Dec. 10, 1935. E. C. WEAVER ET AL 2,023,865

PENCIL

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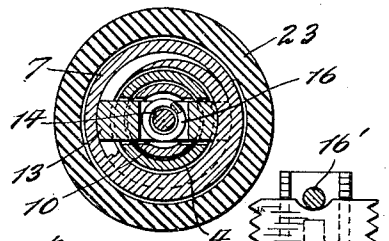


Fig. 4.

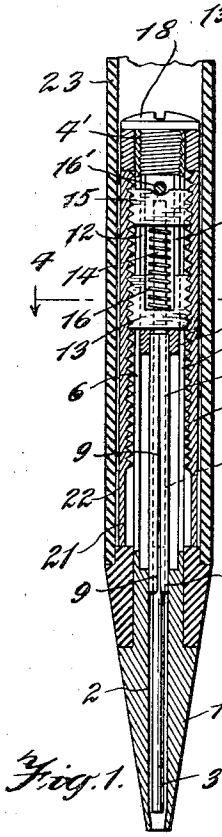


Fig. 1.

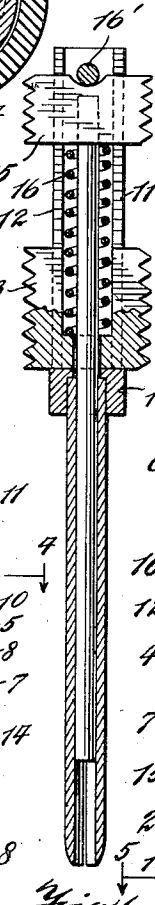


Fig. 6.

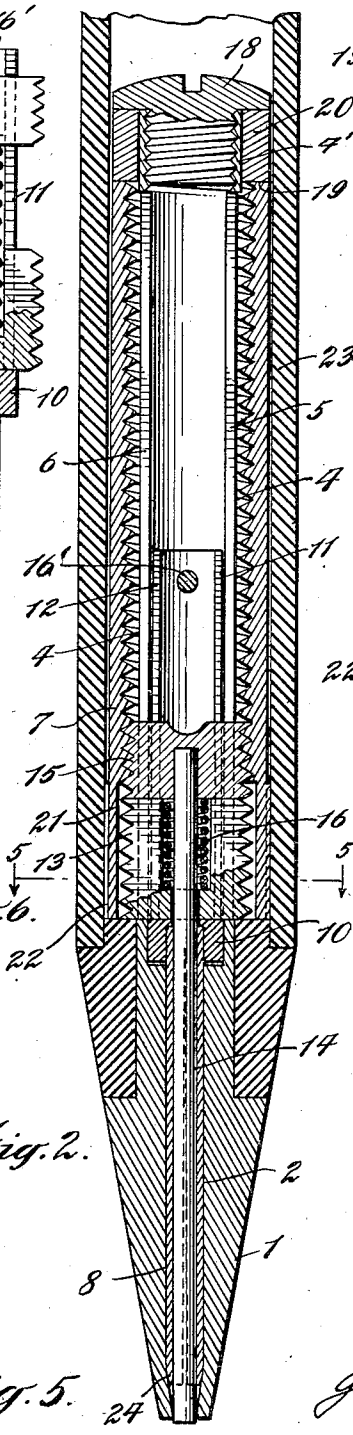


Fig. 2.

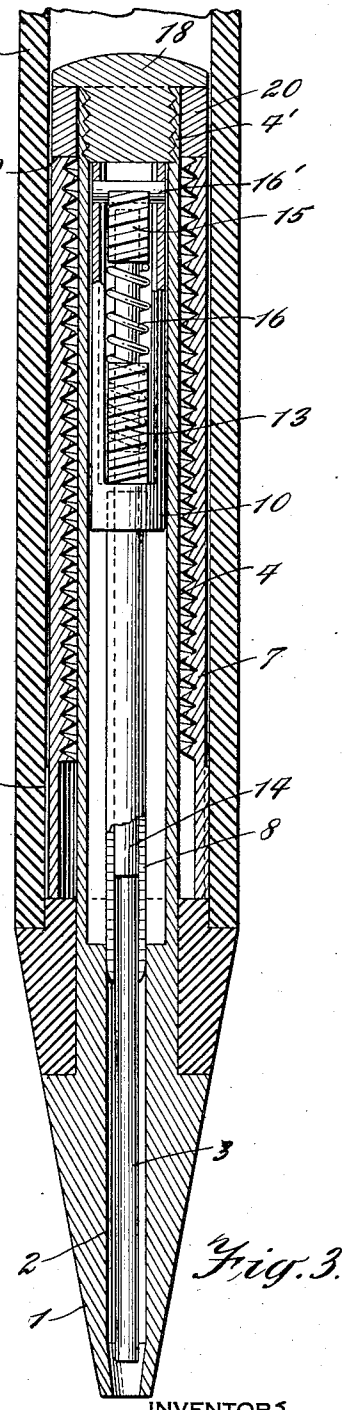


Fig. 3.

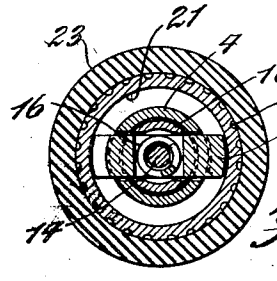


Fig. 5.

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Application March 6, 1933, Serial No. 659,746

12 Claims. (Cl. 120—18)

This invention relates to a novel and improved form of pencil having means for feeding and retracting the lead, the novel features of which will be best understood from the following description and the annexed drawing, in which we have shown a selected embodiment of the invention and in which:

Fig. 1 is a sectional view through a pencil showing the invention embodied therein and with the parts in position where the lead is retracted.

Fig. 2 is a view similar to Fig. 1 but on a larger scale and showing the position of the parts after the lead has been ejected or expelled from the pencil;

Fig. 3 is a view similar to Fig. 2 but taken at right angles thereto and showing the parts in the same relative position as occupied in Fig. 1;

Fig. 4 is a section on the line 4—4 of Fig. 1;

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

Fig. 6 is an elevation of the lead-holder and parts associated therewith detached from the other structure.

Referring now to the drawing in detail, the numeral 1 designates a tip of any suitable and usual form having a longitudinally extending opening 2 therethrough and through which lead 3 may be moved to bring it into or out of the right position beyond the end of the tip. Secured rigidly to the tip and disposed substantially concentrically with the opening 2, is a slotted sleeve 4, this sleeve preferably being tubular in form, as shown, and having oppositely disposed slots 5 and 6 therein, for a purpose which will presently appear. Surrounding the slotted sleeve and concentric thereto, is a second tubular sleeve 7 interiorly threaded, as plainly shown.

Slidable in the opening 2, is a tubular lead-holder 8, slotted as indicated at 9 and formed of sufficiently resilient material so that a lead 3 may be forced into the end of the holder, as plainly indicated in Fig. 1. The lead-holder extends into the sleeve 4 and has within that sleeve a head 10 likewise having slots 11 and 12 registering with the slots 5 and 6 of the sleeve 4.

Slidable within the head is a flat cross-head 13 extending through the aligned slots into engagement with the threaded interior of the tubular sleeve 7, and it will be seen that the amount of threaded engagement lengthwise of the pencil is of a substantial amount so that an extended threaded engagement is provided. By this arrangement, rotation of the sleeve 7 will cause movement of the cross-head 13 and consequently of the lead-holder 8 lengthwise of the pencil, to push the lead 3 outwardly beyond the end of the point 1 or to retract it to the inoperative position shown in Fig. 1.

Extending through the cross-head 13 and slidable in the lead-holder 8, is a follower 14 having secured to the upper end thereof a flat cross-head 15 likewise extending through the aligned slots into engagement with the threaded interior of the sleeve 7. The cross-head 13 is shown as of U-shape, and within legs of the U is coiled a compression spring 16 engaging the two cross-heads 13 and 15 to normally urge them apart into some such relative position as that indicated in Figs. 1 and 3, the amount of separation being limited by the pin 16'. As best seen from Figs. 3 and 6, the slots 5 and 6 extend to the upper end of the head 10, and the pin 16' performs the additional function of preventing passage of the cross-head 15 out of the head. A pin of this type may be easily removed, thus providing a ready arrangement for replacement of any of the parts 13, 14, 15, and 16.

The upper end of the sleeve 4, by which is meant the end furtherest from the point of the pencil, is in the form of a continuous ring 4' having interior threads thereon to receive a threaded cap 18, and the threaded sleeve 7 preferably terminates at a point 19 beneath the head of the cap so that turning of the sleeve will not cause loosening of the cap. A collar 20 may be interposed between the end 19 of the sleeve 7 and the head of the cap, as plainly shown.

The lower end of the sleeve 7 is left unthreaded, as indicated at 21, for a distance at least as great as the threaded extent of the cross-head 13, for a purpose which will be presently explained. The outer surface of the sleeve 7 may be roughened or knurled, this knurling being shown opposite the unthreaded portion 21 and designated 22. A barrel 23 may be disposed over the sleeves and have a driving fit with the knurled portion 22 to form a tight connection therebetween so that rotation of the barrel will be transmitted to the sleeve 7 and parts fixed thereto. Since the sleeve 7 is rotatable with respect to the point, the barrel also is thus relatively rotatable with respect to the point.

In operation, assuming that the parts are in the position shown in Fig. 1, the barrel and consequently the sleeve 7 may be rotated relatively to the point 1, and this will cause movement of both cross-heads 13 and 15 lengthwise of the pencil and towards the point. The threads are preferably so arranged that a right-hand turning of the barrel will cause the lead 3 to move towards the point, although this, of course, may be changed if desired. As the lead is used, it may

be moved downwardly to maintain a writing point until the lead is nearly exhausted, at which time the end 24 of the lead-holder will be in about the position shown in Fig. 2. Shortly before it comes to this position, however, it will be seen that the cross-head 13 has become disengaged from the threads on the sleeve 7, having reached the unthreaded portion 21 of the sleeve interior. Continued rotation of the sleeve 7 will, through the cross-head 15 and the spring 16, force the cross-head 13 down to the position shown in Fig. 2. Then continued rotation of the sleeve 7 will force the follower through the lead-holder 2 to expel the remaining small length of lead therein, it being understood that the lower end of the follower is normally in contact with the upper end of the lead.

In describing the relation of the various parts, we have treated the pencil as if it were upright, as though the point of the pencil were the lowest point thereof. It is understood, of course, that this is merely as a matter of convenience and is not intended to be limiting in any way. The upper part of the pencil has been omitted from the drawing because it may take various forms without affecting the operation of the novel structure.

We claim:

1. A pencil comprising a tip having a longitudinally extending opening therethrough, a barrel rotatably secured to said tip, an internally threaded sleeve rotatable with said barrel and disposed concentrically to said opening, a slotted sleeve fixed to the tip and within said threaded sleeve, a tubular lead-holder slidable within said opening and having a slotted head slidable within said slotted sleeve, a cross-head loosely engaging said holder and extending through the slots in said head and having extended threaded engagement with the threaded sleeve and extending through the slot in said slotted sleeve, a follower slidable within said lead-holder and extending through said cross-head, a second cross-head secured to said follower beyond said lead-holder cross-head and likewise extending through the slot in said slotted sleeve into threaded engagement with the threaded sleeve, the end of said threaded sleeve adjacent the tip being unthreaded for a distance at least equal to the threaded length of the lead-holder cross-head, and a spring disposed between said cross-heads and tending to force them apart.

2. A pencil comprising a tip having a longitudinally extending opening therethrough, a slotted sleeve fixed to said tip and disposed concentrically with respect to said opening with the slots therein extending lengthwise of the pencil, an internally threaded sleeve surrounding and closely fitting said slotted sleeve and rotatable thereon, means holding said threaded sleeve against movement lengthwise of said slotted sleeve, a lead actuating member movable lengthwise in said opening and having a cross-head extending through said slots into a threaded engagement with said threaded sleeve, and a barrel secured directly to and closely fitting said threaded sleeve to rotate therewith with respect to said tip.

3. A pencil comprising a tip having a longitudinally extending opening therethrough, a slotted sleeve fixed to said tip and disposed concentrically with respect to said opening with the slots therein extending lengthwise of the pencil, an internally threaded sleeve surrounding and closely fitting said slotted sleeve and rotatable thereon, means holding said threaded sleeve against movement lenthwise of said slotted sleeve, a tubular lead holder slidable within said opening and having a head slidable within said slotted sleeve, a cross-head rotatable with said head and extending through the slots in said slotted sleeve into threaded engagement with said threaded sleeve and loosely received in said slots, a second cross-head likewise rotatable with said head but slidable with respect thereto lengthwise of the pencil and extending through the slots of said slotted sleeve into threaded engagement with said threaded sleeve, a follower slidable within said lead holder and connected to said second-named cross-head, a spring disposed between said cross-heads and forcing them apart lengthwise of the cylinder, and means limiting the movement caused by said spring.

4. A pencil comprising a tip having a longitudinally extending opening therethrough, a slotted sleeve fixed to said tip and disposed concentrically with respect to said opening with the slots therein extending lengthwise of the pencil, an internally threaded sleeve surrounding and closely fitting said slotted sleeve and rotatable thereon, means holding said threaded sleeve against movement lengthwise of said slotted sleeve, a tubular lead holder slidable within said opening and having a head slidable within said slotted sleeve, a cross-head rotatable with said head but slidable with respect thereto lengthwise of the pencil and extending through the slots in said slotted sleeve into threaded engagement with said threaded sleeve, a second cross-head likewise rotatable with said head but slidable with respect thereto lengthwise of the pencil and extending through the slots of said slotted sleeve into threaded engagement with said threaded sleeve, a follower slidable within said lead holder and connected to said second-named cross-head, a spring disposed between said cross-heads and forcing them apart lengthwise of the cylinder, and means limiting the movement caused by said spring.

5. A pencil comprising a tip having a longitudinally extending opening therethrough, a slotted sleeve fixed to said tip and disposed concentrically with respect to said opening with the slots therein extending lengthwise of the pencil, an internally threaded sleeve surrounding and closely fitting said slotted sleeve and rotatable thereon, means holding said threaded sleeve against movement lengthwise of said slotted sleeve, a lead actuating member slidable within said opening and having a head slidable within said slotted sleeve, a cross-head rotatable with said head but slidable with respect thereto lengthwise of the pencil and extending through the slots in said slotted sleeve into threaded engagement with said threaded sleeve, and a spring resiliently holding said cross-head in position on said head.

6. In a pencil, a lead holder having a head fixed thereto, said head having slots therein extending lengthwise of the pencil, two cross-heads slidably mounted in said head and extending through said slots, a spring forcing said cross-heads apart, means limiting the amount of movement of the cross-heads under action of said spring, and a follower slidable in said holder and passing through one of said cross-heads and secured to the other thereof.

7. In a pencil, a lead holder having a head fixed thereto, said head having slots therein extending lengthwise of the pencil, a cross-head rotatable

with but slidable on said head, a follower slidable in said holder and extending through said cross-head, and a second cross-head slidable in said slots and secured to said follower.

8. In a pencil, a lead holder having a head fixed thereto, said head having slots therein extending lengthwise of the pencil, a cross-head rotatable with but slidable on said head, a follower slidable in said holder and extending through said cross-head, a second cross-head slidable in said slots and secured to said follower, a spring disposed between said cross-heads and tending to force them apart, and means limiting the movement of the second cross-head by said spring.

9. A pencil comprising a tip having a longitudinally extending opening therethrough, a slotted sleeve fixed in said tip and disposed concentrically with respect to said opening, with the slots therein extending lengthwise of the pencil, an internally threaded sleeve surrounding said slotted sleeve and rotatable thereon, a lead actuating member movable lengthwise in said opening and having a part extending through said slots into threaded engagement with the threads on said threaded sleeve, the end of said slotted sleeve remote from said tip being in the form of a ring extending beyond the end of the threaded sleeve, a cap having threaded engagement with said ring and extending over the end of the threaded sleeve, and a member loosely mounted on said ring and disposed between said cap and said end of the threaded sleeve.

10. In a pencil, a lead-holder having an elongated tubular head fixed thereto, said head having longitudinal slots in its walls extending to one end thereof, a follower slidable in said holder and having a cross-head extending through said slots, and a pin extending across the holder adjacent the end where the slots terminate, to prevent the cross-head from passing out of the head through said slots.

11. In a pencil, a lead-holder having a head fixed thereto, said head having slots therein extending lengthwise of the pencil, a cross-head slidably mounted in said slots and having a U-shape, with the heads of the U extending towards one end of the head and the base of the U normally engaging the head at one end of the slots, and a compression spring disposed partially in the space between the legs of the U and forcing said base of the U towards the bottom of the slots.

12. In a pencil, a lead-holder having a head fixed thereto, said head having slots therein extending lengthwise of the pencil, a cross-head slidably mounted in said slots and having a U-shape, with the heads of the U extending towards one end of the head and the base of the U normally engaging the head at one end of the slots, a second cross-head likewise slidable in said slots and having a follower secured thereto and passing through an opening in the bottom of said U, and a compression spring bearing against said second-named cross-head and surrounding said follower and bearing against the bottom of said U between the two legs thereof.

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