Sept. 26, 1950 F. W. HALVERSON 2,523,568

PENCIL WITH MECHANICAL MEANS FOR ADVANCING THE LEAD THEREOF

Filed May 26, 1948

Fig. 1.

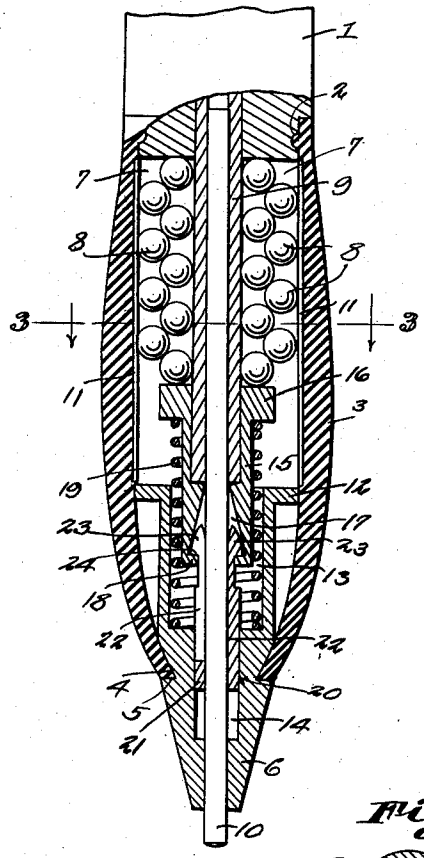


Fig. 2.

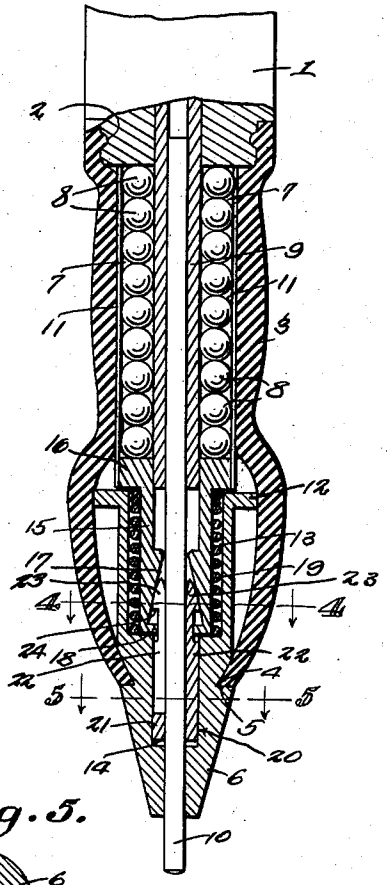


Fig. 5.

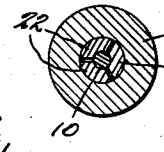
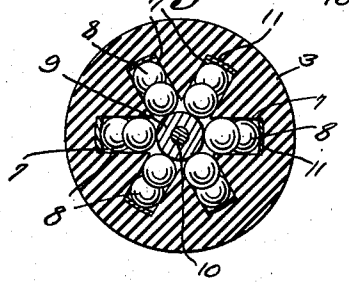


Fig. 3.



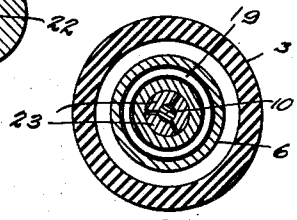


Fig. 4.

F. W. Halverson

INVENTOR.

BY C. A. Snow & Co.

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PENCIL WITH MECHANICAL MEANS FOR ADVANCING THE LEAD THEREOF

Ford W. Halverson, Milwaukee, Wis.

Application May 26, 1948, Serial No. 29,330

4 Claims. (Cl. 120—17)

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This invention relates to improvements in pencils with step by step feed.

An object of the invention is to provide a pencil of the type wherein the user can advance the lead from time to time to replace the point as it wears away or accidentally breaks off.

Another object of the invention is to provide a lead pencil of the mechanical type including an improved form and construction of clutch device for advancing the lead from time to time, means being provided for operating the clutch by the gripping action of the hand holding the pencil.

A further object of the invention is to provide a lead pencil of the mechanical type having an axially compressible and reciprocable clutch or feed mechanism for advancing the lead as it wears away, said feed being disposed well within the forward part or simulated point of the pencil and controlled therefrom.

Other objects will appear as the description proceeds.

In the accompanying drawings which form a part of this application:

Figure 1 is a longitudinal sectional view through the writing end of a mechanical pencil formed in accordance with the present invention showing the lead advancing clutch device in retracted or writing position.

Fig. 2 is a longitudinal sectional view through the writing end of a mechanical pencil formed in accordance with the present invention showing the lead advancing clutch device in lead advanced position.

Fig. 3 is a sectional view taken on the line 3—3 of Fig. 1.

Fig. 4 is a sectional view taken on the line 4—4 of Fig. 2.

Fig. 5 is a sectional view taken on the line 5—5 of Fig. 2.

The same characters of reference are used throughout the following specification and the accompanying drawings to designate the same parts.

In carrying out the invention, there is shown an improved mechanical type pencil including an elongated body 1 formed with a screw thread 2 on its point supporting end. A molded rubber sleeve 3 is threaded upon the threaded end 2 of the pencil body 1, and is formed with a constricted lower end 4 firmly secured in the annular groove 5 formed in the tip 6, which sleeve is part of a skeleton framework having a plurality of longitudinally extending radial slots 7 formed therein for receiving or accommodating inner and outer rows or stacks of spherical balls 8.

A centrally disposed longitudinally extending guide tube 9 is supported within the pencil body 1 for accommodating the writing lead 10, and at the same time providing a wall against which

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balls 8 of the inner row of balls rest. Longitudinally extending control bars 11 are disposed in the slots 7 between the spherical balls 8 and the molded rubber sleeve 7, with said spherical balls lying between said control bars 11 and the centrally disposed longitudinally extending guide tube 9 for the writing lead 10. The balls of the outer row rest between adjacent balls of the inner row of balls, the spaces between the balls of one row being normally substantially narrower than the diameter of the balls of the adjacent row. Thus it will be seen that when the sleeve 7 is pressed inwardly, the balls of the outer row will be forced between the balls of the inner rows, spreading the balls of the inner rows and lengthening the inner row of balls, operating the clutch member 15 to advance the lead.

The tip 6 has at its inner end a laterally extending annular flange 12, and is formed with a large inner bore 13 and a reduced outer bore 14.

An inner clutch member 15 having a laterally extending annular flange 16 on its upper end is slidably supported on the outer end of the guide tube 9 and is provided with a conical inner wall 17 and an inwardly extending annular flange 18 in its lower end. A coil spring 19 is disposed within the inner bore 13 about the clutch member 15 with one end contacting the annular flange 16 on the clutch member 15 and its outer end engaging the base 7 of the bore 13. The outermost of the spherical balls 8 will rest upon the inner end of the clutch member 15 while the innermost of the spherical balls 8 will contact the adjacent end of the pencil body 1.

A second clutch member 20 is slidably disposed within the reduced bore 14 in the tip 6 and comprises an outer ring 21 which snugly surrounds the writing lead 10 and three radial upwardly extending clutch fingers 22 which terminate with the hooked inner ends 23 which are formed with shoulders 24 extending above and supported by the annular flange 18 on the clutch member 15.

At rest, the spherical balls 8 are held in position by the pressure of the coil spring 19, being forced to rest against the guide tube 9 on the inside and the control bar 11. Pressure upon two sides of the rubber sleeve 3 forces the bars 11 inwardly pushing the outermost spherical balls 8 between the row of innermost balls 8, bringing into alignment all of the balls 8 in each slot. With the top ball 8 resting against the outer end of the pencil body 1, the outer ball 8 is forced a sufficient distance outward to bring about a subsequent movement of the clutch members 15 and 20 to advance or expel writing lead 10 slightly from the tip 6.

Upon release, the clutch member 15 is forced inward by the spring 19 permitting the fingers 21 to release their grip on the writing lead 10. Clutch member 20 is retarded by friction until

the shoulders 23 and the inwardly extending annular flange 18 are engaged. Further inward motion returns the entire clutch assembly to a normal position.

Having thus described my invention what I claim as new and desire to secure by Letters Patent of the United States is:

1. A pencil having a body, a lead guide tube supported axially by one end of said body, a compressible rubber sleeve supported by said body concentrically about said lead guide tube, an axially bored tip supported by the opposite end of said rubber sleeve, a writing lead in said lead guide tube, cooperating clutch members in said tip, outer and inner rows of balls supported within the body, the balls of outer rows resting against the balls of the inner rows separating the balls of the inner rows, and the balls of the outer rows being movable between the balls of the inner rows in contact with the guide tube, spreading the balls of the inner rows and operating the clutch members.

2. In a mechanical pencil, a body, a lead guide tube supported axially of the body and in which writing lead is held, a clutch member slidable on the guide tube, engaging the writing lead advancing the lead through one end of the guide tube, a coiled spring normally urging the clutch member longitudinally of the guide tube, outer and inner rows of spaced balls surrounding the tube, portions of the balls of the outer rows being normally disposed between the balls of the inner rows, and a collapsible rubber sleeve encasing the rows of balls, said rubber sleeve adapted to force the balls of the outer rows between the balls of the inner rows when pressure is directed thereto, lengthening the inner rows of balls and operating said clutch.

3. In a mechanical pencil, a body, a lead guide tube supported axially of the body in which a writing lead is mounted, a collapsible rubber sleeve having radial slots supported by said body concentrically about the lead guide tube, outer and inner rows of balls mounted within the slots, a clutch member on which balls of the inner row rest, the balls of the outer row being movable between the balls of the inner row under pressure directed to the balls of the outer row by said collapsible rubber sleeve, lengthening the inner row of balls, operating the clutch member, and a coiled spring mounted within the body adapted to return the clutch member to its inactive position.

4. In a mechanical pencil, a body, a lead guide tube supported axially of the body in which writing lead is held, a clutch member engaging the lead advancing the lead as the clutch is operated, a collapsible rubber tube surrounding the lead tube, outer and inner rows of balls held between the lead guide tube and rubber tube, a coiled spring within the body engaging the clutch member urging the clutch member against the balls of the inner row forcing the balls of the outer row outwardly against the collapsible rubber tube, the outer row of balls being movable between the balls of the inner row under pressure directed to the collapsible tube, operating the clutch, and means for gripping the lead holding the lead against inward movement.

FORD W. HALVERSON.

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The following references are of record in the file of this patent:

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