(No Model.)

L. H. SONDHEIM.

LEAD PENCIL.

No. 426,742. Patented Apr. 29, 1890.

Fig. 1.

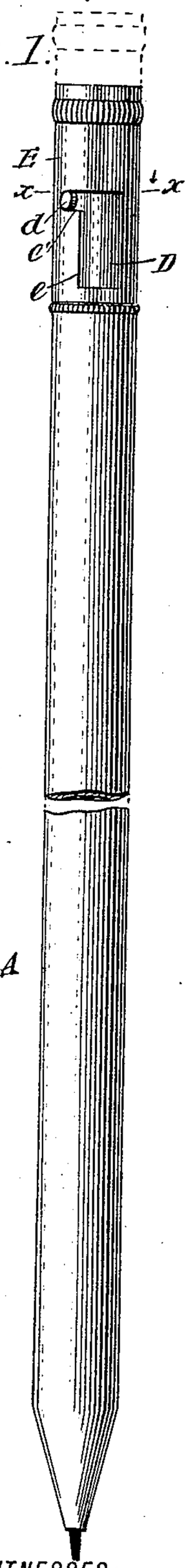

Fig. 2.

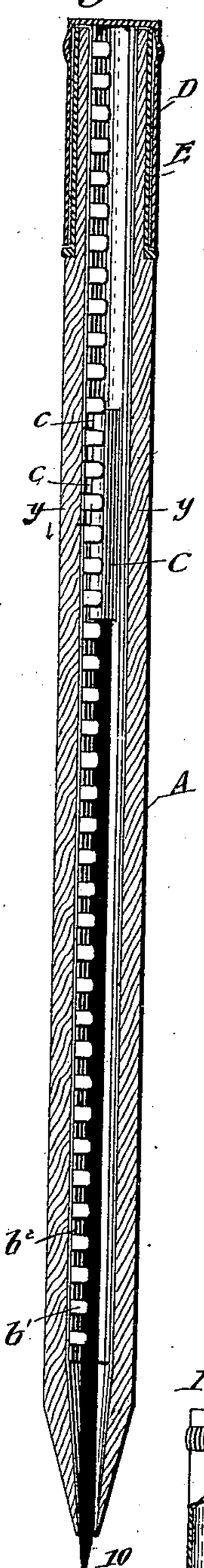

Fig. 7.

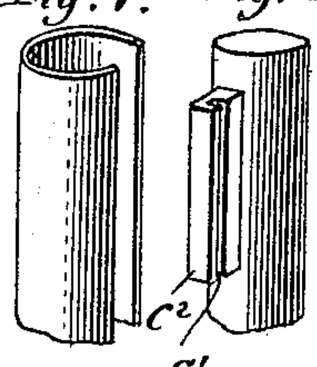

Fig. 8.

Fig. 9.

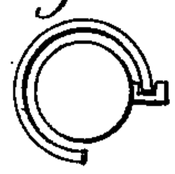

Fig. 3.

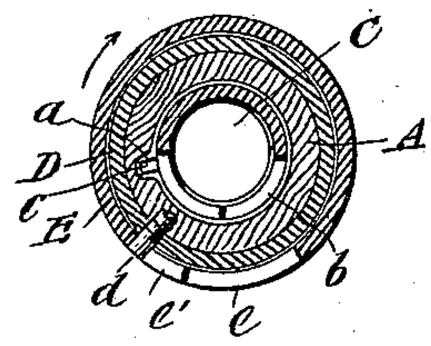

Fig. 4.

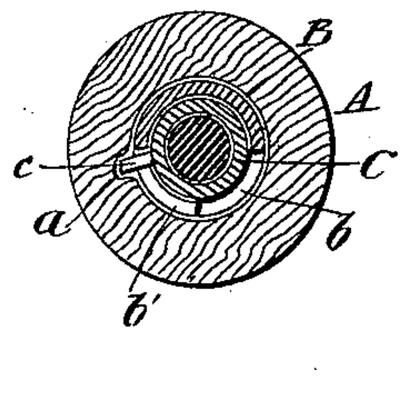

Fig. 5.

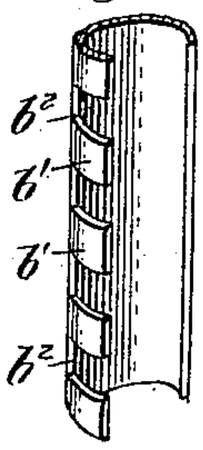

Fig. 6.

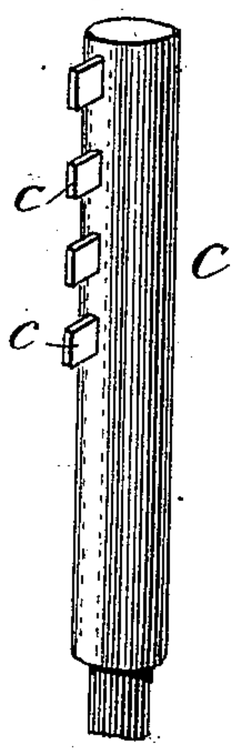

Fig. 10.

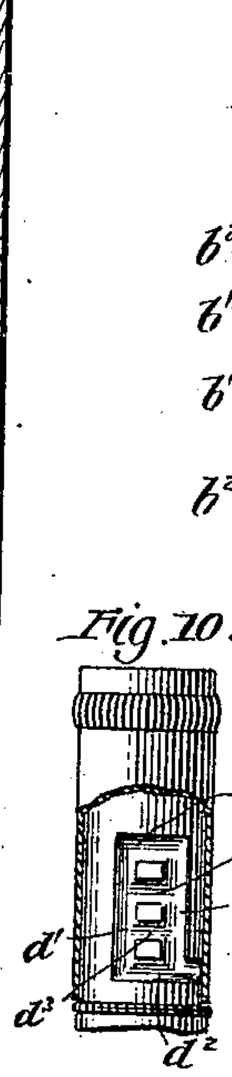

Fig. 11.

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UNITED STATES PATENT OFFICE.

LEWIS H. SONDHEIM, OF NEW YORK, N. Y.

LEAD-PENCIL.

SPECIFICATION forming part of Letters Patent No. 426,742, dated April 29, 1890.

Application filed July 17, 1889. Serial No. 317,791. (No model.)

To all whom it may concern:

Be it known that I, LEWIS H. SONDHEIM, of the city, county, and State of New York, have invented a new and Improved Lead-Pencil, of which the following is a full, clear, and exact description.

My invention relates to that class of pencils in which the lead or crayon is projected by a "step-by-step" movement as it is worn away by use; and the invention has for its object to provide a simple, efficient, and easily-adjusted pencil of this character.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation of my improved pencil partly broken away Fig. 2 is a longitudinal sectional elevation of the pencil. Fig. 3 is an enlarged cross-section taken on the line *x x* in Fig. 1. Fig. 4 is an enlarged cross-section taken on the line *y y* in Fig. 2. Fig. 5 is a perspective view of part of the slotted and notched lead or crayon feeding tube. Fig. 6 is a perspective view of a preferred form of traveler with a portion of the lead or crayon held thereby. Figs. 7, 8, and 9 illustrate a modified construction of the feeding tube and traveler partly broken away; and Figs. 10 and 11 show a preferred arrangement of the latch device, allowing a closer graduated adjustment of the lead or crayon by operating the end cap or finger-piece of the pencil.

I show the outer pencil-case A made of wood; but it may be made of metal, rubber, celluloid, or other suitable material. The case is hollow to accommodate most of the working parts of the pencil, and at the inside is provided with a lengthwise groove *a*, which opens into the central bore, in which is fitted a lead operating or feeding tube B, capable of a longitudinal movement and a partial rotary movement. This tube is provided with a longitudinal slot or way *b*, along one side of which, in the construction shown in Figs. 1 to 6 of the drawings, are formed teeth *b'*, providing notches b^2 between them.

Within the tube B is fitted a traveler C, which is preferably made of metal and hollow to adapt it to receive and, when desired, to also clamp the pencil lead or crayon 10, which extends forward from the traveler within the tube B, and is adapted for projection through an opening at the tapered point or end of the case A, which the lead preferably fits quite snugly, so as by friction to prevent withdrawal of it as the tube B is actuated to operate the traveler for projecting the lead in a manner presently explained. The traveler is provided with one or more radial lips or studs *c*, adapted to enter one or more of the notches b^2 of the lead-feeding tube B, and when the tube is turned to withdraw the notches or the teeth *b'* forming them from the traveler-studs the tube may be moved lengthwise without moving the traveler, as the traveler-studs then lie in the straight part of the tube-slot *b*. The traveler-studs *c* are preferably long enough to project through or past the side wall of the tube B into the longitudinal slot *a* of the case A, which positively prevents rotary movement of the traveler by the tube as the latter is turned in the case to engage or disengage the stud or studs of the traveler; but should the lead or crayon be made square or flat-sided and pass through a correspondingly-shaped opening or bore at the forward end of the pencil-case A the slot or groove *a* of the case may be dispensed with, and the traveler-stud *c* would then project only into the notches b^2 of the tube B, and in this construction the fit of the square or flat-sided lead into the pencil-case point would prevent rotation of the traveler when the tube B was turned to disengage or engage the traveler.

When the pencil-case A is made of wood, as shown, I prefer to fix upon its back end a ferrule D, which provides a durable bearing for an exterior end cap or finger-piece E, to which the outer end of the lead or crayon feeding tube B is fixed by soldering or otherwise. This metal ferrule also firmly holds a pin or stud *d*, which enters a rectangular side slot *e*, made in the finger-piece E. This slot is of sufficient width to allow ample rotary movement of the tube B by the finger-piece to disengage or engage the traveler-stud by the tube notches, and is also long enough to allow sufficient lengthwise movement of the engaged tube and traveler to properly project the lead or crayon. At one side the finger-piece slot is extended laterally by a notch *e'*, which may be engaged with the case pin

or stud *d* to lock the tube, the traveler, and the lead against endwise movement. If desired, the full equivalent of the slot or way *e e'* may be produced in the cap or finger-piece E by pressing the metal outward from the inside without removing it, and the equivalent of the pin *d* may be produced on the ferrule by pressing the metal outward in a manner well understood.

The operation of the parts as above described is as follows: Presuming the traveler C to be engaged with its operating-tube B, as best shown in Figs. 3 and 4 of the drawings, the finger-piece E is turned partly around in direction of the arrow shown in Fig. 3 of the drawings and carries the tube B around with it sufficiently to disengage the tube from the traveler C, so that the stud or studs *c* of the traveler then are in the straight part of the slot *b* or clear of the tube-teeth *b'*. This movement of the finger-piece carries its notch *e'* clear of the case pin or stud *d*, which then stands in the main slot or way *e* of the finger-piece, and when the finger-piece is drawn backward or upward it will carry the tube B with it, while the traveler C remains at rest and until the lower wall of the slot *e* strikes the pin *d*, and the finger-piece will now be turned around in the reverse direction to cause one or more of the notches b^2 of the tube B to again engage one or more of the studs *c* on the follower, whereupon the finger-piece will be pushed forward and will advance the tube, and with it the traveler, to project the lead 10 beyond the tapering end of the pencil-case for a distance compassing two of the teeth b^2 of the tube B, the length of the slot *e* being gaged to assure this extent of movement and allow instant disengagement and engagement of the tube and follower. By continuing the last above named rotary movement of the finger-piece its slot or notch *e'* will again be engaged with the pencil-case stud *d* to lock the parts in position with the lead properly projected.

To withdraw the lead or crayon within the pencil-case the above-described movements will be made in reverse order, as will readily be understood.

It will be noticed that by connecting the traveler actuating or feeding tube B directly to the exterior cap or piece E, which is adapted for operation directly and positively by the fingers of the person using the pencil, the construction is made very simple and cheap without sacrificing efficiency, and as the movements of the finger-piece are always positively communicated to the traveler-actuating tube the operator is always sure of the workings of the concealed tube and traveler. Furthermore, all more or less complex and expensive concealed mechanisms for automatically engaging and disengaging the tube and traveler are dispensed with, which promotes the efficient working and durability of the entire pencil.

Under my improvements, as hereinafter specifically claimed, I am not limited to the particular mode of coupling and uncoupling the feeding-tube B and traveler C. (Shown in Figs. 1 to 6 of the drawings and above described.) This is instanced by the modified construction shown in Figs. 7, 8, and 9 of the drawings, which exhibit a traveler provided with a rather long lug c^2, having a lengthwise slot *c'* at one side, into which one smooth edge or side wall of the slot *b* of the feeding-tube B is adapted to be turned by rotating the tube by the cap or finger-piece connected to it. The traveler-slot *c'* is intended to be of proper width to allow the edge of the slot *b* of the tube B to lock into it tightly or closely enough to cause the engaged traveler to be moved endwise by and with the tube. Under my improvements I am also not limited to the special form of latch employed to lock the tube and traveler to the pencil-case by means of the cap or finger-piece E. For instance, instead of using the slot *e e'* in the finger-piece to engage with a pin or stud *d* on the pencil-case, as above described, I may use the latch device shown in Figs. 10 and 11 of the drawings, wherein a pin or stud e^2 is fixed to the inner face of the finger-piece E, or is pressed inward from its outer face, and is adapted to work relatively with a series of vertically and laterally ranging grooves or recesses *d' d'*, d^2 d^2, and d^3 d^3, forming a substantially rectangular figure and pressed or partly pressed and partly cut into the body of the ferrule D, which is fixed to the pencil-case. The lower groove d^2 of this rectangularly-disposed series of communicating grooves extends beyond one of the side grooves *d'* to provide for interlocking the finger-piece stud e^2 into it to prevent endwise movement of the tube B, the traveler C, and the projected lead or crayon. The cross grooves or slots d^3 d^3, which are only by preference employed in the rectangular figure of grooves, are spaced apart and from the end grooves about the distance of one tooth on the tube B, whereby the traveler with the lead may be advanced the distance of one, two, or three teeth of the tube, as desired, instead of advancing the traveler and lead the whole length of the finger-piece slot *e*, as in the first-described construction. Should the preferred cross-grooves d^3 be dispensed with, the traveler and lead would be advanced the whole length of the rectangular figure of grooves in the ferrule, or the distance between the two end grooves d^2 d^2 of the figure.

This advantage of the construction, (shown in Figs. 10 and 11 of the drawings,) in permitting a more closely graduated positive feed of the lead or crayon, may assure its adoption in practice, and should this be done I may prefer to press the grooves or ways outward from the inside of the cap or finger-piece and press the pin or stud outward from the inside of the ferrule; but in this case the lateral extension of one of the end grooves to engage the pin or stud to lock the lead against end-

wise movement would be at the upper right-hand corner of the rectangular figure of grooves instead of at the lower left-hand corner. This obviously possible transposition of the grooves and stud from the ferrule and finger-piece to the finger-piece and ferrule, respectively, is clearly within the scope of my invention and could readily be made by any mechanic familiar with this class of work.

As regards the latch device, the parts of it formed in or on the ferrule are practically in or on the casing to which the ferrule is fixed.

The detent which the latch-stud engages is preferably formed as a groove or way projecting laterally from one end of the rectangular way or groove in which the stud moves in operating the pencil, as hereinbefore described; but I am not limited to this form of detent, as it may be substituted by a deeper impression at one corner of the rectangular way or groove, as will readily be understood.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a pencil, the combination, with the casing and the slotted operating-tube and the lead-actuating traveler therein, of an exterior finger-piece or cap fixed to the tube, both finger-piece and tube movable axially and lengthwise on the casing, substantially as herein set forth.

2. In a pencil, the combination, with the casing and the slotted operating-tube and the lead-actuating traveler therein, of an exterior finger-piece or cap fixed to the tube and movable axially and lengthwise on the casing, and a latch device for the finger-piece and casing, consisting of a stud on one part and a substantially rectangular way or groove in the other part to which the stud is adapted, substantially as herein set forth.

3. In a pencil, the combination, with the casing and the slotted operating-tube and the lead-actuating traveler therein, of an exterior finger-piece or cap fixed to the tube, and a latch device for the finger-piece and casing, consisting of a stud on one part and a substantially rectangular way or groove in the other part, having connecting intermediate cross grooves or ways, to all of which grooves or ways the stud is adapted, substantially as herein set forth.

4. In a pencil, the combination, with the casing and the slotted operating-tube and the lead-actuating traveler therein, of an exterior finger-piece or cap fixed to the tube and movable axially and lengthwise on the casing, and a latch device for the finger-piece and casing, consisting of a stud on one part and a substantially rectangular way or groove in the other part to which the stud is adapted, and a detent next the rectangular way or groove and into which the stud enters to lock the finger-piece and the tube against endwise movement on the casing, substantially as herein set forth.

5. In a pencil, the combination, with the casing and the slotted operating-tube and lead-actuating traveler therein, of an exterior finger-piece or cap fixed to the tube and movable axially and lengthwise on the casing, and a latch device for the finger-piece and casing, consisting of a stud on one part and a substantially rectangular way or groove in the other part, having connecting intermediate cross grooves or ways, to all of which grooves or ways the stud is adapted, and a detent next the rectangular way or groove, into which detent the stud enters to lock the finger-piece and the tube against endwise movement in the pencil-casing, substantially as described, for the purposes set forth.

6. In a pencil, the combination of a casing, a tube fitted loosely therein and provided with a lengthwise slot, a traveler placed in the tube and adapted to engage it and to be disengaged by axial movement of the tube, and also adapted to be moved endwise by endwise movement of the engaged tube, a lead or crayon held in the tube and adjustable by the traveler as the latter is moved by and with the tube, a finger-piece or cap fixed to the tube and adapted for axial and endwise movements on the casing, and a latch device for the finger-piece and casing, allowing axial and endwise movements of the attached lead-tube and locking the finger-piece, the tube, and the traveler against endwise movement, substantially as described, for the purposes set forth.

7. In a pencil, the combination of a casing provided with an interior lengthwise groove, a tube fitted loosely in the casing and provided with a lengthwise slot, a traveler placed in the tube and adapted to engage it at its slot and to be disengaged by partial rotation of the tube, and also adapted to be moved endwise by endwise movement of the engaged tube, said traveler having a stud entering the interior lengthwise groove of the casing, a lead or crayon held in the tube and adjustable by the traveler as the latter is moved by and with the tube, a finger-piece or cap fixed to the tube and adapted for axial and endwise movements on the casing, and a latch device allowing axial and endwise movement of the connected finger-piece and tube and locking the finger-piece, the tube, and the traveler against endwise movement, substantially as described, for the purposes set forth.

8. In a pencil, the combination of a casing, a tube fitted loosely therein and provided with a lengthwise slot, a traveler placed in the tube and adapted to engage it and to be disengaged by a partial rotation of the tube, and also adapted to be moved endwise by endwise movement of the engaged tube, a lead or crayon held in the tube and adjustable by the traveler as the latter is moved by and with the tube, a finger-piece or cap fixed to

the tube and adapted for axial and endwise movements on the casing, and a latch device for the finger-piece and casing, consisting of a stud on one part and a substantially rectangular way or groove in the other part to which the stud is adapted, and a detent into which the stud enters to lock the finger-piece, the tube, the traveler, and the lead against endwise movement in the pencil-casing, substantially as described, for the purposes set forth.

9. In a pencil, the combination of a casing, a tube fitted loosely therein and provided with a lengthwise slot, a traveler placed in the tube and adapted to engage it and to be disengaged by a partial rotation of the tube, and also adapted to be moved endwise by endwise movement of the engaged tube, a lead or crayon held in the tube and adjustable by the traveler as the latter is moved by and with the tube, a finger-piece or cap fixed to the tube and adapted for axial and endwise movements on the casing, and a latch device for the finger-piece and casing, consisting of a stud on one part and a substantially rectangular way or groove in the other part to which the stud is adapted and provided with intermediate or cross grooves or ways, and a detent at one end into which the stud may enter, substantially as described, whereby the finger-piece may be actuated to project the lead considerably or by more closely graduated positive feed movement, and the finger-piece, the tube, the traveler, and the lead may be locked against endwise movement on the pencil-case, as herein set forth.

LEWIS H. SONDHEIM.

Witnesses:
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C. SEDGWICK.