

Sept. 18, 1928.

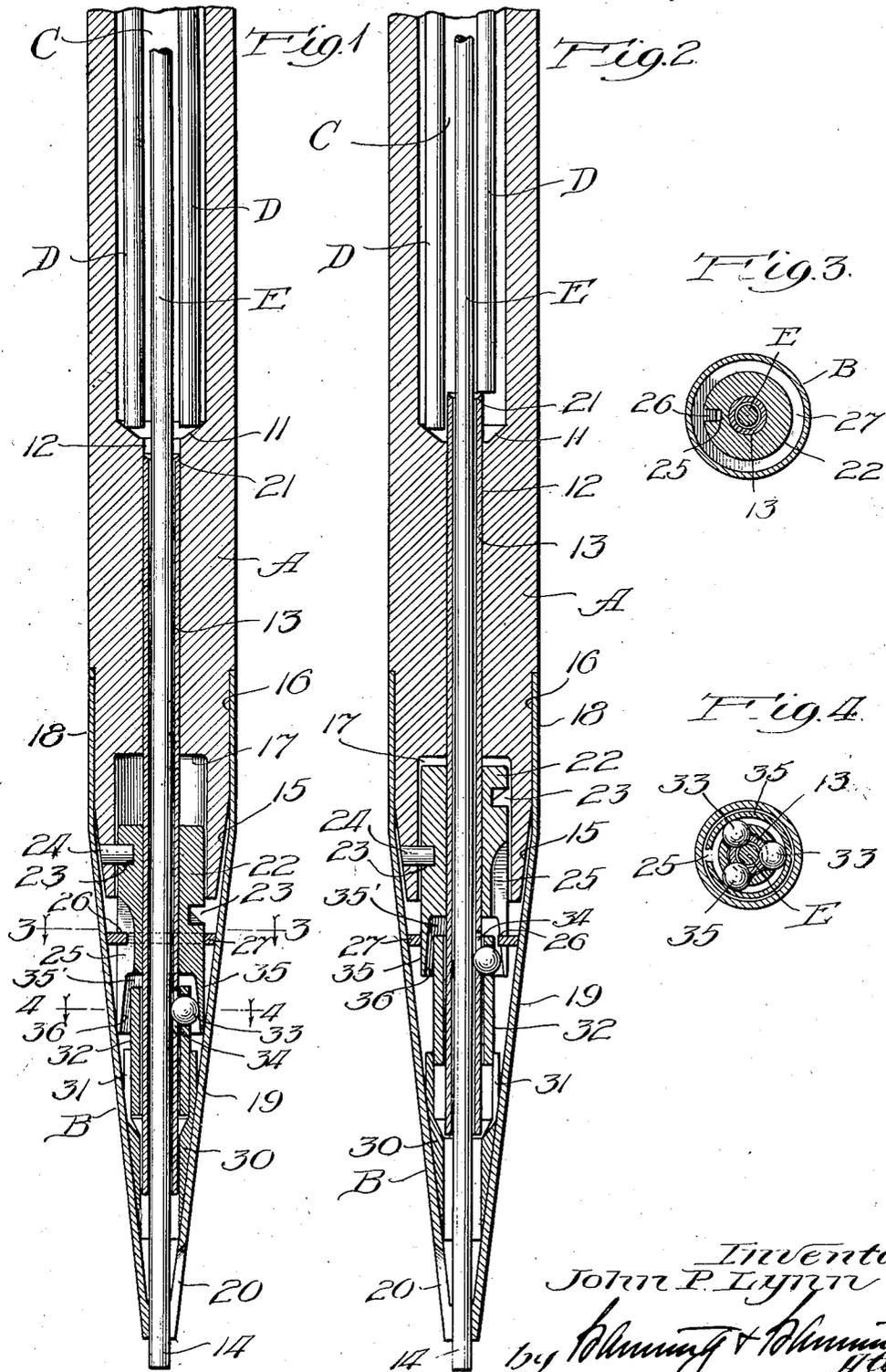
1,684,635

J. P. LYNN

PENCIL

Filed Jan. 14, 1924

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

Fig. 5.

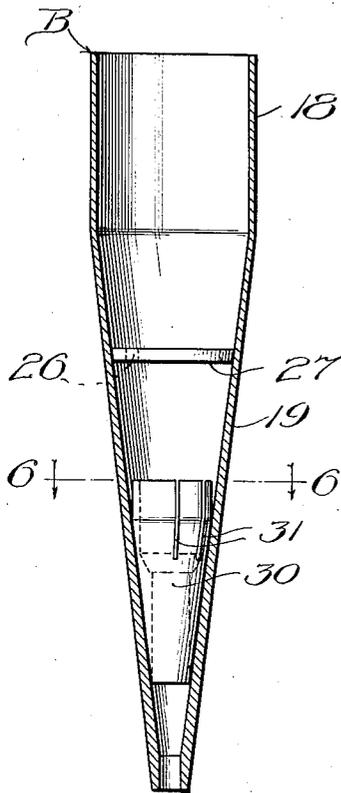


Fig. 9.

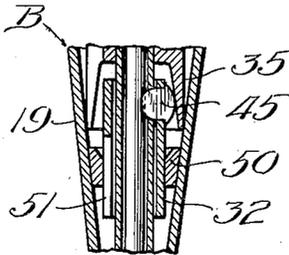


Fig. 8.

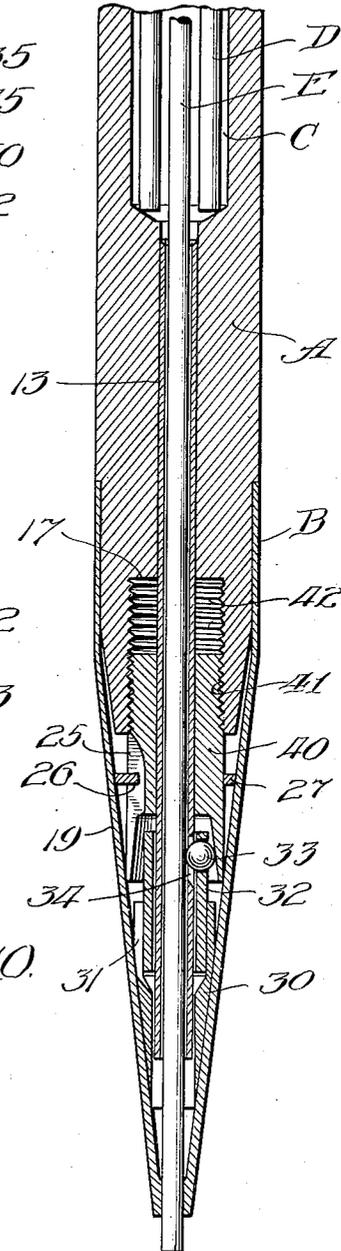


Fig. 7.

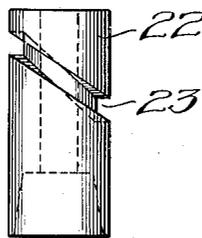


Fig. 6.

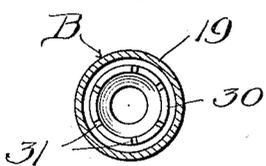
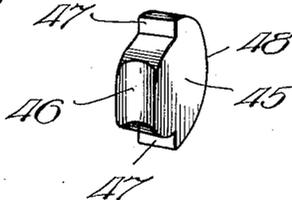


Fig. 10.



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UNITED STATES PATENT OFFICE.

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PENCIL.

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This invention relates to a pencil having a chambered body through which a lead is adapted to be advanced into position for writing, and more particularly to certain means for mechanically advancing the lead, as desired.

In a pencil of this general character, the present improvements have been incorporated, with the result that I have attained simplicity in construction and operation; a grip upon the lead such as to prevent its retraction under pressure developed during writing; and a feed of reserve leads, successively, contained within a magazine, into a guiding tube which extends through to the tip end of the pencil. My invention is concerned with objects such as these, as well as with others, as will more fully hereinafter appear.

In the accompanying drawing is shown an exemplification of my invention in the manner following:

Figure 1 is a longitudinal section through the lower or writing end of the pencil body whereon is secured a rotatable tip through which the lead is advanced into writing position;

Fig. 2 is a similar view showing the reciprocable propelling parts as they appear when fully retracted;

Figs. 3 and 4 are transverse sections taken respectively on lines 3—3 and 4—4 of Fig. 1;

Fig. 5 is a longitudinal section through the hollow tip detached from the pencil body, the freely detachable operating parts being removed therefrom to better exhibit the construction of those remaining;

Fig. 6 is a transverse section taken on line 6—6 of Fig. 5;

Fig. 7 is a detail in side elevation of the reciprocable member which is a component of the propelling mechanism illustrated in the preceding figures;

Fig. 8 which is a view similar to Fig. 1, shows a modified reciprocable member which may be substituted for that illustrated elsewhere;

Fig. 9 is a fragmentary view in longitudinal section showing a modified construction of lead engaging device forming part of the propelling mechanism; and

Fig. 10 is a detail in perspective of the cam which engages the lead, as elsewhere illustrated in Fig. 9.

For the purposes of this invention it is de-

sirable to use a pencil body A of suitable size and construction, in combination with a relatively rotatable tip B having a connection, permanent or otherwise, with the lower end of the body. As shown, the body is provided with a chamber C extending preferably from its upper end (not shown) downwardly for a desired distance. The lower end of this chamber is defined by an inclined or funnel-shaped bottom 11 communicating with an axial bore 12. The chamber thus formed constitutes a magazine for reserve leads D whose lower ends are rested upon the inclined bottom, as shown in Figs. 1 and 2. Centrally of the magazine is an active lead E which extends through a guide tube 13 that is slidably mounted in the bore 12, the lower or writing end 14 of the lead being exposed exteriorly of the pointed end of the pencil tip. As the lead becomes shortened with use, it may be moved in a downward direction by the propelling means presently to be described, with the result that one of the reserve leads D should then take up a central position to succeed the active lead in its travel through the tip.

As shown, the lower end of the body is tapered as at 15 and upwardly of this tapered region is reduced or chambered for a short distance, as at 16. Also for accommodation of certain of the propelling parts, the lower body end is hollowed in the form of a chamber 17. With a pencil body thus formed, or otherwise suitably constructed, I associate the tip B having cylindrical walls 18 in its upper region of a size to be conveniently fitted upon the reduced portion 16. Below the cylindrical portion of its walls the tip is tapered as at 19 clear to its lower extremity where one or more slits 20 may be provided, as shown. The resulting intervening segmental sections at the tip end will act to frictionally grip the lead and thus prevent its slipping through the tip.

The upper end 21 of the guide tube 13 is inwardly beveled to facilitate entering of the reserve leads D which follow the active lead through the pencil. By means presently to be described, this tube is reciprocated with operation of the propelling mechanism. This results in an agitation within the lower end of the magazine such as to facilitate a successive feeding of the reserve lead into the guide tube. Connected with this tube is a reciprocable member 22 arranged for up and down move-

ment in the chamber 17 at the lower end of the body. As shown, this member is provided with a cam groove 23 into which is projected a pin 24 carried by the body near its lower end. I also form upon the outer side of this member a longitudinal slot 25 into which is projected a key 26 that is formed upon a washer 27 having a fixed mounting in the tip. The parts just described—the reciprocable member 22, the pin 24 projecting therein from the body, and the key 26 extending from the tip into the slot 25—constitute a separate unit in the propelling mechanism. With rotation of the tip relative to the body, the reciprocable member will be caused to travel up and down, thereby reciprocating the upper end of the guide tube into the lower end of the magazine. The two extreme positions of the parts just described are represented in Figs. 1 and 2.

The tube 13 continues downwardly below the reciprocable member so as to present its lower end within a friction sleeve 30 that is carried in the tip. This sleeve comprises upper and lower portions, the former having longitudinal slits 31 to provide between them segmental sections which frictionally but yieldably engage a bushing 32. In this bushing are openings wherein are accommodated a lead engaging device such as a plurality of balls 33 each of which extends in part within a slot 34 formed in the tube 13. The balls are accordingly permitted to engage frictionally for propelling purposes the active lead that is in the tube.

As best shown in Fig. 1, the upper portion of the ball bushing is disposed within a chamber 35' that is formed in the lower end of the reciprocable member 22. The annular walls 35 surrounding this chamber are interiorly tapered as at 36 to exert a wedge pressure against the balls with each downward movement of the reciprocable member. The result of this is to force the balls against the lead with a sufficient pressure to propel the same downwardly with like movement of the reciprocable member. When the mechanism is moved in an upward direction, the pressure upon the balls is released, due in part to the frictional yielding engagement of the spring sections of the sleeve 30 with the ball bushing, this engagement acting as a drag upon the bushing which has a limited endwise movement upon the guide tube.

From the foregoing description, the operation of advancing the lead should be apparent. Rotation of the tip through 180° will, with the cam groove 23, as shown, act to move the reciprocable member either up or down. A further rotation of the tip through a like distance will cause the reciprocable member to be moved in the opposite direction. With each upward movement, pressure upon the lead engaging balls is removed, but with downward movement these devices are forced

into propelling engagement with the lead. As long as the parts are related as shown in Fig. 1, this ball engagement with the lead will continue so as to prevent retraction of the active lead should an undue endwise pressure develop in writing. If, however, the parts be moved to another position, such as is represented in Fig. 2, this pressure of the balls upon the lead will be released. The lead will then be permitted to retract within the pencil if a sufficient endwise pressure be applied for this purpose.

The construction shown and described can be variously modified in detail. For instance, in Fig. 8, I have shown another form of reciprocable member 40 having screw threads 41 in its upper region to co-operate with threads 42 that are provided interiorly of the body chamber 17. In all other respects the construction is the same, and its several parts are designated by reference numerals similar to those applied to the preceding figures. In this modification, the tip may be rotated through several turns, during all of which the lead is caused to advance. When the member 40 has been rotated to the limit of its threads, a reversal of rotation, extending through a like number of turns, will act to restore the parts to their initial position. This construction is suggested as alternative of the one previously described, and differs therefrom only in the use of screw threads in lieu of a single cam groove.

Referring now to Figs. 9 and 10, I have shown a further modification, in that lead engaging devices of a somewhat special formation are utilized in place of the balls 33. These devices which bear the reference numeral 45 are each formed with a concave lead engaging face 46, also with a pair of shoulders 47 adapted to rest adjacent the outer side of the bushing 32, and with a rounded back face 48 against which a wedge pressure is exerted by the tapered walls 35 at the lower end of the reciprocable member. Such devices may be used, if desired, in lieu of the balls elsewhere shown. Also it is possible to provide a friction drag for the bushing somewhat different than that heretofore described. In the construction shown of Fig. 9 I have represented the tip as carrying a washer 50 adapted to engage frictionally with the bushing 32 wherein are formed slits 51 extending throughout its lower end to provide intervening spring sections wherewith the washer may engage. By means such as this, which is suggested as alternative of the construction shown in Figs. 1 and 2, a sufficient drag is placed upon the bushing to ensure a release of pressure upon the lead engaging devices carried thereby with each upward movement of the reciprocable member.

I would have it noted that the propelling mechanism of my invention is such as to grip the lead at times and at other times to re-

lease the lead. Also with regard to the particular construction of the means which so engages the lead, I provide for a recurrent agitation within the lower end of the magazine such as to facilitate the successive guiding into central position of the reserve leads which follow the active lead into position to be acted upon by the propelling mechanism. These features of my invention, as well as others which have been hereinbefore disclosed are susceptible of embodiment in different forms, all of which, as defined by the claims following, I shall deem to fall within the purview of this patent.

15 I claim:

1. A pencil having, in combination, a body wherein is formed a chamber for accommodating reserve leads, also an axial bore through which an active lead may be moved from the chamber through to the lower end of the body, a hollow tip rotatably connected with the body, and means for propelling the active lead through the axial bore and out through the tip with rotation of the latter relative to the body, said means including also an agitator extending into the reserve lead chamber and adapted to facilitate a successive transfer of leads therein into central position for travel through the axial bore of the pencil, substantially as described.

2. A pencil having, in combination, a body with which is associated a rotatable hollow tip, means extending axially through the tip and lower end of the body for guiding a lead in downward movements therethrough,

the body being formed with a reserve lead chamber having a bottom which tapers toward the lead guiding means to facilitate lateral movement of a reserve lead into position for movement through said guiding means, lead propelling mechanism connected for operation with rotation of the tip relative to the body, and means associated with said mechanism extending at times into the magazine and adapted to agitate the leads therein, substantially as described.

3. A pencil having, in combination, a body with which is associated a rotatable hollow tip, means within the tip for advancing a lead therethrough comprising a reciprocable lead gripping device, friction means engaging yieldingly with said device, and means operatively connected with both the body and tip adapted with rotation of one relative to the other in a single direction to reciprocate said device and move the same into lead gripping position, substantially as described.

4. A pencil having, in combination, a lead propelling mechanism, consisting of two relatively rotatable parts, a reciprocable member, and a reciprocable lead engaging device, the member being connected with the two rotatable parts in a manner to be reciprocated with movement thereof in a single direction, and the lead engaging device having a slip connection with the member such that it is moved endwise with reciprocation thereof, substantially as described.

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