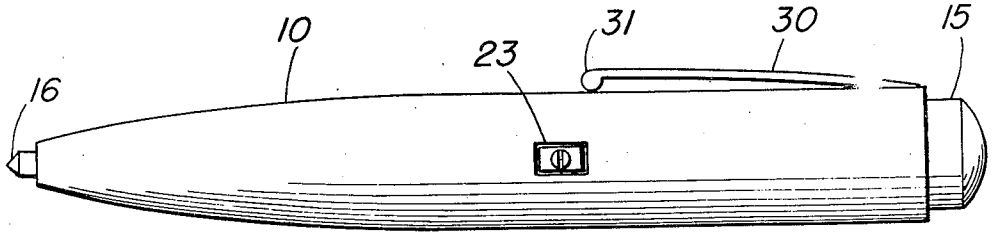




FIG. 3.

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## MECHANICAL PENCIL

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3 Claims. (Cl. 120—17)

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This invention relates to a mechanical pencil, and more particularly to a pencil having manually operable mechanism for positively advancing a lead to and holding it in right position.

In accordance with one embodiment of my invention, my pencil may take the form of a casing in which is enclosed a tube adapted slidably to house the lead. Also, in this tube is an impelling member capable of incremental movement by a finger piece for forcing the lead out of the pencil as desired by the user. I also provide means for resisting movement of the lead back into the pencil housing from writing pressure, or the like.

In accordance with another feature of my invention, the rear end of the pencil housing or barrel is removable and the finger piece, which is operable to feed lead out of the pencil, is movable or rather operable transversely of the axis of the barrel.

In the drawing, wherein I have shown one form of my pencil,

Figure 1 is a sectional elevation of the pencil;

Figure 2 is a perspective view of the pencil, a portion thereof being broken away to show the lead advancing and holding mechanism; and,

Figure 3 is a side elevation of the pencil.

Similar reference characters refer to similar parts throughout the views of the drawing.

Referring first to Figure 1, my pencil comprises a body or barrel, generally indicated at 10, which may be formed of any suitable material. Thus the pencil barrel may be molded of a suitable plastic, or may be fabricated from metal tubing, with a suitable filler inserted therein to form the relatively solid and heavy portion 11 of the writing end of the pencil. The mass of portion 11 of the pencil barrel is of advantage in that it weights the writing end of the pencil, thus facilitating its use. The writing end of barrel 10 is provided with an elongated concentric bore 12 in which is fixed in any suitable manner an elongated tube 13, the left-hand end of which may be flush with the end 10*a* of barrel 10. If desired, however, bore 12 of barrel 10 may be just large enough to accommodate a lead, and may be shouldered (not shown) at its right-hand end to provide a seat for the left-hand end of tube 13. Preferably tube end 13*a* is slotted or pinched as at 13*b*, or otherwise conformed to a diameter just slightly less than the diameter of the pencil lead, so as to preclude the lead's falling out of the pencil.

The right-hand end 13*c* of tube 13 is disposed in and may be fixed to a collar 14 secured in any suitable manner to the right-hand end 10*b* of

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barrel 10 within a chamber 10*c* formed in the barrel. Thus collar 14 may be press fitted into the barrel, or may be pinned, if desired, in proper position therein, properly to position and hold tube 13. If desired, collar 14 may have one or more openings 14*a* extending therethrough, through which leads may be inserted, thus to be stored within barrel chamber 10*c*. The open end of barrel end 10*b* may be filled by a cap which conveniently holds an eraser 15.

Tube 13, of course, comprises a lead tube for the reception of lead 16, and also acts as a holder and guide for a feed rack 17, the left-hand end 17*a* of which is adapted to abut the right-hand end 16*a* of lead 16, and upon movement force the lead to the left by means of the manually operable mechanism, generally indicated at 18.

As is more clearly shown in Figure 2, the manually operable mechanism 18 may comprise a resilient stop finger 19 and a feed finger 20, secured at their right-hand ends in any suitable manner to tube 13. The left-hand end of stop finger 19 is downwardly bent to provide a foot 21 adapted to engage rack 17 between adjacent teeth thereof. In other words, stop finger 19, together with its foot 21, comprises a pawl or detent which is so sprung as to be under a counterclockwise bias, thus to permit movement of rack 17 to the left, but to preclude movement thereof to the right unless raised out of ratcheting engagement with the rack. The left-hand end of feed finger 20 overlies foot 21 of finger 19, and is curved downwardly to provide a foot 22, the end of which is adapted to engage the teeth of rack 17. It should be noted that the feet 21 and 22 of fingers 19 and 20 enter tube 13 by way of an opening 13*a* cut therein.

To the top of finger 20 is secured a finger piece 23, as by a screw 24, and this fingerpiece extends through an opening 25 cut in barrel 10. Finger 20 overlies finger 19 and is in effect bowed so that in rest position it is somewhat spaced from finger 19. It accordingly follows that when fingerpiece 23 is pressed inwardly of the pencil barrel 10, finger 20 flattens, and in so doing elongates in such manner that its foot 22 is forced to the left, thus to drive rack 17 and accordingly lead 16 to the left a distance equal to at least one tooth of rack 17. Upon release of fingerpiece 23, the resilience of finger 20 restores the bow to spring 20, and in so doing causes movement of its foot 22 to the right, thus to engage it with another tooth of the rack, finger 20 thus being restored to its lead feeding position. During the feeding action of finger 20, finger 19 or rather its foot 21 ratchets

over one or more of the rack teeth, thus securely to hold the rack in its new position, thereby precluding movement of the rack to the right during return movement of finger 20, and from writing pressure exerted on the rack through lead 16. Thus it may be seen that lead 16 may be advanced in increments until the lead is exhausted.

Fingerpiece 23 is preferably so dimensioned, i. e. its height is such that when finger 20 (Figure 1) is completely flattened, i. e. is flattened to a point beyond that necessary to move rack 17 one notch, the upper surface of the fingerpiece underlies the inner surface of barrel portion 10*b*. By so dimensioning the fingerpiece tube 13, rack 17 and the fingers 19 and 20 attached to the tube may be installed in or removed from the pencil barrel as a unit, thus facilitating initial assembly of the pencil, or subsequent repair thereof.

Preferably rack 17 is of such length that its left-hand end 17*a* will protrude slightly from tube end 13*a* before it is disengaged by the feed on the ends of fingers 19 and 20, thus to warn the user not only that the lead is exhausted, but also that the rack should be restored to the position shown in Figure 1, thus to preclude the rack from becoming completely disengaged by the feeding mechanism 18.

It may accordingly be seen that through the manipulation of feeding mechanism 18, lead 16 is positively and incrementally fed to the left as additional lead is required, and is positively held by finger 19 and its foot 21 against writing pressure, which otherwise might well cause the lead to be forced back into the pencil barrel.

It is, of course, necessary to provide means for refilling or reloading the pencil with new lead. To this end, I have attached a strap 26 (Figure 2) to the lower finger 19, the upper end of this strap being provided with a lip 27 which overlies, but is not secured to the top of finger 20. Thus it follows that both of fingers 19 and 20 may be lifted out of engagement with rack 17 merely by grasping fingerpiece 23 and pulling it outwardly of the pencil barrel. Upon such manipulation, finger 20 pulls outwardly on strap 26 and accordingly draws finger 19 outwardly therewith. With the two fingers thus out of ratcheting engagement with rack 17, it is but a simple matter to insert a new lead into tube 12 and force it into the pencil barrel, thus moving rack 17 to the position shown in Figure 1.

Under certain circumstances, finger 19 may be dispensed with, finger 20 and its foot 22 acting as both a feeding and stopping element. Under such circumstances, however, the right-hand end of rack 17 is notched as at 17*b*, and the end of the rack spread so as frictionally to engage the inside of tube 13. The value of the frictional engagement of the spread end of the rack with the tube should be sufficient to prevent movement of the rack to the right during the return action of finger 20 and the consequent dragging effect of its foot 22 on the rack, which might well force the rack to the right and thus prevent the feeding of lead.

As shown in Figure 3, the pencil barrel 10 is provided with a conventional clip 30, the free end 31 of which lies between the writing and eraser ends of the pencil. Clip 30 is preferably so attached to barrel 10 as to be angularly displaced from fingerpiece 23, so that when the pencil is clipped in the user's pocket, fingerpiece 23 is not engaged as the pencil is placed in the pocket or removed therefrom. Therefore, by angularly displacing the clip and fingerpiece, the fingerpiece is conveniently located so as to be operated by the user without materially changing his writing grip on the pencil.

It may now be seen that I have provided a pencil which attains the several objects set forth hereinabove in a thoroughly practical and efficient manner.

As many possible embodiments may be made of the above invention, and as many changes might be made in the embodiment above set forth, it is to be understood that all matter hereinbefore set forth or shown in the accompanying drawing is to be interpreted as illustrative and not in a limiting sense.

I claim:

1. In a mechanical pencil, in combination, a barrel, a lead tube in said barrel, a notched feeding element in said tube adapted to be moved axially thereof for feeding lead therethrough, a bowed resilient member having one end connected to said tube and the other end extending through a hole in said tube to engage said notched element whereby, when said bowed member is flattened and accordingly elongated, said notched element is advanced in lead-feeding direction, means extending transversely of and through said barrel to an accessible position and connected to said bowed member for operating the same and accordingly moving said notched element, and means for positively precluding movement of said notched element in non-lead feeding direction, said transversely extending means comprising a finger piece so dimensioned that its outer end lies within said barrel when said resilient member is completely flattened, whereby said tube, said element, said member, and said finger piece may be installed in or removed from said barrel as a unitary assembly.

2. In a mechanical pencil, in combination, a barrel, a lead tube in said barrel, axially movable means in said tube for feeding lead therethrough, a reciprocable finger piece projecting transversely through said barrel and connected with said feeding means for moving said feeding means in a direction to feed a lead through said lead tube out of said barrel, and means on said axially movable means frictionally engaging the inner diameter of said lead tube for resisting movement of said axially movable means when actuated by said reciprocable means, thereby to resist non-feeding movement of said feeding means during the return or non-feeding stroke of said manually operable means.

3. A pencil in accordance with claim 2 wherein the feeding means comprises an elongated element slidably disposed within said lead tube and having an enlarged portion which frictionally engages the diameter of the tube and tends to resist movement of the elongated element therethrough.

JOHN H. MASON.

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