June 18, 1935. A. C. WELLS 2,005,485

PENCIL

Original Filed Aug. 30, 1930

Fig. 1.

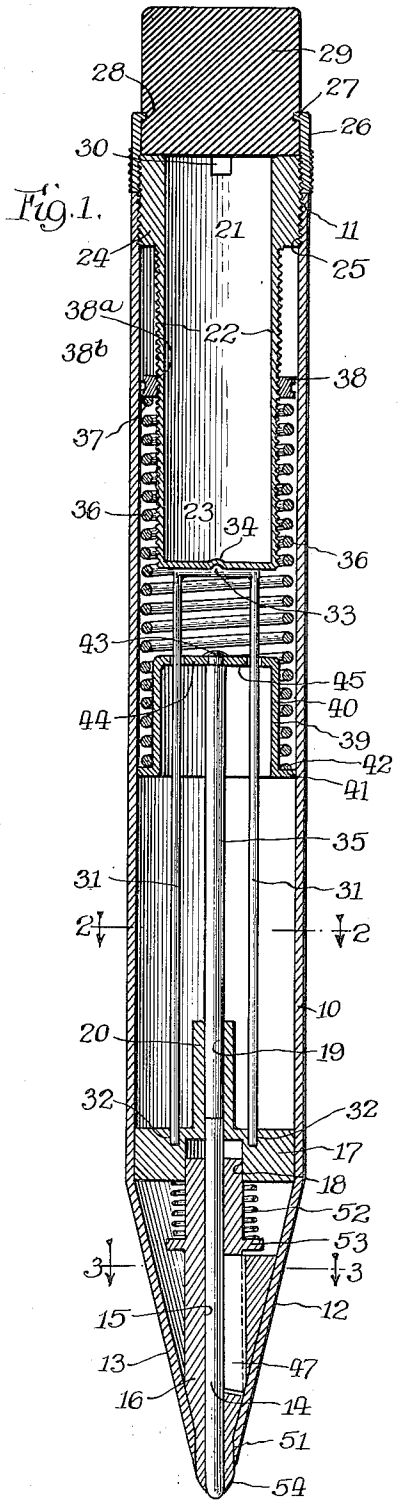


Fig. 2.

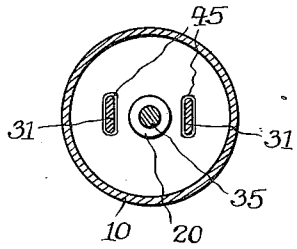
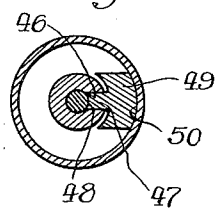


Fig. 3.



Inventor:
Albert C. Wells,
By Chisdahl, Parker & Carlson
Attys.

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PENCIL

Albert C. Wells, Chicago, Ill.

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3 Claims. (Cl. 120—17)

The invention relates generally to pencils and more particularly to mechanical pencils of the type in which a length of lead or other writing medium is slidably mounted substantially axially of the body of the pencil and projected to operative position from an end thereof.

One object of the invention is to provide a new and improved means for projecting the lead from a mechanical pencil which is simple, compact and economical of manufacture and such as to positively drive the lead to operating position.

Another object of the invention is the provision of means to progressively feed the lead of a pencil of the character described to writing position as an incident to the wear occasioned by its use.

A further object of the invention is the production of a pencil of the character described embodying feeding means adapted to advance a writing medium in increments of varying extent without necessitating temporary cessation of use of the pencil.

Yet another object of the invention is the provision of a fully automatic mechanical pencil in which the writing medium is urged downwardly into writing position by a continuously acting feeding means, the operation of which is controlled by a releasable detent.

Another object of the invention is to provide a mechanical pencil in which a spring pressed plunger constantly exerts an effort to project the writing medium externally of the pencil and is normally restrained by the action of an elongated wedge carried in an axial slot of a spring pressed sliding sleeve member which journals the lead and projects slightly beyond the truncated end of the cone-shaped extremity of the pencil, the sleeve member forcing the wedge downwardly into the restricted conical end of the pencil where its converging walls exert lateral effort on the wedge to bind the lead against movement in the sleeve.

Ancillary objects and advantages will become apparent from the following description of a preferred embodiment of the invention and in the accompanying drawing, in which:

Figure 1 is a vertical longitudinal sectional view.

Fig. 2 is a sectional view taken on line 2—2 of Fig. 1.

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

For purposes of description, I have illustrated in the drawing and will hereinafter describe in detail the preferred embodiment of the invention with the understanding that I do not intend to limit the invention to the particular construction and arrangement shown, it being contemplated that various changes may be made by those skilled in the art without departing from the spirit and scope of the appended claims.

Referring to the drawing, the invention in its preferred form is embodied in a pencil having an elongated cylindrical barrel 10 which may be formed of metal or other suitable material, its upper end defining a circular opening 11, its lower end being tapered as at 12 to provide a relatively short truncated conical section 13.

The writing medium, which in the present instance is a short length of lead 14 is slidably mounted for movement longitudinally of its principal axis in an axial bore 15 of a guiding and supporting member 16. Means is provided to centrally align the inner end of the guide 16 in the body of the pencil and comprises in this embodiment of the invention a circular disk shaped element 17, the under surface of which is formed with an axial bore 18 adapted to receive the upper end of the guide. Communicating with the bore 18 in the disk 17 is a smaller concentric upwardly extending bore 19 defined by an integrally formed bearing sleeve 20.

A cylindrical, axially disposed lead receptacle 21 having side walls 22 and bottom 23 is removably supported adjacent the open end of the barrel 10 with its lower walls 22 in spaced relation to the inner surface of the walls of the barrel. In this instance the lead receptacle is formed with an enlarged threaded shoulder 24 which is adapted for engagement with a complementary thread 25 provided on the inner surface of the barrel adjacent its open end 11.

The threaded shoulder 24 of the lead receptacle 21 projects externally of the open end of the barrel to receive a threaded collar 26, the upper end of which is crimped inwardly as at 27 to engage an annular groove 28 in an eraser 29. It will be seen that the collar 26 is readily removed for the purpose of affording access to the lead receptacle or to permit renewal of the eraser. Removal of the lead receptacle from the barrel is facilitated by a diametrical notch 30 formed in the peripheral edge of the collar 26 and adapted to receive the blade of a screwdriver.

The disk 17 is slidably fitted in the barrel of the pencil, its limiting downward position being determined by the point at which the sides of the barrel converge inwardly to form the conical section 13. To restrict the disk

against displacement from its proper position, as illustrated in Fig. 1, a longitudinally extending yoke 31 is provided, the legs of which act between the bottom 23 of the receptacle 21 and the upper surface of the disk.

A pair of diametrically disposed sockets 32 formed in the upper face of the disk serve to correctly position the lower legs of the yoke and a small knob 33 provided at the junction of the respective legs is adapted to engage a complementary indentation 34 struck upwardly in the bottom wall 23 of the lead receptacle. It will be seen that when the lead receptacle is screwed into position in the upper end of the pencil its bottom wall will abut the yoke to retain the disk 17 in position.

Feeding means is provided to yieldingly urge the lead downwardly to writing position. To this end a plunger 35, reciprocably mounted in the bearing sleeve 20 is adapted to be forced downwardly into abutting engagement with the upper end of the lead by an expansive coiled spring 36 acting between the former part and a relatively stationary element of the pencil. Referring particularly to Fig. 1 the spring 36 will be seen to be guided for movement in the annular space provided between the external surface of the walls of the lead receptacle and the adjacent inner surface of the body of the pencil with its stationary end 37 in abutment with an annular stop collar 38. To permit the use of springs of varying lengths and tension and for the further purpose of facilitating adjustment of the feeding pressure of the particular spring in use, the collar 38 is preferably movable longitudinally of the barrel. To this end the collar 38 in the present embodiment of the invention is provided with an internal screw thread 38^a adapted to engage a complementary thread 38^b formed on the external surface of the wall 22 of the lead receptacle 21.

In operating from extreme compressed to extreme elongated position the spring 36 is flexed substantially one-half of the length of the barrel 10. It is accordingly desirable to employ a spring of greatest possible length to insure uniformity of pressure throughout its operating range. To this end the energy of spring 36 is exerted upon plunger 35 through a thimble-shaped connecting member 39, the side walls 40 of which extend downwardly in spaced relation to the walls of the barrel a distance substantially equivalent to the length of bearing sleeve 20 and terminate in an annular seat 41 adapted to receive the mobile end 42 of the feeding spring. Thus the use of a spring of appreciably greater length than could otherwise be employed is made possible.

The plunger 35 may be rigidly secured to the connecting member 39 in any desired manner as by peening over a short section 43 of reduced diameter which is projected through an aperture of suitable size formed in the transverse wall 44 of the thimble. Movement of the thimble relative to the yoke 31 is provided for by the formation of two similar apertures 45 in the transverse wall 44 of the thimble in which the respective legs of the yoke are freely slidable.

The above described feeding means is normally restrained against movement by an automatically operable detent which, in the present embodiment of the invention is adapted to frictionally engage an appreciable area of the surface of the lead. To this end an elongated radially extending slot 46, which is formed in the guide 16 in communication with the bore 15, is slidably fitted with a tongue 47 of somewhat lesser length than the slot, the tongue being formed with a surface 48 which is arcuately shaped to afford an extensive bearing engagement with the lead. It will be apparent that the tongue 47 is capable of an incremental movement relative to the guide. The tongue 47 is normally held in frictional engagement with the lead by an integrally formed wedge 49 the camming surface 50 of which, in the present instance, cooperates with the converging walls of the section 13 of the body as shown in Figs. 1 and 3. Means is provided to move the wedge longitudinally of the barrel to release the tongue 47 from binding engagement with the lead. To this end the sleeve 16 is longitudinally slidable in the bore 18 and is provided with a journal 51 adjacent its lower end which is slidably received in the truncated end of the conical section 13. The sleeve is normally urged to its downward position to move the wedge and tongue to locking position by a coiled expansive spring 52 which acts between the under surface of disk 17 and annular collar 53 preferably formed integrally with the sleeve. It will be apparent that the feeding means will normally be prevented from moving the lead downwardly because of the inherent tendency of the wedge 49 to move down and inwardly under the influence of spring 52 to force the tongue 47 into locking engagement with the lead.

The invention embodies means to automatically release the locking action of the wedge as an incident to wearing of the writing medium to such an extent as to defeat further use of the pencil. In this particular embodiment of the invention the locking action of the wedge is controlled by the sleeve 16, the lower end of which protrudes beyond the truncated lower end of the pencil at 54. When the pencil is in use and the writing medium has been worn so as to permit the protruding end 54 of the sleeve to lightly contact the paper, the sleeve will be moved upwardly against the action of the spring 52, the lower end of slot 46 contacting the lower end of tongue 47 shortly thereafter to release the wedge 49 with its tongue 47 from binding engagement with the lead. Thereupon the relatively stronger spring 36 will serve to drive the lead downwardly through the medium of the piston 35 a sufficient distance to release the upward pressure upon the sleeve 16 whereupon the spring 52 again moves the wedge downwardly to cause the tongue to resume its binding action upon the lead thereby stopping the feeding action. Thus, while the spring 36 is acting to drive the lead downwardly in a feeding movement, the sleeve 16 is momentarily restrained in the position to which it was forced through contact with the writing surface. Hence, movement of the lead occurs relative to the tongue. As the downward pressure on the sleeve is released, its spring 52 acts to force both sleeve 16 and tongue 47 downwardly to normal position, the wedge 49 simultaneously cooperating with the converging lower end of the pencil to force the tongue into binding frictional engagement with the lead.

It will be seen that a wholly automatic mechanical pencil has been provided in which the lead is continuously forced downwardly to writing position under control of a locking means normally operable to prevent a feeding movement and automatically releasable as an incident to wearing of the lead to permit feeding action, thereby permitting uninterrupted use of the pencil.

I claim as my invention:

1. A pencil comprising, in combination, an elongated tubular body having a conically shaped lower end section, a sleeve slidably supported coaxially of said body with its lower end protruding externally of the conical end thereof, said sleeve having a longitudinal bore adapted to support a length of lead in position for writing and a radially extending slot communicating with said bore, spring means normally urging said sleeve downwardly, a plunger slidable longitudinally in said bore, spring means acting between said plunger and a stationary part of said body to urge said plunger downwardly to feed a lead to writing position, an elongated tongue projecting into the radially extending slot therein, and being movable axially thereof, and a wedge member fixed to said tongue and operable to force said tongue into binding engagement with a lead when said sleeve is moved downwardly and to release said lead for feeding movement when said sleeve is moved upwardly.

2. A pencil comprising, in combination, an elongated tubular body having a conically shaped lower end section, a sleeve slidably supported coaxially of the body with its lower end protruding externally of the conical end thereof, said sleeve having a longitudinal bore adapted to support a length of lead in position for writing and a longitudinally extending opening communicating with said bore, a clamping wedge movable in said opening radially with respect to said bore to clamp a lead in said bore, a spring means normally urging said sleeve downwardly to engage said wedge with said conical lower end section and thereby move said clamping wedge to its active position, a plunger slidable in said bore into endwise abutment with a lead positioned in the bore, and spring means acting constantly to urge said plunger against said lead and controlled in its feeding function by the restraining action of the wedge upon the lead.

3. A pencil comprising, in combination, an elongated tubular body having a conically shaped lower end section, a sleeve slidably supported coaxially of said body with its lower end protruding externally of the conical end thereof, said sleeve having a longitudinal bore adapted to support a length of lead in position for writing, spring means normally urging said sleeve downwardly, a plunger slidable longitudinally in said bore, spring means acting between said plunger and a stationary part of said body to feed a lead downwardly in said sleeve to writing position, a clamping wedge for securing the lead against movement by said plunger, said sleeve having a longitudinally extending opening therein through which said wedge may be moved radially toward and into clamping engagement with the lead, said wedge having a slight axial movement in said opening and being shiftable into binding engagement by camming engagement with the inner surface of said conical lower end when the sleeve is moved downwardly, the lead being released by said wedge when the sleeve is moved upwardly.

ALBERT C. WELLS.