

1,130,741.

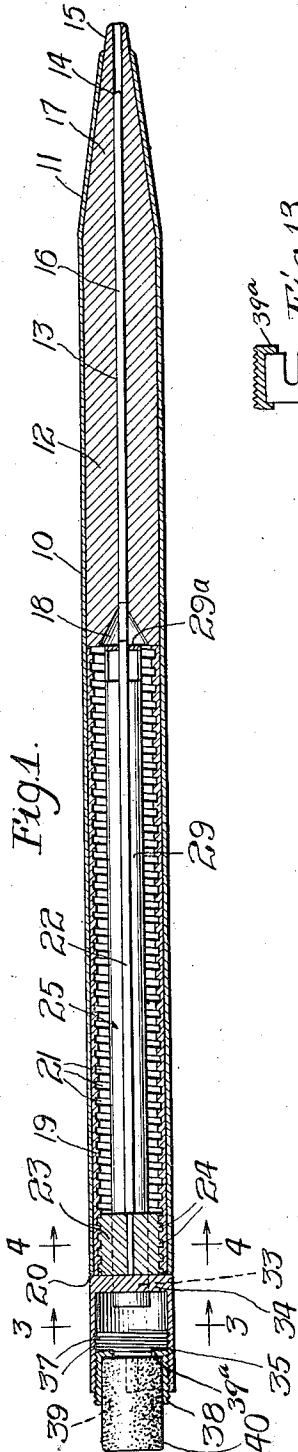


Fig. 1.

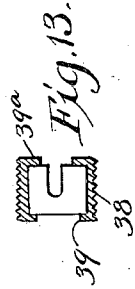


Fig. 13.

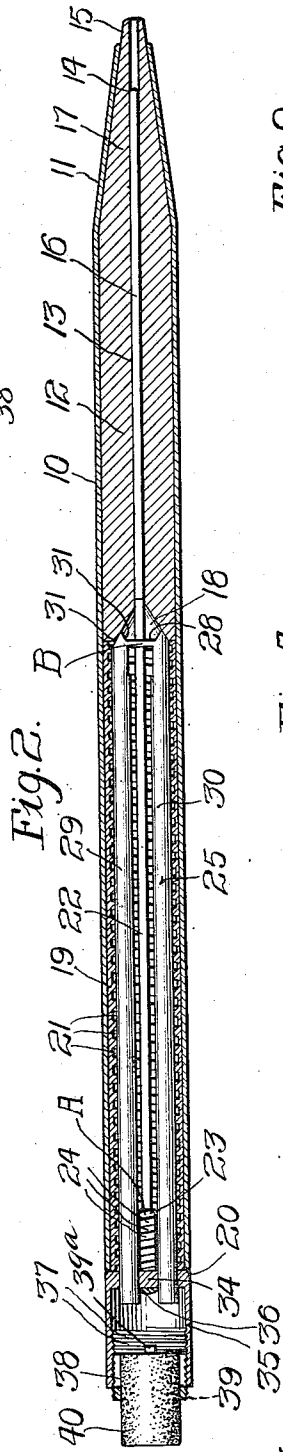


Fig. 2.

Fig. 9.

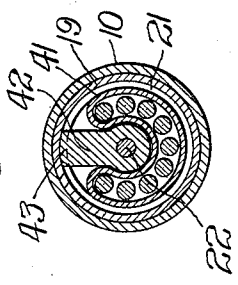


Fig. 4.

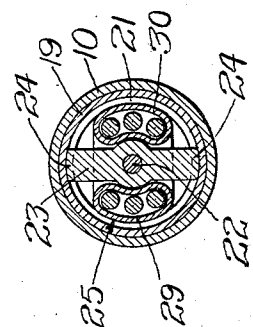
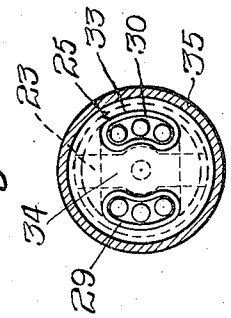


Fig. 3.



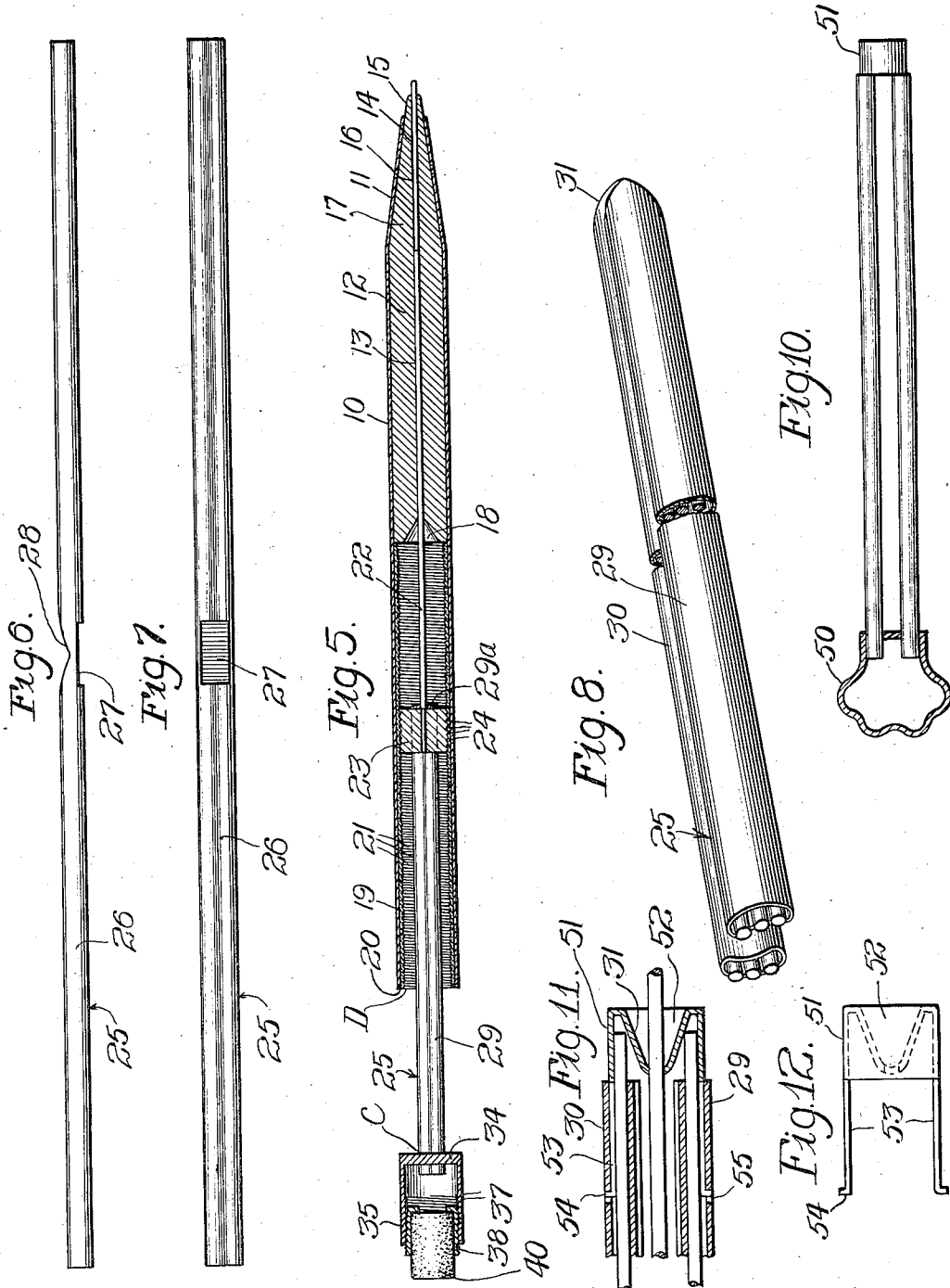
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1,130,741.

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LEAD PENCIL.
APPLICATION FILED OCT. 10, 1913.

Patented Mar. 9, 1915.
2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

CHARLES R. KEERAN, OF BLOOMINGTON, ILLINOIS.

LEAD-PENCIL.

1,130,741.

Specification of Letters Patent.

Patented Mar. 9, 1915.

Application filed October 10, 1913. Serial No. 794,508.

To all whom it may concern:

Be it known that I, CHARLES R. KEERAN, a citizen of the United States, residing at Bloomington, in the county of McLean and State of Illinois, have invented certain new and useful Improvements in Lead-Pencils, of which the following is a specification.

The present invention relates to that form of pencil employing a permanent body or casing into which individual leads are inserted from time to time as may be desired, the leads being forced out from the forward end of the body or casing by suitable means.

The objects of the present invention are to provide a device of the class described which will be simple of construction and operation and contain no involved or intricate parts which would be likely to become disordered or imperfect in ordinary usage; to so arrange the parts comprising the pencil as to provide a magazine for extra leads which will be contained within the body of the pencil, and to utilize this magazine as an actuating member for moving the follower which forces the lead from the end of the pencil; to so arrange the parts as to prevent a breaking of the lead when a new lead is placed in position; to so correlate the parts as to provide an indicator for determining the length of lead left within the pencil; to provide means for centering and alining the lead with the follower during the recharging operation, and to maintain such alinement during use; to so arrange the parts as to have the lead forced through and out of the body thereof at all times by a pressure directed against the longitudinal center thereof, and thus eliminate any and all side strains or pressures against the lead which would tend to break the same; to prevent the lead from being forced back in the holder by pressure on the point, except by first withdrawing the follower; and to use the interior portions of the pencil as a filler for the outer sheathing or casing which permits the use of a thin shell of the finer metals for said sheathing without subjecting them to the danger of mutilation during usage by denting.

The invention further consists in the features of construction and combination of parts hereinafter described and claimed.

In the drawings: Figure 1 is a longitudinal section of the pencil of the present invention; Fig. 2 is a similar view taken in a

plane at approximately right angles to the plane in which the first section is taken; Fig. 3 is a section on line 3—3 of Fig. 1, looking in the direction of the arrow; Fig. 4 is a section on line 4—4 of Fig. 1, looking in the direction of the arrow; Fig. 5 is a view similar to Fig. 1 on a somewhat reduced scale, and showing the follower member advanced, and the magazine member and actuating member pulled out from the casing, this view illustrating the manner in which the position of the parts gives an indication of the amount of lead remaining in the pencil; Fig. 6 is a detail showing the magazine member in its initial stages of formation; Fig. 7 is a detail showing the magazine member after it has been rolled to give it the elongated formation in cross section; Fig. 8 is a perspective of the magazine member in completed form; Fig. 9 is a cross section illustrating a modified form of magazine; Fig. 10 is an elevation of another modified form of magazine; Fig. 11 is an enlarged section of the end of said magazine; Fig. 12 is a detail of the cap piece for said magazine; and Fig. 13 is a detail section of the plug for holding the eraser.

Referring now to the drawings, the pencil, as illustrated, comprises an outer sheathing or shell 10 which is drawn to a taper at this forward end 11. This sheathing or shell may be of any suitable material, and may be in the nature of a relatively thin sheathing if made of the finer metals, such as gold or silver, but may, of course, be made of any suitable material and of any suitable design or size. This sheathing or shell forms a chambered body which receives what may be termed the interior portions or parts of the pencil. A core or filler 12 is positioned in the forward portion of this chambered interior. This core is preferably made of some suitable fibrous material, and is formed with an axial bore 13 which is contracted at its forward end 14 giving a sliding fit to the lead through the major portion of the bore therein with a clutching engagement upon the lead at the contracted outer end of the bore. The core, as illustrated, has its forward end 15 projecting slightly beyond the end of the sheathing or casing 10.

The lead 16 which passes through the bore in the core is preferably of a small diameter or gage, and is of such a nature as to give at all times a suitable writing point without

the necessity of sharpening the same; that is, the normal diameter of the lead is of a proper size to constitute a writing point. In usage, it is preferred not to have this lead extend beyond the outer end of the bore in the filler or core 12 beyond a short distance, for the reason that, if any material projection is allowed, the lead will be apt to break under the pressure of the writing because of its small diameter. The filler 12 is tapered at its forward end 17 in conformity to the taper of the forward end of the shell 10, and is provided with a funnel-shaped opening 18 at its rear end which merges into the bore 13. The function of this funnel-shaped opening will be more fully hereinafter explained.

In the construction illustrated, an inner sleeve or tubing 19 is provided which extends from the rear end 20 of the shell or casing to the rear end of the filler 12, and abuts against the filler. This tube or sleeve 19 is fitted tightly into the shell or casing, and is not, under normal operation, intended to be removable from said shell, and is in effect a portion of the shell, and when the finer grades of metal are used for the shell or sheathing, this sleeve serves to reinforce the same. This sleeve is formed with an interior threaded surface 21 extending from end to end thereof, and the sleeve, when inserted, maintains the filler 12 in its proper position within the casing.

The means, illustrated as constituting the follower which forces the lead out from the end of the pencil through the bore or passage 13, consists of a member 22 in the nature of a stiff wire, which member terminates at its rear end in an enlarged head 23 which, as best shown in Figs. 2, 3, and 4, is of an elongated form in cross section. This head is formed exteriorly with threaded surfaces, 24 adapted to mesh with the threads 21 of the sleeve 19. It is obvious, as this head is rotated, that it will advance through the sleeve 19, and force the follower forward, with the result that the lead is fed out from the end of the pencil.

The means for turning the head comprises a hollow shell-like member 25 which forms, in effect, a magazine for carrying extra leads for the pencil. This magazine in its preferred form is constructed from a tube 26, and the method of making the same is briefly as follows: The tube is first cut to form an opening 27, and opposite said opening is formed a depression 28. The wall of the tube is provided at the center of the depression with an opening 29^a of a size to allow the follower to pass therethrough. The tube is then subjected to a rolling operation which flattens it out so as to give it the elongated arcuate formation clearly shown in Figs. 3, 4, and 8. The tube, after being subjected to the rolling operation, is

shown in Fig. 7, and after this operation it is bent at the point where the opening 27 is cut, so that companion magazine members 29 and 30 are finally produced which are joined together by the depression 28. This depression gives at the point of juncture of the two sections a funnel-shaped surface 31, the function of which is to center the lead 16 in alinement with the follower member, and is formed in the forward end of the magazine for the following reason: The bore 13 is designed so that the lead has a free passage therethrough until positioned in the same; that is, the lead will not engage with the contracted portion 14 of the bore until the rear end of the lead has passed beyond the rear end of the bore 13 and the lead fully positioned in the bore of the filler; thus the follower 22 and the lead 16 will be within the bore 13 before any material pressure is exerted to force the lead through the contraction 14. Consequently, the bore 13 holds the follower 22 and lead 16 in proper alinement as the head is forced forward, but it is possible that in operation the bore through the filler may become slightly clogged or choked, in which case the lead, when dropped into place, would not pass into the bore the distance intended, and the rear end of the lead would project out beyond the rear end of the filler. Then when the magazine is inserted in its place, it might happen that the forward end of the same would hit the lead, bending it sidewise and breaking it, but by providing the conical depression 31 a guiding means is provided, whereby the lead, if engaged by the forward end of the magazine, will be forced to the center of the magazine and into alinement with the opening 29^a; and thus the follower member will engage directly with the rear end of the lead and force it forward through the bore as the magazine is forced into place by a direct pressure longitudinally thereof. In this way the lead is not subjected to any side stresses or strain and the danger of breakage is obviated. This feature of the invention is particularly important especially when a lead of small diameter or gage is utilized.

As will be seen from Figs. 2, 3, and 4, the head 24 of the follower will be positioned so as to lie between the magazine sections 29 and 30, but, of course, will project beyond said section a sufficient distance to enable the threads on said head to engage with the threads on the tube 19. The magazine portion has both a turning and sliding fit within said tube, and the magazine is formed of a size so that a sufficient frictional engagement is maintained between the outer surface of the magazine sections and the inner surface of the tube 19 to prevent the dropping back of the magazine from the interior

of the pencil, should the pencil be turned upside down. This friction is not sufficient to prevent a free turning and sliding movement of the magazine within the tube, whenever pressure is exerted tending to produce such movements.

The assembling of the follower and the magazine is very simple, simply involving the placing of the end of the follower through the hole 29^a and the springing of the head into position between the magazine sections. The rear ends of the magazine sections project through suitable openings 33 in a transverse wall 34 of a cup-shaped member 35. The outer periphery of this cup-shaped member may be of knurled formation, if desired. This cup-shaped member is of a diameter so that it bears against the rear end of the outer shell or casing. The magazine members are intended to be fixedly secured in this cup-shaped member, which securance can be accomplished by any suitable means, as, for instance, a drop of solder 36, as indicated in Fig. 2. Thus, with the magazine sections and cup-shaped member fixedly held together, a rotative movement imparted to the cup-shaped member will obviously turn the magazine sections within the tube 19, and the magazine sections, in conjunction with the cup-shaped member, will thus constitute the actuating means for the follower. The cup-shaped member to all intents and purposes is a continuation of the magazine sections.

The interior of the cup-shaped member may be threaded as at 37 and a plug 38 inserted within said threaded portion. Said plug has formed at its outer end inwardly extending lugs or tines 39 and at its bottom is provided with inwardly extending lugs or ears 39^a. This plug is intended to receive a rubber eraser 40 and when the eraser is inserted in position within the plug it will rest against the lugs 39^a. The plug, as shown, is slotted and hence when it is inserted in the cup-shaped member it will be contracted to an extent thus embedding the tines 39 in the body of the eraser and preventing displacement of the same from the plug. As shown in Figs. 1, 2, and 3, the ends of the magazine members extend through the transverse wall 34, so that the leads 16 carried by said magazine member may be easily obtained by removing the plug 38 and tapping the pencil in a manner to cause them to slide out of the magazine.

The method of assembling and the operation of the device is as follows: The filler 12 is first positioned within the casing 10; the sleeve 19 is then inserted within the casing and forced in place so that the forward end engages the rear end of the filler. The magazine section is then taken and the follower is placed through the opening 29^a and the member or head 23 sprung into position

between the magazine sections. A lead is then dropped into the interior of the pencil and will be guided into the bore 13 by the walls of the tapered openings 18. The assembled magazine and the follower is then pushed into the tube 19 until the threads of the member 23 engage the thread of the tube 19. Then by rotative movement the magazine is turned, turning the head 23 which, by reason of its threads, follows the threads of the sleeve 19 and travels inward in the space between the magazine sections 29 and 30 until the lead is forced out from the end of the pencil. When the exposed portion of the lead has been worn away by writing, the cup-shaped member 35 is turned, thereby actuating the follower and forcing more lead out from the core or filler. When it is desired to retract the projected point of the lead, this can be readily done by giving a slight backward turn to the cup-shaped or actuating member 35, and then by pushing on the end of the lead, it will be pushed back so that no portion thereof will project.

Another feature of arranging the parts in the manner specified lies in the fact that by so arranging them an indication can be obtained of the amount of lead remaining in the pencil. This is due to the fact that the distance between the inner face of the head 23, indicated by the letter A in the drawings, and the wall of the magazine section in which the opening 29^a is located, which wall is indicated by the letter B in the drawings, is approximately equal to the initial length of the lead. Now as the lead is fed out, the head 23 approaches constantly nearer to the cross wall B, so that this distance decreases in proportion to the decrease in length of the lead. Therefore, assuming the lead to have been worn to the extent shown in Fig. 5, the head 24 will have been advanced the distance indicated in said figure. Thus, the magazine section can only be pulled out from the interior of the pencil a distance equal to the distance between the cross wall B of the magazine and the inner face A of the head.

As shown in Fig. 5, the magazine has been extended until the cross wall has engaged the head, and has, therefore, reached its limit of retraction by a non-rotative movement. As previously explained, the distance of this retraction will be approximately equal to the amount of lead left in the pencil, and thus by observing the distance between the inner face of the cup-shaped member 35, indicated by C in the drawings, and the outer or rear edge of the casing 10, indicated by D in the drawings, you will have the exact amount of lead left within the pencil. This distance will be the amount of retraction afforded the magazine section, and the amount of retraction will be equal to the amount of lead remaining in

the pencil. It will thus be a very simple matter to determine when a new lead should be placed in position. By the retracted movement, above referred to, is meant a non-rotative retraction, because a rotative retraction will, of course, retract the head at the same time, and thus the indicating feature will then be lost.

In Fig. 9, a magazine 41 is illustrated which is based on the same principle as the magazine described, with the exception that the tube, from which the magazine is formed, is somewhat larger and is not bent at the middle portion. The head 42 in this instance projects beyond the magazine in one direction only, and hence has only one threaded surface 43 which meshes with the threads 19 of the sleeve. This magazine, however, is used in the same manner as the foregoing, and accomplishes the same purposes and results.

The foregoing description is, of course, directed solely toward the construction illustrated, and the device is susceptible of modifications, the invention not being limited in any other way than by the terms of the appended claims.

In Fig. 9, a modified form of magazine is shown, which corresponds in principle of construction to the form previously explained, but which differs from these forms in that it is provided with a closed outer cap-piece or head 50 which, if desired, can be of a decorative nature. The lower ends of the magazine are closed by a cap-piece 51 consisting of a body 52, from which extend arms 53 provided with outwardly turned ends 54 arranged to catch and lie within openings 55 in the walls of the magazine. This cap-piece is removable by forcing the ends 54 out of the hole 55, and by removing the cap piece 51 new leads can be obtained. This method of extracting the lead is necessitated owing to the closing of the upper end of the magazine by the cap-piece 50.

I claim:

1. In a lead pencil of the class described, the combination of an outer sheathing constituting a chambered body, a core piece within said body extending partially the length thereof and formed with an axial bore adapted to receive a lead, a follower for forcing said lead through said bore, said follower being enlarged for a portion of the length thereof and exteriorly threaded on said enlarged portion, a threaded surface located interiorly of the body, adapted to receive the threads on said head, a hollow member serving as a magazine for leads, the outer end of the magazine abutting the inner end of the core when the parts are assembled, means for centering the abutting edges of the magazine and core, said magazine having a sliding and turning fit within

said chambered portion, said magazine engaging the threaded portion of the follower, and means located exteriorly of said casing for turning the magazine, substantially as described.

2. In a lead pencil of the class described, the combination of a body, a core piece within said body extending partially the length thereof, an interiorly threaded sleeve within the body extending from the inner terminus of the core to the rear end of the body, said core having an axial bore adapted to receive a lead, a follower for forcing the lead through said bore, said follower being enlarged for a portion thereof, and exteriorly threaded to mesh with the threads on said sleeve, a hollow member serving as a magazine for leads, said magazine having a sliding and turning fit within said sleeve, said magazine engaging the threaded portions of the follower, and means exteriorly of said casing for turning the magazine, substantially as described.

3. In a lead pencil of the class described, the combination of a sheathing forming a chambered body, a core piece in said body extending partially the length thereof, and provided with an axial bore to receive a lead, a follower for forcing the lead through said bore embodying an exteriorly threaded head, the interior of said chamber being provided with a threaded surface for receiving the threads on said head, a chambered magazine member having a rotating and sliding fit in said chamber and engaging said head, means exteriorly of said sheathing for rotating said magazine member, said member serving as a stop for limiting the non-rotative outward movement of the magazine member from the body, whereby the amount of retraction thus allowed the magazine gives an indication of the amount of lead remaining in the pencil, substantially as described.

4. In a lead pencil of the class described, the combination of a sheathing forming a chambered body, a core piece in said body, an axial bore in said core to receive a lead, a follower for forcing the lead through the bore embodying an exteriorly threaded head, a magazine comprising shell-like members arranged to lie upon opposite sides of said head, said members having a sliding and rotatable fit in said chambered portion, the outer end of the magazine portion abutting the inner end of the core, means for centering said abutting ends, a threaded surface in said chamber for receiving the threads on said head, and means exteriorly of said sheathing for turning said magazine portion, substantially as described.

5. In a lead pencil of the class described, the combination of a sheathing forming a chambered body, a core piece in said body extending partially the length thereof and

provided with an axial bore to receive a lead, a follower for forcing the lead through the bore embodying an exteriorly threaded head, a sleeve within said sheathing provided with an interior thread with which the threads on the head engage, said sleeve extending from the rear end of the core to the rear of the sheathing, a magazine comprising companion members of shell-like formation adapted to lie upon each side of the head, said member having a slidable and rotatable fit in said sleeve, and means exteriorly of said head for rotating said magazine, substantially as described.

6. In a lead pencil of the class described, the combination of a sheathing forming a chambered body, a core piece in said body provided with an axial bore to receive a lead, a follower for forcing the lead through the bore embodying an exteriorly threaded head, a magazine formed of a single piece of tubing bent midway its longitudinal dimension to provide companion shell-like members adapted to lie upon opposite sides of said head, said tube at the point of bending being provided with an opening through which the follower passes, and said tube, when inserted within the chambered body, having a sliding and turning fit therein, a threaded surface within said chambered portion adapted to receive the threads on said head, and means exteriorly of the shell for turning the magazine, substantially as described.

7. In a lead pencil of the class described, the combination of a sheathing forming a chambered body, a core piece in said body provided with an axial bore to receive a lead, a follower for forcing the lead through the bore embodying an exteriorly threaded head, a magazine comprising shell-like members arranged to lie upon opposite sides of said head, said members having a slidable and rotatable fit in said chambered portion, the outer end of the magazine portion abutting the inner end of the core, said magazine at its abutting end being formed with a funnel-shaped opening converging toward a point central of said shell-like members and forming a means for guiding the lead into the space between the shell-like members, a threaded surface in said chamber for receiving the threads on said head and

means exteriorly of said sheathing for turning said magazine portion, substantially as described.

8. In a lead pencil of the class described, the combination of a sheathing forming a chambered body, a core piece in said body, an axial bore in said core to receive a lead, a follower for forcing the lead through the bore embodying an exteriorly threaded head, a magazine comprising shell-like members arranged to lie upon opposite sides of said head, said head having central curved portions struck from an arc having its center at the center of the chambered body, said shell-like members having their inner and outer walls struck upon a similar curve, said members having a sliding and rotatable fit in said chambered portion, a threaded surface in said chamber for receiving the threads on said head and means exteriorly of said sheathing for turning said magazine portion, substantially as described.

9. In a lead pencil of the class described, the combination of a shell forming a chambered body, a core piece in said body, an axial bore in said core adapted to receive a lead, a follower for engaging and forcing the lead through said bore embodying a rectangular shaped head having a threaded surface on two opposed sides thereof, a threaded surface in said chambered portion for receiving the threads on said head, a magazine for extra leads comprising shell-like members arranged to lie upon opposite sides of the interior of said body and spaced away from one another at the center of said body and having a rotatable and slidable fit within said body, said head lying in the space between said shell-like members and in engagement with the walls thereof whereby it has a sliding motion longitudinally of said shell-like members and independent thereof and is rotated in unison with the rotation of said shell-like members, said head having no positive connection with said shell-like members, and means exteriorly of said sheathing for turning said magazine portions, substantially as described.

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