

- [54] **EVER-SHARP PENCIL WITH RETRACTABLE CORE PIPE**
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- [51] Int. Cl.B43k 21/22, B43k 21/20
- [58] Field of Search.401/65, 67, 68, 6

[56] **References Cited**

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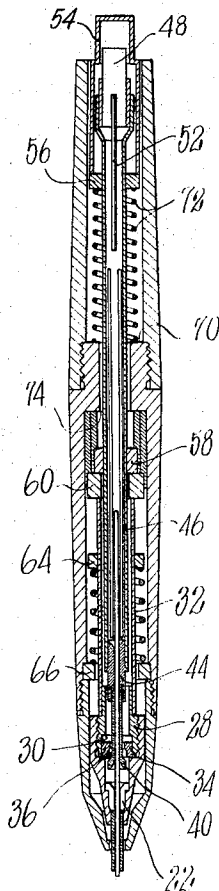
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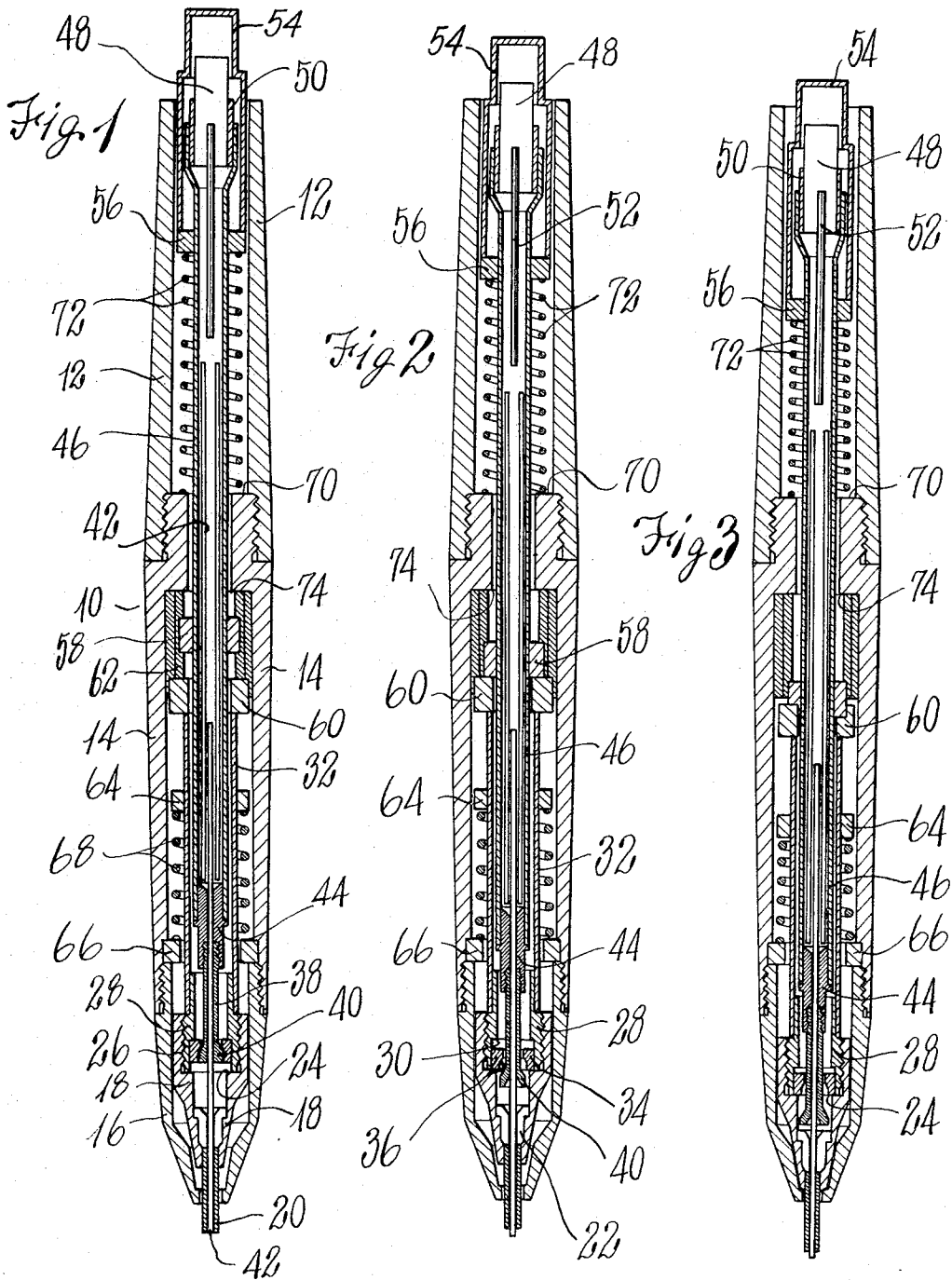
Primary Examiner—Lawrence Charles
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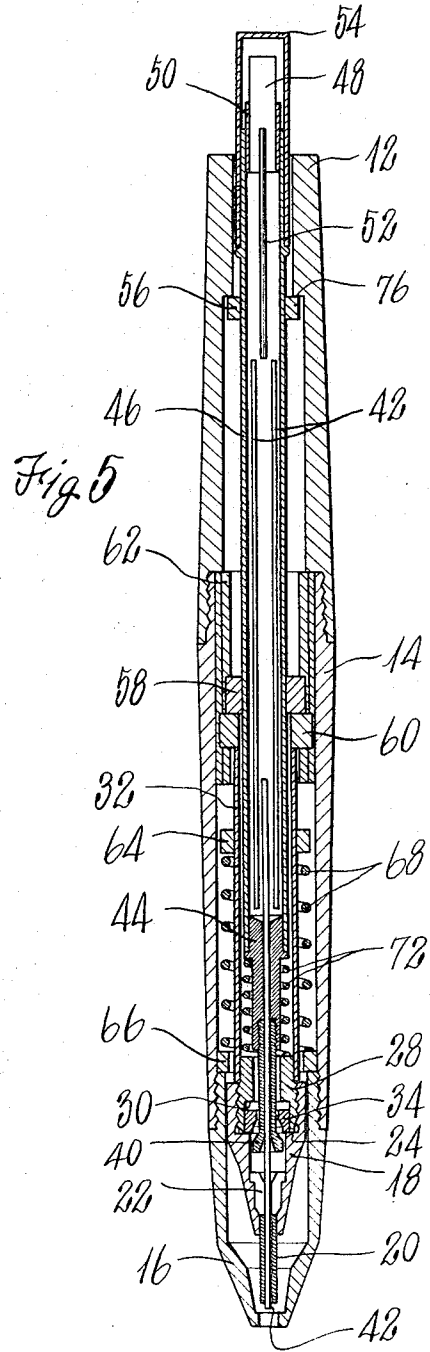
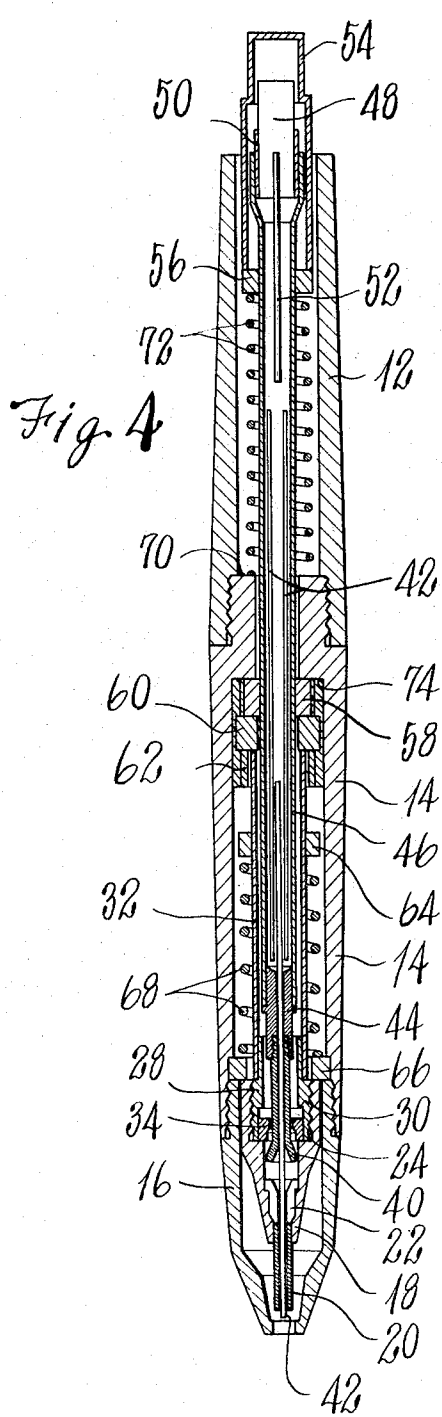
[57] **ABSTRACT**

In an ever-sharp pencil comprising two coupled body casings having a cap nozzle and a push means, a lead tube means is retractably arranged in the cap nozzle and selectively operated by a release mechanism arranged in the middle of the body casing without entailing any undesired extension of the lead.

4 Claims, 5 Drawing Figures







EVER-SHARP PENCIL WITH RETRACTABLE CORE PIPE

BACKGROUND AND SUMMARY OF THE INVENTION

This invention relates to improvements in lead storage pencils, and more particularly, to a pencil providing a retractable core tube.

A principal object of the invention is to provide a novel pencil in which undesired extension of the lead may be positively prevented.

It is a feature of the present invention that lead will not be extended on subjecting the pencil to a gentle pushing operation when the core tube is in its retracted position or even when subjected to a strong pushing operation for exposing the core pipe.

It is another feature of the invention to provide a pencil comprising two coupled body casings having a cap nozzle at one open end and a push means at the opposite open end, a lead tube means being arranged in the said cap nozzle and retractable under the influence of a first resilient means, a core fixing means operatively connected to the push means for selectively chucking or releasing the lead, a release mechanism arranged in the middle of the pencil comprising a rotary disc means connected to the lead core pipe means and a push ring means mounted around a core casing connected to the core fixing means, and a second resilient means for urging the push means and the fixing means upwardly.

When the lead tube means is located in the writing position, providing a separation between the rotary disc means and the push ring means, the lead is chucked by the fixing means through the release mechanism and the resilient means whereas when the lead tube is retracted within the cap nozzle the distance between the rotary disc means and the push ring means is reduced due to an engagement of the push ring means mounted on the core casing with a stepped portion provided on the internal surface of the pencil body.

Objects and advantages of the invention will in part be obvious and will in part appear hereinafter.

BRIEF DESCRIPTION OF THE DRAWINGS

For a fuller understanding of the nature and object of the invention a reference should be had to the following detailed description taken in connection with the accompanying drawing, in which the same reference numerals designate the same or similar parts throughout the drawings;

FIG. 1 is a longitudinally sectioned view in writing operation of the ever-sharp pencil according to the invention;

FIG. 2 is a longitudinally sectioned view similar to FIG. 1 but showing that the lead core is in extension by a gentle pushing operation;

FIG. 3 is a longitudinally sectioned view similar to FIG. 1 but showing that the pencil is subjected to the powerful pushing operation for drawing the lead core;

FIG. 4 is a longitudinally sectioned view of the ever-sharp pencil showing the core pipe being retracted; and

FIG. 5 is a longitudinally sectioned view similar to FIG. 4 illustrative of another embodiment.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now in more detail to the drawings, wherein like parts are indicated by like reference numerals and initially to FIG. 1, there is illustrated therein in longitudinally sectioned view a main body of the lead storage pencil 10 made of steel, synthetic resin and other materials and shaped into a hollow tube of predetermined diameter and length and divided into two body casings, i.e. an upper sleeve 12 and a lower sleeve 14 which is provided at its open end with a cap nozzle 16.

Within the cap nozzle 16 is arranged a retractable inner nozzle 18 having at its constricted end an integrally secured tube 20 with a lead holder 22 of a resilient material such as rubber, synthetic resin and the like.

The inner nozzle 18 at its enlarged portion is interiorly provided with a shoulder 24 terminating in a threaded portion 26 which is threadedly connected with an intermediate member 28 which is interiorly provided with a shoulder 30 and connected to a tube 32 as best shown in FIG. 2. In the space between the shoulder 24 and the shoulder 30 is slidably provided a clamping ring 34 having a partially recessed portion 36 adapted to receive a protruded end portion of the lead securing-releasing member hereinafter described.

For securing or releasing lead there is inserted through the clamping ring 34 a chucking member 38 having at one end portion a divided and outwardly projecting end portion 40 adapted to embrace a lead 42 so that the lead may be chucked or released in accordance with an engagement or disengagement of the chucking member 38 with the clamping ring 34. The chucking member 38 at its other end portion is connected to a lead guide member 44 which is in turn connected to a casing 46 so that a spare lead stored in the casing may be fed step-by-step into the chucking member 38.

The core casing 46 at its opposite end portion has an enlarged diameter portion for removably accommodating an eraser 48 encompassed by sheet metal member 50. As shown in FIG. 1, the rod 52 is carried at the inwardly facing end of the eraser 48 for cleaning the tube 20 and the chucking member 38. A push cap 54 enclosing the eraser 48 is secured through the intermediary of a stop ring 56 to the outer periphery of the core casing 46.

To the outer surface of the casing 46 is mounted a push ring 58 having an angular end portion. The tube 32 at its end portion opposite the push ring 58 has secured thereto a rotatable disc member 60 through the central opening in which extends the casing 46, the disc member 60 and casing 46 being movable relative to one another as will be appreciated from the showing in FIG. 1. The disc member 60 at its end surface facing the angular end of the push ring 58 is provided with recessed indentations defining pawls which are adapted to receive the angular end of the push ring 58 for indexed movement of the disc member as shown in FIGS. 1, 3 and 4. Thus, in FIG. 1, with the push ring 58 and disc member 60 in the relative positions shown, the lead 42 will be clutched in writing position. In this position, the disc member, as seen in FIG. 1, abuts the end face of protuberances 62, more fully hereinafter dis-

closed, and is prevented thereby from assuming an adjoining position to push ring 58, the position of which is determined by spring 72.

When a writing operation is terminated, the cap 54 will be moved from the FIG. 1 through the FIG. 3 position to the FIG. 4 position. Thus, as seen in FIG. 3, downward displacement of cap 54 urges the angular end 58' into the end pawl surface 60' and moves the disc member 60 beyond the end of protruberances 62 whereby to rotationally index the disc member, under the camming action of the push ring 58, a predetermined amount sufficient to align portions of the disc member 60 with a groove defined between the protruberances 62. In consequence, when the pressure on cap 54 is released, the cap 54 will be urged into its FIG. 4 position under the influence of spring 72 and the tube 20 will be retracted as shown in FIG. 4 due to the upward movement of disc member 60 by spring 68 to a position adjoining push ring 58, the movement of which is limited by stepped portion 74 hereinafter described.

When it is again desired to begin a writing operation, the user of the automatic pencil will urge the cap 54 downwardly as shown in FIG. 3 to index the disc member so that it will once again abut the protruberances 62 upon release of manual pressure from cap 54 whereupon the cap 54 and the push ring 58, under the influence of spring 72 will automatically be returned to their FIG. 1 positions.

The lower sleeve 14 at its upper portion is interiorly provided with the aforementioned protruberances 62 defining a shallow groove adapted to receive a guided part of push ring 58 and a deep groove adapted to receive a guided part of the rotary disc member 60 so that the push ring 58 is guided for reciprocation along the shallow groove while the rotary disc member 60 is guided for movement along the deep groove.

As aforementioned, the rotary disc member 60 is indexed angularly in predetermined steps under controlled engagement of the angular end of the push ring 58 with the pawl surfaces on the disc member 60.

The tube 32 at its outer periphery is provided with a first spring stop ring 64 while the lower sleeve 14 at its internal wall surface, in abutment with the threaded portion thereof, is provided with a second spring stop ring 66 and the spring 68 is mounted therebetween to continuously direct the inner nozzle 18 and the intermediate member 28 inwardly of the lower sleeve 14. Moreover, between a threaded end 70 of the lower sleeve 14 and the stop ring 56 secured to the core sleeve 46 is mounted a spiral spring 72 to urge the casing 46 upwardly in relation to the FIG. 1 showing so that the projected end portion 40 of the lead chucking member 38 is within the clamping ring 34 to embrace the lead 42 under the influence of the spring 72. In another embodiment illustrated in FIG. 5, the spiral spring 72 is mounted between the intermediate member 28 and the stepped corner of the lead guide 44.

As illustrated in FIG. 1, when the rotary disc member 60 is in abutment with the lower end of the protruberance 62 in the lower sleeve 14, the push ring is separated from the stepped portion 74 and from rotary disc member 60 under the influence of the spiral spring 72. On the other hand, when the rotary disc member is located in its upper position as shown in FIG. 4, tube 20

is retracted into the cap nozzle 16 and push ring 58 will be seen to be in engagement with stepped portion 74 formed at an upper end of the lower sleeve 14, thus maintaining the chucking member 38 in open position as best shown in FIGS. 4 and 5.

With the parts positioned as illustrated in FIG. 4, when the tube 20 is retracted in the cap nozzle 16, the push ring 58 abuts the stepped portion 74 preventing the chucking member 38 from engaging the clamping ring 34 so that a writing operation would not be possible even if the lead extended beyond the tip of the pencil.

In the embodiment as best shown in FIG. 5, a spiral spring 72 for effecting the chucking of the lead core is mounted between the rear side of the intermediate member 28 and a stepped portion of the lead guide member 44 to urge the stop ring 56 into abutment with the stepped portion 76.

The writing operation with the pencil in accordance with the invention may be carried out with the tube 20 extended from the cap nozzle 16. Extension of the lead may be effected by a gentle pushing operation; i.e. from the FIG. 1 to the FIG. 2 position.

With the tube 20 in extended position and the cap 54 in its FIG. 1 position the lead will normally be fixed by engagement of the chucking member 38 with clamping ring 34, thereby enabling a writing operation. When desired, the lead may be extended by a pushing action on cap 54. The lead may also be extended when the pencil structure is subjected to a strong pushing force on cap 54 effective to extend the tube 20 as best shown in FIG. 3. When the tube 20 is retracted within the cap nozzle 16, because of the limited movement of casing 46 in relation to the coaxial movement of tube 32 (by virtue of abutment of push ring 58 with stepped portion 74), chucking of the lead will not occur because, as seen in FIGS. 4 and 5, the clamping ring 34 is moved rearwardly by shoulder 24 on inner nozzle 18 (operatively connected to tube 32) a distance greater than the distance traversed by the chucking member 38 operatively connected to casing 46. In the retracted position of tube 20 as shown in FIGS. 4 and 5 lead will not be extended even if the cap is gently pushed downwardly. Also, should the cap 54 be subjected to a strong downward pushing force for positioning tube 20 as in FIG. 1, the lead during such movement will still not be extended because no chucking action takes place during the transition from the FIG. 4 to the FIG. 1 showing.

In accordance with the pencil of the present invention, the desired extension of the lead may take place by a gentle pushing operation projecting the tube 20 into writing position.

When the pencil is not to be used, the tube 20 is retracted to protect both the lead end and the tube 20 and while the tube 20 is retracted the lead cannot be extended even by a gentle pushing operation.

As already noted, when the cap 54 is subjected to a strong pushing force from its FIG. 4 through its FIG. 3 and ultimately its FIG. 1 position the lead will be clutched (as seen in FIG. 1) and lead can thereafter be extended by applying a limited gentle force on cap 54 to the extent shown in FIG. 2. On each gentle depression on cap 54, lead will be extended from the pencil.

Moreover, when the core pipe 20 is retracted, the lead core is released by the chucking member so that the lead is free to move inwardly preventing thereby breaking thereof while carried by the user.

While certain preferred embodiments of the invention have been illustrated by way of example in the drawings and particularly described, it will be understood that modifications may be made in the construction and that the invention is in no way limited to the embodiments shown.

What is claimed is:

1. A pencil comprising a casing means terminating at one end thereof in a cap nozzle formed with an end opening and at the opposite end thereof with an axially displaceable member having a portion extending outwardly of the casing means, a first tube adapted to extend through said end opening in said cap nozzle, a second tube within said casing having its lower end portion operatively connected to said first tube for movement of the latter with said second tube, first stop means on said second tube and second stop means on said casing means below said first stop means, said first and second stop means being above the connection of said lower end portion of the second tube to said first tube, first resilient means between said first and second stop means to urge said first and second tubes toward said opposite end of the casing means, a third tube within said casing means movable relative to and coaxial with said second tube and being operatively connected at one end portion to said displaceable member and adapted to terminate at its opposite end in a lead securing means effective, as a function of predetermined relative movement between said second and third tubes, to secure or release the lead, cooperating means for imparting said predetermined relative movement between said second and third tubes and comprising a disc mounted on said second tube and a push ring

mounted on said third tube at a location thereon above the location of the mounting of said disc on said second tube, said push ring being adapted to move said disc, against the force of said first resilient means, upon downward movement of said displaceable member, and a second resilient means for normally urging the displaceable member and the third tube connected thereto toward said opposite end of the casing means, said downward movement of said displaceable member being against the force exerted by said second resilient means.

2. A pencil according to claim 1, wherein said first tube is connected to a hollow extension of said second tube, a recessed sliding member being carried within said hollow extension and supported on a shoulder thereon for predetermined upward movement relative thereto, said securing means at said opposite end of the third tube comprising a chucking means adapted to be received in and moved from the recess in said recessed member.

3. A pencil according to claim 1, wherein the first resilient means is axially oriented with respect to the second resilient means and therebelow, said second resilient means extending between a stop on and adjacent the upper end of the third tube and a casing stop located above said push ring.

4. A pencil according to claim 2, wherein said second resilient means is inward of and coaxially disposed with the first resilient means, said second resilient means extending between a shoulder on said extension of said second tube and a shoulder on a lead guide means which interconnects said lead securing means to said opposite end of the third tube, said third tube adjacent said one end thereof carrying a stop adapted to abut an inwardly facing shoulder formed in the casing means adjacent said opposite end thereof.

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