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W. H. LINDEMON
MECHANICAL PENCIL

1,905,920

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Fig. 1.

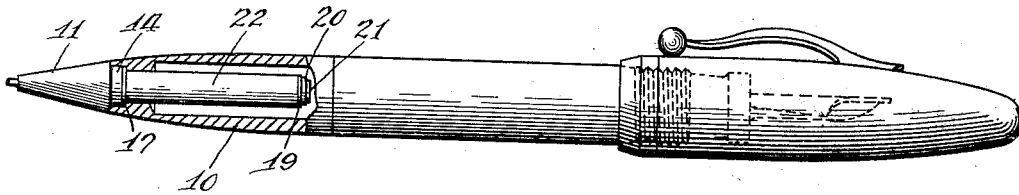


Fig. 2.

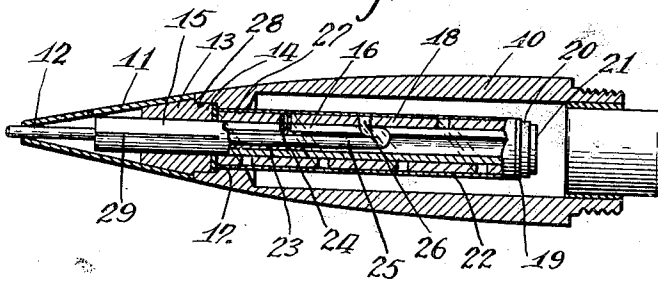
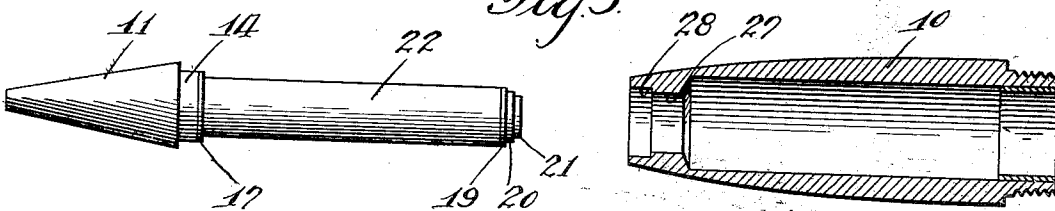


Fig. 3.



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UNITED STATES PATENT OFFICE

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MECHANICAL PENCIL

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This invention relates to a pencil mechanism and has special reference to a means for assembling the tip relatively to the pencil barrel and operating mechanism.

5 More particularly, this invention has reference to a mechanical pencil comprising essentially a tip having an extending trunnion for engagement with a centering aperture in the end of a barrel, the tip having an axial aperture in the main body portion thereof for receiving a split tubular extension of the operating mechanism in forced engagement therewith.

15 With the advent of the mechanical pencil having a barrel of a plastic material, a metallic tip has been provided having an axial aperture through which the lead is guided. In order that the aperture of the tip be axially aligned with the lead propelling mechanism, the tip has been preferably secured directly thereto and, in so far as applicant is aware, the edge of the tip ordinarily merely abuts the end of the plastic material of the barrel. Due to the shrinkage and wear of the material of the barrel, the tip subsequently often becomes displaced with respect to the axial opening in the barrel and develops side-play or breaks the continuity of the abutting surfaces of the tip and barrel when viewed in longitudinal cross-section.

The present invention contemplates the provision of a tip having a circular extension thereon for snugly engaging an aperture in the end of the pencil barrel. In such a construction, the shrinkage of the plastic material of the barrel compensates for wear whereby side-play and other results caused by displacement of the tip are obviated. This invention also contemplates the provision of a securing means between the tip and operating mechanism of the pencil that will be economical and highly efficient, the means preferably comprising the provision of a split guide tube on which is forced the bushing of the tip. The guide tube of the operating mechanism is split as by means of running a saw groove through the end thereof.

50 One of the objects of this invention is to

provide a mechanical pencil of the type hereinbefore described in which the tip is prevented from side-play with reference to the pencil of the barrel and the continuity of the outer surfaces of the tip and barrel are sustained.

Another object of this invention is to provide a mechanical pencil of the character noted above in which the tip thereof is secured with reference to the operating mechanism in a manner to be highly efficient and durable and to be economical in manufacture and assembly.

Other objects and advantages will hereinafter be more fully pointed out and for a more complete understanding of the characteristic features of this invention reference may now be had to the following description when taken together with the accompanying drawing, in which latter:

Figure 1 is an elevational view of a combination fountain pen and mechanical pencil showing the barrel of the latter member broken away to expose the operating mechanism thereof;

Fig. 2 is a central longitudinal sectional view of the mechanical pencil of this invention; and

Fig. 3 is an exploded view of two of the elements forming the mechanical pencil in Fig. 2.

Referring now more particularly to the drawing, the mechanical pencil of this invention is shown as a detachable element of a combination fountain pen and mechanical pencil, although, it is to be understood, of course, that the invention contemplated herein may be employed in connection with a pencil of an elongated form such as are commonplace on the market today.

The pencil portion comprises a casing or barrel 10 which is formed preferably of a plastic material or any other suitable material. An operating shell 11 preferably of a conical shape is disposed adjacent one end of the casing 10 and in axial alignment therewith, the shell having an axial opening 12 at the apex thereof for permitting the passage of a pencil lead therethrough. In the enlarged end opening of the conical

shell or, in other words, at the base thereof, an apertured bushing 13 is soldered or otherwise secured, the bushing being of a frusto-conical shape essentially having a trunnion 14 extending from the base portion thereof outside of the end of the conical shell 11. The frusto-conical bushing is provided with a taper on the side walls thereof of substantially the same angle as that of the tapered walls of the shell and, in this instance, the walls are shown as having the surfaces thereof fixed by means of solder. This is, of course, but one form of tip illustrative of an operative structure.

15 An operating mechanism is provided for the mechanical pencil and consists of a guide tube 15 for forced engagement with the aperture in the conical shaped bushing 13 of the tip 11, the guide tube having a longitudinally extending slot 16 extending from one end thereof to a point near the bushing 14. A washer 17 preferably of Monel metal is slipped over the free end of the guide tube 15 to engage the face of the trunnion 14.

25 A spirally slotted propelling tube or sleeve 18 is slipped over the end of the guide tube 15, one end thereof abutting the Monel washer 17. A washer 19 is disposed adjacent the end of the spirally slotted sleeve 18 and has a metal washer 20 preferably of brass adjacent thereto.

The end of the guide tube 15 is preferably crimped over as at 21 against the brass washer 20 to hold the spirally slotted sleeve 18 in an assembled relation on the guide tube 15 although rotatable thereon. A sleeve 22 is disposed over the spirally slotted sleeve and is held thereon preferably in a fixed relation therewith by crimping and by means of the washers hereinbefore described.

40 A tubular lead socket or clutch 23 is carried within the guide tube 15 and is adapted to have free reciprocal movement therein, the clutch being provided with a finger 24 adjacent one end, which finger is adapted to extend through the longitudinal opening of the guide tube 15 and the spiral slot of the propelling tube 18. A follower 25 is disposed within the tubular clutch 23 and is adapted to have free reciprocal movement relatively thereto, the follower being preferably formed of a piece of relatively stiff wire which is bent upon itself and then at right angles to the axis of the wire at one of its ends thus forming an enlarged elongated portion adapted to engage the longitudinal slot of the guide tube 15, the piece formed at right angles to the axis of the wire forming a finger 26 for slidably engaging the spiral slot of the propelling tube 18.

65 From the above description, it will be apparent that the guide tube 15 is fixed relatively to the bushing 13 and the conical shell 11 and that the spiral tube 18 is rotat-

able relatively to the guide tube 15. In order, therefore, to obtain relative movement between the tip 11 and the barrel 10, one inside end of the substantially tubular barrel is provided with a reduced opening 27 for forcibly engaging the periphery of the sleeve 22, the latter being held in a fixed relation with the spiral propelling tube 18. An aperture 28 at the extreme end of the tubular barrel communicates with the inner aperture 27 and provides a snug fit on the trunnion 14 of the bushing 13 although there is relative rotatable movement therebetween.

The provision of a trunnion on the bushing 13 of the shell 11 for snug, although rotatable, engagement with the end aperture 28 in the tubular barrel provides that the tip be actually aligned with respect to the barrel and provides a continuity of the abutting surfaces of the tip and barrel. If there is shrinkage of the material of the barrel, the tip will not become displaced with reference thereto and, in any event, such shrinkage will merely take the place of the wear of the material of the barrel in its engagement with the trunnion of the bushing. There will be no side-play of the tip relatively to the barrel and, further, due to the tip being mounted directly on the operating mechanism, the lead clutch and guide tube will be aligned with respect to the aperture of the tip at all times.

Further, we have pointed out that the end of the guide tube 15 has a forced engagement with the bushing 13, this engagement being provided by splitting as with a thin saw at 29 through that end portion of the tube which passes through the bushing. This securing means eliminates any special measurement necessary in locating the mechanism with respect to the barrel and the tip since they are merely forced into position and not fastened or aligned with any auxiliary means. This manner of assembly is accurate and economical.

110 While but a single embodiment of this invention is herein shown and described, it is to be understood that various modifications thereof may be apparent to those skilled in the art without departing from the spirit and scope of this invention and, therefore, the same is only to be limited by the scope of the prior art and the appended claims.

I claim:

1. A mechanical pencil comprising a substantially tubular barrel, a metallic tip comprising a shell having an apertured bushing secured therein for one end of said barrel through which the pencil lead is propelled, and a lead operating mechanism, one element of which is secured in said barrel and another element of which has a split tubular extension for forced engagement in the aperture of said bushing.

2. A mechanical pencil comprising a sub-

stantially tubular barrel, a metallic tip comprising a shell having an apertured bushing secured therein for one end of said barrel through which the pencil lead is propelled, and an operating mechanism for longitudinally reciprocating said pencil lead, said mechanism including a guide tube having a longitudinally extending slot, a spiral sleeve rotatably supported on said guide tube and secured in said barrel, and lead engaging means operated by the slots of said guide tube and said spiral sleeve, said guide tube having a split end portion for forced engagement in the aperture of said bushing.

3. A mechanical pencil comprising a substantially tubular barrel having communicating apertures of different diameters at one end thereof, a metallic tip for one end of said barrel through which the pencil lead is propelled, and an operating mechanism comprising relatively rotatable members for longitudinally reciprocating said pencil lead, one of said rotatable members having a forced engagement with one of said apertures, said tip rotating with the other of said rotatable members and having a reduced extension for snugly and rotatably engaging the other of said apertures.

4. A mechanical pencil comprising a substantially tubular barrel having communicating apertures of different diameters at one end thereof, a metallic tip for one end of said barrel through which the pencil lead is propelled, and an operating mechanism comprising relatively rotatable members for longitudinally reciprocating said pencil lead, one of said rotatable members having a forced engagement with one of said apertures, said tip being fixed to said other rotatable member and having an outer surface coextensive with the outer surface of said barrel and having a reduced extension for snugly and rotatably engaging said other aperture.

5. A mechanical pencil comprising a substantially tubular barrel having communicating apertures of different diameters at one end thereof, a metallic tip for one end of said barrel through which the pencil lead is propelled, and an operating mechanism comprising relatively rotatable members for longitudinally reciprocating said pencil lead, one of said rotatable members having a forced engagement with one of said apertures, said tip comprising an outer conical shell and an apertured bushing fixed therein, said bushing receiving said other rotatable member of said operating mechanism in forced engagement therewith and having a reduced extension for snugly and rotatably engaging said other aperture.

In witness whereof, I have hereunto subscribed my name.

WILLIAM H. LINDEMON,