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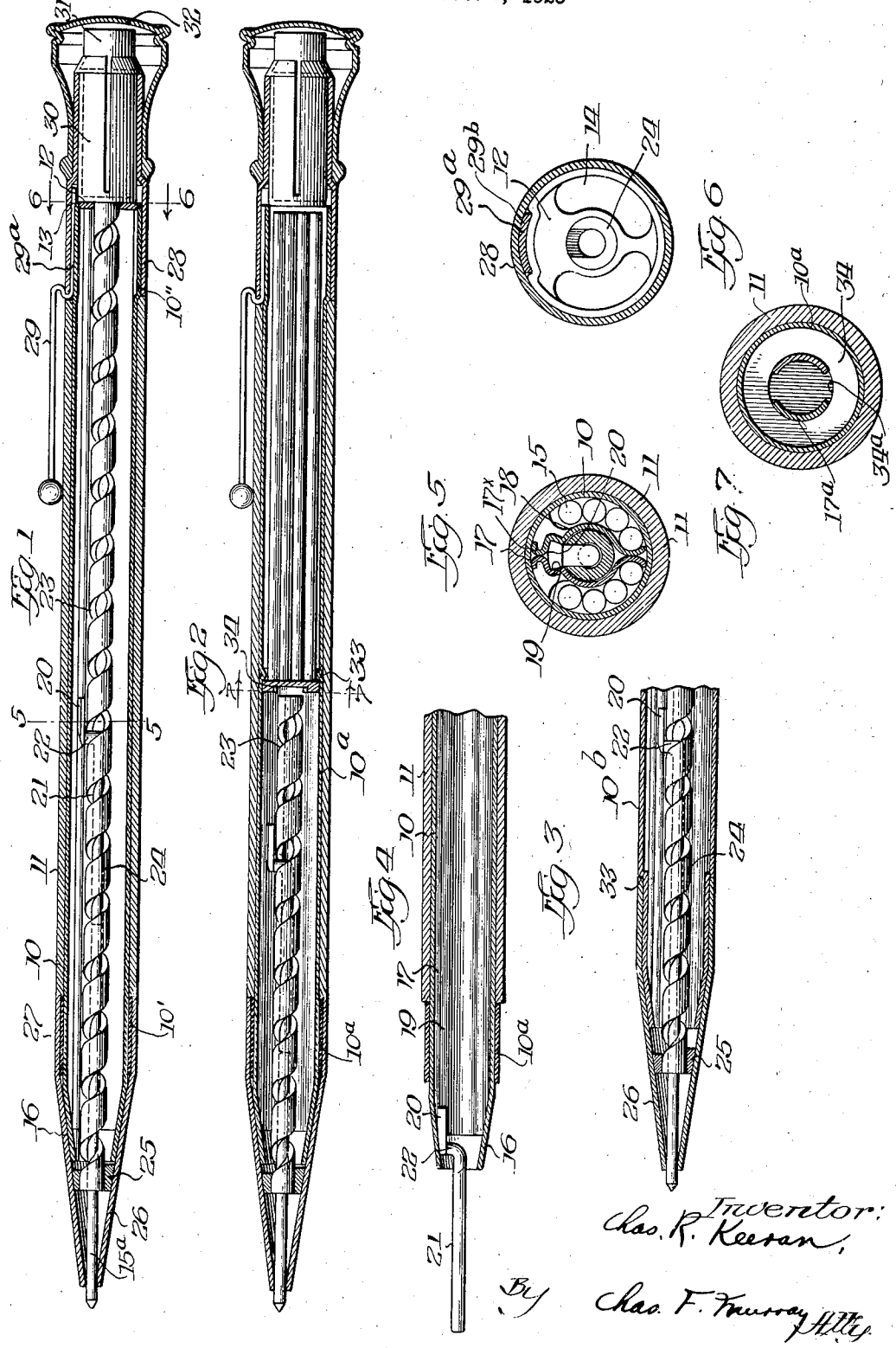

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UNITED STATES PATENT OFFICE.

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MECHANICAL PENCIL.

Application filed October 3, 1925. Serial No. 60,230.

My invention relates to mechanical pencils, and particularly to an improvement in the construction shown in my copending application S. N. 49,569, filed Aug. 11, 1925 of which this application is a continuation in part.

One of the objects of my invention is to simplify the construction of pencils of the class described, and to improve the internal arrangement of parts so as to facilitate assembling and thereby to reduce manufacturing costs.

The invention will be more readily understood by reference to the accompanying drawing, in which;

Fig. 1 is a longitudinal sectional view through a pencil constructed in accordance with my invention;

Fig. 2. is a similar view through a slightly modified form of the invention;

Fig. 3 is a fragmentary view through a still further modification;

Fig. 4 is a fragmentary view showing the arrangement of parts with the tip and attached spiral tube removed and with the lead advancing plunger in its extreme outward position;

Fig. 5 is a sectional view on the line 5—5 of Fig. 1;

Fig. 6 is a sectional view on the line 6—6 of Fig. 1.

Fig. 7 is a sectional view on the line 7—7 of Fig. 2.

In the drawings, and referring particularly to Fig. 1, it will be seen that the device comprises a long inner tube, 10, that constitutes the body, corresponding to the barrel of an ordinary all-metal pencil. Surrounding the tube, 10, is a decorative barrel, 11, that may be composed of celluloid or similar material.

The upper end of the inner tube is partly closed by an aperture disc, 12, held in position by spinning over the end, 13, of the tube. The arcuate apertures, 14 in the disc, provide for the insertion and removal of reserved leads, indicated at 15, in Fig. 5.

The forward end of the tube, 10, is tapered inwardly as at 16, for a purpose hereafter described. Mounted within the tube and firmly held by frictional engagement are two plates, 17, 17× of similar form in reverse arrangement and mounted in face to face relation within and longitudinally of the inner tube, 10. The assembly of the division plates provides an internal tube, 18, and a parallel guideway, 19, the sides of which are undercut and which is in communication with the space within the tube 18. This construction of the division wall, provides for very simple manufacturing processes and the assembly of the several parts is easily accomplished. By making the width of the plates, 17, 17× slightly greater than the cross sectional diameter of the tube, 10, the parts may be sprung sufficiently to force them into their proper position and they will be held therein by the resiliency of the metal.

The undercut guideway, 19, provides for the reception and holding of the head, 20, of the lead advancing plunger, 21, the head being connected to the plunger through a lateral arm, 22. The arm, 22, engages with the spiral slot, 23, in a tube, 24, fixed by means of solder, 25, to the tip, 26. It will be noted that the head has converging side walls, the contour of the head in cross-section conforming to the cross section of the guideway, 19. Thus the head is firmly held against lateral movement while permitted from longitudinal movement.

The lower end of the tube, 10, is provided with a sleeve or bushing, 10′, of hard rubber or similar material, provided for several purposes. First; to act as a stop for holding the barrel, 11, in place against downward movement; second, to provide for additional material to fill the space that would otherwise result in a jog at the junction of the barrel and the tip, and third; to provide for a better surface for the rotative engagement of the tip with the pencil body. The cylindrical portion, 27, of the tip fits over the bushing, 10′, with capacity for rotation and for removal when a renewal lead is to be inserted.

The plates of the division wall, 17, 17× are tapered off at their lower ends on both sides, to fit within the tapered portion, 16, of the inner tube, thus extending the guidway, 19, into the tapered portion of the tube. This is for the purpose of permitting the plunger head to travel forwardly into the contracted portion of the tube, as shown in Fig. 4, where it is held firmly against displacement laterally and prevented from escape at the lower end of the pencil. Thus upon removal of the tip and attached spiral, the plunger will travel to the limit of its downward

movement and upon rotation of the tip the spiral may be disengaged from the plunger. Thus there are but two parts for the user to account for when supplying a renewal lead. The plunger will remain in its centered position with a portion extending from the lower end of the tube as shown in Fig. 4.

The upper end portion of the inner tube, 10, is expanded slightly at 10″, and a groove, 29ᵇ, is formed therein to receive the head, 29ᵃ, of a clip, 29. A ferrule or sleeve, 28, is mounted over the expanded portion and the head of the clip and is relatively permanently secured in position. A split eraser holder, 30, is mounted within the sleeve and acts as a closure for the reserve lead chambers. The eraser holder is constructed to receive a relatively long eraser, 31 and to support the same in different positions of outward adjustment. A decorative cap, 32, may surmount the ferrule and cover the cap. It will be noted that the expanded portion of the inner tube and the sleeve mounted thereon constitute a stop or abutment for the upper end of the barrel, 11.

In the construction of Fig. 2, the described parts are identical except that the operative length of the spiral tube is lessened. A bead, 33, is rolled in the inner tube, 10ᵃ, and this serves as a stop for a disc, 34, which constitutes the bottom of the reserve lead chamber. The sectional wall construction heretofore described may be employed if desired, in which case the ends of the plates are shaped to provide extensions, 17ᵃ, which fit within a recess, 34ᵃ, in the disc and serve to center the plates. The chamber at the upper end of the body provides for a large stock of short reserve leads although the total length of reserve leads is no greater than that provided for in the construction already described.

In the construction shown in Fig. 3, there is no change except that the inner tube, 10ᵇ, is not provided with a decorative barrel, the lower end of the tube being reduced to provide a shoulder or stop for the tip. The pencil need be varied in no other particular so far as the operative parts are concerned.

The operation will be apparent. In each of the described forms, relative rotation of the tip and body will effect an advance of the lead, 15ᵃ. When the lead is exhausted, a longitudinal pull on the tip will separate the same from the body, the plunger being retained in the guideway. Complete separation is effected by giving the tip several turns to disengage the spiral from the plunger. A renewal lead is then inserted in the rear end of the spiral tube and the parts reassembled.

The points of superiority over similarly constructed pencils are, simplicity and economy in cost of manufacture, ease of operation or manipulation and a strong and rugged construction, insuring long and satisfactory operation.

Modifications may be made in the construction without departure from the spirit of my invention.

I claim:

1. A pencil comprising in combination a tube extending from end to end, the side walls of which tube are imperforate, means providing an internal coaxial tube and an undercut guideway in communication with said coaxial tube, a plunger having a head adapted for movement and confined in said guideway, a tip and an attached spiral, said spiral being adapted to enter said coaxial tube and to actuate said plunger.

2. A pencil, comprising in combination a tube, extending from end to end, the side walls of which tube are imperforate, means providing an internal coaxial tube and an undercut guideway, in communication with said coaxial tube, a plunger having a head adapted for movement and confined in said guideway, a tip and an attached spiral, said spiral being adapted to enter said coaxial tube and to actuate said plunger, and means preventing the withdrawal of said plunger head from the lower end of said guideway.

3. In a pencil, the combination of a tube comprising a barrel, a tip and an attached spiral, means in said tube providing a guideway, the sides of which are undercut, a plunger having a head adapted to be retained in said guideway against movement in a lateral direction, and means associated with said guideway preventing the escape of the plunger from the lower end of the pencil.

4. In a pencil, the combination of a tubular body, a tip and an attached spiral removably mounted on the lower end of said body, a division wall in said body providing an internal coaxial tube and a parallel guideway and a plunger having a head cooperating with said guideway.

5. A pencil, comprising in combination a tubular body, a removable tip and a spiral attached to said tip, a pair of division plates, frictionally held within the said body and jointly providing a coaxial tube and a communicating guideway, and a plunger having a head slidably mounted in said guideway.

6. A pencil, comprising in combination a tubular body, a removable tip and a spiral attached to said tip, a pair of division plates, frictionally held within the said body and jointly providing a coaxial tube and a communicating undercut guideway, and a plunger having a head slidably mounted in said guideway.

7. A pencil, comprising in combination a tubular body, a removable tip and a spiral attached to said tip, a pair of division plates, frictionally held within the said body and jointly providing a coaxial tube and a communicating undercut guideway, a plunger

having a head slidably mounted in said guideway, and means preventing the withdrawal of the plunger from the lower end of the pencil.

8. In a pencil, the combination of a tubular body having a contracted lower end, a tip removably mounted on the lower end of the body and having a spiral attached thereto, means providing a coaxial tube in said body and an undercut guideway in communication with said coaxial tube, a plunger having a head slidable in said guideway, and prevented from lateral movement by reason of the undercut walls of said guideway, the tapered lower end of said body serving to prevent the withdrawal of the plunger from the lower end of the pencil.

9. In a pencil, the combination of a metallic body portion, a tip removably mounted on the lower end thereof lead advancing means adapted to be actuated by the rotation of said tip and a decorative shell surrounding said body, the lower extremity of said shell constituting a shoulder or abutment for the upper end of the tip.

10. In a pencil, the combination of a tubular body, a tip removably and rotatably mounted on the lower end of the body, a spiral attached to the tip, a divisional wall providing an internal tube and a guideway in communication therewith, a plunger having a head slidable in said guideway, the space surrounding said wall constituting a pair of reserve lead chambers.

11. In a pencil the combination of a body having an axial opening, a tube therein having a longitudinal guide slot, the sides of the slot converging inwardly so that the inner portion of the slot which is nearer the axis of the tube is narrower than the outer portion, a tip with a tube fixed therein, said tube having a spiral slot, a plunger having a lateral projection adapted to extend through the slot in the tube, and a head fixed to said projection, said head having a part of greater width than the width of the narrower portion of the longitudinal guide slot in said first mentioned tube and adapted to slide in said slot.

12. In a pencil the combination of a body having an axial opening, a tube therein having a longitudinal guide slot, the sides of the slot converging inwardly so that the inner portion of the slot which is nearer the axis of the tube is narrower than the outer portion, a tip with a tube fixed therein, said tube having a spiral slot, a plunger having a lateral projection adapted to extend through the slot in the tube, a head fixed to said projection, said head having a part of greater width than the width of the narrower portion of the longitudinal guide slot in said first mentioned tube and adapted to slide in said slot, and means preventing the withdrawal of the plunger from the forward end of said first mentioned tube.

13. In a pencil the combination of a body having an axial opening, a tube therein having a longitudinal guide slot, a tip removably fitted in the forward end of the body, a helically coiled member fixed at one end to the tip and acting as a lead tube, the coils of the helix being spaced to form a slot which is open at the other end of said member, a plunger in said lead tube, said plunger having a lateral portion extending through the space between adjacent turns of the helix, and a head fixed to the projection and operating in the guide slot of the first mentioned tube, the forward end of said guide slot being formed to act as a stop for said plunger head, the relative dimensions of the head and the guide slot being such that the head cannot pass laterally through the slot.

14. In a pencil the combination of a barrel having a central opening, a tube frictionally held in the opening, said tube having a longitudinal guide slot provided with inwardly inclined sides, a tip and attached lead tube having a helical slot, a plunger in said lead tube and a plunger head constructed to engage and slide in said guide slot, the sides of the head being inclined corresponding to the incline of the sides of the guide slot, whereby the plunger is permitted to slide longitudinally but is confined against removal except with said guide slot tube.

15. In a pencil the combination of a body having an axial bore with a longitudinal guide slot, a tip at the writing end of the pencil rotatably engaged with the body and having a spirally slotted tube removably telescoped within the bore of the body, a plunger in said bore having a lateral projection engaging the guide slot, the upper end of the spiral slot being open for engaging and disengaging said projection.

16. In the combination defined in claim 15, the lower end of the guide slot being formed to arrest the projection and prevent withdrawal of the plunger from the lower end of the bore.

In testimony whereof I have affixed my signature.

CHARLES R. KEERAN.