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I. D. TEFFT ET AL

1,920,770

MECHANICAL PENCIL

Filed June 4, 1931

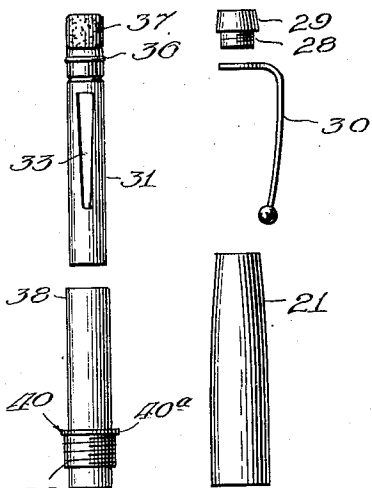


Fig. 8.

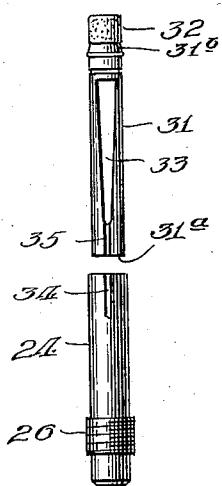


Fig. 4.

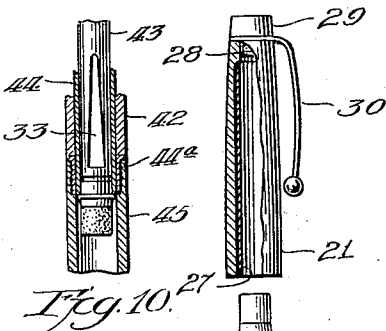


Fig. 10.

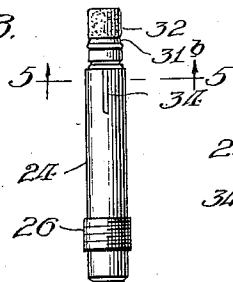


Fig. 5.

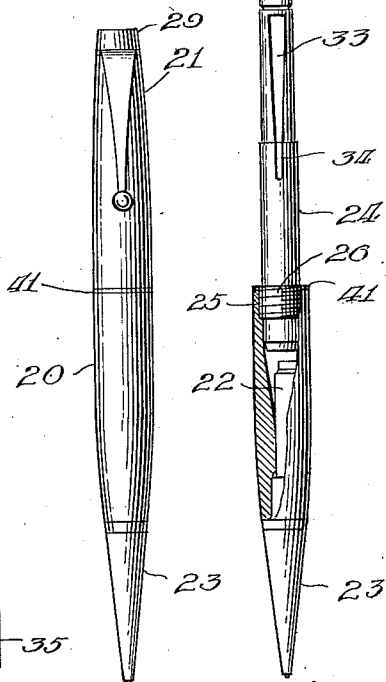


Fig. 1. Fig. 5.

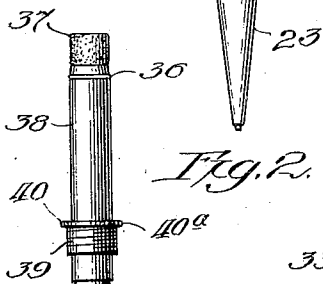


Fig. 9.

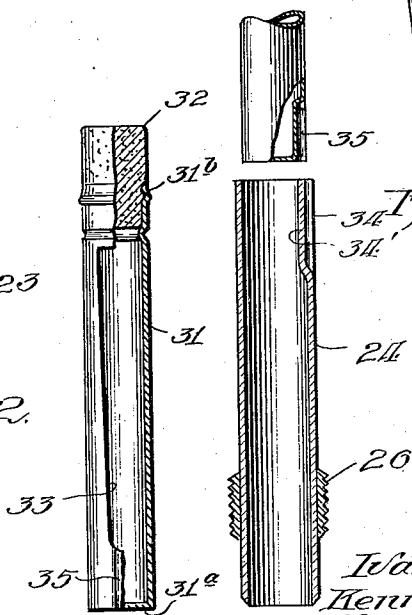


Fig. 7. Fig. 6.

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UNITED STATES PATENT OFFICE

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MECHANICAL PENCIL

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22 Claims. (Cl. 120—14)

Our invention relates generally to mechanical pencils and has to do especially with a novel arrangement for carrying reserve leads.

One of the objects of our invention is to provide a pencil structure of the foregoing character which is adapted to receive a cartridge-like container carrying a supply of reserve leads, which container is readily and quickly removable for the substitution of a new and similar container when its reserve leads are exhausted; which structure readily lends itself to an arrangement whereby spare leads may be packaged and sold in a so-called re-fill cartridge or container adapted to be placed directly in the pencil and which may be thrown away when its reserve leads are exhausted.

Another object is to provide a cartridge or container of the foregoing character which includes, as a permanent part thereof, an eraser whereby each time a new cartridge is substituted a new eraser is made available to the user.

A further, and more specific, object is to provide a reserve-lead cartridge of tubular form and which has both ends closed and has a longitudinal slot in its wall for the removal of leads, which cartridge is so arranged and positioned with respect to the pencil casing that the casing serves as a closure for the lead-discharge slot in the normal position of the cartridge, and the cartridge is adjustable relative to the pencil casing for opening of such slot to discharge a lead.

Still another object is to provide a mechanical pencil adapted to receive a cartridge of reserve leads and which is so arranged that the cartridge may be removed from and inserted in the pencil without detachment of any of the secured-together pencil parts and without interfering in any manner with the pencil operating mechanism.

An additional object is to provide a simple and inexpensive pencil having a body formed of two readily separable sections, one of which sections removably supports the reserve-lead cartridge unit and the other of which serves to conceal such cartridge unit.

Other objects are to provide a pencil of the foregoing character having a cylindrical casing in which a similarly-shaped reserve-lead cartridge is telescopically received, which cartridge supports an eraser at its outer end, means being provided for preventing rotation of the cartridge relative to its support as the eraser is used; to provide for an arrangement eliminating the inconvenience heretofore experienced in the handling of spare leads where the leads are removed from their marketing container and placed in a separate magazine within the pencil; to provide means for limiting the extent to

which the cartridge may be inserted into the pencil casing thereby maintaining the eraser always in position for ready use; to provide an arrangement wherein the insertion-limiting means also prevents relative rotation as between the cartridge and the pencil; and to provide a simple and inexpensive mechanical pencil which is durable and of high efficiency in use.

Further objects and advantages will become apparent as this description progresses and by reference to the drawing wherein,—

Figure 1 is an elevational view of one form of mechanical pencil embodying our invention;

Fig. 2 is a separated assembly view of the structure of Fig. 1; illustrating certain of the detachable pencil parts in separated relation in condition for assembly;

Fig. 3 is a partial sectional view illustrating the end cap or rear barrel section in detached relation and the lead cartridge partly withdrawn;

Fig. 4 is a separated assembly view of the lead cartridge and its supporting casing part;

Fig. 5 is a section taken substantially on line 5—5 of Fig. 2;

Fig. 6 is a sectional view of the pencil casing part which supports the cartridge, and showing a portion of the cartridge partially in section in readiness to be inserted in such casing part;

Fig. 7 is a view, partially in section, of the lead cartridge;

Fig. 8 is an elevational view of a modified form of cartridge shown in position to be inserted within a modified form of pencil casing part;

Fig. 9 is an assembled elevational view of the structure shown in Fig. 8; and

Fig. 10 is a sectional view of another form of pencil embodying my invention.

Referring to the pencil structure shown in Figs. 1 to 7, inclusive, it comprises a pencil barrel structure formed of a so-called front section 20 and a rear section or cap 21. The front section 20 supports the pencil-movement mechanism (not shown in detail but indicated generally at 22 in Fig. 3) with which there is associated a writing point or tip 23 rotatable relative to the barrel section 20. This movement mechanism may take any desired form whereby upon relative rotation as between the barrel 20—21 and the tip 23 the lead is adjustable for writing, or otherwise, as may be desired.

The front barrel section 20 is long enough, preferably, to project rearwardly somewhat beyond the rearward end of the movement mechanism 22 and is adapted to receive a tubular, cylindrical casing member or sleeve 24 as follows: The rear end of the barrel section 20 is internally threaded as at 25 and the sleeve 24 has an externally threaded bushing 26 permanently secured thereto (in any suitable manner)

at a point slightly inward from its forward end. This bushing 26 serves as a means for screw-threadedly attaching the sleeve 24 to the rear end of the barrel section 20.

8 The rear barrel section 21 is of such shape, preferably, as to continue the uniform curvatures or shaping of the front barrel section 20 as illustrated in Fig. 1. This section 21 is tubular and receives a cylindrical metal insert 27
10 which has an inside diameter closely approximating the outside diameter of the sleeve 24 so that the barrel section 21 serves as a cap snugly passing down over the sleeve 24, the friction fit as between these parts holding the section 21
15 in the assembled position shown in Fig. 1. The extreme rear end of the barrel section 21 is internally threaded to receive the reduced threaded portion 28 of an end cap 29 which, when secured in place, also secures a clip 30
20 (Fig. 1). The parts so far described may be assembled into the condition shown in Fig. 1 and the pencil is usable after proper relative manipulation of the rotatable tip 23 with respect to the pencil barrel.

25 A pencil of this character, as is well known, is adapted to handle a comparatively short-length piece of writing lead and, as the lead is used up, a new lead is inserted in the tip or point 23. Heretofore, for the convenience of
30 the user, it has been customary to provide the pencil with a self-contained magazine into which reserve leads may be placed and carried. These magazines have constituted a part of the pencil barrel structure or the pencil-operating mechanism, or they have been so interlocked with
35 these structures as to form a permanent part of the pencil.

It has also been customary for various manufacturers to package and sell reserve leads in various forms of containers. The pencil user in
40 purchasing such reserve leads has been required to remove them, or some of them, from the package or container in which they were purchased and insert them in the pencil magazine. This
45 has been quite inconvenient because the small leads are difficult to handle, they are many times broken in inserting the same in the pencil, and, in some instances, they have become jammed causing waste and great inconvenience to the
50 pencil user.

Our invention provides for the elimination of all of these prior inconveniences. It provides a pencil structure which is adapted to receive a
55 separate and independent reserve lead container or cartridge in which the spare leads may be separately marketed and which, when its spare or reserve leads are used up, may be thrown away. Also, our arrangement is such that after
60 the cartridge has been inserted in the pencil, it is adjustable for the removal of spare leads and it need not be entirely removed from the pencil until all of the spare leads are used up.

It is also a well known fact that considerable inconvenience has heretofore been experienced
65 with mechanical pencils because of the rapid wearing away of the comparatively small erasers which must necessarily be supplied. Our invention also contemplates the elimination of this undesirable condition by the provision of a reserve lead cartridge of the foregoing character
70 which includes as a permanent part thereof an eraser which may be quickly and conveniently exposed for use. In other words, with every purchase of a supply of spare leads for the pencil, or every time a new cartridge is placed in the

pencil, a new eraser is also made available for use.

More particularly, we provide (Figs. 4 and 7) a tubular, cylindrical container formed, preferably, of any suitable kind of metal in such a way
80 that its end 31^a is closed by the metal thereof and its other end is closed by an eraser 32. The eraser, normally, is of greater diameter than the cartridge 31 and is permanently secured therein by upsetting the metal at the eraser-supporting
85 end in a manner, preferably, as indicated at 31^b (Fig. 7). The outside diameter of the cartridge 31 closely approximates the inside diameter of the barrel-carried sleeve 24 so that the cartridge 31 may be slip-fitted into the sleeve 24 and frictionally held against free movement therein.
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In order that the leads may be readily removed from the cartridge one at a time, we provide a longitudinal slot 33 in the side wall of the cartridge which, when the cartridge is marketed as
95 a separate unit, may be closed in any desired manner as by the cartridge wrapper, or the like. When it is desired to insert the cartridge in the pencil, it is first placed in the condition illustrated in the drawing (its marketing wrapper,
100 if any, removed) and inserted to the position illustrated in Fig. 2. In such position, the wall of the sleeve 24 serves as a closure for the slot 33 preventing discharge of the leads except when the cartridge is slid outwardly, for example, to
105 the position shown in Fig. 3, opening up the outer end of the slot 33. It will be noted that the slot 33 increases in width from its front to its rear end so that in the position indicated in Fig. 3, by tipping the pencil sidewise with the
110 slot on the underside, the end of a lead will readily project therethrough where it may be easily grasped and removed. The cartridge may then be slid back into the sleeve 24 and the lead inserted in the pencil tip in the usual manner
115 for use.

The eraser 32 is exposed for use by removing the rear barrel section or cap 21. It will be appreciated that this eraser, unless otherwise
120 guarded against, as well as the cartridge, may tend to rotate in the sleeve 24 which is undesirable for best erasure. To prevent this, we provide a detent 34 extending inwardly a slight distance from the extreme rear end of the tube
125 24, providing on the interior thereof a relatively short, longitudinally extending rib 34'. The extreme forward end of the cartridge 31, in longitudinal alignment with the slot 33, is likewise indented providing an external recess 35 of dimensions closely approximating the dimensions
130 of the rib 34' and in which such rib is received when the cartridge is inserted into the sleeve 24. As the cartridge is inserted, the rib 34' and recess 35 are first engaged and, as they are moved on into the position shown in Fig. 2, the rib 34' rides into the slot 33 and finally comes to rest
135 against the rearward end of the slot 33,—in which position, obviously, the cartridge is held against rotation and the extent to which the cartridge may be slid into the sleeve 24 is limited. This insertion-limiting feature insures that the eraser 32 will always be exposed for erasure purposes.
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While we preferably employ a structure guarding against rotation of the cartridge and erasure
145 structure when making erasures, such feature, in certain instances, may not be desired. For example, in Fig. 8, we show a cartridge structure which does not include such feature. Specifically, this cartridge is the same as that shown
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in Fig. 7 except that the cartridge is provided with a slightly enlarged annular bead 36 at its rear end just inwardly of the eraser 37; which bead is adapted to strike against the inward end of the cartridge-receiving sleeve 38, limiting the extent to which the cartridge may be inserted into such sleeve, as clearly shown in Fig. 9. The sleeve structure 38 is identical with that shown in Fig. 6, except that the externally-threaded bushing 39 is provided with a comparatively narrow annular flange 40 which is adapted to seat upon the rear end of the front barrel section. The outer edge surface 40^a of this flange which is exposed when the barrel sections are together gives a desirable banding effect between the barrel sections. A similar effect is provided in the form shown in Fig. 1 by the use of a separate band member 41 supported at the rear end of the barrel section 20.

It may be also desirable in certain instances to support the cartridge removably in the rear barrel section or cap, and in Fig. 10, we have illustrated such an arrangement. Specifically, the rear section or cap 42 may be similar to the cap shown in Fig. 3 and the cartridge 43 may be identical either with the cartridge shown in Fig. 7 or Fig. 8. The cap 42 is provided with a tubular insert 44 formed preferably of metal which projects on below the inward end of the cap 42 providing an externally threaded attachment portion 44^a which is adapted to be screw-threaded into the rear end of the front section 45 in the same manner as the bushing 26 of Fig. 1 is adapted to be screwed into the front barrel section 20. The cartridge is of such size and shape that it slip-fits into the insert 44 and is held therein frictionally, with the same capabilities of adjustment for removal of leads as in the previously-described forms. Otherwise than as above described, this form is the same and provides for the same benefits and advantages as the previously-described forms.

While we have shown and described only three forms of my invention, it will be understood that other changes in details and arrangement of parts may be made therein without departing from the spirit and scope of our invention as defined by the claims which follow.

We claim:

1. In a pencil of a character having a pair of hollow sections and means detachably mounting one of said sections upon the other with their hollow interiors in longitudinal alignment, an elongated spare lead container shaped in cross sections similarly to the interior of one of said sections and detachably held in said one section independently of said other section merely by longitudinal slide, friction fit therein, the other of said sections rendering said container inaccessible when said other section is mounted upon said one section.

2. A pencil which comprises a barrel having an open-ended portion, an elongated spare lead container frictionally and removably supported in the open-ended portion of said barrel by frictional engagement only therein, said container having both ends closed and having a slot in one side for the discharge of leads therefrom, and said container being slidably adjustable relative to the open end of said barrel to open said slot in one position and to cause said barrel to close said slot in another position, and another barrel portion detachably mounted upon said first barrel portion independently of said spare-lead container to complete the pencil bar-

rel and to normally conceal said spare lead container.

3. A pencil of the class described which comprises a barrel having an open-ended portion, a closed-end spare lead container, said container being supported solely by slide-fit means in the open end of said barrel, said container and barrel being so constructed and related that said container is removable by merely pulling it away from the barrel, and means for limiting the extent of insertion of said container into the barrel to maintain said end-closure means in its projected position.

4. A pencil of the class described which comprises a barrel having an open-ended portion, a closed-end spare lead container, means supporting said container in the open end of said barrel, said container and barrel being so constructed and arranged that said container is removable by merely pulling it away from the barrel, means for limiting the extent of the insertion of said container into the barrel to maintain said end-closure means exposed, and means for preventing rotation of said container in either direction relative to said barrel.

5. A pencil of the class described which comprises a barrel having an open-ended portion, a closed-end spare lead container slidably supported in the open-end of said barrel, means for predetermining the depth of insertion of said container within said barrel to maintain part of the container projected from said barrel, the connection between said container and barrel being such that said container is entirely removable from its fully-inserted position by merely pulling it away from the barrel, said container having a longitudinal slot in its side constituting the sole medium of discharge of lead therefrom, slide movement of said container relative to said barrel serving to uncover and to cover said slot.

6. In a pencil of the class described, a body having an elongated tubular portion at one end, a separate and similarly-shaped tubular spare-lead container mounted in such tubular portion for longitudinal adjustment only, said container being detachable from said body by moving it away from said tubular portion and having an elongated longitudinally-extending slot in its side wall which is concealed and closed by said body tubular portion when the container is fully inserted therein and is exposed and open when said container is adjusted outwardly relative to said body.

7. In a mechanical pencil of the type having a barrel with a pair of sections, an open-ended sleeve projecting from one of said sections, a spare-lead container supported in said sleeve for slide movement only therein, and for removal by merely outward longitudinal movement said container having one end projecting from the open end of said sleeve when the former is freely inserted in said sleeve, the other of said sections being non-engaged with said container and fitting over said sleeve to conceal the latter and the projected part of said container.

8. In a mechanical pencil, a barrel having a pair of sections, an open-ended sleeve projecting from one of said sections, a spare-lead container slip-fitted into said sleeve and adjustable therein and detachable therefrom by merely applying pressure thereto longitudinally, said container having one end projecting from the open end of said sleeve for ready access thereto and having its other end formed closed, said container also

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having a slot in its side for removal of leads, means closing the said one end of said container, the other of said barrel sections fitting over said sleeve to conceal the latter and the projected part of said container.

9. In a pencil of the class described, a body structure including a section having an open-ended tubular part, a tubular spare-lead container adapted to fit into said tubular part and to be removed therefrom merely by longitudinal movement thereof, and means holding said container against movement in all directions except longitudinal movement.

10. In a pencil of the class described, a body structure having a section with an open-ended tubular part, a similarly shaped spare-lead container adapted to fit into said tubular part and to be removed therefrom by merely longitudinal pull movement, and means for limiting the extent of insertion of said container into said tubular part and for preventing rotation of said container relative to said tubular part.

11. In a pencil of the class described, a body structure having a section with an open-ended tubular part, a similarly shaped spare-lead container adapted to removably fit into said tubular part and to be removed by merely pulling outwardly on same, and means for holding said container against rotation relative to said tubular part.

12. In a pencil of the class described, a body structure including a section having an open-ended tubular part, a similarly shaped spare-lead container having a closed end adapted to be inserted in and removed from said tubular part by mere relative movement between said container and tubular part, means closing the other end of said container, means limiting the extent of insertion of said container into said tubular part to maintain said end-closure means projected from said tubular part for ready access, and a connection between said tubular part and container for holding said container against rotation.

13. In a pencil of the class described, a body structure including a section having an open-ended tubular part, a similarly shaped spare-lead container having a closed end adapted to be removably inserted in said tubular part for removal by mere outward movement thereof, a member for closing the other end of said container, said container having a slot in its side for removal of leads, and means preventing rotation of said container relative to said tubular part.

14. In a pencil of the class described, a body structure including a section having an open-ended tubular part, a similarly shaped spare-lead container having a closed end adapted to be removably inserted in said tubular part for removal merely by relative movement between said container and tubular part, a closure device closing the other end of said container, and limiting the extent of insertion of said container into said tubular part to maintain said closure device in an accessible condition beyond said tubular part, and another body section removably mounted independently of said container and normally concealing said tubular part and container closure device.

15. In a pencil of the class described, a body structure including an open-ended tubular part, a similarly-shaped tubular spare-lead container adapted to removably fit into said tubular part

and removable merely by applying outward pressure thereto, said tubular part having an internal rib formed therein and said container having a recess formed in its side wall to receive said rib.

16. In a pencil of the class described, a body structure including an open-ended tubular part, a similarly-shaped tubular spare-lead container adapted to be inserted into and removed from said tubular part without obstruction, and means preventing insertion of said container part into said tubular part except in one predetermined position relative to each other.

17. In a pencil of the class described, a body structure including an open-ended tubular part, a similarly-shaped tubular spare-lead container adapted to fit into said tubular part, said tubular part having an internal rib formed therein, and said container having an inward depression and a longitudinally-coinciding slot in its side wall in which said rib is received as said container is inserted in said tubular part.

18. A spare lead cartridge for a pencil of the class described comprising an elongated tubular body having one end closed, means having an exposed surface mounted in and closing its other end, said body part having a longitudinally-extending slot in its side, and a groove in said body at one end of said slot and extending longitudinally therefrom.

19. A spare lead cartridge for a pencil of the class described comprising an elongated tubular body having one end closed, means having an exposed surface mounted in and closing its other end, said body part having a longitudinally-extending slot in its side, and a groove in said body extending from one end of said slot to the adjacent end of said body part.

20. In a pencil of the class described, a pencil having a barrel with a detachable end section, said section being tubular and having provision for detachable engagement with the remainder of said barrel, and a readily removable spare lead container of a shape similar to said section and slidably receivable and adjustable therein, said container having a lead-discharge slot in its side wall which is closed in one position of said container relative to said section and open in another position to discharge leads.

21. In a mechanical pencil, a barrel having a body, a spare-lead container mounted in said body by friction fit only with one end projecting therefrom, said container having one of its ends formed closed and a longitudinal slot in the side for the removal of lead, means for closing the other end of said container, and removable means mounted on said body independently of said container for concealing the latter.

22. In a pencil of the class described, a barrel having an accessible, open-ended tubular casing part, a spare-lead-carrying means mounted in said casing and entirely removable from and adjustable relative to the open end of said casing by mere relative movement of said spare-lead-carrying means and said casing, said spare-lead-carrying means having a single lead-discharge opening which in one position of said means is closed by said casing part and in another position is opened to permit discharge of a lead, and a separately removable part supported directly by said casing part independently of said lead-carrying means for normally concealing said lead-carrying means and said casing part.