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GRAVITY AND INERTIA FED PENCIL

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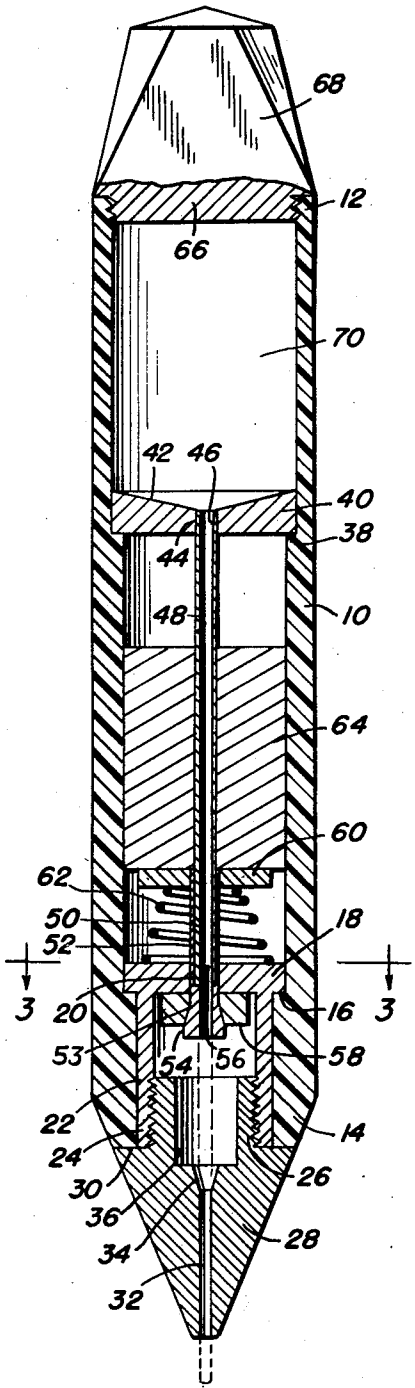


Fig. 1.

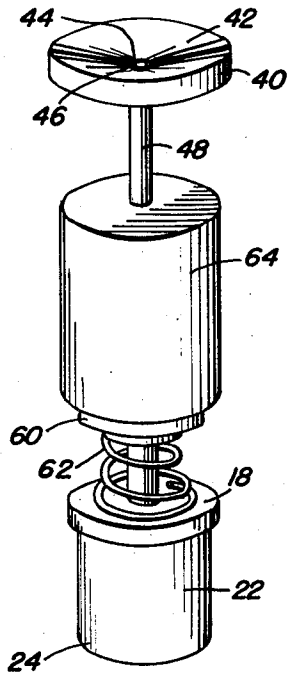


Fig. 2.

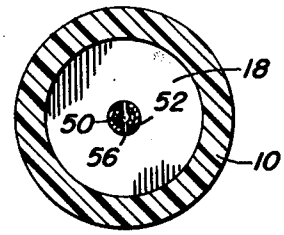


Fig. 3.

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GRAVITY AND INERTIA FED PENCIL

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6 Claims. (Cl. 120—17)

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This invention relates to new and useful improvements in automatic pencils and the primary object of the present invention is to provide a pencil containing a plurality of pencil leads which are extended singly, in a step by step movement from one end of the pencil as the latter is manually forced downwardly with a sudden jerk or wrist action.

Another important object of the present invention is to provide a gravity and inertia fed pencil including a slidable lead holding member, a feed bore, and novel and improved plunger means, manually actuated, to discharge a pencil lead engaged by the holding member into the feed bore.

A further object of the present invention is to provide a pencil that is gravity and inertia actuated to effect a step-by-step discharge of a pencil lead therefrom without the necessity of having to rotate or turn any portion thereof.

A still further aim of the present invention is to provide a gravity and inertia fed pencil that is simple and practical in construction strong and reliable in use, neat and attractive in appearance, small and compact in structure, relatively inexpensive to manufacture, and otherwise well adapted for the purposes for which the same is intended.

Other objects and advantages reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming part hereof, wherein like numerals refer to like parts throughout, and in which:

Figure 1 is a longitudinal vertical sectional view of the pencil constructed in accordance with the present invention;

Figure 2 is a perspective view of the present invention, the body portion and end tip removed therefrom; and,

Figure 3 is a transverse horizontal sectional view taken substantially on the plane of section line 3—3 of Figure 1, the spring, however, not being shown.

Referring now to the drawings in detail, wherein for the purpose of illustration, there is disclosed a preferred embodiment of the present invention, the numeral 10 represents a substantially cylindrical body of any suitable material having an internally threaded, open upper end 12 and an open and tapered lower end 14.

Slidably positioned in the body 10 and engaging an annular inner shoulder 16 provided on the inner wall of the body 10 adjacent the lower open end 14 thereof, is a combined guide plate

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and abutment 18 having a central opening or aperture 20. Integrally formed with the guide plate 18 and depending therefrom, is an annular support sleeve 22 the lower internally threaded end 24 of which terminates coplanar with the lower end 14 of the body 10.

Receivably engaging the internal threads at the lower end 24 of the sleeve 22, is the reduced externally threaded inner end 26 of a substantially frusto-conical tip or end portion 28 having an annular shoulder or base portion 30 that bears against the end 24 of the sleeve 22 and the lower end 14 of the body 10. This tip 28 is formed with an axial opening or bore 32 that is flared at its inner end 34 to communicate with a socket or recess 36 provided in the reduced threaded end 26 of the said tip 28.

Suitably fixed to an annular outer shoulder 38 provided on the inner wall of the body 10, adjacent the upper end 12 thereof, is a support plate 40 having a concaved upper face 42 and a central bore 44 in which there is fixed the upper open end 46 of a tubular guide or feed conduit 48. The lower open end 50 of the feed conduit 48 is loosely received in the opening 20 provided in the guide plate 18 and slidably supports a substantially cylindrical, open ended, lead holding, feed chuck or clutch member 52 that is slidably guided in the opening 20 in the guide plate 18.

The lower enlarged externally cam surfaced end 54 of the lead holding member 52 is formed with a plurality of circumferentially spaced, longitudinal slots 56 thus forming an expansible and contractible collet holding device to grasp leads for a purpose which will later be more fully apparent. Also, the lower end 54 of the lead holding member 52 extends through a countersunk central opening 53 in an operating member or stop element 58 that is slidable on the member 52 and which limits the upward sliding movement of the lead holding member relative to the guide plate 18. The operating member also contracts or actuates the grasping action of the collet when the member 58 contacts the element 18 and is forced upon the cam surface of the end 54 as shown in Figure 1.

Fixed on the lead holding member 52, is an annular bearing plate 60 that is urged together with the lead holding member 52 to a raised or retracted position by a coil spring 62 that embraces the holding member 52 and which is biased between the bearing plate 60 and the guide plate 18.

Slidably positioned on the conduit 48, is a weight or cylindrical plunger 64 that bears upon

the bearing plate 60. This plunger 64 is normally retained in a raised position with the plate 60 by the spring 62.

Receivably engaging the upper internally threaded end 12 of the body 10, is the threaded end 66 of a closure plug or eraser holder 68 of any suitable size or shape.

In practical use of the present invention, pencil lead is placed in the holding compartment or chamber 70 that is disposed between the support plate 40 and the holder 68.

Some of the pencil lead in the chamber 70 will slide, by gravity, into the conduit 48 until the same is frictionally engaged by the slotted end 54 of the lead holding member 52 and at the end 50 of the conduit 48.

As the body is manually shaken by a downward motion, the plunger 64 will be forced downwardly to compress the spring 62 and a portion of the pencil lead held by the holding member 52 will be injected into the axial bore 32 of the tip 28. Each time the body is moved in the above manner, the lead will slide downwardly into the bore 32.

When the pencil lead in the conduit 48 has been used, more lead in the chamber 70, due to the sloping surface 42 of the support plate 40, will enter the conduit thus automatically filling the conduit as the present invention is used.

It should be noted, that member 58 releases the collet holding action upon striking the end 26 of tip 28, part 52 continuing into recess 36 of tip 28 and part 58 remaining on shoulder or end 26 until return action carries it back (at this point part 58 has slid or is retracted on part 52 and is carried back by friction to its normal position at which time part 52 continues its return motion until returned and stopped by 58 which is held against part 18 whereupon the grasping action of collet 52 reoccurs as the member 58 rides upon the cam surface of the end 54).

Obviously, the support sleeve 22 may be eliminated from the guide plate 18 for the convenience of manufacture whereby the threaded end 26 of tip 28 will engage internal threads (not shown) which are formed at the lower end 14 of body 10.

In view of the foregoing description taken in conjunction with the accompanying drawings it is believed that a clear understanding of the device will be quite apparent to those skilled in this art. A more detailed description is accordingly deemed unnecessary.

It is to be understood, however, that even though there is herein shown and described a preferred embodiment of the invention the same is susceptible to certain changes as long as they come within the scope of the appended claims.

Having described the invention, what is claimed as new is:

1. A mechanical pencil comprising a hollow body having a tip at one end, said tip including an axial bore and also an inner end having a recess therein, a lead receiving chamber provided in said body, a conduit leading from the chamber to the bore in said tip, a combined abutment and guide mounted in said body, a feed chuck slidably received on said conduit and slidably carried by said combined abutment and guide, an operating member slidably received on said chuck for compressing the chuck when the member is urged against the combined abutment and guide, said operating member being stopped by the inner end of said tip to permit movement of the chuck away from the operating member and thereby permit expansion of the chuck as the chuck moves into the recess in the inner end of said tip, means movable in the body by bodily movement of the body to urge the chuck and member toward the tip, a bearing plate on said chuck spaced from said combined abutment and guide and spring means associated with the chuck and compressed between said plate and said combined abutment and guide for urging the chuck away from the tip and the member against the combined abutment and guide.

2. The combination of claim 1 wherein said conduit is held stationary within said body, said means movable in the body by bodily movement of the body comprises a weight having a central opening slidably receiving the conduit.

3. A mechanical pencil comprising a hollow body having a lower end and a shoulder on the inner wall of the body adjacent the lower end, a tip including an end received in said lower end of said body and having a recess, a supporting sleeve mounted in the lower end of said body and detachably secured to said tip, said sleeve having an upper end, a guide plate secured to the upper end of said sleeve and seated on said shoulder, said plate having a central opening, a conduit disposed axially in said body and having a lower end received in said central opening, a clutch member having a hollow shank slidable on the lower end of said conduit and slidable in said central opening, a bearing plate attached to the upper end of said shank and overlying said guide plate, an operating member slidable on said shank for compressing the clutch member when the operating member is disposed against the guide plate, said operating member engaging the end of said tip to limit sliding of the operating member and to permit movement of the clutch member from the operating member and expansion of the clutch member as the clutch member moves into the recess in the said end of said tip, a weight slidable on the conduit and supported on said bearing plate, and a spring surrounding the shank and compressed between said guide plate and said bearing plate for yieldingly urging the clutch member and the operating member toward said guide plate.

4. The combination of claim 3 wherein said tip includes a base portion engaging the lower end of said body, and said sleeve is threaded to said tip to hold the guide plate against the shoulder and the base portion against the tip.

5. The combination of claim 1 wherein said body includes a shoulder on its inner wall adjacent said tip, said combined abutment and guide seating against said shoulder, said tip including a base engaging one end of said body, and a threaded connection between said tip and said combined abutment and guide retaining the combined abutment and guide against said shoulder and the base against one end of said tip.

6. A mechanical pencil comprising an open ended body, a tip carried by one end of said body having an axial bore, a conduit fixed in said body intermediate the ends of the body, a feed chamber provided in said body and interposed between the conduit and the tip, an expansible and contractible lead holding member slidably carried by said conduit adjacent the tip, guide means fixed in said body guiding the sliding movement of said lead holding member, means for forcing the lead holding member downwardly toward the tip, spring means urging the lead holding mem-

ber toward a raised and retracted position, said guide means also limiting the raising movement of said lead holding member, and an operating member movable on said lead holding member to contract the lead holding member upon movement of the lead holding member away from the tip and engagement of the operating member with the guide means, said tip having an inner end constituting a stop for engaging the operating member to limit sliding movement of the operating member, the inner end of said tip including a recess receiving the lead holding member therein to permit expansion of the lead holding member as the lead holding member is moved downwardly from the operating member upon engagement of the operating member with said guide means.

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