

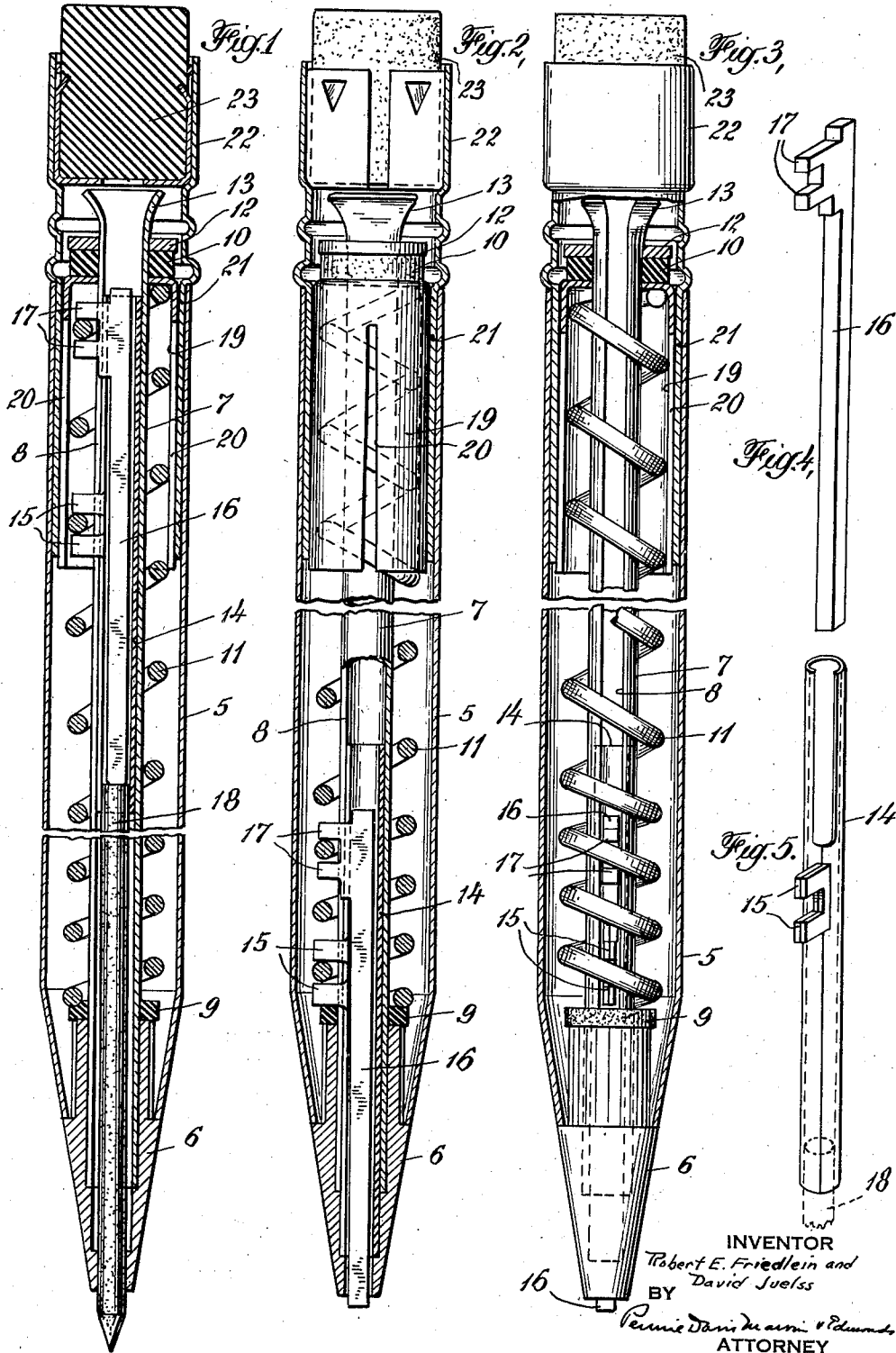
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MECHANICAL PENCIL

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MECHANICAL PENCIL

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4 Claims. (Cl. 120-13)

This invention relates to mechanical pencils and particularly to improvements therein and in the feeding mechanism thereof.

An object of the invention is the provision of a pencil of simple and inexpensive construction which is adapted to receive a long lead and to propel or withdraw the lead as may be desired.

Another object of the invention is the provision of means to expel the end of the lead when it is substantially used up in order that a new lead may be inserted.

A further object of the invention is the provision of a simple and effective clutch mechanism which permits the operation of the propelling means but prevents breakage of the delicate mechanism by continued turning thereof after the parts have reached one or the other end of their path of travel.

Other objects and advantages of the invention will be apparent as it is better understood by reference to the following specification and the accompanying drawing, in which

Fig. 1 is a longitudinal section through a pencil embodying the invention illustrating the parts in normal operating position;

Fig. 2 is a similar view illustrating the position of the parts when the end of the lead has been expelled;

Fig. 3 is a section through the structure as shown in Fig. 2 with the propelling mechanism in elevation; and

Figs. 4 and 5 are details in perspective of parts of the propelling mechanism.

Referring to the drawing, the pencil may comprise any suitable form of casing 5 which may be made of metal or any other suitable material. A terminal conical section 6 of the casing is rigidly secured thereto to form the point of the pencil and is made also of metal or other suitable material.

Within the casing 5 a tubular member 7 having a longitudinal slot 8 is rigidly supported on the terminal conical section and is supported thereby. Loosely mounted on the tubular member 7 between washers 9 and 10 is a helical propelling member 11 which is secured in position under compression by a washer 12 above the washer 10 and adapted to be engaged by an expanded section 13 of the tubular member 7. Thus, the several parts are held in assembled relation, the compression of the helical member 11 being adapted to afford rigidity and to prevent looseness or wobbling of the lead as the latter is used.

The lead-advancing mechanism comprises a tu-

bular slotted member 14 disposed within the tubular member 7 and having ears 15 which are adapted to embrace the helical member 11 so that as the latter is rotated the tubular casing 14 is advanced or withdrawn. Within the tubular member 14 a plunger 16 is supported with ears 17 likewise adapted to embrace the helical member 11. The lead 18 is inserted through an opening in the end of the pencil and into the end of the tubular member 14 bearing against the end of the plunger 16. Consequently the rotation of the helical member 11 engaging both the tubular member 14 and the plunger 16 causes the lead to advance when the helical member is rotated in one direction and, since the end of the lead is gripped by the tubular member 14, to withdraw the lead when the helical member 11 is turned in the reverse direction.

Preferably the helical member is formed so that the upper portion thereof has a relatively large or coarse pitch, whereas the lower section has a relatively narrow or finer pitch as is clearly indicated in the drawing. As the tubular member 14 and plunger 16 advance during the normal operation, they remain in the same relative positions, being both engaged with the helical member at the section having the coarser pitch. However, as the downward movement of the lead 18 results finally in using all but a relatively short portion thereof, the movement of the tubular member 14 is retarded by engagement with the section of the helical member of shorter pitch and the plunger 16 is advanced relatively to the tubular member 14 to the position indicated in Fig. 2 of the drawing, at which point the end of the lead is expelled. By reversing the movement of the parts, the tubular member 14 and the plunger 16 may be withdrawn and a new lead may be inserted.

To effect the movement of the helical member 11, a collet or spring clutch member 19 is supported beneath the fibre washer 10 surrounding a portion of the helical member 11. The collet is slotted at 20 on opposite sides to afford a degree of resilience, and the opposite parts when forced inwardly are adapted to grip the helical member 11. A tubular member 21, which may carry a head 22 supporting an eraser 23, if desired, is adapted to be inserted between the casing 5 and the collet 19, the parts being so proportioned that the collet is thus forced into engagement with the helical member 11. Rotation of the tubular member 21 in either direction thus imparts the desired movement to the helical member 11 to

advance or retract the lead through the mechanism hereinbefore described. Should the parts of the mechanism be at either end of the path of travel, continued rotation of the tubular member 21 will result merely in slippage through the frictional connection, and the pencil will not be damaged. The clutch mechanism is nevertheless sufficiently positive in operation to ensure the satisfactory operation of the pencil, that is to say, the lead may be advanced or retracted readily and at will.

The structure as described is simple, inexpensive and effective, but various changes may be made therein without departing from the invention or sacrificing any of the advantages of the structure.

We claim:

1. A pencil comprising a casing, a helix within the casing, guide means fixed relative to the casing, lead carrying means guided by the guide means and engaging the helix and actuated by the rotation thereof to advance or retract, and clutch means for moving the helix including a resilient slotted collet surrounding a portion of the helix and cylindrical means rotatable in and extending from the casing adapted to engage and compress the collet.

2. A pencil comprising a casing, a wire helix within the casing, means for holding the helix under compression, guide means fixed relative to the casing, lead carrying means guided by the

guide means and engaging the helix and actuated by the rotation thereof to advance or retract, and clutch means for moving the helix including a resilient slotted collet surrounding a portion of the helix and cylindrical means rotatable in and extending from the casing adapted to engage and compress the collet.

3. A pencil comprising a casing, a helix within the casing having sections of different pitches, guide means fixed relative to the casing, lead carrying means guided by the guide means and engaging the helix and actuated by the rotation thereof to advance or retract, comprising a tubular member and a separately actuated plunger therein, and clutch means for moving the helix including a resilient slotted collet surrounding a portion of the helix and cylindrical means rotatable in and extending from the casing adapted to engage and compress the collet.

4. A pencil including a plurality of relatively rotatable means, one of said means comprising a helix, the other of said means comprising a guide, lead-carrying means guided by the guide for movement upon relative rotation of the rotatable means, and clutch means for engaging one of said rotatable means to rotate the same relative to the other rotatable means, said clutch means including a slotted collet, and means for compressing the collet.

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