July 3, 1928. 1,675,826

W. A. SHEAFFER ET AL

PENCIL

Filed Nov. 12, 1920

Fig. 1.

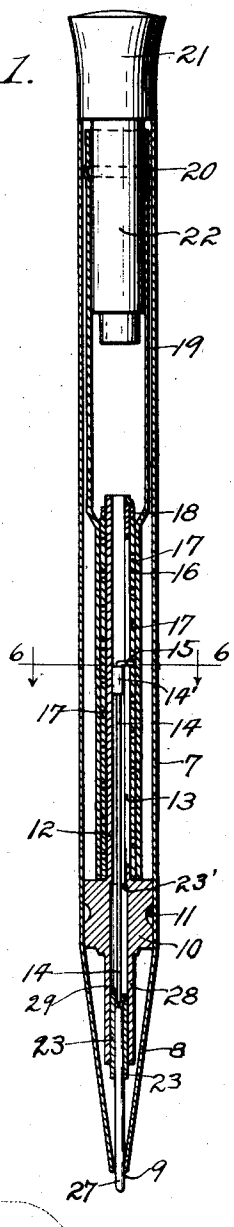


Fig. 2.

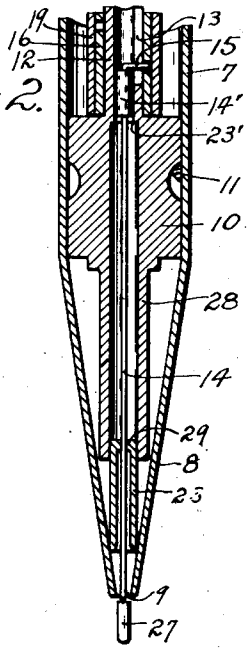


Fig. 3.

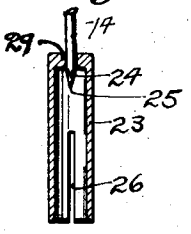


Fig. 4.

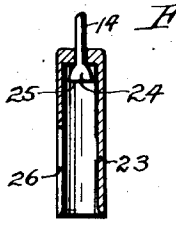


Fig. 5

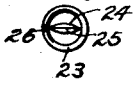
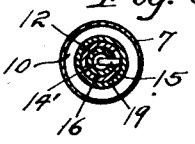


Fig. 6.



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UNITED STATES PATENT OFFICE.

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PENCIL.

Application filed November 12, 1920. Serial No. 423,518.

Our invention relates to pencils, and has for one of its objects the provision of simple and efficient means for propelling a lead out into operative position, retracting or withdrawing the lead back into the pencil, and for completely expelling the lead, when so desired.

Another object is the provision of simple and efficient means for holding the lead in a pencil and for easily and quickly removing the lead from the pencil, when so desired.

A further object is the provision of simple and efficient means for adjusting a lead into position in a pencil.

A still further object is the provision of simple and efficient means for holding a lead against rotation in a pencil.

Other objects will appear hereinafter.

An embodiment of our invention is illustrated in the accompanying drawing, forming a part of this specification, and in which

Fig. 1 is a longitudinal section of a pencil embodying our invention;

Fig. 2 is an enlarged longitudinal section of an end portion of the same;

Fig. 3 is an enlarged section of the lead clamp and fragment of a propelling rod used in the construction;

Fig. 4 is a view similar to Fig. 3 but taken at substantially right angles to the view taken in said Fig. 3;

Fig. 5 is a view looking upwardly at the parts shown in Fig. 4; and

Fig. 6 is a section taken on line 6—6 of Fig. 1.

Referring more particularly to the drawing, we have indicated an outer shell or casing 7 of a pencil having a tapering portion 8 at its lower end and a lead opening 9 at the small end of the portion 8. The shape of the casing 7 may be varied, as desired, or any preferred kind of decorations added to it.

Within the casing 7 we secure a block 10 by means of solder 11. Said block 10 may be secured in the casing in any other desirable manner. From the upper end of block 10 extends a tube 12 which has a longitudinal slot 13 extending substantially its full length. The tube 12 may be formed integrally with block 10, as indicated, or attached to said block in any other desirable manner. It is preferable, however, that the tube 12 be attached so as to be held against movement by said block. The block 10 has an axial perforation registering with the bore of tube 12, and disposed within said opening and bore is a feed rod 14. The upper end 15 of the feed rod 14 is disposed a right angles to the main part of said rod and extends through slot 13. The part 15 is adapted to move longitudinally in slot 13 and prevents the rod 14 from turning.

Journaled on the outer side of tube 12 is a tube 16 having a spiral slot 17 therein. The end 15 of rod 14 is disposed in spiral slot 17 so that rotation of tube 16 causes rod 14 to be moved longitudinally. Since slot 13 prevents rod 14 from turning, the rotation of tube 16 causes slot 17 to move the rod 14 longitudinally. A burr 18 is provided at the upper end of tube 12 to hold the tube 16 against upward movement, and the block 10 holds the tube 16 against downward movement.

Disposed around tube 16 is a tube 19 which extends down substantially against block 10 and is secured to said tube 16 in any desirable manner, such as by solder. The upper end of tube 19 is enlarged adjacent the washer 18 out near the casing 7, although it is preferred not to permit the tube 19 to engage the bore of casing 7. Near the upper end of tube 19 we provide a head 20 which extends out against casing 7 and provides a bearing for the rotating parts.

At the top of the casing 7 is a head member 21 having a constricted portion 22 extending in and frictionally locking against the bore of tube 19 so that by holding casing 7 and turning the head 21 the latter through its constricted portion 22 and tube 19 rotates tube 16 to move the rod 14 longitudinally.

The lower end of rod 14 extends into a cup-shaped clamp 23. The end of rod 14 in clamp 23 is flattened providing a head 24 with a sharp or knife edge 25 at the extreme end of said rod 14. The clamp 23 is indicated as tubular with a slot 26 in one side so that it may yieldingly clamp a lead 27. The enlarged part 24 prevents clamp 23 from passing off of rod 14.

In use head 21 is turned to withdraw rod 14 up into or toward block 10 and this movment of rod 14 draws lead clamp 23 up toward or into block 10. A guide tube 28 may be provided on block 10, as indicated, for guiding lead clamp 23. When the rod 14 and clamp 23 are withdrawn toward block

10 a lead 27 may be inserted through opening 9 into clamp 23. Then by rotating head 21 in the proper direction rod 14 will move lead 27 out into operative position, such as indicated in Fig. 1. When it is not desired to use the lead by rotating head 21 such lead may be drawn up into the tapered portion 8 to prevent its becoming broken or damaged. The clamp 23 being in frictional engagement with said lead insures drawing back or retracting said lead within the casing.

When a lead has been used up until so short a piece remains that it is not useful, then by rotating head 21 until rod 14 is moved to its position indicated in Fig. 2 the lead will be expelled from opening 9, as clearly indicated. In such movement of the rod 14 lead clamp 23 will engage the inner wall of tapered portion 8 and rod 14 move on through said clamp so that its end extends beyond the end of tapered portion 8. When rod 14 is again withdrawn into the casing the enlarged head 24 will draw the clamp 23 back to its proper position.

The sharp edge 25 has a further function of cutting into the end of the lead and with the friction of such lead on the inner wall of the clamp 23 will hold the lead against rotation with respect to the pencil. The size and shape of head 24 may be varied as desired, but should have a sharp portion adapted to cut into the lead and prevent its turning. The number of slots 26 may be varied as desired, and also the sizes of such slots may be varied.

Since the clamp 23 is loosely mounted on the rod 14 and the latter has a lead-engaging head 24, these provide means whereby the lead may be propelled outwardly into operative position and retracted back into the body of the pencil when not in use, or expelled entirely from the body, when so desired, by one single connection with the spiral portion for manipulating the lead.

It should also be noted that when the repelling or retracting mechanism is operated the head 24 will engage the bottom of the cup-shaped clamp 23 and move the latter along the guide tube 28 until the peripheral bottom edge 29 of the clamp engages the annular shoulder 23'. The parts will then be in their initial positions in readiness for a piece of lead of maximum usable length to be inserted through the lead opening 9 into the clamp 23 to the bottom thereof so that it may be pressed firmly against the edge 25. When a lead is inserted in cup 23 the latter engages the periphery of the lead frictionally, but since the cup is loose on rod 14 it is necessary to have the cutting edge 25 cut into the end of the lead so as to lock the lead against turning with respect to the casing 7. If the lead were not locked against turning in the casing in use the lead would be worn with a flat side and make its use very difficult, while if the lead is locked so that it cannot rotate in the casing it will be worn off evenly due to the constant shifting of the pencil in the hand of the user.

It should be particularly noted that the same mechanism which is relied upon to propel the lead outwardly through the lead opening and to retract or repel the lead is also relied upon to expel the lead from the lead holder 23 in the manner indicated in Fig. 2. The driving element 14 has only a single point of contact through the right angle extension 15 with the single spiral 17 and the lead holder 23 is so mounted in the guide tube 28 and associated with the feed rod 14 that when the lead holder engages the inner wall of the tapered portion 8, as shown in Fig. 2, continued outward movement of the feed rod 14 will completely expel the last portion of the lead from the lead opening 9.

We claim:—

1. A pencil comprising a casing having a lead opening at one end, a rod slidably mounted in the casing in alinement with said lead opening, a cup-shaped lead clamp slidably mounted on the rod, and an elongated sharp edge on the rod within the cup adapted to co-operate with the latter to hold a lead against turning.

2. A pencil comprising a casing having a lead opening in one end, a rod slidably mounted in the casing in alinement with said lead opening, a cup-shaped lead clamp slidably mounted on said rod, and an enlargement on the rod within the cup having a lead-engaging knife edge directed toward said lead opening.

3. A pencil comprising a casing having a lead opening therein, a lead clamp adjacent said opening adapted to engage the sides of a lead, and a member having a knife edge thereon adapted to engage the end of a lead in said clamp for holding such lead against rotation.

4. A pencil comprising a casing having a lead opening therein, a tubular lead clamp opening toward said lead opening, a rod slidably mounted in the casing, held against rotation in said casing and extending into said lead clamp, and an elongated cutting edge on said rod in the lead clamp adapted to cut into a lead in said clamp and co-operate with the latter to hold the lead against rotation in said casing.

5. A pencil comprising a casing having a lead opening at one end, a rod slidably mounted in the casing in alinement with said lead opening and held against rotary movement in the casing, a lead holding cup slidably mounted on the rod with its open end directed toward said lead opening, and non-yielding means attached to the rod within

said lead holding cup adapted to engage a lead in the latter and hold such lead against rotary movement with respect to the rod.

6. A pencil comprising a casing having a lead opening therein, a lead-holding cup having its inner wall substantially fitting the outside of a lead, a rod extending through and slidably mounted in said cup, there being a cutting member on the rod directed toward the lead opening and extending substantially across the lead holding cup, and means in the casing associated with the rod for moving the latter toward said opening, said cup being adapted for movement by said rod into engagement with the casing and the rod being adapted to slide through the cup to said opening.

7. A pencil comprising a casing having a lead opening therein, a perforated block fixed in said casing, a longitudinally slotted tube having its bore in registration with the perforation of said block, a rod mounted in said tube and extending into said block and having a portion disposed through the slot in said tube, a lead-holding cup having an opening in its bottom slidably mounted on said rod of a cross-section larger than said lead opening and having its open side directed toward the latter, an enlargement on the end of said rod within said cup, with a cutting edge on said enlargement directed toward said lead opening, and a member having a spiral groove therein rotatably mounted on said longitudinally slotted tube and having its spiral slot engaging a portion of said rod.

8. A pencil comprisng a casing having a lead opening at one end thereof, a feed rod, a cup-shaped tubular clamp mounted on said feed rod to have a longitudinal movement relatively thereto, means on the end of the said rod inside of said clamp but separate from said clamp and adapted to co-operate with the clamp to hold the lead against turning relatively to the casing, said holding means being at the bottom of the cup-shaped clamp when the lead is inserted fully into the clamp, means for moving said feed rod longitudinally to effect longitudinal movement of said clamp together with the lead therein in either direction along the pencil, and means for supporting said clamp in position to engage an inner wall of the casing to limit the movement of the clamp toward said lead opening and thereby cause the movement of said feed rod and the holding means thereon from the bottom of the clamp and longitudinally along the latter to expel the lead from the pencil.

9. A pencil comprising a casing having a lead opening therein, a pusher rod mounted in the casing and having an enlargement on its lower end with an elongated cutting edge on said enlargement, a relatively short lead-holding cup mounted axially of and slidable on the pusher rod, the enlargement on said pusher rod being disposed within said cup with said cutting edge extending substantially across the cup, and means within the casing for stopping the movement of the cup in one direction to permit the movement of the pusher rod through said cup.

10. A pencil comprising a casing having a tapered end with a lead opening at the point of said tapered end, a block having a guide tube extending therefrom with the opening in said tube alining with said lead opening, a relatively short lead-holding cup disposed within said guide tube with its closed end away from and its open end toward said lead opening, a pusher rod extending through said guide tube with an end extending through the bottom of said cup, and a wedge-like enlargement on the lower end of said pusher rod disposed within said cup adapted to prevent movement of the pusher rod out of the cup and to engage a lead for holding the latter against rotation.

11. A pencil comprising a casing having a lead opening therein, a lead clamp adjacent said opening adapted to frictionally engage a lead, and means in the clamp for indenting the inner end of the lead while in said clamp holding the lead against rotation.

12. A pencil comprising a casing having a lead opening therein, a lead clamp within said casing to frictionally engage a lead, and a knife edged device in said clamp engaging the inner end of the lead and holding said lead against rotation.

13. A pencil comprising a casing having a lead opening therein, a guide in the casing in alinement with the lead opening, a shoulder at the end of the guide remote from said opening, a feed rod slidably mounted in the guide, a lead clamp loosely mounted on the rod and slidably mounted in the guide, and means limiting the movement of the lead clamp on the rod in one direction but leaving the rod free to slide through said clamp to expel the lead contained therein.

14. A pencil comprising a casing having a lead opening in one end thereof, a guide in the casing in alinement with said lead opening, a shoulder at that end of the guide remote from the lead opening, a feed rod mounted for reciprocation in the guide, a lead clamp loosely mounted on the rod and slidably mounted in the guide between said shoulder and said lead opening, and a head on the rod in the lead clamp adapted to engage the latter and retract it until it abuts against said shoulder upon retraction of the rod away from said lead opening.

15. A pencil comprising a casing having a lead opening therein, a guide in the casing, a lead clamp slidably mounted in the guide having a diameter greater than the diameter of said opening, a feed rod slidably mounted in the lead clamp and adapted for move-

ment into the lead opening and through the latter, an enlargement on the rod adapted to engage the lead clamp and move the latter in the guide upon movement of the rod in one direction, and means in the guide adapted to engage the lead clamp and stop the latter to effect movement of the enlargement of the rod to the bottom of the lead clamp.

16. A pencil comprising a casing having a lead opening in one end thereof, a guide in the casing in alinement with said lead opening with one end of the guide adjacent the lead opening, a feed rod extending into said guide and adapted to move into said lead opening, a lead clamp slidably mounted in said guide and having an opening in its bottom slidably engaging said rod, and non-yielding means at the end of the rod inside of said clamp for indenting the inner end of the lead to prevent it from turning relatively to the casing when the pencil is being used, said non-yielding means being larger in diameter than the opening in the bottom of said lead clamp and serving to pull the lead clamp away from said lead opening along said guide upon retracting movement of said rod along the pencil.

17. A pencil comprising a holder having a lead opening in one end thereof, an elongated cup-shaped lead clamp within the holder, an elongated guideway in which said lead clamp is fitted and along which it is slidable while in alinement with said opening to co-operate with the latter to hold the lead in the opening during use of the pencil, means for propelling and retracting said clamp to adjust the lead relative to said opening, and non-yielding means at the bottom of said cup-shaped clamp but separate therefrom to prevent rotation of the lead during use of the pencil.

18. A pencil comprising a casing having a tapered end with an opening at the tip for insertion of a lead, a clamping cup within the casing for receiving the lead by insertion from the exterior into said opening, propelling mechanism comprising a plunger rod extending through the bottom of said cup and having an enlargement thereon to cause said clamp to return to its initial position, and an abutment within the casing in position to receive the cup when the plunger is withdrawn and hold said cup in alinement with said opening while the lead is inserted.

19. A pencil comprising a casing having a lead opening at one end, a rod slidably mounted in the casing in alinement with said lead opening, a cup-shaped lead clamp mounted on said rod, and an elongated sharp edge on the rod within the cup adapted to co-operate with the latter to hold a lead against turning.

20. A pencil comprising a casing having a lead opening in one end thereof, a lead clamp within said casing, a plunger rod slidable through one end of the clamp in position to engage the inner end of said lead, means for operating said rod to cause said clamp to engage an inner surface of the casing near said opening to hold the clamp relatively stationary while continued movement of the plunger toward said opening ejects the lead, a guide within the casing for said clamp to hold the latter in alinement with said opening to facilitate the insertion of a new lead through said opennig into said clamp, and a limit stop at the inner end of said guide to limit the inward movement of the clamp while said rod is restored to initial position relative to said clamp, said rod being enlarged at one end to draw said clamp to its initial position.

21. A pencil comprising a casing having a lead opening in one end thereof, a lead clamp within said casing, means for holding the clamp within said casing with its receiving end in alinement with said opening and guiding said clamp for reciprocating movements toward and from said opening, spaced-apart abutments for limiting the reciprocating movements of said clamp along said guide, and means for adjusting the position of the lead relative to said opening comprising a plunger associated with said lead clamp to move the same against one of said abutments to hold the clamp in open position in said guide to receive a new lead inserted through said opening, said plunger being also movable through said clamp toward said opening to eject the lead when the clamp engages the other abutment.

22. A pencil comprising a holder having a lead opening in one end thereof, an elongated cup-shaped lead clamp within said holder, an anchor block having a guide extending along the same concentric with said holder, said guide being adapted to receive said clamp to hold the same for reciprocatory movements toward and from said opening while in alinement therewith, an actuating rod slidable through the bottom of said cup-shaped clamp toward and from said opening but adapted to engage the bottom of said cup-shaped clamp to move the latter away from said opening along said guide, and spaced-apart limit stops within said holder one near said opening to limit the movement of said clamp and cause continued movement of said rod toward the lead opening and through said clamp to eject the lead through said opening, the other limit stop being at the inner end of said guide to enable the rod to move through the clamp away from the opening and draw the bottom of the cup-shaped clamp against such other limit stop in lead-receiving position while said guide holds such clamp in alinement with said opening.

23. A pencil comprising a casing having a lead opening in one end, a rod slidably mounted in the casing in alinement with said lead opening, a cup-shaped lead clamp mounted on said rod, and an enlargement on the rod within the cup having a lead engaging knife edge directed toward said lead opening.

24. A pencil comprising a casing having a lead opening in one end, a rod slidably mounted in the casing in alinement with said lead opening, a cup-shaped lead clamp slidably mounted on said rod, and an enlargement on the rod within the cup having a lead engaging knife edge directed toward said lead opening.

25. A pencil comprising an outer casing, an anchoring block carried within and secured to said casing, pencil lead propelling, retracting and expelling mechanism mounted on said anchoring block, said pencil lead-propelling, retracting and expelling mechanism comprising a lead guide formed as an integral part of said block and projecting in lead-guiding position in advance thereof, and means carried by said casing for operating said pencil lead-propelling, retracting and expelling mechanism.

26. A pencil comprising an outer casing having one end conically shaped with a lead opening therein, an anchoring block within said casing, said block being positioned in spaced relation to said lead opening and having an axial bore extending therethrough, integral tubular portions on opposite sides of said block forming continuations of said bore and providing a tubular guide, pencil lead propelling, retracting and expelling mechanism associated with said guide and comprising a spirally slotted sleeve mounted on said block on that side thereof remote from the lead opening and concentrically with said guide, means for preventing longitudinal movement of said sleeve relatively to said guide but permitting rotary movement relatively thereto, an operating head at that end of the casing opposite the lead opening, and means connected between said operating head and said spirally slotted sleeve for rotating the latter to secure the operation of said pencil lead-propelling, retracting, and expelling mechanism.

In testimony whereof we have signed our names to this specification on this 6th day of November A. D. 1920.

WALTER A. SHEAFFER.
LUCIFER J. MOST.