Jan. 25, 1955 J. ZAHEL 2,700,371

REFILL PENCIL

Filed July 11, 1950

Fig. 1.

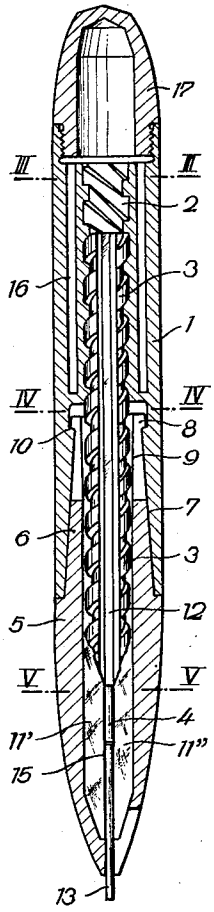


Fig. 3.

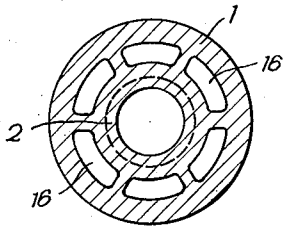
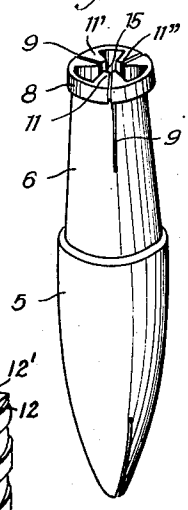


Fig. 2.



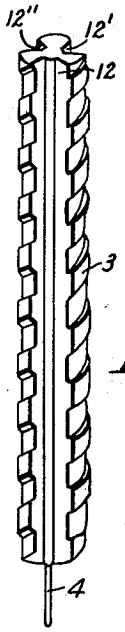


Fig. 6

Fig. 4.

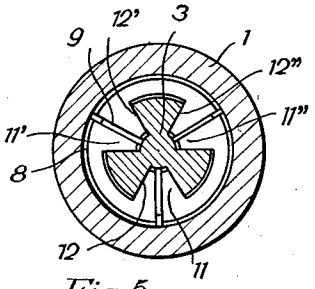
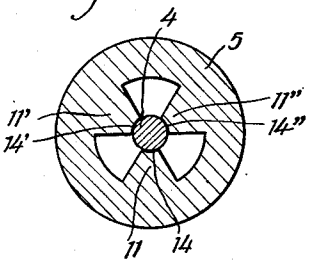


Fig. 5.



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2,700,371

Patented Jan. 25, 1955

2,700,371

REFILL PENCIL

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Application July 11, 1950, Serial No. 173,121

Claims priority, application Czechoslovakia July 17, 1949

1 Claim. (Cl. 120—18)

This invention relates to a refill pencil in which rotation of the shaft and of the point member in relation to one another produces rectilinear driving of the lead propelling mechanism inside the shaft. In known refill pencils of this kind the apparatus for extruding the lead consists of at least five to six components which normally comprise the propelling wire, a wing-like guide projection, a guide tube, a threaded tube, a tube with a female thread, and a tension ring, which components must be made of brass or iron, as a result of which the costs of production are relatively high. The apparatus for extruding the lead must in addition be housed in a pencil shaft and point member, which parts may be made of artificial material. The assembly of such refill pencils is very difficult, and they are unreliable in operation if they are sold at a low price or if there is less insistence upon the precision of their components. Moreover in refill pencils with lead which may be extruded by means of a propelling wire, a guide sleeve also must be fitted in the point member, as a result of which the length of the pencil shaft is increased excessively. The actual length of such known refill pencils then amounts to four times the length of lead which may be used.

The object of the present invention is to simplify the device for extruding the lead and also to shorten the total length of such pencils. This problem is solved by providing the point member internally with continuous guide ribs, projecting towards the axis of the pencil as far as the surface of the lead, which on the one hand are used to control the lead-propelling mechanism which is in the form of a screw spindle, and on the other hand form a guide channel with their opposite longitudinal surfaces and are used to guide the lead in the point member.

One mode of carrying the invention into effect is illustrated by way of example in the accompanying drawing.

Figure 1 is a longitudinal section through a refill pencil, provided with this lead extruding device, in the writing position.

Figure 2 is a perspective view of the point member.

Figures 3, 4 and 5 are cross sections at lines III—III, IV—IV and V—V of Figure 1 on a larger scale.

Figure 6 shows a detail view of the screw spindle.

The pencil shaft **1**, which is preferably made of artificial material, is provided internally with a thread **2** for a screw spindle **3**. The screw spindle **3** carries at its lower end the extruding pin **4** which may be made integral with the screw spindle **3**. Both may preferably consist of artificial material. The hollow point member **5** is inserted into the front end of the shaft **1** in such a way that the shaft **1** and the point member **5** can be rotated in relation to one another. For this purpose the point member **5** is provided with a conical guide member **6** which is placed in a corresponding bore **7** in the front end of the shaft **1**, the inner end of the guide member **6** terminating in a collar **8** provided with several radial slits **9**. The inner

end of the bore is provided with a ledge **10**. When the point member **5** is pushed in, the collar **8** is elastically compressed and then springs into place behind the said ledge, thus ensuring that the point member **5** will not be extruded from the shaft **1**.

The propelling movement of the screw spindle **3** during the rotation of the shaft **1** and the point member **5** in relation to one another is directly effected in the point member **5** by a suitable guidance of the screw spindle **3**. The hollow portion of the point member **5** is provided with preferably three guide ribs **11, 11', 11''** (Figure 5) which always engage in corresponding guide slots **12, 12', 12''** on the body of the screw spindle **3** (Figure 4) whereby these two parts are positively connected together. If now the shaft **1** is rotated relatively to the point member **5**, the ribs **11, 11', 11''** of the point member **5**, engaging in the grooves **12, 12', 12''** of the screw spindle **3**, prevent the screw spindle from turning also, so that by the operation of the screw thread **2** the screw spindle is displaced inside the point member, at the same time extruding the lead **13**.

The guide ribs **11, 11', 11''** inside the point member **5** project towards the axis of the pencil as far as the surface of the lead **13**, a continuous channel **15** (Figure 1), for guiding the lead being formed in the point member by the longitudinal surfaces **14, 14', 14''** of the ribs **11, 11', 11''**.

It will thus be seen that the point member **5** is used not only for rectilinear displacement of the screw spindle **3** but at the same time also, by means of the special arrangement of the ribs **11, 11', 11''** which project as far as the surface of the lead, for guiding the lead, as a result of which the number of the components of the propelling mechanism is reduced to a minimum and the refill pencil may consist only of the shaft **1** with the female thread, the screw spindle **3**, and the point member **5**, because the upper end of the shaft **1** may if necessary be closed directly by a base, without any closing cap. Also the total length of the refill pencil is thereby reduced to only about twice the normal length of the lead.

I claim:

A mechanical pencil comprising an upper hollow shaft, a lower hollow point member, means rotatably connecting the upper end of said point member to the lower end of said hollow shaft, said hollow shaft having an internal thread, an externally threaded spindle projecting within the interior of said hollow shaft and in threaded engagement therewith, said spindle having at its lower end a downwardly-projecting center pin, said point member having extending inwardly from the interior wall surface thereof a plurality of longitudinal guide ribs, said spindle having external longitudinal grooves receiving said guide ribs so as to prevent relative rotation of said spindle with respect to said point member whereby when said hollow shaft is rotated with respect to the point member the hollow shaft is also rotated with respect to the spindle, thereby causing the latter to be displaced longitudinally, said longitudinal guide ribs having inwardly facing surfaces forming a longitudinal opening therebetween, and a lead within said opening and contacting said surfaces so as to be guided thereby.

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