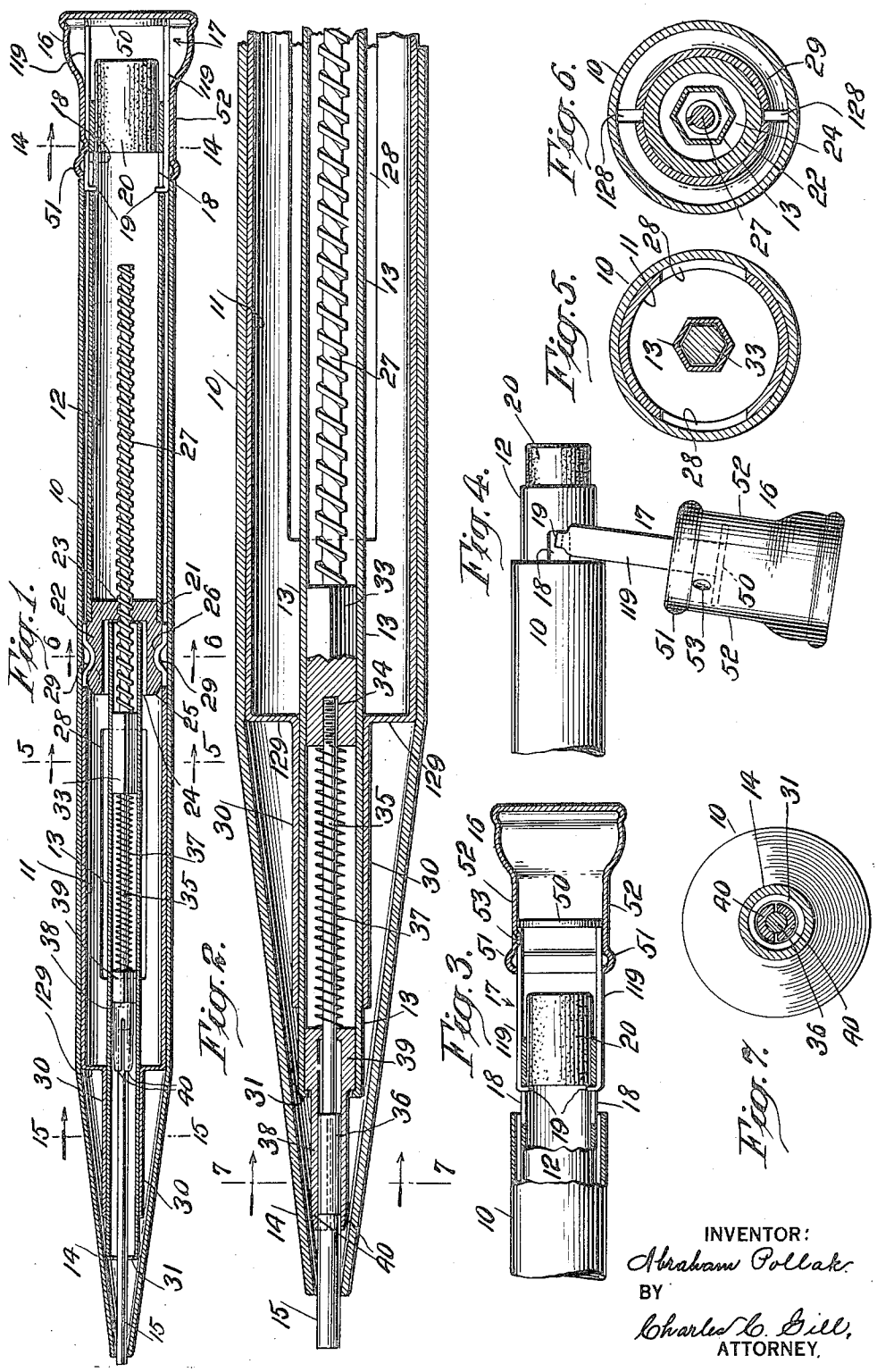
Jan. 9, 1923. 1,441,600

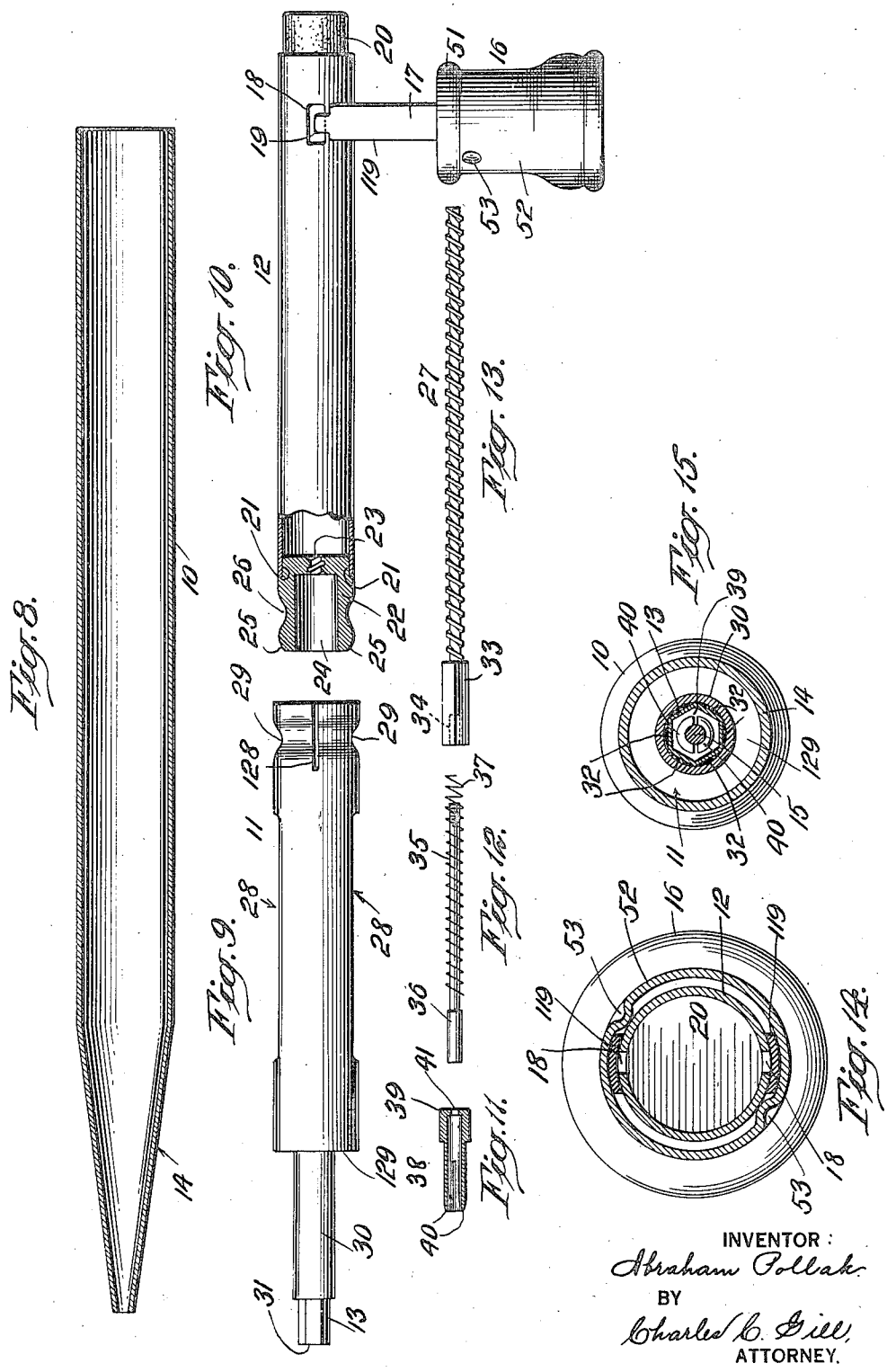
A. POLLAK.
LEAD PENCIL.
FILED FEB. 9, 1922. 2 SHEETS-SHEET 1



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BY
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UNITED STATES PATENT OFFICE.

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LEAD PENCIL.

Application filed February 9, 1922. Serial No. 535,273.

To all whom it may concern:

Be it known that I, ABRAHAM POLLAK, a citizen of the United States, and a resident of New York city, in the county of New York and State of New York, have invented certain new and useful Improvements in Lead Pencils, of which the following is a specification.

The invention relates to improvements in mechanical lead pencils, and it consists in the novel features, structure and combinations of parts hereinafter described and particularly pointed out in the claims, whereby a pencil of improved character is produced.

One object of my invention is to provide an efficient and mechanically practical novel lead pencil in the use of which on the rotation in one direction of a part of the pencil, the stick of lead may be propelled forwardly to expose its outer end for writing purposes and on the rotation of said part in a reverse direction, the stick of lead will be retracted within the pencil.

A special object of the invention is to provide a novel construction of pencil in which the stick or piece of lead after having been sufficiently consumed by use or unduly shortened by breakage, may on the rotation of a part of the pencil, be wholly expelled from the pencil.

A further purpose of the invention is to provide a pencil whose parts are of novel character and operation and may be readily constructed and assembled and which pencil will be durable and highly efficient in use and be capable of exposing the lead for writing purposes, retracting the lead when the use thereof has concluded and finally expelling an unduly short piece of lead entirely from the pencil.

The nature and purposes of the invention will be fully understood from the detailed description hereinafter presented, reference being had to the accompanying drawings, in which:

Fig. 1 is a central vertical longitudinal section through a pencil constructed in accordance with and embodying the invention, the parts of the pencil being shown in the relation they have when the lead is exposed for writing purposes;

Fig. 2 is a substantially corresponding section, on a larger scale and partly broken away, through a portion of the same, the mechanism being shown as in the operation of expelling a short piece of lead from the pencil;

Fig. 3 is a side elevation, partly broken away and partly in section, of the rear end portion of the pencil, a cap therefor being shown as having been drawn outwardly beyond and to expose a rubber eraser carried by an inner barrel or tubular portion of the pencil;

Fig. 4 is a side elevation of the same portion of the pencil, showing the cap as having been turned downwardly from the rubber eraser, leaving the same exposed for use or to be withdrawn for opening the chamber in the pencil for reserve leads;

Fig. 5 is a transverse section, on an enlarged scale, through the pencil, taken on the dotted line 5—5 of Fig. 1;

Fig. 6 is a corresponding transverse section through the pencil, taken on the dotted line 6—6 of Fig. 1;

Fig. 7 is a corresponding transverse section through the pencil, taken on the dotted line 7—7 of Fig. 2;

Fig. 8 is a longitudinal section through the exterior barrel portion or casing of the pencil;

Fig. 9 is a side elevation of an inner forward tubular portion and associated parts, of the pencil, the features shown in Fig. 9 being disposed within the forward portion of the exterior barrel or casing;

Fig. 10 is a side elevation, partly in section, of an inner rear tubular portion of the pencil, with associated parts, to be inserted into the rear part of the exterior barrel of the pencil, Fig. 10 also illustrating the exposed end cap of the pencil swiveled to said rear tubular portion.

Figs. 11, 12 and 13 show the respective parts of the lead holding and actuating mechanism finally disposed centrally within the pencil, these parts when inserted within the pencil being assembled in longitudinal relation in the manner hereinafter described

Fig. 14 is a vertical transverse section, on an enlarged scale, through the pencil, taken on the dotted line 14—14 of Fig. 1, and

Fig. 15 is a corresponding section through the pencil, taken on the dotted line 15—15 of Fig. 1.

The pencil comprises four main tubular members 10, 11, 12 and 13, the member 13

being polygonal in cross section and rigid with the member 11 and carried thereby.

The member 10 constitutes the exterior shell or casing of the pencil and is preferably in one integral tube tapered at its forward end to form a tip-member 14 through the forward end of which the lead 15 is projected, when desired, for writing purposes. The rear end of the casing member 10 is normally closed by a cap 16 whose details will be hereinafter described and which, by means of a yoke 17, is swiveled to the tubular member 12, said member 12 having elongated openings 18 in its opposite sides to receive the forwardly bent ends 19 of the side arms 119 of said yoke and permit said yoke with the cap 16, to have a longitudinal movement when pressed toward the rear end of the casing 10 or to the position shown in Fig. 1 or drawn outwardly therefrom preparatory to being swung downwardly to the position shown in Figs. 4 and 10 to expose the eraser 20 which plugs the rear end of the tubular member 12.

The tubular member 12 is a plain cylindrical barrel having the openings 18 near its rear end and at its front end being secured in an annular recess 21 formed on the rear end of a nut 22 which contains a spirally threaded hole 23 in line with the longitudinal center of the tube 12 and a hollow central portion 24 constituting a recess to freely receive the rear end of the tubular member 13, as shown in Fig. 1. The nut 22 has rounded exterior forward edges 25 and in rear thereof is formed with an annular rounded groove 26. The spirally threaded hole 23 in the nut 22 cooperates with the longitudinally movable spiral rod 27, as hereinafter described and the forward end of the nut 22 enters and interlocks with the rear end of the tubular member 11, said member 11 at its rear end being slit, as at 128, to form spring members adapted to pass over and then clutch inwardly an annularly grooved portion 29 of the tube 11 upon the nut 22 and into the annular recess 26 thereof. In the assembly of the parts the nut may be forced into the rear end of the forward tubular member 11 and when therein said nut serves to interlock the tubular members 11, 12 together and permit the member 12 to have free rotary movement, while the member 11 remains stationary with the outer casing 10.

The tubular member 12 is therefore as a separate member rotatable within the outer shell or casing 10 and carries the nut 22, cap 16 and eraser 20, as shown in Fig. 10. The tubular member 12 forms within it a chamber for reserve leads and said chamber is accessible when the eraser 20 is withdrawn from the tube and closed when said eraser is returned to position.

The tubular member 11 is adapted to be sprung upon the nut 22 and become interlocked therewith, while at the same time permitting the tube 12 and nut 22 to be rotated from the cap 16, the tube 11 itself remaining stationary and firmly bound against the inner walls of the shell or casing 10. The tube 11 is preferably slotted, in its opposite sides, as at 28, and at its forward portion is of reduced diameter or offset inwardly, as at 129, and continued forwardly, as at 30, said portion 30 forming a concentric tube which projects into the forward tapered portion or tip 14 of the shell or casing 10. The offset portion 129 of the tube 11 constitutes a shoulder which engages the rear end of the tapered portion or tip 14 of the tube or casing 10, said shoulder serving to seat the tube 11 at its forward portion firmly within the shell or casing 10 and prevent forward motion of the tube 11. The tube 11 has a firm friction-fit within the shell or casing 10 and I preferably obtain this fit by first bulging the opposite side portions of the tube 11 outwardly and then forcing said tube 11 into the shell or casing 10, the inner walls of which act against the initial bulge of the sides of the tube 11 and firmly engage said sides. The slots 28 permit me to bulge the opposite sides of the tube 11 outwardly to a slight extent before driving said tube into the shell or casing 10.

The tubular member 13 is concentrically within the tube 11 and its member 30 of reduced diameter, and at its rear end said tube 13 freely enters within the recess 24 of the nut 22, while at its forward portion said tube 13 fits closely within the auxiliary tube 30 and projects forwardly beyond the same, as shown in Figs. 1, 2 and 9, and is turned inwardly at its forward extremity to form an annular flange 31. The tubular member 13 is polygonal in cross-section, as shown in Figs. 5, 6, 9 and 15, and is preferably secured within the auxiliary portion 30 of the tube 11 by solder 32, as shown in Fig. 15, whereby the tubular members 11, 13 become a unit and may be handled as one part and both become stationary within the outer casing 10 by reason of the engagement of the inner walls of said casing with the tube 11.

The operative mechanism occupying a central longitudinal position within the pencil and by means of which the lead is propelled forwardly of retracted rearwardly on the rotation in one direction or the other of the tube 12, is shown detached in Figs, 11, 12, 13 and consists of a spirally threaded rod or screw 27 having on its forward end a polygonal head 33 containing a threaded recess 34, a propeller rod 35 threaded on its rear end to be screwed into said recess 34 and having on its forward end a head or section 36 of somewhat greater diameter than

the body of the rod 35, a coiled spring 37 confined on the rod 35 (Fig. 2), and a tubular lead-clutch or member 38 which has on its rear end a polygonal head 39 (Fig. 1) and forwardly projecting slit sides 40 to grasp the lead 15. The head 39 has a hole 41 in it, and in the assembly of the parts the bare rod 35 is, starting at its rear threaded end, inserted into the clutch member 38 from the forward end thereof and through the hole 41 until the head 36 on said rod abuts against the inner surface of the head 39 at said hole, and thereafter the spring 37 is placed upon the rod 35 and compressed to some extent thereon, whereupon the threaded rear end of the rod 35 is screwed into the recess 34 of the head 33 on the spirally threaded rod or screw 27, the spring 37 then being confined between the head 39 of the clutch member 38 and the head 33 on the rod or screw 27. The head 36 on the rod 35 is adapted to have longitudinal movement within the clutch member 38 and at its forward end directly engages the end of the lead 15, as shown in Fig. 2.

The polygonal head 33 on the rod or screw 27 and the polygonal head 39 on the clutch member 38 conform to the interior cross-section of the polygonal tube 13 within which they are placed, as shown in Figs. 1 and 2, the forward edge of the head 39 being pressed against the forward flange 31 on the end of said tube by the spring 37, and said flange serving as a stop to restrain the clutch member within the tube 13. The heads 33, 39 are prevented from rotating within the tube 13 by reason of the polygonal cross-section of said heads and tube, and hence the screw or rod 27, rod 35 and clutch member 38 can have no rotary motion. The heads 33, 39 may, however, have longitudinal sliding movement within the tube 13, and in Figs. 1 and 2 I illustrate said heads in two positions. The means for propelling the heads 33, 39 and with them the rod 35 and clutch member 38, forwardly to expose or wholly eject the lead 15 and for retracting said heads, rod and clutch member to withdraw the lead into the pencil, consist of the rotary tube 12, nut 22 and rod or screw 27, said rod or screw moving forwardly when the said tube and nut are turned in one direction and rearwardly when said tube and nut are turned or rotated in the reverse direction. The clutch member 38 will permit the lead 15 to be forced through it for exposure or expelling purposes but will, by reason of its spring sides, sufficiently bind against the lead to withdraw the lead into the pencil when the said member 38, rod 35 and rod or screw 27 are retracted inwardly. The clutch member 38, rod 35 and screw 27 move forwardly with substantial uniformity until the head 39 meets the stop flange 31, and during this movement the head 36 on the rod 35 exerts a yielding pressure on the lead due to the presence of the spring 37 between the member 38 and head 33, and this is a feature of advantage and avoids a harsh action against and the breaking of the leads. After a lead has become unduly short and it is desired to expel the same entirely from the pencil, the tube 12 and nut 22 are turned to propel the rod 35 and clutch member 38 forwardly until the head 39 on said clutch member reaches the stop flange 31 on the tube member 13 and are then further turned in the same direction to propel the rod 35 and its head 36 along through the clutch member 38 and against the piece of lead 15 until said piece has been expelled, this operation of the parts being indicated in Fig. 2. During this final forward propelling movement of the rod 35 and its head 36 to expel the lead, the clutch member 38 becomes arrested by the flange 31 and the spring 37 becomes compressed between the clutch member and the head 33, which travels forwardly with the rod 35, and this compression of the spring permits the rod 35 to continue in movement beyond its normal throw while the clutch member 38 is stationary. The spring 37 normally acts to press the clutch member 38 forwardly against the rear end of the head 36 on the rod 35, but when the clutch member becomes arrested by the flange 31, said spring by becoming compressed permits the rod 35 to continue in forward movement for exposing or expelling the piece of lead.

The rotation of the tubular member 12 and nut 22 to cause the traveling movement of the rod or screw 27 and its connected parts, is effected by holding the main casing 10 stationary and turning, with the thumb and finger, the cap 16 when said cap is in its operative position at the rear end of said casing, as shown in Fig. 1.

The cap 16 and yoke 17 are of special construction. The yoke 17 consists of two side arms 119 whose forward ends 19 freely enter the slots 18 of the tube 12 and a disk head 50 which connects the rear ends of said arms and is confined within the cap 16. The cap 16 has an enlarged outer end affording an ornamental finish for the pencil, an ornamental bead 51 at its inner edge to engage the rear edge of the main casing 10 and plain sides 52 having indented lugs 53 which perform two functions, one being to prevent the escape of the cap from the yoke 17, while at the same time permitting the cap to be slid inwardly on said yoke and the rear end of the tube 12 to the position shown in Fig. 1 and outwardly from said tube 12 and partly from off the yoke 17 to the position shown in Fig. 3, after which the cap and yoke may be turned downwardly, as shown in Fig. 4, clear of the eraser 20. The cap 16 provides

a chamber for the outer portion of the eraser 20, and when the cap and yoke are turned to a horizontal position while extended in a direction from each other (Fig. 3), the cap may be pushed forwardly on the yoke 17 and tube 12 and will push the yoke forwardly until the bent end portions 19 of the yoke slide to the forward ends of the slots 18 and pass below the outer edges of the main casing 10, the whole then taking the position shown in Fig. 1. When the cap 16 is in the position shown in Fig. 1, it will be utilized as a key for rotating the tube 12, and at this time the indented lugs 53 will perform their second function, to-wit: that of engaging the arms 119 and through said arms imparting the rotary movement of said cap to the tube 12 for actuating the screw 27 and parts associated therewith, said lugs 53 engaging diagonally opposite edges of said arms when the cap 16 is turned clockwise and the other diagonally opposite edges of said arms when the cap is turned counter-clockwise. The cap 16 and yoke 17, thus serve as means for turning the tube 12 in either direction and the cap 16 serves as a finish for the rear end of the pencil and also affords a chamber concealing the eraser 20. The cap 16 is pulled outwardly and then turned downwardly (Fig. 4) when the eraser 20 is to be used or when the eraser is to be detached for exposing the chamber for reserve leads in the tube 12.

I have hereinbefore explained the manner of assembling the screw 27, rod 35, spring 37 and clutch member 38 into one connected part, and when these features have been assembled as described, the screw 27 may be screwed into and through the nut 22 to the requisite extent and thereupon the clutch member 38, rod 35, spring 37, head 33 and forward end of the screw 27 will be moved forwardly into the hexagonal or polygonal tube 13 and the forward end of the nut 22 will be forced into the rear end of the tube 11, thus assembling all the interior parts of the pencil quickly and into unit form.

The exterior casing 10 will then be pushed in a rearward direction over said assembled interior parts, and finally the eraser 20 will be applied and the cap 16 and yoke 17 will be turned upwardly and then pushed forwardly on the tube 12 and to their final position shown in Fig. 1.

The lead 15 will be inserted through the forward end of the tip 14 and into the forward portion of the polygonal tube and within the clutch member 38 up to the forward end of the head 36 on the rod 35, as shown in Fig. 1, and said lead may be projected and retracted or wholly expelled, as may be desired, by the rotation of the head 16 and tube 12 in the manner hereinbefore fully explained.

What I claim as my invention and desire to secure by Letters Patent, is—

1. A lead pencil comprising an exterior casing having at its forward end a tip-member, a rear rotary tube therein equipped with a spirally threaded nut and having an operating head at its rear end, a forward non-rotary tube detachably connected with said rotary tube, a tube polygonal in cross-section extending through said forward tube and rigid therewith and being partly closed at its forward end, a spirally threaded rod extending through said nut and movable longitudinally therefrom and having on its forward end a polygonal head to guide within said polygonal tube, a propeller rod connected with and extending forwardly from said polygonal head, a tubular lead-holding member adapted to receive the writing-lead and slidable within said polygonal tube and having a head to prevent its escape therefrom, and a coiled spring on said rod engaging said lead-holding member head and said polygonal head, said propeller rod extending forwardly through a hole in the head of said lead-holding member and having a head on its forward end to engage the lead and slidable within said member, said propeller rod being adapted when the lead-holding member is arrested at the end of the polygonal tube to continue in motion to expel the remaining piece of lead, said spring then being compressed between the said polygonal head and the lead-holding member.

2. A lead pencil comprising an exterior casing having at its forward end a tip-member, a rear rotary tube therein equipped with a spirally threaded nut and having an operating head at its rear end, a forward non-rotary tube detachably connected with said rotary tube and having a forward tubular extension of reduced diameter projected into said tip member, a tube polygonal in cross-section extending through said tubular extension and rigid therewith and being partly closed at its forward end, a spirally threaded rod extending through said nut and movable longitudinally therefrom and having on its forward end a polygonal guiding head within said polygonal tube, a propeller rod connected with and extending forwardly from said polygonal head, a tubular clutch member adapted to receive the writing-lead and slidable within said polygonal tube and having a polygonal head preventing its escape therefrom, and a coiled spring on said rod engaging said clutch member head and said guiding head, said propeller rod extending forwardly through a hole in the head of said clutch member and having a head on its forward end to engage the lead and expel the same and also at the proper time for drawing said clutch member rearwardly along said polygonal tube,

said propeller rod being adapted when the clutch member is arrested at the end of the polygonal tube to continue in motion to expel the lead, said spring then being compressed between said clutch member and said polygonal guiding head.

3. A lead pencil comprising an exterior casing having at its forward end a tip-member, a rear rotary tube therein equipped with a spirally threaded annularly grooved nut at its forward end and having an operating head at its rear end, a forward non-rotary tube having a split and grooved rear end to be sprung upon said nut and engage the groove thereof, a tube polygonal in cross-section extending through said forward tube and rigid therewith and being partly closed at its forward end, a spirally threaded rod extending through said nut and movable longitudinally therefrom and having on its forward end a polygonal head to guide within said polygonal tube, a propeller rod connected with and extending forwardly from said polygonal head, a tubular clutch member adapted to receive the writing-lead and slidable within said polygonal tube and having a head to prevent its escape therefrom, and a coiled spring on said rod engaging said clutch member head and said polygonal head, said propeller rod extending forwardly through a hole in the head of said clutch member and having a head on its forward end to engage the lead and slidable within said clutch member.

4. A lead pencil comprising an exterior casing having at its forward end a tip-member, a rear rotary tube therein equipped with a spirally threaded nut and having an operating head, a spirally threaded rod extending through said nut and movable longitudinally therefrom and having on its forward end a guiding head, a forward stationary tube receiving said head and partly closed at its forward end, a propeller rod connected with said guiding head and extending forwardly within said forward tube, a tubular lead-holding member adapted to receive the writing-lead and slidable within said forward tube and having a head to prevent its escape therefrom, and a coiled spring on said rod engaging said lead-holding member and said guiding head, said propeller rod extending frowardly through a hole in the head of said lead-holding member and having a head on its forward end to engage the lead and slidable within said member, said propeller rod being adapted when the lead-holding member is arrested at the end of said forward tube to continue in motion to expel the remaining piece of lead, said spring then being compressed between said guiding head and the lead-holding member.

5. A lead pencil of the propeller type comprising a spirally threaded rod adapted for longitudinal movement, rotary threaded means engaging said rod and having means for the manual rotation of the same, a forward guiding head on said rod, a longitudinal tube receiving said head, a propeller rod connected with said head, a tubular lead-holding member slidable within said tube and having a rear head end, and a coiled spring on said propeller rod between said guiding head and said lead-holding member, said propeller rod extending forwardly through a hole in the head of said member and having a head on its forward end slidable within said member, said propeller rod being adapted when said member has become arrested to continue in motion to expel the remaining piece of lead, said spring then being compressed between said member and said head.

6. A lead pencil comprising a spirally threaded rod adapted for longitudinal movement, rotary threaded means engaging said rod and having means for the manual rotation of the same, a polygonal guiding head on said rod, a polygonal tube receiving said head, a propeller rod connected with said head, a lead holding clutch-member slidable within said polygonal tube and having a rear head end, and a coiled spring on said propeller rod between said guiding head and said lead-holding member, said propeller rod extending forwardly through a hole in the head of said member and having a head on its forward end slidable within said member, said propeller rod being adapted when said member has become arrested to continue in motion to expel the remaining piece of lead, said spring then being compressed between said member and said head.

7. A lead pencil comprising a propeller rod on the rear end of which is a guiding head, a tube receiving said head and rod, means for imparting longitudinal movement to said head and rod, a lead holding member slidable within said tube and having a rear head end therein, and a coiled spring on said propeller rod between said guiding head and said lead-holding member, said propeller rod extending forwardly through a hole in the head of said member and having a head on its forward end slidable within said member, said propeller rod being adapted when said member has become arrested to continue in motion to expel the remaining piece of lead, said spring then being compressed between said member and said head.

8. A lead pencil comprising a propeller rod on the rear end of which is a polygonal guiding head, a polygonal tube receiving said head and rod, means for imparting longitudinal movement to said head and rod, a lead holding clutch-member slidable within said polygonal tube and having a

rear end head therein, and a coiled spring on said propeller rod between said guiding head and said lead-holding member, said propeller rod extending forwardly through a hole in the head of said member and having a head on its forward end slidable within said member, said propeller rod being adapted when said member has become arrested to continue in motion to expel the remaining piece of lead, said spring then being compressed between said member and said head.

Signed at New York city, in the county of New York and State of New York, this 7th day of February, A. D. 1922.

ABRAHAM POLLAK.