May 27, 1952 B. M. TAPNER 2,598,083

MOVEMENT UNIT FOR MECHANICAL PENCILS

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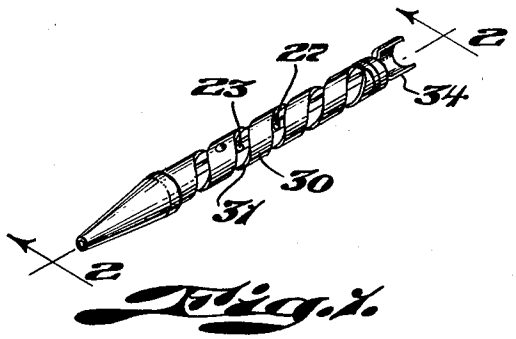


Fig. 1.

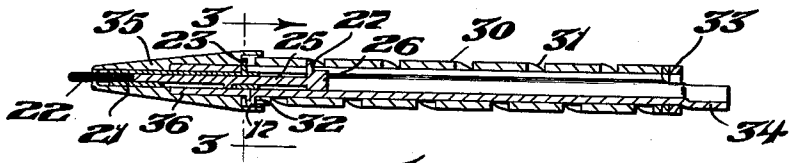


Fig. 2.

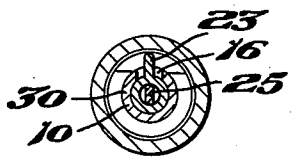


Fig. 3.

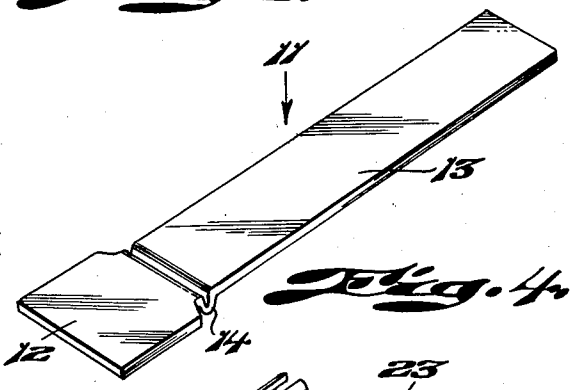


Fig. 4.

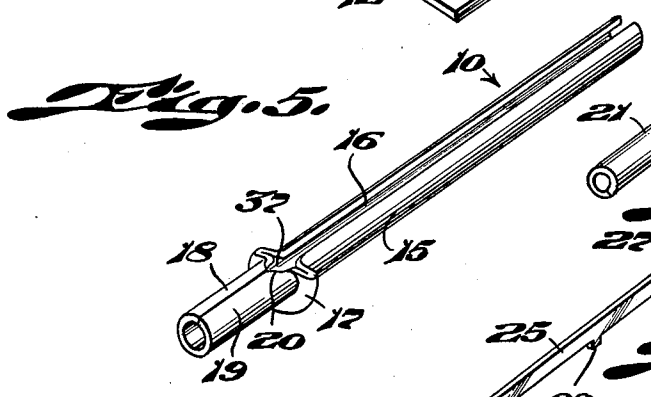


Fig. 5.

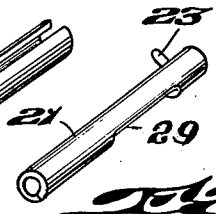


Fig. 6.

Fig. 7.

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UNITED STATES PATENT OFFICE

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MOVEMENT UNIT FOR MECHANICAL PENCILS

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Application April 1, 1950, Serial No. 153,311

4 Claims. (Cl. 120—18)

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This invention relates to a mechanical pencil and more particularly to the movement which is used for manipulating the lead.

In many approved manufactures of mechanical pencil constructions some sort of a cap or sleeve is provided which is assembled with the helically slotted and longitudinally slotted tubes so as to receive the radial finger of the lead carrier and hold it while the ejector is advanced to force the last end of the lead out of the lead carrier, thus requiring a separate operation for forming such a cap and an additional assembly operation in positioning it in place.

One of the objects of this invention is to simplify the construction of the movement unit.

Another object of this invention is to reduce the assembly operations in assembling the parts of the movement unit.

Another object of this invention is to so form the longitudinally slotted tube that it will perform the function of the cap, making unnecessary the formation of a separate cap and an additional assembly operation.

With these and other objects in view, the invention consists of certain novel features of construction, as will be more fully described and particularly pointed out in the appended claims.

In the accompanying drawings:

Figure 1 is a perspective view of the assembled movement unit for a mechanical pencil;

Figure 2 is a sectional view on substantially line 2—2 of Figure 1 and showing a piece of lead in the lead carrier with the parts in such position that further advance relative rotation of the helical tube and longitudinally slotted tube will eject the lead;

Figure 3 is a section on line 3—3 of Figure 2;

Figure 4 is a perspective view of the blank from which the longitudinally slotted tube is formed;

Figure 5 is a perspective view of the longitudinally slotted tube formed from the blank of Figure 4;

Figure 6 is a perspective view of the lead carrier;

Figure 7 is a perspective view of the lead ejector.

In proceeding with this invention I have cut from a piece of sheet stock a blank and then bend this blank to provide a flange and then roll the blank into a tube. The blank is of such shape that there is a slot extending longitudinally of the tube from one end to a distance just beyond the flange with the remainder of the tube closed by the edges meeting in substantially abutting relation for the remainder of the length of the tube. The other parts of the movement are substantially the same as have heretofore been utilized.

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With reference to the drawings, the longitudinally slotted tube is designated generally 10 (Fig. 5) and is formed from a piece of sheet stock designated 11 and shown in Figure 4. The stock is wider at end portion 12 than in the general extent of its body 13 and at a point spaced from the inner end of the wider portion 12, the stock is doubled upon itself and flanged laterally as at 14. This blank, as shown in Figure 4, is then rolled to provide the cylindrical tube 10 having a generally cylindrical body 15 with its edges spaced to form the longitudinal slot 16, while the doubled portion 14 provides a flange 17 extending radially outwardly from the tube. The edges 18 and 19 of the wider part 12 are in substantially abutting relation so as to form a stop 20 terminating the slot 16 at a point just beyond the flange 12 and between the flange and the closed end of the tube.

Within this longitudinally slotted tube there is contained a lead carrier 21 which is of tubular formation and receives a lead 22 in one end thereof. A finger 23 extends radially of this tubular carrier outwardly through the slot 16. An ejector 25 which may be of a solid construction or a strip of sheet material is positioned to slide within the cylindrical carrier 21 and has its outer end 26 somewhat larger than the portion which extends into and through the tube 21, and it is also provided with a radial finger 27 to extend outwardly through the slot 16 of the tube 10. A projection 28 on the ejector extending through slot 29 in the carrier limits the movement of the ejector in the carrier in both directions.

A tube 30 telescopes over the tube 10 so that the two are in nesting relation, and this tube is provided with a helical slot 31 extending the length thereof. The end 32 of this helical tube abuts the flange 17, while a washer 33 at the opposite end of this helical tube is held snugly against the opposite end of the helical tube so as to maintain it in engagement with the flange 17 by spreading the end portion 34 of this longitudinally slotted tube, as shown in Figures 1 and 2, so that the helical tube cannot move endwise although there is free relative rotation of the two tubes. The radial fingers 23 and 27 of the lead carrier and ejector also extend into the helical slot of the tube 30. The assembly so far described is then inserted into a point 35 by forcing the closed end of the longitudinally slotted tube 10 into a bore 36 in this point and which

is larger than the bore through which the lead carrier and lead project. This bore is such as to form a good tight friction fit with this closed end of the longitudinally slotted tube and maintain the parts in this assembled relation.

The lead carrier and ejector when in normal position with the lead in the carrier somewhere along the length of the helically slotted tube has the radial fingers **23** and **27** located the distance apart of the pitch of the helical slot **31**. However, as the carrier and ejector advance by relative movement of the helically slotted tube and the longitudinally slotted tube, the finger **23** of the carrier passes out of the helical slot and into the end **37** of the longitudinal slot **16** which is beyond the flange **17** and thus is held so that further rotation of the helically slotted tube will not affect it. This is substantially the position shown in Figure 2 with finger **23** against the stop **20**, the stop **20** being positioned beyond the flange **17** a sufficient distance to receive this finger **23**. Further relative rotation of the two tubes in a direction to cause advance will cause the ejector to be fed through the new stopped lead carrier so as to force the lead out. This advance may occur until such time as this ejector has its finger **27** reach or abut the finger **23**, and this position is preferably provided while the finger **27** still remains in the helical slot; thus, the pointed edge of the end of the helical slotted member **30** will pick up this finger **27** upon an opposite relative rotative movement for retraction of the ejector. There is sufficient friction between the ejector and the lead carrier so that it will drag the lead carrier out of its position in engagement with the stop **20** so that it will also be picked up in the helical slot of the tube or the projection **28** engaging the end of slot **29** will serve this purpose and both parts will then be in the position shown in Figure 1 for manipulation of the lead.

I claim:

1. A movement unit for a mechanical pencil comprising two cylindrical tubes nesting one within the other, one tube having a helical slot and the other a longitudinal slot extending axially thereof, a lead carrier having a radial finger extending into both of said slots, an ejector within the carrier having a radial finger extending into both of said slots, a radial flange on said longitudinally slotted tube spaced from the end thereof against which said helically slotted tube abuts, said longitudinal slot extending beyond the flange and terminating to provide a stop located in the path of the said fingers of the lead carrier to be engaged thereby at a point beyond the end extremity of the helically slotted tube a distance sufficient to permit the said finger

of the lead carrier to pass completely beyond the end of the helically slotted tube.

2. A movement unit as in claim 1 wherein the longitudinally slotted tube is within the helical tube and said radial flange extends outwardly from the axis thereof.

3. A movement unit for a mechanical pencil comprising two cylindrical tubes nesting one within the other with the outer tube having a helical slot and the inner tube a longitudinal slot extending axially thereof, a lead carrier having a radial finger extending into both of said slots, an ejector within the carrier having a radial finger extending into both of said slots, said inner tube having a portion of the stock thereof doubled upon itself providing a radial flange spaced from the end thereof and against which said helically slotted tube abuts, said longitudinal slot extending beyond the said flange and terminating to provide a stop located in the path of said fingers at a point beyond the end extremity of the helically slotted tube a distance sufficient to permit the finger of the lead carrier to pass completely beyond the end of the helically slotted tube.

4. A movement unit for a mechanical pencil comprising two cylindrical tubes nesting one within the other with the outer tube having a helical slot and the inner tube a longitudinal slot extending axially thereof, a lead carrier having a radial finger extending into both of said slots, an ejector within the carrier having a radial finger extending into both of said slots, a radial flange on said longitudinally slotted tube spaced from the end thereof against which said helically slotted tube abuts, said longitudinal slot extending beyond the flange and terminating to provide a stop located in the path of said fingers at a point beyond the end extremity of the helically slotted tube a distance sufficient to permit the finger of the lead carrier to pass completely beyond the end of the helically slotted tube.

BURTON M. TAPNER.

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