

July 14, 1964

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3,140,694

REFILLABLE AND RETRACTABLE LEAD PENCIL

Filed April 10, 1961

3 Sheets-Sheet 1

FIG. 1.

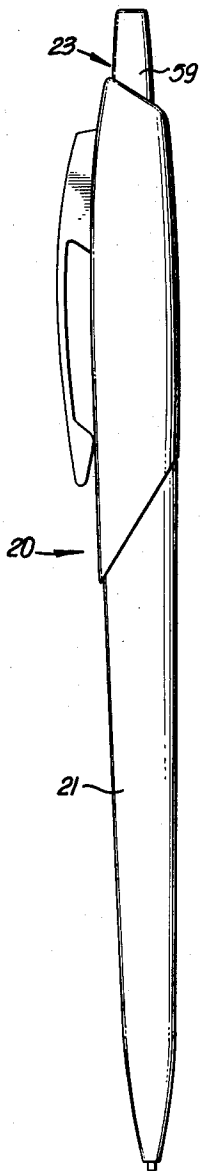


FIG. 2.

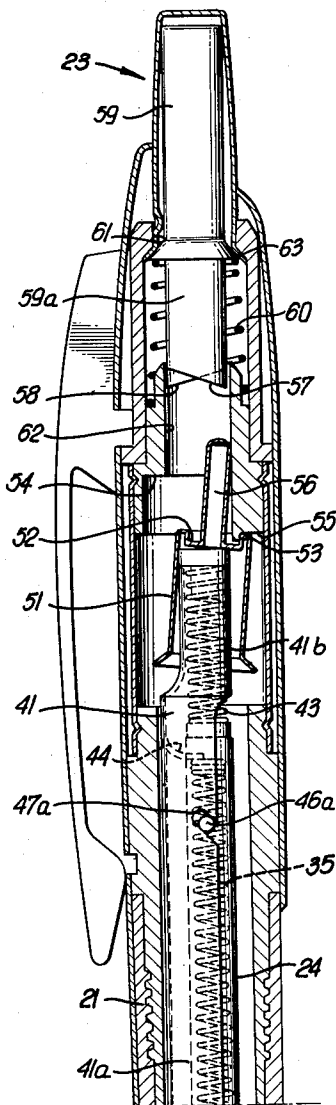
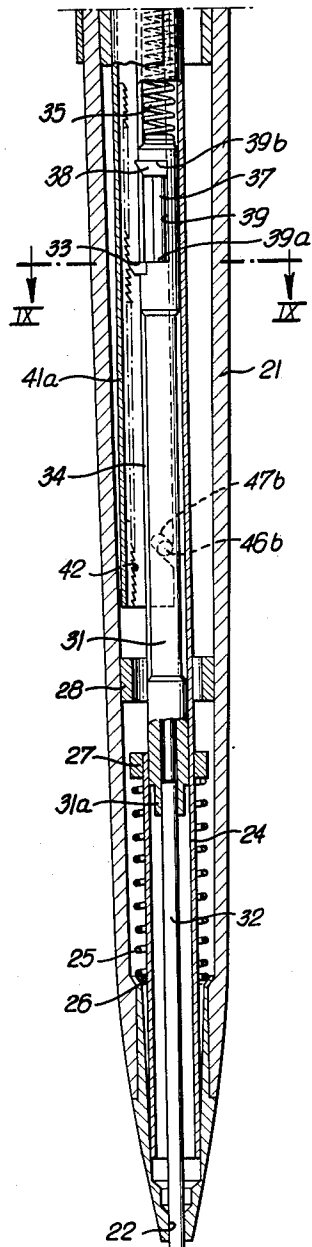


FIG. 2a.



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FIG. 3.

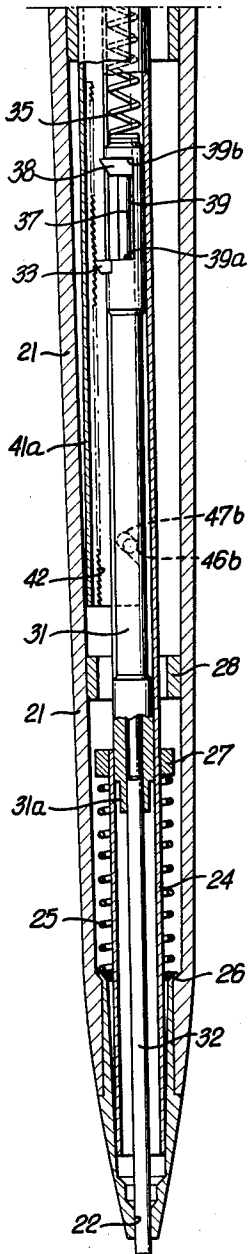


FIG. 4.

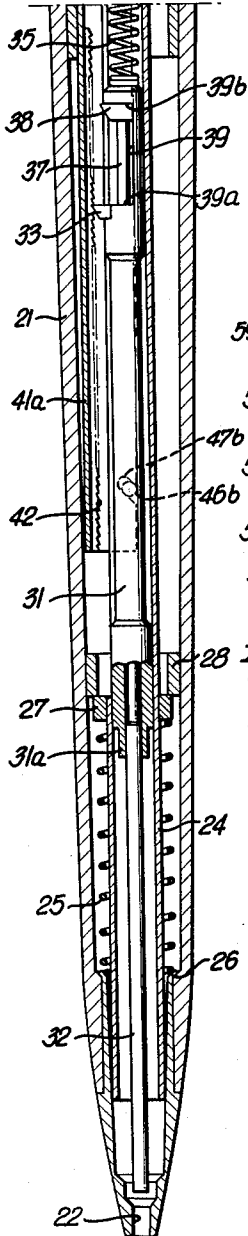


FIG. 5.

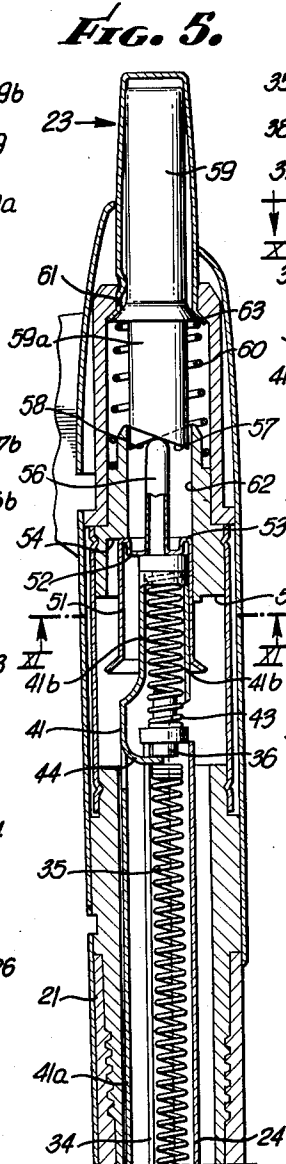
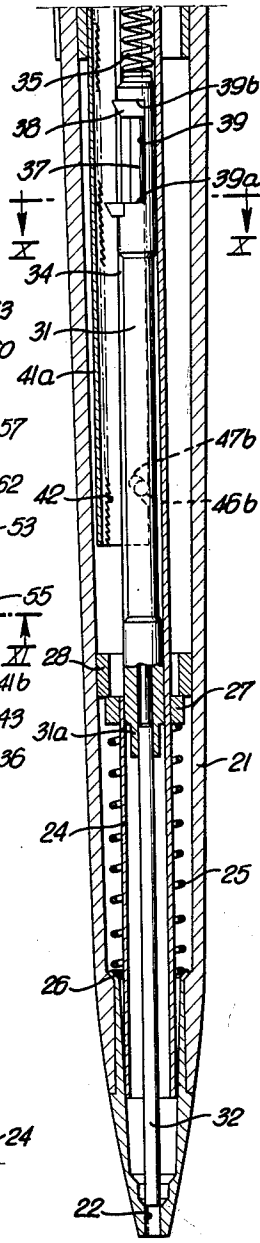


FIG. 5a.



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3,140,694
**REFILLABLE AND RETRACTABLE
LEAD PENCIL**

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12 Claims. (Cl. 120—14.9)

The present invention relates to a refillable pencil having lead adapted to be projected into and retracted out of writing position and more particularly to such a pencil which automatically provides a constant or uniform length of exposed lead upon each projection regardless of horizontal, vertical or even inverted position of the pencil.

Heretofore, refillable pencils having retractable lead were only capable of providing a uniform length of exposed lead for writing purposes after a push member, rotatable knob or some other means was actuated. The lead was not automatically moved into position so that a uniform length of lead was constantly exposed after each retraction. Moreover, these refillable pencils were required to be held in a vertical position with the writing point facing downwardly in order for the lead to be moved into proper position for providing a uniform length of exposed lead. This was primarily due to the lead being fed forwardly or downwardly by gravity and not by a positive means. Therefore, refillable pencils could only provide a uniform length of exposed writing lead after each retraction or use of the lead by holding the pencil in a vertical and downward position and actuating a button, knob or other means.

The present invention is an improvement over the refillable pencils described above in that after the lead has been retracted into the barrel of the pencil, means are provided for sensing that lead has been used and automatically the lead is moved into position so that a uniform length of lead is exposed for writing purposes upon the next successive projection of the lead into a writing position. This automatic lead wear compensating means functions automatically without the actuation of any manual means such as knobs or push buttons. Moreover, the automatic, lead compensating means in the present invention operates irrespective of the position of the pencil, whether in vertical writing, horizontal or even inverted position.

In general, the present invention includes an elongated, hollow barrel having a forward opening for receiving a stick of lead. A main elongated, hollow member is slidably carried in the barrel and is biased rearwardly by a return spring within the barrel. A lead carrier member is slidably carried in the main elongated, hollow member and frictionally holds the end of a forwardly extending stick of lead for axial movement therewith. A lead carrier spring is provided within the main elongated member for positively and continuously urging the lead carrier forwardly and to place the end of the stick of lead at the entrance to the barrel opening. The barrel opening acts as a friction holding member and has a diameter such that the stick of lead is prevented from passing therethrough under pressure from only the lead carrier spring. Additional force is required to pass the lead through the barrel opening. A latching means, mounted for axial and lateral movement within the barrel is actuated by any well known project-retract means for locking the main elongated member and lead carrier member together as a unit during movement of the lead between projected and retracted positions. In addition, means are provided for unlocking the latching means when the return spring has moved the stick of lead into a fully retracted position whereby the stick of lead and lead carrier

are automatically and positively urged forwardly until the stick of lead engages the entrance to the opening of the barrel. The stick of lead is now in position for the next projection through the barrel opening. Moreover, as lead is used or becomes worn, the stick of lead will always be moved into the same position for the next successive projection. The present invention thereby provides a separate lead wear compensating means which automatically provides a uniform length of exposed lead upon each projection irrespective of the vertical position of the pencil.

Accordingly, it is a general object of the present invention to provide a refillable pencil that avoids all of the foregoing disadvantages of similar type pencils used heretofore.

An object of the present invention is to provide a refillable and retractable lead pencil which automatically provides a uniform length of exposed lead upon each projection.

Another object is to provide a refillable and retractable pencil having automatic lead wear compensating means whereby a uniform length of lead is exposed upon each projection regardless of the position of the pencil with respect to the vertical.

A further object is to provide a refillable pencil which positively ejects a relatively short piece of lead from the barrel of the pencil.

Another object is to provide a refillable pencil as shown and described which requires no service, is relatively inexpensive to manufacture, and constantly operates in a positive and non-jamming manner irrespective of the position of the pencil with respect to the vertical.

Other objects and advantages of this invention will be readily apparent from the following description when considered in connection with the appended drawings.

In the drawings:

FIG. 1 is a side elevation of an exemplary refillable pencil of the present invention;

FIGS. 2 and 2a are enlarged, longitudinal sections of the upper and lower portions, respectively, of the exemplary pencil in FIG. 1 with the lead in an exposed writing position and the project-retract means in a fully projected position;

FIG. 3 is an enlarged, longitudinal section of the lower portion of the pencil in FIG. 1 and is similar to FIG. 2a with the exception that a portion of the exposed lead has been used and is shorter in length;

FIG. 4 is an enlarged, longitudinal section, similar to FIGS. 2a and 3 with the lead in a concealed position during movement of the project-retract means towards a fully retracted position;

FIGS. 5 and 5a are enlarged, longitudinal sections of the upper and lower portions, respectively, of the pencil in FIG. 1 with the project-retract means in a fully retracted position and the lead having been moved forwardly to place the end of the lead at the entrance of the barrel opening for projection on the next succeeding actuation;

FIG. 6 is an enlarged, longitudinal section of the lower portion of the pencil with short piece of lead remaining concealed in the pencil;

FIG. 7 is an enlarged longitudinal section, similar to FIG. 6, of the pencil with a short piece of lead being ejected by the short lead ejection means;

FIG. 8 is an enlarged, fragmentary, longitudinal section of the forward end of the pencil in FIGS. 6 and 7 with a short piece of lead being ejected from the barrel opening by the short lead ejection means;

FIG. 9 is a transverse section of the device taken along plane IX—IX of FIG. 2a;

FIG. 10 is a transverse section of the device taken along plane X—X of FIG. 5a;

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FIG. 11 is a transverse section of the device taken along plane XI—XI of FIG. 5; and

FIG. 12 is a transverse section of the device taken along plane XII—XII of FIG. 7.

In the refillable pencil of the present invention, there is provided a retracting mechanism capable of selectively and sequentially moving the stick of lead in the pencil between an exposed, projected writing position and a concealed, retracted position. The particular type of retracting mechanism used forms no part of the present invention as many well known mechanisms may be used equally as well. Retracting mechanisms provided in ball point pens may be used with the refillable pencil of the present invention and such an exemplary project-retract mechanism is shown and described herein and is specifically disclosed in Patent No. 2,941,510. However, it should be understood that retracting mechanisms of the side button and rotary type may also be used.

In the figures, an exemplary refillable pencil 20 is shown including an elongated hollow barrel 21 having a forward opening 22 for receiving a stick of lead and a selectively operable, project-retract means 23 carried in the rearward portion of the barrel 21 for projecting lead through the opening 22 into an exposed, projected writing position (FIGS. 2 and 2a) and for allowing lead to be returned within the barrel 21 into a concealed, retracted position (FIGS. 5 and 5a). The barrel 21 may comprise various elongated sections connected together by friction or threads and adapted to be easily disconnected for refilling the pencil and also for ease of assembling the pencil during manufacture.

A main, elongated, tubular or hollow member 24 is slidably carried in the barrel 21 and is biased rearwardly by return spring means 25 within the barrel 21. Spring 25 may be seated at its lower end on shoulder 26 in the barrel 21 and may bear at its upper end against an annular, laterally extending abutment 27 formed integrally with or rigidly connected with the main member 24.

Stop means is provided within the barrel 21 for limiting rearward movement of the main elongated member 24 and may be provided by an inwardly extending annular stop 28 formed integrally with or rigidly connected on the inside of barrel 21. Abutment 27 is adapted to engage stop 28 when the return spring 25 has moved the main elongated member 24 rearwardly towards or into a retracted position.

A lead carrier member 31 is slidably carried in the main elongated member and is adapted at a collet portion 31a to frictionally hold the end of a forwardly extending stick of lead 32 for axial movement therewith. The lead carrier member 31 may be provided with a transversely extending pawl member 33 which is adapted to extend through and is slidably movable in a longitudinally extending slot 34 in the main elongated member 24. The slot 34 may extend from the abutment 27 to the rearward end of main elongated member 24. The pawl member 33 has a forward surface which is inclined with respect to the axis of the pencil and a rearward surface which is straight and transverse to the axis of the pencil.

A lead carrier spring means 35 is carried within the main elongated member 24 for continuously urging the lead carrier 34 forwardly towards the barrel opening 22. As will be described in detail hereinafter, the spring 35 is effective to move the lead carrier forwardly and independently of the main member 24 to place the end of the stick of lead 32 into the entrance of the barrel opening 22 when the elements are fully retracted. The spring 35 is weaker than return spring 25 and bears at its lower end on the rearward end of lead carrier 31 and is adapted to be seated at its upper end on a centering pin 36 (FIG. 5) fixed to the inner end of main elongated member 24.

The barrel opening 22 functions as a friction holding member and has a diameter such that the stick of lead 32 held by the lead carrier 31 is prevented from passing

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therethrough under pressure from only said lead carrier spring 35 whereby additional force is required to pass the lead through the opening 22.

The lead carrier 31 may be hollow and is adapted to slidably carry short lead ejection means for ejecting a relatively short piece of residual lead out of the barrel opening 22. Such ejecting means may comprise an elongated rod 37 slidable in the lead carrier 31 and adapted to engage the rear end of the stick of lead 32 frictionally held by the collet 31a on lead carrier 31. A dog member 38 may be rigidly connected to the rear end of ejection rod 37 and extends laterally through an opening 39 in the rearward end of the lead carrier 31. The dog 38 is axially movable or has a stroke between axially spaced shoulders 39a and 39b forming the forward and rearward walls, respectively, of the opening 39. The dog 38 extends transversely through and is adapted to move in slot 34 in the main elongated member 24. In addition, the dog 38 is rearwardly of and shorter in length than the pawl 33 for reasons which will become obvious hereinafter. The rear shoulder 39b of opening 39 in lead carrier 31 engages dog 38 causing rod 37 to move axially with lead carrier 31 unless dog 38 is moved relative to lead carrier 31.

Axially movable latching means are provided within the barrel 21 and are adapted to be actuated by the project-retract means 23 for locking the main elongated member 24 and lead carrier 31 together as a unit to move the stick of lead 32 through the barrel opening 22 during movement between projected and retracted positions. The latching means may include an elongated member 41 exemplarily shown as being semi-circular in section having an elongated forwardly extending arm 41a and a rearward cup-shaped end 41b.

The latching means 41 is biased rearwardly into operative engagement with project-retract mechanism 23 by a relatively weak, unlatching spring means 43 exerting pressure between the rearward end of main elongated member 24 and the rear cup-shaped end 41b. Centering pins may be provided on each of these ends for preventing lateral movement of the spring 43.

It should also be noted that an inwardly extending tongue 44 may be punched out of the arm 41a of a latching means 41 and may be received in main elongated member 24 through slot 34 for engaging the rear end of lead carrier spring 35. As the latching means 41 moves axially forward, the tongue 44 further compresses spring 35 to urge lead carrier 31 forwardly.

The arm 41a on latching means 41 extends forwardly and may be provided with a longitudinally extending series of serrations, teeth or the like forming a rack 42 which is adapted to engage pawl 33 carried by the lead carrier 31. The forward end of latching arm 41a in its forwardmost position during projection of the lead is spaced from stop 28 (FIGS. 2a and 7) so as to allow the rack or serrations 42 thereof to engage the dog 38 on the lead ejection means and eject short pieces of lead. This operation is to be further described in detail. However, generally due to its greater lateral length, the pawl 33 carried by the lead carrier 31 is adapted to engage and disengage with the latching member 41 at any one of a number of points along the length of the latching member 41 upon lateral movement thereof. Each serration or tooth on the rack 42 terminates in a rearward transverse stop shoulder, each of which is adapted to engage the rearward, transverse surface of the pawl member 33 to prevent rearward relative movement when pawl 33 engages rack 42. However, the pawl member 33 is adapted to move forwardly and relative to the rack 42 because of the forwardly inclined surfaces on the teeth or serrations of the rack 42 and pawl member 33. The pawl member 33 and rack 42 are thus locked and will move as a unit when they are in engagement and when pawl member 33 is moved rearwardly. Pawl member 33 will move forward and relative to rack 42 when pawl member 33 is

moved forwardly in response to actuation by the project-retract mechanism 23.

Means are further provided for interconnecting the latching means 41 and the main elongated member 24 for translating limited relative axial movement therebetween into a lateral movement of the latching means 41 with the main member 24 and lead carrier 31. Such means may comprise laterally extending, aligned pins 46a and 46b rigidly connected to opposite sides of the main elongated member 24 and rearwardly and laterally extending aligned cam slots 47a and 47b provided in opposite sides of latching arm 41a. The pins 46a and 46b are slidably received in cam slots 47a and 47b, respectively, for camming the arm 41a laterally towards and away from main elongated member 24 when the latching arm is moved axially. During inward lateral movement of the latching arm 41a, the rack 42 engages the pawl 33 on the lead carrier 31, see FIG. 9.

The latching means 41 therefore functions as a locking means between main elongated member 24 and lead carrier 31. Pawl 33 and rack 42 lock the lead carrier 31 to latching means 41 and cam slots 47a and 47b and pins 46a and 46b, respectively, function to lock the main elongated member 24 to the latching means 41. Therefore, when the latching means 41 has been actuated forwardly by the project-retract means 23, as shown in FIGS. 2, 2a and 9, the latching means 41, lead carrier 31 and main elongated member 24 move as a unit.

As stated above, the latching means 41 is actuated by and is biased rearwardly into operative engagement with a project-retract means 23. While various retracting mechanisms may be used, an exemplary means is shown and will now be described.

An actuating element, latch or wobbler 51 is at all times in rockable contact with the rearward end 41b of the latching means 41. The actuating element 51 includes a lateral retract-shoulder 52 and lateral, project-shoulder 53 adapted to engage axially, spaced stops 54 and 55, respectively, provided in the rearward end of the barrel 21. A rearwardly extending stem 56 is integrally provided on the center of actuating element 51 for successively engaging retracting cam face 57 and projecting cam face 58 formed on the lower end of an axially extending, operating push-button 59.

Push-button 59 extends axially of the pencil through a port 61 in the barrel 21 and its downwardly extending shank 59a carries the cam faces 57 and 58. The cam faces 57 and 58 are oppositely inclined and each is displaced from the longitudinal axis of the push-button 59. The shank 59a is adapted for sliding movement within axial passageway 62 formed in the barrel 21. The push-button 59 is biased rearwardly by spring 60 and is retained within the barrel 21 by a stop shoulder 63 carried by the push-button and bearing against the inner surface of the barrel port 61.

The operation of the refillable and retractable pencil is as follows:

With the pencil in its fully retracted position as shown in FIGS. 5 and 5a, the push button 59 is moved axially downwardly so that projecting cam surface 58 forces actuating element 51 against the rear end 41b of latching means 41 and moves latching means 41 downwardly thereby compressing spring 43. The return spring 25 at this point holds main element 24 stationary. Because of the cooperation of cam slots 47a and 47b with pins 46a and 46b, respectively, the axial movement of latching means 41 is translated into lateral movement and the rack 42 on latching arm 41a engages pawl 33. It should be understood that from this point in projection, until the elements assume this same position after retraction, the main elongated member 24 and lead carrier 31 are locked together and axially moved as a unit because of latching means 41. The return spring 25 continuously forces pins 46a and 46b into engagement with the latching means 41 through cam slots 47a and 47b; and lead carrier 31,

is also locked to latching means 41. Therefore, while abutment 27 is out of engagement with stop 28, the lead carrier 31 and main elongated member 24 move in a longitudinal direction as a unit.

Upon further actuation of push-button 59, the lead carrier 31 and main elongated member 24 are moved downwardly into the projected position shown in FIGS. 2 and 2a. Additional force was therefore applied to move the stick of lead 32 through the barrel opening 22 and into the exposed, projected writing position. During this movement, actuating element 51 has also been moved downwardly and urged laterally to the right when FIG. 2 is observed until projecting shoulder 53 has moved beyond and below projecting stop 55. When the pressure is released on push-button 59, spring 60 urges it rearwardly and return spring 25 urges the main elongated member 24, lead carrier 31, latching means 41 and actuating element 51 rearwardly a relatively short distance until projecting shoulder 53 on the element 51 engages projecting stop 55 as shown in FIG. 2. The pencil 20 is now in writing position with a predetermined length of exposed writing lead.

After writing with the pencil, the writing end of the stick of lead 32 becomes worn as seen in FIG. 3.

When it is desired to retract the lead, the push-button 59 is again moved downwardly so that the retracting cam face 57 engages the stem 56 of actuating element 51 and moves the entire assembly of elements 41, 24 and 31 a short distance downwardly against the action of return spring 25 until the projecting shoulder 53 on actuating element 51 has moved out of engagement with projecting stop 55. During this movement, the actuating element 51 is rocked laterally towards the other side of the pencil by the oppositely inclined surface, retracting face 57. Pressure on push button 59 is released and the return spring 25 now urges the entire assembly rearwardly until abutment 27 re-engages stop 28 as shown in FIG. 4. The main elongated member 24 has reached its rearward limit of travel and the stick of lead 32 has been moved within the barrel 21 and into a retracted position, but lead 32 is still locked to latching arm 41a by the engagement of pawl 33 and rack 42.

The weaker, unlatching spring 43 now assumes control and urges the latching means 41 rearwardly. However, this axial movement is translated into lateral movement of the latching means 41 by cooperation of cam slots 47a and 47b with pins 46a and 46b, respectively. Therefore, latching means 41 is moved both rearwardly and laterally causing the rack 42 and pawl 33 to become unlatched. The unlatching spring 43 continues to urge the latching means 41 rearwardly until the retracting shoulder 52 on actuating element 51 engages retracting stop 54, see FIGS. 5 and 5a. As soon as pawl 33 becomes unlocked from the rack 42, the lead carrier 31 is controlled by the lead carrier spring 35 which immediately urges the lead carrier 31 forwardly until the forward end of the stick of lead 32 engages the entrance of the barrel opening 22 as shown in FIG. 5a. In this position, the stick of lead is in position for the next successive projection through opening 22. Moreover, the lead wear compensating mechanism of the present invention has moved the stick of lead 32 forwardly a distance corresponding with the length of lead that was used or worn, as illustrated in FIG. 3.

Upon the next projection, the stick of lead 32 will be exposed the same uniform length for writing purposes. As the lead is worn and is later retracted, the lead will automatically be moved forwardly into the position shown in FIGS. 5 and 5a for the next successive projection. No manual means are required to accomplish this. Moreover, the automatic lead wear compensating means will function regardless of the position of the pencil with respect to the vertical. It is common to lay the pencil in

a horizontal position after writing and the retracted lead will still be automatically moved into the correct position so that a uniform length of lead will be exposed on the next projection.

Another advantage of the present invention is the provision of automatically ejecting lead when it becomes too short to function properly. As seen in FIG. 6, only a relatively short piece of lead 32 remains held by lead carrier 31. The spring 35 has moved the lead carrier 31 forwardly into the retracted position, until the end of the piece of lead 32 engages the entrance of barrel opening 22. In this position, pawl 33 on lead carrier 31 has moved downwardly beyond the end of latching arm 41a. Upon downward movement of latching means 41, in response to pressure on the push button, the latching arm 41a is moved downwardly and laterally inwardly in accordance with the operation of elements 46 and 47 as described above. However, now rack 42 engages dog 36 and not pawl 33, since pawl 33 is now in position below the end of latching arm 41a. Upon further downward movement of the latching arm 41a, and push button 59, the ejecting rod 37 is forced downwardly and ejects the short piece of lead 32 from between the lead friction-holding collet 31a and out of the barrel opening 22 as shown in FIGS. 7 and 8. It is understood that lead carrier spring 35 is still continuously urging the lead carrier 31 forwardly until the collet end 31a engages the inside of the barrel 21 adjacent to the entrance of barrel opening 22, see FIG. 7.

To refill the pencil 20, the retract-project mechanism 23 is actuated into a retracted position. This movement unlatches the lead carrier 31 which is then moved forwardly in the main elongated member 24 under action of lead carrier spring 35. A fresh stick of lead of a predetermined length and diameter is pushed through the barrel opening 22 until the rear end of the lead frictionally engages the opening in the collet 31a on lead carrier 31. Further rearward pressure on the stick of lead will cause the lead carrier 31 to move rearwardly and compress the spring 35. The lead is then further moved through barrel opening 22 until the forward end of the lead is flush with the forward end of barrel opening 22. The retracting mechanism 23 is then actuated causing the lead to be more firmly engaged within collet 31a of lead carrier 31 and moving the lower end of the lead slightly beyond the tip of the barrel opening 22 in an exposed condition. By resting the exposed lead on a hard surface and exerting a slight downward pressure on the pencil, the lead will be further moved upwardly into tight frictional engagement with lead carrier 31. The pencil is now refilled with a fresh stick of lead and ready for use. The end of the fresh stick of lead is not required to be severed or broken off as with other lead pencils during refilling. It can therefore be understood that the present invention provides a refillable and retractable pencil which automatically provides a uniform length of exposed lead upon each projection regardless of horizontal, vertical or even inverted position of the pencil. Moreover, the present pencil may have its push-button 59 actuated repeatedly in successive movements, as a nervous person may do, without the lead being slowly ejected from the barrel. Upon each retraction and projection, the same uniform length of lead is exposed. In other lead pencils, repeated and successive operation of the push button will eject the stick of lead.

Obviously, many modifications and variations of the present invention are possible in the light of the above teachings. For example, the barrel walls of opening 22 may be split to allow for slight lateral movement when the diameter of the lead 32 varies slightly. This is to compensate for the tolerance in the diameter of lead used. It is therefore to be understood that within the scope of the appended claims, the invention may be practiced otherwise than as specifically described.

I claim:

1. A refillable pencil having a lead adapted to be projected into and retracted out of writing position, said pencil having automatic lead wear compensating means whereby a uniform length of lead is exposed upon each projection irrespective of the position of the pencil with respect to vertical, comprising: an elongated hollow barrel having a forward opening for a stick of lead; a selectively operable, project-retract mechanism in the rearward portion of the barrel, said mechanism including an actuating element movable into and between two axially displaced positions, a main elongated hollow member slidably carried in said barrel for axial movement between fixed stop means; a return spring biasing said main member rearwardly; a lead carrier slidably carried in the main member and adapted to frictionally hold the end of a forwardly extending stick of lead for axial movement therewith; a latching means axially movable within said barrel, means interconnecting said latching means and main member for translating limited relative axial movement therebetween into a lateral movement of said latching means with said main member and lead carrier therein; a pawl carried by the lead carrier and adapted to engage and disengage with said latching member at any one of a number of points along the length of said latching member upon lateral movement of the latching means; spring means biasing the latching member upwardly into contact with the actuating element; whereby upon movement of the actuating element from a rearwardly displaced position to a forwardly displaced position the latching member is engaged with said lead carrier and moves therewith to project the lead through said opening; and whereby upon movement of the actuating element from a forwardly displaced position to a rearwardly displaced position said latching member, main member and lead carrier are moved rearwardly by the return spring to retract the lead into the barrel through said opening, and separate lead wear compensating means including a spring effective to move said lead carrier forwardly and independently of said main member and latching means at the end of said retraction to place the end of the lead into the entrance to the barrel opening.

2. A refillable pencil as stated in claim 1 including ejection means carried by the lead carrier and movable into engagement with said latching member upon lateral movement thereof when said lead carrier and its pawl has been axially advanced forwardly beyond the end of said latching member, movement of the actuating element from a rearwardly displaced position to a forwardly displaced position thereupon causing the latching member to engage the ejection means to move the latter forwardly within the lead carrier to eject the residual lead carried thereby.

3. In a refillable pencil of the character stated, a longitudinally extending ratchet type latching member; a main elongated hollow member; a lead carrier slidably carried in the main member and having a forward end adapted to frictionally hold the end of a stick of lead for axial movement therewith; an ejection means movably carried in the lead carrier and having a dog extending laterally therefrom adjacent the rear end of said carrier; means interconnecting said latching member and main member to translate limited axial movement therebetween into a lateral movement of said latching member with said main member and lead carrier therein; a pawl carried by the lead carrier forwardly of said dog; said main member extending forwardly of said latching member, said pawl being adapted to engage and disengage with said latching member at any one of a number of points along the length of the latching member upon lateral movement of the latching member without engagement with said dog, said dog engaging the latching member when the lead carrier pawl is moved forwardly beyond the end of the latching member; spring means normally biasing the latching member out of engagement with the

said pawl and dog; and spring means biasing the lead carrier forwardly within the main member.

4. A refillable pencil having lead adapted to be projected into and retracted out of writing position and adapted to automatically provide a uniform length of exposed lead upon each projection irrespective of the horizontal or vertical position of the pencil, comprising: an elongated, hollow barrel having a forward opening for receiving a stick of lead, selectively operable, project-retract means carried in the rearward portion of said barrel for projecting lead through said opening into an exposed, projecting writing position and for allowing lead to be returned within said barrel into a concealed, retracted position, a main elongated, hollow member slidably carried in said barrel and biased rearwardly by return spring means within said barrel, stop means within said barrel for limiting rearward movement of said main elongated member, a lead carrier member slidably carried in said main elongated member and adapted to frictionally carry a stick of lead on its forward end, lead carrier spring means within said main elongated member for continuously urging said lead carrier member forwardly towards said barrel opening, said barrel opening having a diameter such that the lead carried by said lead carrier is prevented from passing therethrough under pressure from only said lead carrier spring means whereby additional force is required to pass the lead through said opening, said return spring means being of greater strength than said lead carrier spring means, axially movable, latching means within said barrel and actuated by said project-retract means for locking said main elongated member and said lead carrier member together as a unit to move the lead through said barrel opening during movement between said projected and retracted positions, and means for unlocking said latching means from said main elongated member and said lead carrier member when said return spring has moved the lead into a fully retracted position, whereby the lead and lead carrier member are automatically urged forwardly by said lead carrier spring means until the lead frictionally engages said barrel opening.

5. A refillable pencil as stated in claim 4 wherein said latching means includes, an elongated arm member having a longitudinally extending series of serrations, said main member having a longitudinal slot therein, and said lead carrier member having a transversely extending pawl member extending through and adapted to be slidably moved in said longitudinal slot in said main member, said pawl member adapted to be engaged by said serrations when said arm member is actuated during movement of the lead between projected and retracted positions.

6. A refillable pencil as stated in claim 4 wherein said means for unlocking said latching means includes unlatching spring means for continuously urging said latching means rearwardly and into operative engagement with said project-retract means, said return spring means being of greater strength than said unlatching spring means, and cooperating cam means on said latching means and main member for urging said latching means laterally to unlock the main member from said lead carrier member when the lead is in the retracted position.

7. A refillable pencil as stated in claim 4, including short lead ejection means slidably carried by said lead carrier member and engageable with the lead, said latching means being engageable with and adapted to move said lead ejection means forwardly into contact with the lead for ejecting a substantially short length of lead from said lead carrier member and out of said barrel opening in response to movement of said project-retract means being actuated into the projected position.

8. A refillable pencil as stated in claim 7, wherein said lead ejection means having a transversely extending dog member rearwardly of said pawl member on said lead carrier member, said dog member on said lead ejection

means extending beyond said tubular member but being shorter in length than said pawl member, whereby said latching means is adapted to engage and actuate said dog member and lead ejection means when said pawl member has moved forwardly beyond the end of said latching means.

9. A refillable pencil having lead adapted to be projected into and retracted out of writing position and adapted to automatically provide a uniform length of exposed lead upon each projection irrespective of the horizontal or vertical position of the pencil, comprising: an elongated, hollow barrel having a forward opening for receiving a stick of lead, selectively operable, project-retract means carried in the rearward portion of said barrel for projecting lead through said opening into an exposed, projected writing position and for allowing lead to be returned within said barrel into a concealed, retracted position, a main tubular member slidably carried in said barrel and biased rearwardly by return spring means within said barrel, stop means carried by said barrel for limiting rearward movement of said main tubular member, a lead carrier member slidably carried in said main tubular member and adapted to frictionally carry a stick of lead on its forward end, lead carrier spring means within said main tubular member for continuously urging said lead carrier member forwardly towards said barrel opening, said barrel opening having a diameter such that the lead carried by said lead carrier is prevented from passing therethrough under pressure from only said lead carrier spring means whereby additional force is required to pass the lead through said opening, said return spring means being of greater strength than said lead carrier spring means, axially movable, latching means within said barrel and actuated by said project-retract means for locking said main tubular member and said lead carrier member together as a unit to move the lead through said barrel opening during movement between said projected and retracted positions, and means for unlocking said latching means from said main tubular member and said lead carrier member when said return spring has moved the lead into a fully retracted position, whereby the lead and lead carrier member are automatically urged forwardly by said lead carrier spring means until the lead frictionally engages said barrel opening.

10. In a refillable pencil having lead adapted to be projected and retracted, the provision of: an elongated hollow barrel having a forward opening for receiving lead, a lead carrier member slidably carried in said barrel and adapted to carry lead on its forward end, lead carrier spring means within said barrel for continuously urging said lead and lead carrier member forwardly towards said barrel opening, said barrel opening having a diameter such that the lead carried by said lead carrier member is prevented from passing therethrough under pressure from only said lead carrier spring means whereby additional force is required to pass the lead through said opening, and latching means for operatively engaging said lead carrier member during movement of the lead between projected and retracted positions through said opening and thereby oppose forward movement of the lead by said lead carrier spring means and for releasing said lead and lead carrier member when retracted whereby said lead and lead carrier member are urged forwardly by said lead carrier spring means until the lead frictionally engages said barrel opening.

11. A refillable pencil having lead adapted to be projected into and out of writing position, comprising: an elongated hollow barrel having a forward opening for receiving a stick of lead, a lead carrier member slidably carried in said barrel and adapted to carry a stick of lead on its forward end, selectively operable, project-retract mechanism carried on said barrel and cooperating with latching means for moving said lead carrier axially in said barrel and for projecting and retracting the stick of

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lead through said barrel opening, and separate lead wear compensating means including a spring for automatically moving said lead carrier and stick of lead forwardly after the lead has been retracted through said barrel opening to place the end of the lead into the entrance of the barrel opening before the next successive projection of the lead, said barrel opening having a diameter such that the lead is prevented from passing therethrough under pressure from only said spring.

12. In a refillable pencil having lead adapted to be projected and retracted, the provision of: an elongated hollow barrel having a forward opening for receiving a stick of lead, a lead carrier member slidably carried in said barrel and adapted to carry a stick of lead on its forward end, lead carrier spring means within said barrel for continuously urging said lead and lead carrier member forwardly towards said barrel opening, said barrel opening having a diameter such that the lead carried by said lead carrier is prevented from passing therethrough under pressure from only said lead carrier spring means, and short lead ejection means slidably carried by said lead carrier member and engageable with said lead for ejecting a short piece of lead through the barrel opening,

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said lead carrier member having a transversely extending pawl member, said short lead ejection means having a transversely extending dog member rearwardly of and shorter in length than said pawl member, and latching means for operatively engaging said pawl member during movement of the lead between projected and retracted positions and when a relatively long unused piece of lead is carried by said lead carrier member, and for operatively engaging said dog member to move said short lead ejection means forwardly when a short piece of unused lead is carried by said lead carrier member and said pawl member has moved forwardly beyond the end of said latching means.

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