March 11, 1958 O. GOSSWEILER ET AL 2,826,173

LEAD CHANGE PENCIL

Filed Nov. 19, 1954 2 Sheets-Sheet 1

FIG. 1

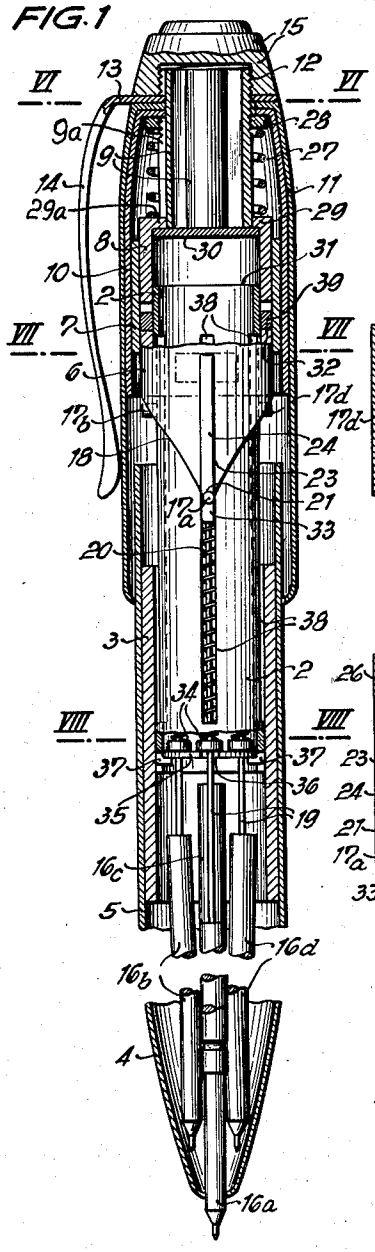


FIG. 2

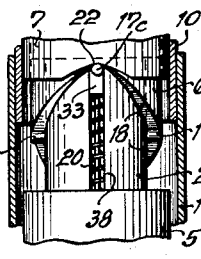


FIG. 3

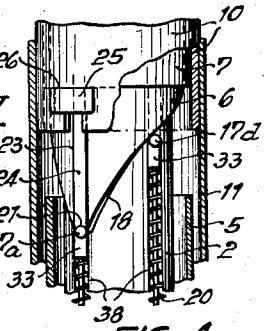


FIG. 4

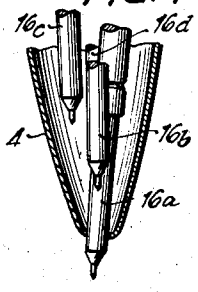
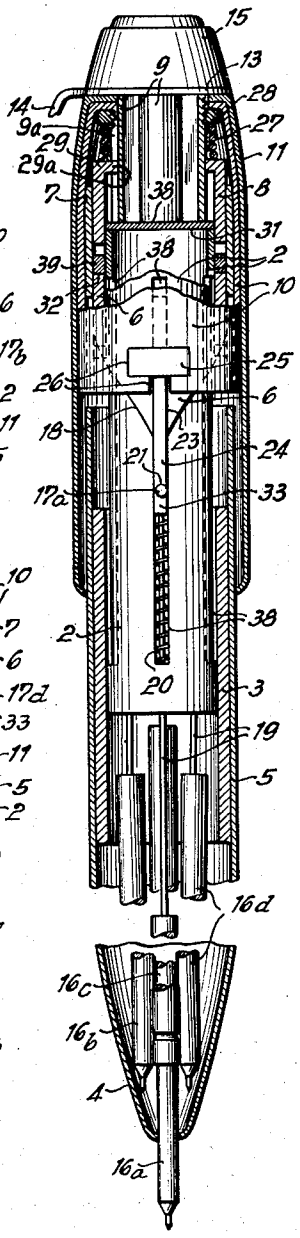


FIG. 5



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FIG. 6

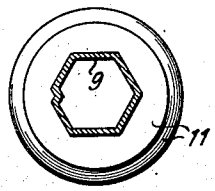


FIG. 14

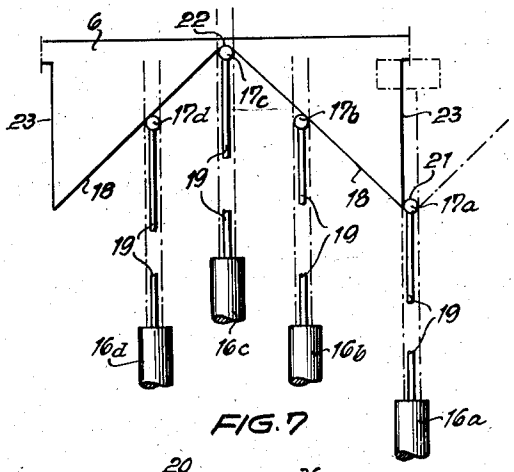


FIG. 9

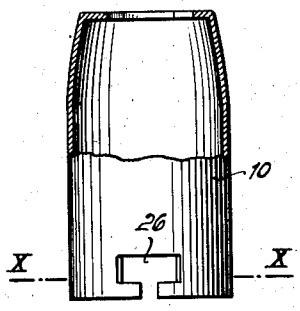


FIG. 7

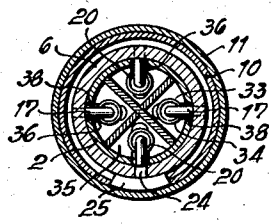


FIG. 10

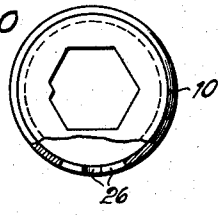


FIG. 15

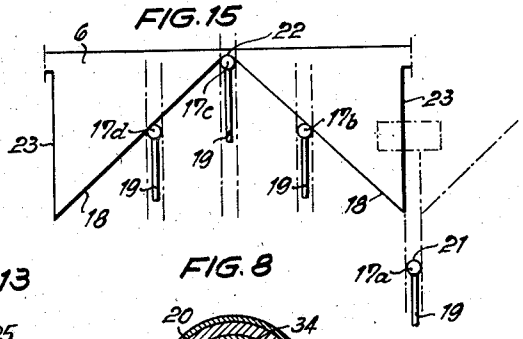


FIG. 11



FIG. 12

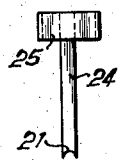


FIG. 13

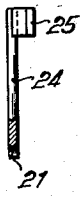
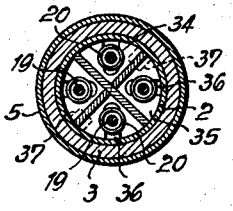


FIG. 8



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2,826,173

LEAD CHANGE PENCIL

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Claims priority, application Germany November 25, 1953

7 Claims. (Cl. 120—14.5)

The present invention relates to lead-change-pencils, and is particularly directed to a four-color-pencil provided with a slotless outer jacket, with a mechanism for the forward feeding and return movement of the lead-carriers, and with an end-cap through the actuation of which the forward feeding and return movement are effected. It relates more particularly to a pencil of the aforesaid kind, wherein there is positioned in the slotless outer jacket an inner casing in which the spring-loaded lead-carrier-shanks are enclosed, and in which the feed-pins of the lead-carrier-shanks are guided in slots extending parallel to the longitudinal axis of the pencil, whereby, upon movement of the end-cap, the feed-pins slide along on a curve-casing, likewise accommodated within the outer jacket, and are thus moved into and out of writing position.

There are already known to the art lead-change-pencils in which the spring-loaded lead-carrier-shanks are arranged in a casing connected with the end-cap, and in which the feed-pins of the lead-carrier-shanks are guided in slots of the casing, whereby, upon rotation of the cap, the feed-pins slide along a slide path or curve provided on a stationary curve-casing arranged in the outer jacket and thus move the lead-carriers into and out of writing position. However, in this known form of construction the lead-carriers can be locked only in one forward position, which simultaneously serves as writing position and as position for the regulation of the lead-carriers and for the insertion of new leads into the lead-carriers. Consequently, the lead-carrier in its writing position has to project from the outer jacket to such an extent that it is unsatisfactorily supported in writing position and unduly exposed to damaging.

Furthermore, in the multi-color pencils of known construction, it is only possible to rotate the color-change device in one sense, either right or left-hand, so that, when for instance, one color out of three or four is to be selected, the device must be rotated in that sense until the desired color registers with the writing position.

It is an object of our invention to provide a lead-change pencil wherein a lead carrier is brought into a writing position close to the mouth of the pencil jacket at the pencil tip, while the lead carrier is further advanced out of the mouth of the jacket to a second position relative to the mouth of the pencil jacket, which position is further spaced from the jacket mouth, and in which position the lead in the lead carrier can be adjusted or a consumed lead can be replaced by a new one.

It is another object of our invention to provide a lead-change pencil devised as a multi-color pencil which permits the selection of each color directly, at will, by either a left-hand or a right-hand rotation of the turn-cap of the pencil.

These and other objects and advantages of the invention are achieved by providing, in a lead-change pencil, the aforementioned curve casing with a slide path, or cam, which ascends from a point of deepest recession, or lowermost point, uniformly on both sides of that lowermost point to a point most advanced toward the writing tip of the pencil, which most advanced point is preferably arranged on the side of the curve casing opposite the aforesaid lowermost point and corresponds to the writing position of the lead. Furthermore, according to another main feature of the invention, the curve casing is provided with a longitudinal slot extending parallel to the longitudinal axis of the pencil, which slot opens at the aforesaid most advanced point of the cam on the curve casing and houses a feed finger adapted to move the lead back and forth between the aforesaid writing position and a position still further advanced relative to the tip of the pencil, in which further advanced position the lead can be adjusted with regard to its position in its lead carrier, or it can be replaced by a new one.

These and other features and advantages of the invention will be understood from a consideration of the following detailed description taken in connection with the accompanying drawings, forming a part of this specification and in which an embodiment of the invention has been shown by way of example. However, we wish to say that the invention is not confined to any strict conformity with the showing of the drawings, but may be changed or modified, so long as such changes or modifications mark no material departure from the salient features of the invention as expressed in the appending claims.

In the drawings, in which like parts are referred to by the same reference numerals in all of the several figures,

Fig. 1 is a longitudinal sectional view of the lead-change-pencil (four-color-pencil) with one of its lead-carriers in writing position;

Fig. 2 is a sectional detail view of the pencil seen from the opposite side of that shown in Fig. 1;

Fig. 3 is a sectional detail view shown in a position somewhat displaced with respect to that of the illustration of Fig. 1;

Fig. 4 is a sectional detail view showing the forward ends of the lead-carriers in a position displaced from that of Fig. 1 for 90 degrees;

Fig. 5 is a longitudinal sectional view similar to that of Fig. 1 showing the lead-carrier in its second ultimate feed position (lead-regulating-position);

Fig. 6 is a cross-section on line VI—VI of Fig. 1;

Fig. 7 is a cross-section on line VII—VII of Fig. 1;

Fig. 8 is a cross-section on line VIII—VIII of Fig. 1;

Fig. 9 is a front-view, partly in section, of the feed-casing;

Fig. 10 is a top-view of the feed-casing, partly in section, on line X—X of Fig. 9;

Fig. 11 is a top-view of the feed-finger;

Fig. 12 is a front-view of the feed-finger;

Fig. 13 is a side-view of the feed-finger;

Fig. 14 is a layout of the curve-path of the lead-change-pencil with the lead-carriers and feed-pins in the position of Fig. 1;

Fig. 15 is a layout of the curve-path of the lead-change-pencil with the lead-carriers and feed-pins in the position of Fig. 5.

Referring now to the drawings in detail, the reference numeral 2 designates the casing of the lead-carrier-shanks, which casing 2 is rigidly connected via an intermediate casing 3 with the outer jacket 5 terminating in the tapered tip or front portion 4 of the mechanical pencil. At the opposite end of the pencil, the curve-casing 6 is rigidly connected via a surrounding casing 7 with the guide-casing 8 for the magazine 9 of the leads. By means of its polygonal shape, the magazine 9 is (see Fig. 6) simultaneously rotatably connected with the guide casing 8 and the curve-casing 6, as well as the feed-casing 10 and the turn-cap 11 as will be described in greater detail hereinafter. The magazine 9 is provided at its rear-

end with a threaded portion 12, onto which the end cap 15 is screwed after mounting the clip-ring 13 with clip 14 on the portion 12.

Upon rotation of the turn-cap 11—in one direction or the other—and consequently also of the curve-casing 6, the lead-carriers 16*a*, *b*, *c*, *d* are, through sliding of their feed-pins 17*a*, *b*, *c*, *d* along the slide-path 18 of the curve-casing 6, successively fed into operating (writing) position against the pressure of the return-springs 20 surrounding the lead-carrier-shanks 19 (see Figs. 1 and 14). This is accomplished by the feature that the slide-path 18 of the curve-casing 6 ascends on both sides in uniform manner from its lowermost point 22, positioned preferably opposite the supporting notch 21 for the lead-carrier-feed-pin 17 located in writing position, up to said supporting place 21 for the feed-pin 17 (see Figs. 1, 2, 14, 15). The feed-pins 17 slide in longitudinal slots 38 of the casing 2 of the lead-carrier-shanks.

The curve-casing 6 is provided with a longitudinal slot 23 extending parallel to the longitudinal axis of the pencil and terminating in the pointed end of the slide-path 18. Mounted in the slot 23 is a feed-finger 24, which at its forward end is devised a supporting notch for the lead-carrier-feed-pin 17 located in operating (writing) position, and which at its rear-end is provided with a shoulder piece 25 adapted to engage in a corresponding opening 26 of the feed-casing 10 surrounding the curve-casing 6 (see Figs. 9 to 13).

Through pressure exerted upon the end-cap 15, the lead-carrier 16*a* (Figs. 1 and 14) located in writing position can be moved, via the feed-casing 10, the feed-finger 24 and the feed-pin 17*a* resting against the feed-finger 24, into a second ultimate feed position (lead-regulating-position—see Figs. 5 and 15), whereby the curve-casing 6 remains in its position of rest, and whereby the feed-finger 24 slides in the longitudinal slot 23 of the curve-casing 6.

Arranged in the rear-end of the pencil is a compression spring 27 which during the forward feeding into the second ultimate feed position is likewise tensioned and which, when the pressure upon the end cap 15 ceases, effects in cooperation with the return-spring 20 pertaining to the feed pin 17*a* the automatic backward slipping of the advanced pencil parts into their rearward position and therewith the return of the lead carrier 16*a* into writing position (Fig. 1). The compression spring 27 surrounds preferably the magazine 9 enclosing the pencil leads and bears at one end against a collar 28 provided at the magazine 9 and at its other end against a stop 29 formed by a rear-end shoulder of the guide-casing 8. This shoulder 29 protrudes with a nose 29*a* (Figs. 1 and 5) into a longitudinal groove 9*a* of magazine 9, thus serving as guiding means for the magazine 9 and as rearward holding means for the casing 2 inclosing the lead-carrier-shanks. Similar noses 10*a* and 11*a* are provided on the feed-casing 10 and the turn-cap 11 (see Figs. 6 and 9). These noses protrude into the groove 9*a* of magazine 9 and secure joint rotation of magazine 9 with casing 10 and turn-cap 11. Casing 10 and turn-cap 11 are also rigidly held in position on the magazine 9 between the collar screwed to the magazine thread 12 from below, and end cap 15 screwed on the same thread 12 from above parts 10 and 11. Thereby the pressure or push connection between these parts and the magazine 9 for the pencil-leads is established. The collar 28 may consist of a ring screwed onto the threaded portion 12 of the magazine 9.

Consequently, in the lead-change pencil according to the invention, there can be distinguished a rotary displacemen of parts relative to the pencil jacket 5, which serves to bring a selected lead into writing position, and a pressure displacement or push displacement for advancing the lead from the writing position to a lead-regulating position. Rotated are the parts which are connected with each other for simultaneous rotation due to a groove-

nose connection between them, i. e. the turn-cap 11, the feed casing 10, the magazine 9 with end cap 15, the guide casing 8, as well as cover casing 7 and the curve casing 6, the latter two being rigidly connected to the guide casing 8, and finally the feed finger 24, because it is housed in the slot 23 in curve casing 6, as well as in the opening 26 of the feed casing 10 and therefore follows the rotation of these parts.

On the other hand, in the feed movement toward the lead-regulating position (shown in Fig. 5), there merely participate the following parts: turn-cap 11, feed casing 10, magazine 9 with end cap 15, and the feed finger 24, the latter because its shoulder piece 25 is housed in the opening 26 of feed casing 10 and follows the movement of the latter toward the pencil tip. Parts 8, 7 and 6 do not participate in this movement because the nose 29*a* of the guide casing 8 is longitudinally displaceable in the groove 9*a* of magazine 9, and consequently does not follow the movement of the latter toward the pencil tip.

While in its first advanced position as shown in Fig. 1, the lead carrier 16*a* occupies a position close to, and just protruding from the mouth of the pencil jacket, i. e. its writing position, the same lead occupies a second, ultimate position (shown in Fig. 5) more advanced out of said jacket mouth than said writing position. In this second, ultimate position, the lead in the lead carrier can be exchanged or a consumed lead can be replaced by a new one.

The second ultimate feed position (see Fig. 5) is limited by the stop offered by the rear-end 31 of the casing 2 enclosing the lead-carrier-shanks to the bottom 30 of the magazine 9 sliding in the guide-casing 8, while the rearward position of rest is limited by the stop offered by the overlapping rear-end 29 of the guide-casing 8 to the bottom 30 of the magazine 9. The casing 2 enclosing the lead-carrier-shanks is supported in the rear-end of the pencil for example by means of a ring 39 fastened to the casing 2 and resting against the rear-edge 32 of the curve-casing 6.

The return-springs 20 bear at both ends against collars or abutments of which the rearward ones 33 surround the feed-pins 17, while the forward abutments 34 slidably surrounding shanks 19 rest against the bottom 35 arranged in the casing 2 enclosing the lead-carrier-shanks. The bottom 35 is provided with slots 36 for the extension therethrough of the lead-carrier-shanks 19, and is secured in position by the inwardly turned flange 37 provided at the lower edge of the casing 2 of the lead-carrier-shanks.

The return springs 20 thus act upon the bottom 35 of casing 2 and urge the latter in the direction toward the tip of the pencil.

The feed-pins 17 may in simple manner be formed through outward bending of the rear-ends of the lead-carrier-shanks 19 (see Fig. 7).

What we claim as new and desire to secure by Letters Patent of the United States is:

1. In a change-color pencil having a slotless outer jacket, a cap rotatably and depressably overlapping said jacket; a plurality of lead carriers, each comprising a spring-urged lead-carrier shank and a feed pin at the free end of said shank, a lead-carrier advance and return mechanism comprising; a first casing rigidly mounted in said outer jacket, said first casing enclosing said lead-carrier shanks, and having a plurality of slots extending in parallel with the longitudinal axis of the pencil, each of which slots guides one feed pin therein; a curve casing displaceably mounted about said first casing, said curve casing having a curved slide path ascending from a point of deepest recession in said casing uniformly on both sides from said deepest recessed point to a most advanced point on said curve casing opposite the former point; there being an elongated slot in said curved casing extending from said most advanced point parallel to the

longitudinal axis of the pencil means for connecting said curve casing with said cap for rotating the former simultaneously with the latter, thereby causing said slide path independently of the sense of rotation of said cap to guide the feed pin of one of said lead carriers toward said most advanced point on said slide path which corresponds to the writing position of the lead of the respective lead carrier, further comprising a feed finger displaceably arranged in said elongated slot, said feed finger being provided at its one end with a supporting notch for the feed pin of that lead carrier which is in writing position, and at its other end with a shoulder piece; a feed casing surrounding said curve casing displaceable parallel to the longitudinal axis of the pencil, said shoulder piece of said feed finger being coupled to said feed casing; and means connecting said feed casing with said cap for rotary as well as longitudinal displacement therewith.

2. In a change-color pencil having a slotless outer jacket, a cap rotatably and depressably overlapping said jacket; a plurality of lead carriers, each comprising a spring-urged lead-carrier shank and a feed pin at the free end of said shank, a lead-carrier advance and return mechanism comprising; a first casing rigidly mounted in said outer jacket, said first casing enclosing said lead-carrier shanks and having a plurality of slots extending in parallel with the longitudinal axis of the pencil, each of which slots guides one feed pin therein; a curve casing displaceably mounted about said first casing, said curve casing having a curved slide path ascending from a point of deepest recession in said casing uniformly on both sides from said deepest recessed point to a most advanced point on said curve casing opposite the former point; there being an elongated slot in said curved casing extending from said most advanced point parallel to the longitudinal axis of the pencil, means for connecting said curve casing with said cap for rotating the former simultaneously with the latter, thereby causing said slide path independently of the sense of rotation of said cap to guide the feed pin of one of said lead carrier toward said most advanced point on said slide path which corresponds to the writing position of the lead of the respective lead carrier, further comprising a feed finger displaceably arranged in said elongated slot, said feed finger being provided at its one end with a supporting notch for the feed pin of that lead carrier which is in writing position, and at its other end with a shoulder piece; a feed casing surrounding said curve casing displaceable parallel to the longitudinal axis of the pencil, said feed casing having an opening of a shape corresponding to that of said shoulder piece of said feed finger, said shoulder piece engaging said opening.

3. In a change-color pencil having a spotless outer jacket, a cap rotatably and depressably overlapping said jacket; a plurality of lead carriers, each comprising a spring-urged lead-carrier shank and a feed pin at the free end of said shank, a lead-carrier advance and return mechanism comprising; a first casing rigidly mounted in said outer jacket, said first casing enclosing said lead-carrier shanks and having a plurality of slots extending in parallel with the longitudinal axis of the pencil, each of which slots guides one feed pin therein; a curve casing displaceably mounted about said first casing, said curve casing having a curved slide path ascending from a point of deepest recession in said casing uniformly on both sides from said deepest recessed point to a most advanced point on said curve casing opposite the former point; there being an elongated slot in said curved casing extending from said most advanced point parallel to the longitudinal axis of the pencil, means for connecting said curve casing with said cap for rotating the former simultaneously with the latter, thereby causing said slide path independently of the sense of rotation of said cap to guide the feed pin of one of said lead carrier toward said most advanced point on said slide path which corresponds to the writing position of the lead of the respective lead carrier, further comprising a feed finger displaceably arranged in said elongated slot, said feed finger being provided at its one end with a supporting notch for the feed pin of that lead carrier which is in writing position, and at its other end with a shoulder piece; a feed casing surrounding said curve casing displaceable parallel to the longitudinal axis of the pencil, said shoulder piece of said feed finger being coupled to said feed casing; and means connecting said feed casing with said cap for rotary as well as longitudinal displacement therewith so that said cap, when depressed relative to said jacket, moves said feed casing and in connection therewith said feed finger in said elongated slot of said curve casing in the direction of said jacket, with said curve casing remaining stationary, and thereby moves the feed pin of the lead carrier engaging said notch of said feed finger from the writing position to a position further advanced in the direction from the cap toward said jacket.

4. A mechanism as described in claim 3 wherein said means connecting said cap and said curve casing comprise a compression spring urging said cap away from said curve casing, and wherein a return spring is mounted on each of said lead-carrier shanks, the return spring on the shank of the lead carrier in writing position urging the feed pin on that shank into engagement with the notch of said feed pin, thereby cooperating with said compression spring in returning said feed pin from said advanced position to said writing position when depression of said cap toward said jacket ceases.

5. In a change-color pencil having a spotless outer jacket, a cap rotatably and depressably overlapping said jacket; a plurality of lead carriers, each comprising a spring-urged lead-carrier shank and a feed pin at the free end of said shank, a lead-carrier advance and return mechanism comprising; a first casing rigidly mounted in said outer jacket, said first casing enclosing said lead-carrier shanks and having a plurality of slots extending in parallel with the longitudinal axis of the pencil, each of which slots guides one feed pin therein; a curve casing displaceably mounted about said first casing, said curve casing having a curved slide path ascending from a point of deepest recession in said casing uniformly on both sides from said deepest recessed point to a most advanced point on said curve casing opposite the former point; there being an elongated slot in said curved casing extending from said most advanced point parallel to the longitudinal axis of the pencil, means for connecting said curve casing with said cap for rotating the former simultaneously with the latter, thereby causing said slide path independently of the sense of rotation of said cap to guide the feed pin of one of said lead carriers toward said most advanced point on said slide path which corresponds to the writing position of the lead of the respective lead carrier, further comprising a feed finger displaceably arranged in said elongated slot, said feed finger being provided at its one end with a supporting notch for the feed pin of that lead carrier which is in writing position, and at its other end with a shoulder piece; a feed casing surrounding said curve casing displaceable parallel to the longitudinal axis of the pencil, said shoulder piece of said feed finger being coupled to said feed casing; and means connecting said feed casing with said cap for rotary as well as longitudinal displacement therewith, said means connecting said cap and said curve casing comprising a compression spring urging said cap away from said curve casing, a return spring mounted on each of said lead-carrier shanks, a lead magazine rigidly attached to the inner end surface of said cap and having an external threading, an inwardly threaded collar being screwed on to said magazine and securing the same in said cap; a guide casing rigidly connected to said curve casing and adapted for guiding one end portion of said first casing, said guide casing having an internally flanged shoulder portion surrounding said magazine and slidably guiding

the same, and means connecting said guide casing with said magazine for simultaneous rotation with said cap, said compression spring resting with one end upon said shoulder portion of said guide casing and with its other end against said collar.

6. A mechanism as described in claim 5, wherein said cap, when depressed relative to said jacket, moves said feed casing and in connection therewith said feed finger in said elongated slot of said curve casing in the direction of said jacket, with said curve casing remaining stationary, and thereby moves the feed pin of the lead carrier engaging said notch of said feed finger from the writing position to a position further advanced in the direction from the cap toward said jacket, and wherein a bottom plate is provided on said magazine, which plate is adapted to abut against the end of said first casing facing said magazine when said cap is being depressed, thereby limiting the movement of said feed pin from the writing position to said further advanced position.

7. A mechanism as described in claim 5, wherein said cap, when depressed relative to said jacket, moves said feed casing and in connection therewith said feed finger in said elongated recess of said curve casing in the direction of said jacket, with said curve casing remaining stationary, and thereby moves the feed pin of the lead carrier engaging said notch of said feed finger from the writing

position to a position further advanced in the direction from the cap toward said jacket, and wherein a bottom plate is provided on said magazine, which plate is adapted to abut against the end of said first casing facing said magazine when said cap is being depressed, thereby limiting the movement of said feed pin from the writing position to said further advanced position, and which bottom plate is further adapted to abut adjacent said shoulder portion of said guide casing, thereby limiting the return movement of said cap under the effect of said compression spring.

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