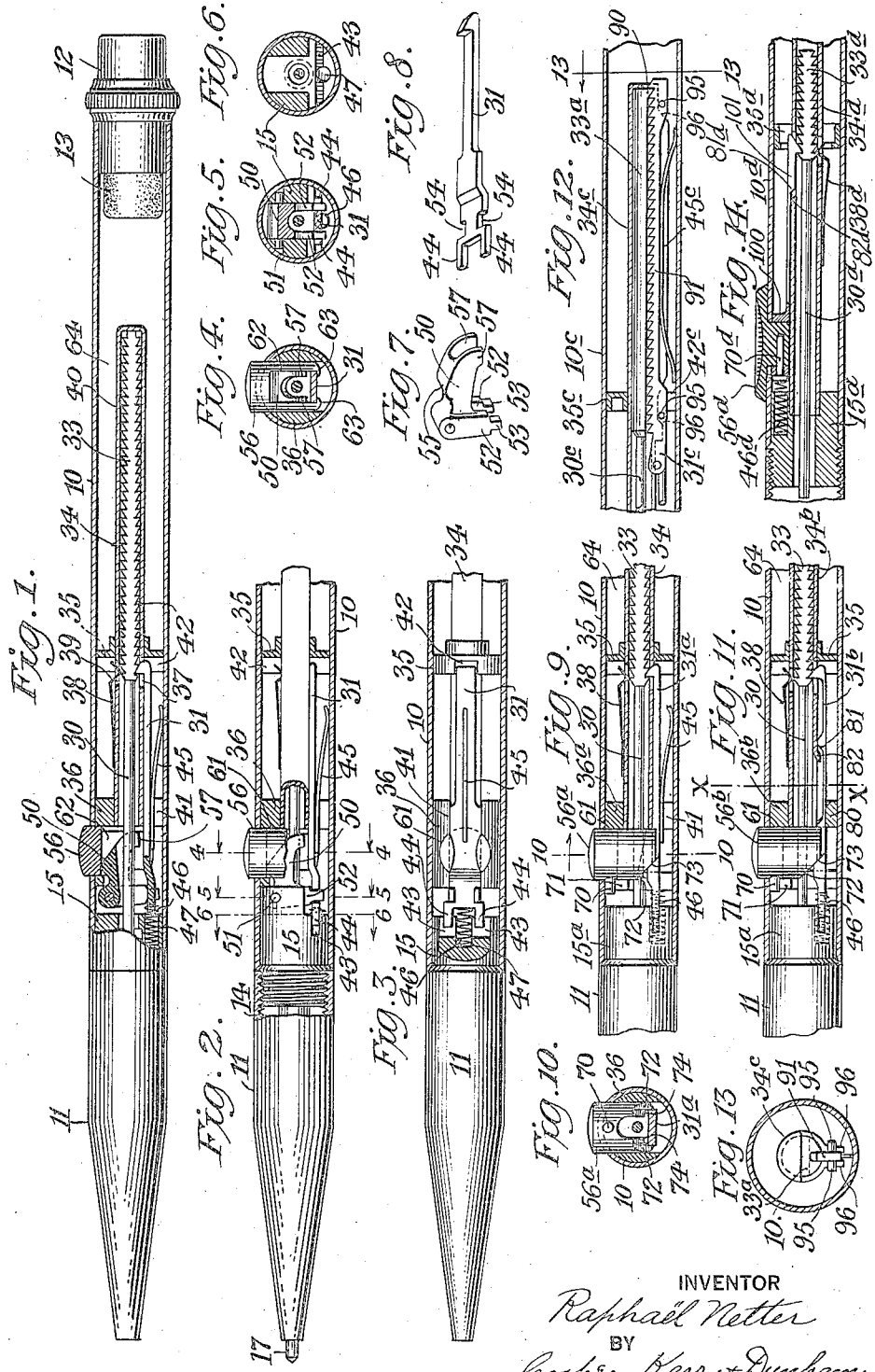
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R. NETTER

AUTOMATIC PENCIL

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RAPHAËL NETTER, OF NEW YORK, N. Y.; ADELAIDE FOLLET NETTER EXECUTRIX OF SAID RAPHAËL NETTER, DECEASED.

AUTOMATIC PENCIL.

Application filed December 22, 1921. Serial No, 524,050.

To all whom it may concern:

Be it known that I, RAPHAËL NETTER, a citizen of the Republic of France, residing at New York city, in the county and State of New York, U. S. A., have invented certain new and useful Improvements in Automatic Pencils, of which the following is a full, clear, and exact description.

This invention relates to pencils. More specifically it relates to refillable pencils in which a crayon may be fed forwardly from the body or casing of the same.

One of the principal objects of the invention is to provide a pencil in which the crayon may be fed forwardly by the actuation of a push element, preferably a push button.

Another object is to provide a pencil wherein the crayon may be fed forwardly or released for retractive movement by the actuation of a push element, preferably a push button. Other objects and advantages will appear as the invention is hereinafter disclosed.

Referring to the drawings which illustrate what I now consider preferred forms of the invention:

Fig. 1 is a longitudinal section through one form of pencil embodying the invention.

Fig. 2 is a fragmentary detail elevation, partly in section, of the pencil shown in Fig. 1.

Fig. 3 is an inverted plan view, partly in section, of the structure shown in Fig. 2.

Figs. 4, 5 and 6 are sections taken substantially on the lines 4—4, 5—5, and 6—6, respectively, of Fig. 2.

Figs. 7 and 8 are respectively perspective views of a lever and pawl forming a part of the structure shown in Fig. 1.

Fig. 9 is a fragmentary elevation, partly in section, of a modified form of pencil.

Fig. 10 is a section taken substantially on line 10—10 of Fig. 9.

Fig. 11 is a view similar to Fig. 9 but illustrating a further modification.

Fig. 12 is a detail sectional elevation illustrating still another modification.

Fig. 13 is a section on the line 13—13 of Fig. 12.

Fig. 14 is a view similar to Fig. 11 but illustrating a further modification.

Referring to Figs. 1 to 8 it will be seen that the pencil there illustrated comprises a casing 10 having at one end a tip 11 and at the other a cap 12. The cap 12 is adapted frictionally to fit the casing in the position shown in Fig. 1 or in a position reversed with respect to that position so as to expose for use the eraser 13. The pencil is provided with a crayon-receiving bore and preferably with any suitable means for imposing a frictional force upon the crayon to prevent inadvertent or accidental movement of the crayon with respect to the body of the pencil.

The tip 11 is detachable from the barrel 10 by virtue of the cooperating screw-threads 14 provided on the interior of the tip and on the exterior of a sleeve 15 frictionally or otherwise held in said barrel.

One form of operating or crayon-feeding mechanism will now be described.

A longitudinally movable follower rod or member 30 and a longitudinally movable actuating member 31 are provided. The member 31, in this instance, serves as a pawl to engage ratchet teeth 32 provided upon the enlarged extension 33 of the follower rod. The latter is adapted to enter the bore of the sleeve 16 to push the crayon 17 from the pencil and extends into a sleeve or tube 34 secured within the casing or barrel 10 by means such as annular spacer blocks 35 and 36. The active end of the pawl 31 passes through an opening 37 in the tube 34, this opening being of sufficient size to permit the pawl to impart the desired movement to the rack 33 and consequently to the follower rod. A spring 38 secured to tube 34, and extending through an opening 39 thereof into engagement with the ratchet teeth 40 on the rack 33, is provided to prevent overthrow or accidental movement of the rack. If the pawl 31 is held in the position shown in Fig. 1 it will prevent the follower rod, and consequently the crayon 17, from being forced into the pencil. And if the pawl 31 is moved forwardly the follower rod and crayon will be correspondingly moved thereby. I therefore provide devices for normally holding the pawl 31 in the position shown in Fig. 1 and for actuating or reciprocating the pawl. One form of such means is shown in Figs. 1 to 8 and may be constructed as follows.

The pawl 31 is guided in its longitudinal movement by the slots 41 and 42, in the blocks 36 and 37, through which said pawl passes, and is further guided in such movement by the slots 43, 43, in the member 15,

into which slots the bifurcations 44, 44, of the pawl extend. The pawl 31 has also a limited degree of lateral movement toward and away from the rack 33. It will be noted that any pivotal movement of the pawl, if it may be said to move about a pivot, is about the edges of the slots 43, 43 as a fulcrum or pivot. A spring 45 secured to the pawl and engaging casing 10 biases the pawl toward the rack 33. The pawl is biased toward the head or butt end of the pencil by means of a compression spring 46 mounted in a bore 47 in the block 15 and engaging the pawl between the bifurcations 44, 44.

A bell crank lever 50 is pivoted at 51 to the block 15 and movable in a slot provided in said block. This lever has a bifurcated arm 52, which extends across the casing 10 and through which the rod 30 extends. The bifurcations 52 terminate in reduced elements 53, each of which is adapted to enter a corresponding one of the notches 54 provided in the pawl. The other arm of the bell crank lever is provided with a portion 55, adapted to be engaged by and to engage a push button 56, and is provided also with a bifurcated end 57 through which the rod 30 extends. The extremities of the bifurcations 57, 57 are designed to engage and operate the pawl 31 laterally when the push button has been actuated to a sufficient extent.

The push button 56 is generally in the form of a cylinder and extends through an aperture 60 in the side wall of the casing 10 and is slidable in a transverse bore 61 in the block 36. Directing specific attention to Fig. 4, it will be noted that the push button is slotted at 62 and straddles the lever 50 and pawl 31. It will be noted further that the push button is provided with shoulders 63 which are adapted to engage the underside of the pawl 31 to limit the outward movement of the said push button. The various operations in assembling the parts of the pencil and the comparative ease with which these operations may be performed will be apparent to those skilled in the art in view of the foregoing description and therefore need not be set forth. After having been assembled, the pencil shown in Figs. 1 to 8 is so designed and constructed as to operate substantially as follows:

When the parts occupy the position illustrated in Figs. 1 and 2, the pencil is in condition for use, i. e., it may be employed to write. The pawl 31 is prevented from moving longitudinally toward the head 12 by virtue of the lever 50 and push button 56. The pawl 31 therefore serves, at this time, to prevent the crayon 17 from moving into or being forced into the pencil. When the crayon 17 has become worn by use, or is broken off, it may be fed forwardly as follows. The user, without any substantial movement of his writing hand with respect to the pencil from the writing position, depresses the push button 56, using his thumb or one of the fingers of his writing hand for this purpose. This depression of the push button 56 causes the lever 50 to move clockwise (as viewed in Figs. 1 or 2) to move the pawl 31 forwardly. The pawl 31, being thus actuated, moves the rack 33 forward one step and consequently the crayon is pushed forwardly from the pencil a fixed distance corresponding to the distance between teeth of the rack. Sufficient depression of the push button 56 causes the ends 57 thereof to engage the pawl 31 to move the latter out of engagement with the rack 33. This is an important feature in that, by virtue of this construction, the rack may be released and the crayon 17 may be forced back into the pencil at any time, and this release is effected by operation of the same element 56 employed to cause feed movement of the crayon. When the push button is released, the springs 45 and 46 return the parts 31, 50 and 56 to the position shown in Fig. 1. The spring 38 prevents movement of the rack 33 by the back or return stroke of the pawl 31.

As the crayon becomes consumed it is fed forward a step each time the push button 56 is depressed. When completely consumed the pencil may be recharged by unscrewing the tip 11 from the body portion 10, inserting a new crayon into the bore, depressing push button 56 to release the pawl 31, pushing the follower rod back into the barrel 10, and then screwing the tip 11 back upon the said body portion. The pencil may then be employed in the manner above described. The extra leads or other crayons may be stored in the ample magazine space 64, accessible by removing the head 12.

I shall not enumerate all of the advantages gained by my invention but I wish to direct particular attention to the fact that a single actuation of the radially movable push button 56 feeds the crayon 17 forward a substantial amount, i. e., an amount substantially equivalent to the additional exposure of crayon incident to the sharpening of an ordinary wooden pencil. This feature is rendered possible, without increasing the diameter of the barrel 10 to ungainly and unwieldy proportions and without bending or flexing the follower rod, by the extension of the arm 52 and the push button 56 substantially across the interior of the casing. Other important advantages will be apparent to those skilled in the art in view of the foregoing description.

The form of invention described above is susceptible to modification in various respects. Thus the lever 50 may be omitted and the push button may be employed directly to operate the pawl. One form of mechanism thus modified is illustrated in

Figs. 9 and 10 to which attention is now directed. The elements 10, 11, 30, 33, 34, 35, 38, 45 and 46 are the same as those described in connection with Figs. 1 to 8. The following changes should be noted. The push button 56^a is not only guided for vertical movement in the substantially cylindrical bore 61 of the block 36 but is provided with a pin 70 operable in a slot 71, in the block 36, to prevent rotational movement of the push button and to limit the extent of outward radial movement. Here again the push button is slotted or provided with an opening to straddle the follower rod 30. The lower faces 72, 72 of the push button are inclined as indicated and are each adapted to cooperate with a corresponding one of a pair of inclined faces 73 on the pawl 31^a. The push button is provided also with a pair of shoulders 74 adapted to engage the upper surface of the pawl 31^a and to move the pawl laterally at the end of the feed stroke.

When it is desired to feed the lead or crayon forwardly, the push button 56^a is depressed as described in connection with the pencil shown in Figs. 1 to 8. This causes the pawl 31^a to move forwardly by virtue of the action of the cooperating inclined faces 72 and 73. The pawl 31^a thereby moves the rack 33 forwardly one step and at the end of the feed stroke the shoulders 74 engage the pawl so that continued depression of the push button releases the pawl from the rack. When the push button is released the springs 45, 46, come into play to restore the parts 31^a, 56^a, to the position shown in Fig. 9, the spring 38 holding the rack in the position to which it has been actuated. Except for differences set forth above, the construction and operation of the form of pencil illustrated in Figs. 9 and 10 is the same as that shown in Figs. 1 to 8.

Further modifications may be resorted to without departing from the generic invention. For example, the spring 45 may be dispensed with or the longitudinal movement of the pawl may be employed to effect its lateral release movement etc. Changes in construction such as those last mentioned are illustrated in Fig. 11. The elements 10, 11, 30, 33, 35, 38 and 46 are the same as those illustrated in Figs. 1 to 8 and Figs. 9 and 10. The element 15^a in Fig. 11 is the same as the element 15^a in Fig. 9. However, the following changes should be noted in the elements 31^b, 34^b, 36^b and 56^b corresponding respectively to the elements 31^a, 34^a, 36^a and 56^a of Figs. 9 and 10. The pawl 31^b, instead of moving laterally about the block 15^c as a fulcrum, bends about the block 36^b as a fulcrum and the inherent resiliency of the end of the pawl is relied upon to bias it to ratchet-engaging position. This change of fulcrum is effected by employing an opening 80, in the block 30^b (see Fig. 11) instead of the slot 41 shown in Figs. 1 and 9. The pawl 31^b is provided with a lug or projection 81 adapted to engage a struck up portion 82 on the sleeve 34^b so as to move the pawl 31^b out of ratchet-engaging position at the end of the feed stroke of the pawl. By virtue of this construction the shoulders 74, 74 (Figs. 9 and 10) may be and are dispensed with in the form of pencil shown in Fig. 11.

When the push button 56^b is depressed, the cooperating inclined faces 72, 73 cause the pawl 31^b to move forwardly to actuate the rack 33 one step. At the end of the feed stroke the elements 81, 82, cause the pawl to become disengaged from the rack teeth. When the push button 56^b is released the spring 46 and the inherent resiliency cause the parts 56^b and 31^b to assume the position shown in Fig. 11. The operation of the pencil shown in Fig. 11 will now be understood, in view of the foregoing description in connection with Figs. 1 to 10.

In all forms of the invention thus far described the longitudinally movable follower rod or member 30 is provided with rack-forming or ratchet-forming teeth and the member 31 (or 31^a or 31^b) constructed in the form of a pawl. This structure may be modified by providing teeth on the reciprocatory member and a pawl on the follower rod. An example of such an arrangement is shown in Figs. 12 and 13 to which reference is now made.

The follower rod 30^c is provided with an enlarged portion or extension 33^a which is guided in its longitudinal movement by the tube 34^c. This tube is mounted in the casing 10 in a manner similar to the tubes 34 and 34^b in the preceding figures, i. e. by means including a spacer member 35^c. The portion 33^a of the follower rod is provided with a tooth or pawl 90 adapted to be engaged and operated by a rack or ratchet member 91. The latter is connected to a member 31^c which in turn may be operated by mechanism such as that shown in Figs. 1, 9 or 11, preferably that shown to the left of the line X—X in Fig. 11. In other words, the member 31^c (Fig. 12) would constitute the right hand portion and that portion of the member 31^b which lies to the left of the line X—X in Fig. 11 would constitute the left hand portion of the longitudinally reciprocating member. The rack 91 is biased to pawl-engaging position by any suitable means such as a spring 45^c. In order to disengage the rack from the pawl 90 at the end of the feed stroke of the former, the rack may be provided with a plurality of pins 95 each adapted to engage a corresponding one of inclined portions 96 provided on the outwardly turned edges 96 of the tube 34^c. The design and

construction are such that this form of mechanism will operate substantially as follows.

When the push button is depressed, the members 31^c and 91 move forward to operate the pawl 90 and follower rod 30^c one step in a forward direction. At the end of the feed stroke the pins 95 cooperating with the inclined portions 96 cause the ratchet or rack 91 to become disengaged from the pawl 90. Upon release of the push button the parts are automatically restored to original position with the exception of the follower rod 30^c, which is held in the position to which it has been actuated by friction or by other suitable means.

In Fig. 14 I illustrate a form of pencil in which the member 56^d is shown in the form of a manually operable slidable member, mounted for slidable movement in reverse directions parallel to the axis of the pencil, the slide member being mounted in a suitable opening or aperture provided in the side wall of the casing 10^d nearer the tip than to the other end of the pencil. It will be noticed that the member 56^d is provided with a depression or concave portion adapted to receive the operator's finger or thumb to facilitate manual operation. The elements 10^d, 15^d, 30^d, 33^d, 34^d, 35^d, 38^d and 46^d correspond generally to the similar elements which are designated by the same numerals, with different subscripts, in the other figures. The member 56^d may be prevented from turning in its slot by any suitable means. For example the shank of said member and the said slot may be so designed as to permit sliding but to prevent turning of the slide 56^d with respect to the pencil casing. The pawl 101 is provided with an annular portion or ring 100 which surrounds the shank of the member 56^d and is secured thereto by means of a pin 70^d. It will be noted that said pin 70^d and ring 100 prevent outward radial movement of the member 56^d when the parts are assembled. The parts 81^d and 82^d correspond to the elements 81 and 82 in Fig. 11. This form of pencil is constructed and designed to operate as follows.

To feed the crayon forward, the slide 56^d is moved toward the pencil tip. Such movement actuates the pawl 101 to feed the follower rod and crayon forwardly one step. At the end of the feed stroke the parts 81^d, 82^d cause the pawl to be thrown laterally away from the rack 33^d. The operation of this form of pencil will now be clearly understood in view of the foregoing description in connection with Fig. 14 and the preceding figures.

In accordance with the provisions of the patent statutes, I have herein described the principle of operation of my invention, together with the apparatus which I now consider to represent the best embodiments thereof, but I desire to have it understood that the apparatus disclosed is only illustrative and that the invention can be carried out by other means. Also while it is designed to use the various features and elements in the combinations and relations described, some of these may be altered and others omitted and some of the features of each modification may be embodied in the others without interfering with the more general results and effects outlined, and the invention extends to such use.

What I claim is:—

1. A pencil comprising in combination a casing having a tip through which a crayon is adapted to be fed; releasable means carried by said casing for preventing movement of a crayon inwardly through said tip; means, comprising a push button accessible from the exterior of said casing and mounted for sliding movement toward and away from the axis of said casing, for feeding a crayon outwardly through said tip upon depression of said push button; and means called into action upon further depression of said push button for releasing said releasable means to permit a crayon to move inwardly through said tip.

2. A pencil comprising in combination, a casing having a tip through which a crayon is adapted to be fed, a follower rod slidably mounted in said casing and adapted to propel a crayon through said tip, a push button slidably mounted with respect to said casing and accessible from the exterior of the pencil for manual operation, a lever mounted within said casing and operable by said push button, and pawl and ratchet mechanism operatively connecting said lever and follower rod.

3. A pencil comprising in combination, a casing having a tip through which a crayon is adapted to be fed, a follower rod slidably mounted in said casing and adapted to propel a crayon through said tip, a push button slidably mounted with respect to said casing and accessible from the exterior of the pencil for manual operation, a member mounted within said casing for longitudinal reciprocating movement with respect thereto, means operatively connecting said member and follower rod whereby reciprocating movement of said member imparts longitudinal crayon-feed movement to said rod, and operative connections between said push button and member.

4. A pencil comprising in combination, a casing having a tip through which a crayon is adapted to be fed, a follower rod slidably mounted in said casing and adapted to propel a crayon through said tip, a push button slidably mounted with respect to said casing and accessible from the exterior of

the pencil for manual operation, a lever mounted within said casing and extending across said follower rod, said lever being operable by said push button, and means operatively connecting said lever and follower rod for imparting step-by-step movement to the latter by actuation of said push button.

5. A pencil comprising in combination, a casing having a tip through which a crayon is adapted to be fed, said casing having a side wall aperture, a follower rod slidably mounted in said casing and adapted to propel a crayon through said tip, a push button carried by the pencil and slidably mounted in said aperture, and means, comprising a lever through which said follower rod extends, for operating said follower rod by manual operation of said push button.

6. A pencil comprising in combination, a casing having a tip through which a crayon is adapted to be fed, a follower rod slidably mounted in said casing and adapted to propel a crayon through said tip, a push button carried by said casing and through which said follower rod extends, and means for operating said follower rod by manual operation of said push button.

7. A pencil comprising in combination, a casing having a tip through which a crayon is adapted to be fed; a follower rod slidably mounted in said casing and adapted to propel a crayon through said tip; a push button carried by said casing and through which said follower rod extends; and means, including a lever through which said follower rod extends, for operating said follower rod by manual operation of said push button.

8. A pencil comprising in combination, a casing having a tip through which a crayon is adapted to be fed, a follower rod slidably mounted in said casing and adapted to propel a crayon through said tip, a member mounted within said casing for longitudinal reciprocatory movement with respect thereto, means operatively connecting said member and follower rod whereby reciprocatory movement of said member imparts longitudinal crayon-feed movement to said rod, and a push button accessible from the exterior of said casing for manual operation and directly engageable with said member to operate the same.

9. A pencil comprising in combination, a casing having a tip through which a crayon is adapted to be fed, a push element accessible from the exterior of said casing and mounted nearer to the tip than to the opposite end of the pencil for movement toward the axis of said casing, means for moving the push element away from the axis of the casing, and crayon-feeding mechanism within said casing and operable by depression of said push element.

10. A pencil comprising in combination, a casing having a tip through which a crayon is adapted to be fed, an element movably mounted with respect to said casing at a position nearer to the tip than to the opposite end of the pencil and accessible from the exterior of said casing, a crayon extending through the tip of said casing, means operable by said element and comprising a toothed follower element for forcing the crayon through said tip, and spring means biasing said element toward one of its positions.

11. A pencil comprising in combination, a casing having a tip through which a crayon is adapted to be fed, an element movably mounted with respect to said casing at a position nearer to the tip than to the opposite end of the pencil and accessible from the exterior of said casing, means comprising a pawl for normally preventing a crayon from being forced into said casing, means including said pawl and operable by said element for feeding a crayon through said tip, and spring means biasing said element toward one of its positions.

12. A pencil comprising in combination; a casing having a tip through which a crayon is adapted to be fed; releasable means carried by said casing for preventing movement of a crayon inwardly through said tip; means, comprising a push element accessible from the exterior of said casing and mounted for movement toward the axis of said casing, for feeding a crayon outwardly through said tip upon depression of said push element; means called into action upon further depression of said push element for releasing said releasable means to permit a crayon to move inwardly through said tip, and means for moving the push element away from the axis of the casing.

13. A pencil comprising in combination, a casing having a tip through which a crayon is adapted to be fed, a follower rod slidably mounted in said casing and adapted to propel a crayon through said tip, an element movably mounted with respect to said casing at a position nearer the tip than to the other end of said pencil and accessible from the exterior of the pencil for manual operation, a lever mounted within said casing and operable by said element, and means including a pawl rod and ratchet mechanism operatively connecting said lever and follower rod.

14. A pencil comprising in combination, a casing having a tip through which a crayon is adapted to be fed, a follower rod slidably mounted in said casing and adapted to propel a crayon through said tip, an element movably mounted with respect to said casing at a position nearer the tip than to the other end of the pencil and accessible from the exterior of the pencil for manual

operation, spring means biasing said element toward one of its positions, a member mounted within said casing for longitudinal reciprocating movement with respect thereto, means operatively connecting said member and follower rod whereby reciprocating movement of said member imparts longitudinal crayon-feed movement to said rod, and operative connections between said element and member.

15. A pencil comprising in combination, a casing having a tip through which a crayon is adapted to be fed, a follower rod slidably mounted in said casing and adapted to propel a crayon through said tip, an element movably mounted with respect to said casing at a position nearer the tip than to the other end of said pencil and accessible from the exterior of the pencil for manual operation, a lever mounted within said casing and extending across said follower rod, said lever being operable by said element, and means operatively connecting said lever and follower rod for imparting step-by-step movement to the latter by actuation of said element.

16. A pencil comprising in combination, a casing having a tip through which a crayon is adapted to be fed, said casing having a side wall aperture, a follower rod slidably mounted in said casing and adapted to propel a crayon through said tip, an element carried by the pencil and movably mounted in said aperture, and means, comprising a lever through which said follower rod extends, for operating said follower rod by manual operation of said element.

In testimony whereof I hereto affix my signature.

RAPHAËL NETTER.