June 10, 1930. A. WOELM 1,762,317

MAGAZINE PENCIL

Filed March 12, 1926

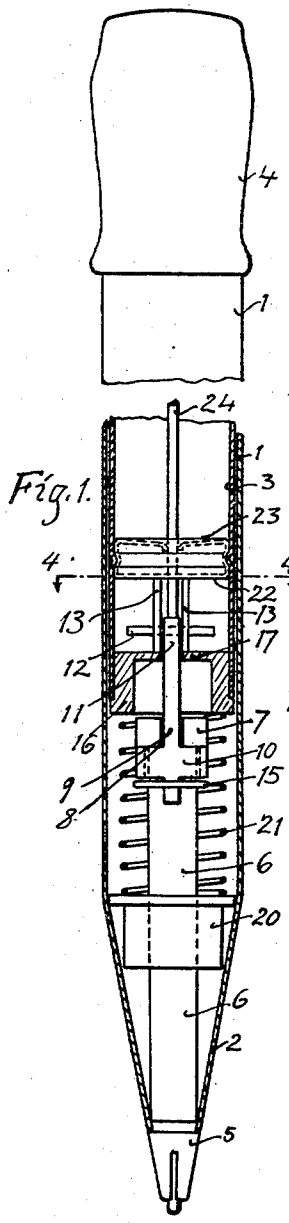

Fig. 1.

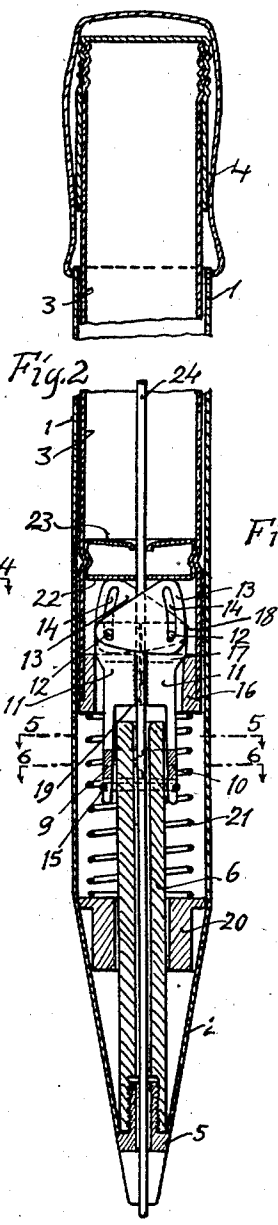

Fig. 2

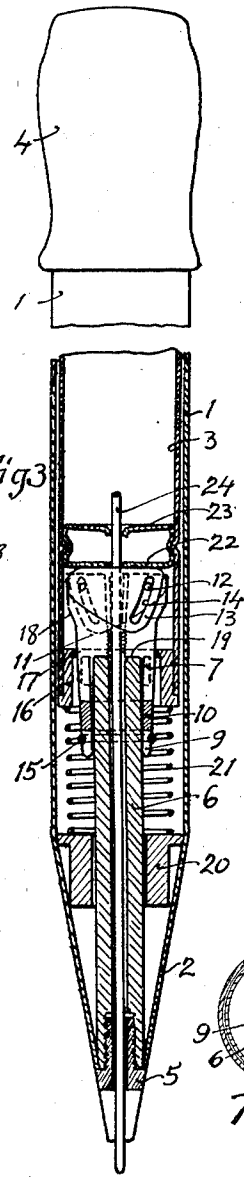

Fig. 3

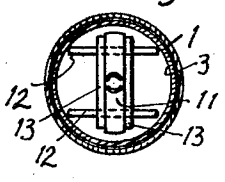

Fig. 4.

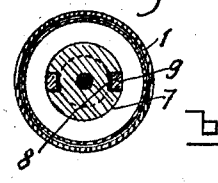

Fig. 5.

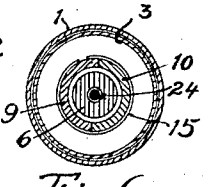

Fig. 6.

Inventor

Alfred Woelm

by Ernest D. Jansen

Atty.

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1,762,317

UNITED STATES PATENT OFFICE

ALFRED WOELM, OF BERLIN, GERMANY, ASSIGNOR, BY MESNE ASSIGNMENTS, TO PENCIL MECHANISM CORPORATION, A CORPORATION OF NEW YORK

MAGAZINE PENCIL

Application filed March 12, 1926, Serial No. 94,262, and in Germany August 7, 1925.

This invention relates to step-by-step lead pencils, and more particularly to mechanical pencils adapted to propel step-by-step a succession of leads received from a magazine in the upper end of the pencil.

In general, it is the object of the invention to provide a mechanical pencil which is simple and inexpensive in construction, which is efficient and certain in operation, which can be manufactured and assembled with extreme ease, and which will efficiently accomplish the purposes for which it is intended.

A more specific object is to provide a pencil wherein a plurality of reciprocable lead-grippers are positively brough into and out of action when they reach their limits of movement.

Another object is to provide direct-action mechanism for operating the grippers in response to the longitudinal movement of a casing member such as the pencil cap.

Still another object is to provide an improved pencil wherein the mechanism is adapted to operate satisfactorily on leads of varying diameter.

Other objects of the invention will in part be obvious and will in part appear hereinafter.

The invention accordingly comprises an article of manufacture possessing the features, properties, and the relation of elements which will be exemplified in the article hereinafter described and the scope of the application of which will be indicated in the claims.

For a fuller understanding of the nature and objects of the invention reference should be had to the following detailed description taken in connection with the accompanying drawing, in which:

Figure 1 is a longitudinal section through the pencil embodying the invention with the parts in normal position, the interior construction being shown partly in elevation;

Fig. 2 is a longitudinal section taken at right angles to Fig. 1, and also showing the parts in inoperative position,

Fig. 3 is a longitudinal section similar to Fig. 2 with the parts pushed forwards to their furthest extent,

Fig. 4, a cross-section along line 4—4 of Fig. 1,

Fig. 5, a cross-section along line 5—5 of Fig. 2, and

Fig. 6, a cross-section along line 6—6 of Fig. 2.

Referring to the drawings 1 designates the shell or casing of the pencil which is drawn to a conical point 2. Within the shell 1 and adapted to slide therein is an inner tube 3 provided at its upper end with the cap 4. On the tip 5 of the conical point 2 is screwed the lead guide tube 6 having a collar 7 at its upper free end. The collar 7 is provided with a pair of oppositely disposed slots 8 in which are guided the limbs 9 of the grippers. The collar 7 also fixes the position of rest of the grippers and the remaining movable parts, by reason of the engaging semi-circular parts 10 of the grippers 9 abutting against the lower edge thereof. As will be apparent from the drawings, the edges of the parts 10, which may be rounded, if desired, serve as a fulcrum upon which respective grippers pivot during the movement of the jaws into and out of engagement with the lead. The jaws 11 of the grippers are provided with transverse pins 12. Upon each pin 12 is rotatably journaled a segment-shaped member 13 which is guided upon the pin 12 of the other gripper by means of an eccentric slot 14. The lower ends of the limbs 9 are embraced by a springy ring 15 which has the tendency to contract them. At the lower end of the inner tube 3 is mounted a cap-like member 16 the upper wall 17 of which is guided upon the grippers. This top wall 17 serves at the same time as stop for the stroke of the inner tube 3 by encountering the collar 7 of the lead guide tube 6. The ring 16 has a slot formed through the wall 17 thereof, the width whereof is such that the gripper jaws 11 will move freely therein, and the length whereof is such that while the broadened portions 18 of the grippers lie within it they cannot be separated or opened out. This arrangement prevents the premature opening of the gripper jaws. The said jaws can only be brought into their spread position when their lower edges 19 abut against the collar 7 of the lead guide tube

and the ring 16 has moved down sufficient to clear the broadened portions 18. Upon the lead guide tube 6 is loosely mounted a collar 20 or the like which serves as lower abutment or support for the spring 21 the upper end of which abuts against the member 16 and returns the movable parts into their normal position of rest. Upon the segment-like parts 13, adapted to effect the spreading apart of the gripper jaws, rests a transverse wall or bottom 22 which is firmly mounted within the inner tube 3. Combined or integral with the said bottom 22 is preferably a second spaced bottom 23 which serves as bottom for supporting the strips of lead within the magazine.

My improved magazine pencil operates in the following manner: If the lead 24 is to be fed forward, a pressure is exerted upon the cap 4 whereby the inner tube 3 and the ring 16 is displaced in relation to the outer shell or casing 1. The transverse wall 22 within the inner tube as yet exerts no pressure upon the rotatable segments owing to the cooperation of the member 16, and are not moved about their pivot points so that the lead embraced by the gripper jaws 11 is fed forward. When the edges 19 of the grippers encounter the collar 7 of the lead guide tube 6 the forward motion of the grippers and thus of the lead is stopped. The continued downward movement of the member 16 will cause its wall 17 to move away from and free the broadened portions 18 of the grippers, and the plate 22 will press against the top of the segment 13 and cause them to turn around their pins or pivots 12, the eccentric slots 14 effecting the positive spreading apart of the gripper jaws, see Figure 3. The advance of the inner tube 3 with the member 16 is finished as soon as the wall 17 of the member 16 encounters the collar 7 at the upper end of the lead guide tube 6.

When the cap 4 is released the inner sleeve 3, with it the member 16 is returned to its normal position of rest under the action of the spring 21. The member 16 hereby first moves the grippers 9, 11, in front of itself into the spread position until their semi-annular parts 10 abut against the underside of the collar 7 and come to rest. During the further upward movement of the sleeve 3 the transverse walls 17 of the member 16 abuts against the segment-shaped members 13 and causes their upward movement, the slots 14 contracting the gripper jaws 11 so that the jaws again firmly grip the lead but at a higher point thereon. Small variations in the thickness of the lead strips are compensated for by the slots 14 having a certain play beyond the position of rest so that the gripper jaws 11 are forced together more or less according to the thickness of the lead.

It will be readily understood by those skilled in the art that the details of construction may be varied without departing from the spirit or scope of my invention and I desire therefore that the same should be limited only by the state of the prior art or by the appended claims.

I claim:—

1. In a magazine pencil of the class described: a coacting pair of grippers normally securing a lead in writing position and adapted to be moved downward by the longitudinal displacement of a part of the pencil casing and carry with them a lead in position therebetween, and means secured on said grippers whereby the gripping ends thereof are positively forced apart after they encounter a stop adapted to limit their downward travel; and are positively forced closed after they encounter a stop adapted to limit their upward travel.

2. In a magazine pencil of the class described: a coacting pair of grippers normally securing a lead in writing position and adapted to be moved downward and carry the lead with them until they strike an abutment, one of said grippers having a segment-like member with a cam slot therein pivoted thereto, said cam slot engaging a pin on the other of said grippers; and a transverse member carried in the tube of the pencil and adapted to force said segment-like member to be turned about its pivot point after the grippers have come into contact with said abutment.

3. In a magazine pencil of the class described: a coacting pair of grippers normally securing a lead in writing position and adapted to be moved downward and carry the lead with them until they strike an abutment, one of said grippers having a segment-like member with a cam slot therein pivoted thereto, said cam slot engaging a pin on the other gripper, a transverse member carried in the inner tube of the pencil, said segment-like member lying between said transverse member and said grippers, and said transverse member being adapted to cause said segment-like member to turn about its pivot and positively force said grippers open after they strike said abutment, and a cap-like member in said inner tube spaced below said transverse member and adapted to cause the segment to be turned in the other direction and positively force said grippers closed after they contact with an abutment adapted to limit their upward travel.

4. In a magazine pencil of the class described: a magazine tube, a plurality of grippers arranged to receive a lead therebetween, the lower end of said tube being capped by a member having a slotted opening therethrough adapted to pass the grippers when closed and to fit slidably thereon; and a transverse partition with an opening therethrough adapted to pass the leads one

at a time, secured in said tube above and in spaced relation to said slotted member.

5. In a magazine pencil of the class described: a coacting pair of grippers the gripping ends of which are connected together by a cam-like linking member pivoted on one of them and the effective length of which is changed by the displacement of a part of the pencil casing thereby causing said grippers to be positively forced apart when a part of the pencil casing is displaced from its normal position for more than a fixed distance, and to be positively closed when said part is returned to normal position.

6. In a magazine pencil of the class described: a coacting pair of lead grippers pivoting on each other at a point distant from their gripping ends, the gripping end of one having a plate with a cam slot therein pivotally connected thereto, the slot in said plate engaging a pin on the other gripper; and means whereby the displacement from its normal position of a part of the pencil casing will cause said plate to be moved about its pivot and the grippers to be forced apart, and the return of said part of the casing to its normal position will cause said grippers to be forced together.

7. In a magazine pencil of the class described: a coacting opposed pair of lead grippers pivoting on each other at a point near their lower ends, the gripping end of each having a plate with a cam slot therein pivotally connected thereto, the slot in said plates engaging with and adapted to slide on a pin in the other gripper; a spring holding said grippers in pivotal relation to each other and tending to cause the gripping ends thereof to separate; and means whereby the depression of the magazine part of the pencil will cause said plates to move about their pivot points and the cam slots therein to force the grippers apart after they reach the desired limit of their downward travel, and when the magazine part is returned to starting position will be moved in contra direction and force said grippers to close after they reach the limit of their upward travel.

8. In a mechanical pencil: a coacting pair of lead gripping members on the lower portion of each of which is formed curved projecting arms which pivotally contact with similar arms on the other gripper, the upper ends of said members forming gripping jaws.

9. In a mechanical pencil: a coacting pair of lead gripping members on the lower portion of each of which there is formed curved projecting arms adapted to fit about a guide tube and to pivotally contact with like arms on the other gripper, the two parts held in pivotal relation by a resilient binding ring, the upper ends of said members forming gripping jaws.

10. In a mechanical pencil: a coacting pair of lead gripping members the lower portion of each in pivotal contact with the other, the upper ends thereof forming gripping jaws each of which has a cam plate pivotally secured thereon in which there is a cam slot slidably engaging a pin on the other gripper, whereby the oscillation of said cam plates in one direction will cause the jaws to be opened, and in the other direction to be closed.

11. In a magazine pencil of the class described: a magazine unit comprising a tube with a slotted cap-like member secured in its lower end and a horizontally disposed partition with an opening central therethrough secured therein in spaced relation to said cap-like member; a lead guide tube, formed at its upper end with a collar and having oppositely disposed guide notches therein, detachably secured in the lower end of the pencil shell; a coacting pair of lead gripping members the lower portions of which surround and slide on said guide tube and pivoted upon each other, their upper ends lying above the cap-like member of the magazine unit and each having pivoted thereto a segment-like plate vertically disposed between said cap-like member and the partition in said magazine unit and having a cam slot therein slidably engaging a pin in the other gripper whereby the oscillation of said segments in one direction will positively open the grippers and oscillation in the other direction will positively close them, the intermediate parts of the grippers having abutments formed thereon adapted to limit their downward travel and lying in the guide notches in the flange on said guide tube and in the slotted opening in the cap like member of the magazine unit; and a spring resisting downward movement of the magazine unit.

12. In a magazine pencil of the class described: a magazine unit comprising a tube with a slotted cap-like member secured in its lower end and a horizontally disposed partition with an opening central therethrough secured therein in spaced relation to said cap-like member; a lead guide tube, formed at its upper end with a collar having oppositely disposed guide notches therein, detachably secured in the lower end of the pencil shell; a centering collar extending about said guide tube below the collar formed on the tube and a coacting pair of lead gripping members the lower portions of which surround and slide on said guide tube and pivot upon each other, their upper ends lying above the cap-like member of the magazine unit and each having pivoted thereto a segment-like plate vertically disposed between said cap-like member and the partition in said magazine unit and having a cam slot therein slidably engaging a pin in the other gripper whereby the oscillation of said segments in one direction will positively open the grippers and oscillation

in the other direction will positively close them, the intermediate parts of the grippers having abutments formed thereon adapted to limit their downward travel and lying in the guide notches in the flange on said guide tube and in the slotted opening in the cap-like member of the magazine unit; and a spring compressed between said cap-like member and said centering collar.

13. In a step-by-step pencil, the combination of mechanism movable longitudinally of the pencil, a plurality of longitudinally movable jaws arranged for the reception of a lead therebetween, means to limit the longitudinal movement of said jaws, means associated with said longitudinally movable mechanism for causing said jaws normally to engage a lead in the pencil and for moving said jaws longitudinally between their limits of movement, and movement transmitting means operable by the movement of said longitudinally movable mechanism to move said jaws out of engagement with the lead after they reach their limit of downward travel.

14. In a magazine pencil, the combination of mechanism movable longitudinally of the pencil, means providing a lead magazine arranged to permit the passage of lead strips successively downwardly therefrom, a plurality of longitudinally movable jaws arranged for the reception therebetween of strips of lead from said magazine and for the propulsion of the same downwardly through the pencil step-by-step, means to limit the longitudinal movement of said jaws, means associated with said longitudinally movable mechanism for causing said jaws normally to engage a strip of lead and for moving said jaws longitudinally between their limits of movement, and movement transmitting means operable by the movement of said longitudinally movable mechanism to move said jaws out of gripping engagement with the lead after the jaws have reached their limit of downward movement.

15. In a magazine pencil comprising an outer shell and a cap mounted for longitudinal movement upon said shell, the combination of means providing a lead magazine arranged to permit the passage of strips of lead successively downwardly therefrom, said means being connected to said cap, a pair of longitudinally movable jaws arranged to receive therebetween a lead from said magazine, a member movable with said cap and said magazine arranged normally to maintain said jaws in gripping position and to carry said jaws downwardly therewith, means to limit the downward movement of said jaws, and movement transmitting means responsive to the movement of said cap to move said jaws out of engagement with the lead after they reach their limit of downward movement.

16. In a magazine pencil comprising an outer shell and a cap mounted for longitudinal movement upon said shell, the combination of means providing a lead magazine arranged to permit the passage of strips of lead successively downwardly therefrom, said means being connected to said cap, a pair of longitudinally movable jaws arranged to receive therebetween a lead from said magazine, a member movable with said cap and said magazine and arranged normally to maintain said jaws in gripping position and to carry said jaws downwardly therewith, means to limit the downward movement of said jaws, and movement transmitting means responsive to the movement of said cap to move said jaws out of engagement with the lead after they reach their limit of downward movement, said movable member being arranged to move said jaws upwardly while the jaws are out of engagement with the lead.

17. In a step-by-step pencil, the combination of a longitudinally movable casing member, a coacting pair of grippers normally securing a lead in writing position and arranged to be moved downwardly by the longitudinal displacement of said casing member and to carry a lead downwardly therebetween, means to limit the downward movement of the grippers, and means whereby the jaws of the grippers are positively forced apart by continued longitudinal displacement of said casing member after the grippers have reached their limit of downward movement.

18. In a step-by-step pencil, the combination of a member movable longitudinally of the pencil, a pair of longitudinally movable jaws arranged for the reception of a lead therebetween, cam means adapted to spread said jaws upon a downward movement of said longitudinally movable member, means normally causing said jaws to engage a lead, said last mentioned means being connected with said longitudinally movable member and acting upon the downward movement of the same to carry said jaws downwardly and to prevent the operation of said cam means, means to limit the downward movement of said jaws whereby upon further downward movement of said longitudinally movable member said cam means will operate to spread said jaws, and means for causing an upward movement of said longitudinally movable member, said cam means being arranged to maintain said jaws in spread position during a portion of the upward movement of the jaws.

19. In a step-by-step pencil, the combination of a member movable longitudinally of the pencil, a pair of grippers, means normally to maintain said grippers in lead-gripping position, means connecting said grippers and adapted to move the same out of engagement with a lead, and means to impart operation to said connecting means in response to a

predetermined portion of the movement of said longitudinally movable member.

20. In a step-by-step pencil mechanism, the combination of a plurality of reciprocable grippers, provided with jaws arranged for the reception of a lead therebetween, means to reciprocate said grippers, and means to impart to said grippers, jaw-separating and jaw closing movements of measured extent at predetermined periods in the operation of the mechanism.

21. In a step-by-step pencil mechanism, the combination of a longitudinally movable lead-gripping member, a pivotally-mounted cam member connected to a free end of said gripping member, and means to cause said cam member to be moved on its pivot to carry said gripper out of engagement with the lead in response to a predetermined portion of the movement of said longitudinally movable member.

22. In a step-by-step pencil mechanism, the combination of a longitudinally movable member, a coacting pair of grippers, gripper-connecting mechanism the effective length of which is variable, and means to increase the effective length of said connecting mechanism during the latter part of the downward movement of said longitudinally movable member, and means to decrease the effective length of said connecting mechanism during the latter part of the upward movement of said longitudinally movable member.

23. In a magazine pencil comprising an outer shell and a tubular member longitudinally movable within said shell, the combination of a partition member cooperating with the upper portion of said tubular member to provide a lead magazine, said partition member being formed with an opening therethrough, a cap-like member carried by said inner tube at a point beneath the partition member and having slots therethrough, a plurality of grippers extending respectively through said slots and arranged to receive a lead therebetween and to rest in lead-gripping position upon said cap-like member, means to limit the downward movement of said grippers while permitting continued downward movement of said inner tube, means to spread said grippers after they reach their limit of downward movement, and exteriorly-accessible means for causing longitudinal movement of said inner tube.

24. A magazine pencil comprising an outer shell and a tubular magazine unit longitudinally movable within said shell, the combination of a lead guide tube detachably secured in the lower end of said shell, a collar formed on the upper end of said guide tube and provided with parallel vertical notches, and lead-gripping members formed with portions extending into said notches and enlarged portions on either side of said collar and spaced therefrom to serve as abutments to limit longitudinal movement of said grippers in either direction.

25. In a magazine pencil comprising an outer shell and a tubular member longitudinally movable within said shell, the combination of a partition member cooperating with the upper portion of said tubular member and movable therewith to provide a lead magazine, said partition member being formed with an opening therethrough, a member secured to the pencil shell and formed with guiding recesses therein, and a plurality of grippers each formed with a guiding tongue extending into one of said recesses.

26. In a magazine pencil comprising an outer shell, and means providing the walls and bottom of a magazine slidable within the upper portion of said shell, the combination of a lead-guide tube secured to said outer shell, a plurality of longitudinally movable jaws positioned between said guide tube and said magazine, and means carried by said guide tube and providing vertical guideways for the guiding of said jaws.

27. In a step-by-step pencil, a longitudinally movable member, a plurality of longitudinally movable lead grippers, longitudinal extensions on said grippers, means providing pivots for said grippers, a spring encircling the extensions on said grippers and tending to cause a movement thereof on their pivots, and means to cause said grippers to grip and propel a lead in response to the operation of said longitudinally movable member.

28. In a step-by-step pencil, a longitudinally movable member, a plurality of longitudinally movable lead grippers, means providing pivots for said grippers, a jaw on one end of each of said grippers, a longitudinal extension on the other end of each gripper, a spring encircling the extensions on said grippers and tending to move said jaws out of engagement with a lead, and means responsive to the movement of said longitudinally movable member to cause said grippers to grip and propel a lead.

29. In a step-by-step pencil, a plurality of longitudinally movable lead grippers, longitudinal extensions on said grippers, means for pivotally mounting said grippers, and a spring encircling said extension on said grippers and tending to move the grippers out of engagement with the lead, and means for maintaining said grippers normally in engagement with the lead and for moving said grippers downwardly while in said lead-engaging position.

30. In a step-by-step pencil, a longitudinally movable member, a plurality of longitudinally movable lead grippers, longitudinal extensions on said grippers, means providing pivots for said grippers, a spring encircling the extensions on the grippers, and means coacting with said spring to move the

grippers out of engagement with a lead in response to the longitudinal movement of said longitudinally movable member.

31. In a step-by-step pencil mechanism, the combination of a plurality of reciprocable lead grippers and means to impart lead releasing action thereto, said means also acting to impart a lead gripping action to the grippers.

32. In a magazine lead pencil, an outer shell, means slidable within the upper portion of said shell and providing the side and bottom walls of a magazine adapted to feed leads successively downwardly, a lead guide tube secured in the lower portion of said shell, and a plurality of reciprocable lead-gripping and -feeding jaws positioned above said guide tube and beneath said magazine and adapted to receive a lead directly from said magazine.

33. In a step-by-step pencil, a casing, a pencil cap at the upper end of said casing and reciprocable with respect thereto, a plurality of reciprocable pivoted lead-grippers, a spring encircling said grippers and tending to move the same out of engagement with a lead; and means normally holding said grippers in engagement with the lead and being adapted, in response to the movement of the pencil cap, to reciprocate said grippers and to permit the operation of said spring at predetermined periods in the cycle of operation of said grippers.

34. In a step-by-step pencil, a longitudinally movable member, a plurality of reciprocable pivoted lead-grippers, a spring encircling said grippers and tending to move the same out of engagement with a lead; and means normally holding said grippers in lead-gripping position and being adapted, in response to the movement of said longitudinally movable member, to reciprocate said grippers and to coact with said spring to move the grippers out of engagement with the lead at predetermined periods in their cycle of operation.

35. In a magazine lead pencil, an outer shell, means slidable within the upper portion of said shell and providing the side and bottom walls of a magazine adapted to feed leads successively downwardly, a lead-guide tube secured in the lower portion of said shell, and a plurality of lead-gripping and -feeding jaws operative on the lead intermediate the bottom of said magazine and the upper end of said guide tube and operable in response to the reciprocation of said slidable means.

36. In a magazine lead pencil, an outer shell, means slidable within the upper portion of said shell and providing the side and bottom walls of a magazine adapted to feed leads successively downwardly, a lead-guide tube secured in the lower portion of said shell, and a plurality of reciprocable lead-gripping and -feeding jaws movable in the space between the bottom of said magazine and the upper end of said guide tube and adapted to receive a lead from said magazine and to grip the same and feed the same downwardly in response to the operation of said slidable means.

37. In a magazine lead pencil, an outer shell, means slidable within the upper portion of said shell and providing the side and bottom walls of a magazine adapted to feed leads successively downwardly, a lead-guide tube secured in the lower portion of said shell, and a plurality of reciprocable lead-gripping and -feeding jaws positioned beneath said magazine and said guide tube and adapted substantially to surround a lead therefrom and to feed the same step by step downwardly through said guide tube in response to the reciprocation of said slidable means.

38. In a magazine lead pencil, an outer shell, means slidable within the upper portion of said shell and providing the side and bottom walls of a magazine, a plurality of lead-gripping and -feeding jaws positioned beneath said magazine and adapted to receive a lead therefrom and to feed the same downwardly in response to the downward movement of said slidable means, and a reciprocable ring adapted to surround said jaws and to effectuate a closing movement thereof.

39. In a magazine lead pencil, an outer shell, means slidable within the upper portion of said shell and providing the side and bottom walls of a magazine, reciprocable lead-gripping and -feeding jaws beneath said magazine, and means including a reciprocable ring for operating said jaws in response to the movement of the magazine.

40. In a step-by-step pencil, a plurality of lead-gripping jaws, and means including a jaw-operating member mounted for pivotal movement on an axis transverse of the pencil for swinging said jaws positively into and out of engagement with the lead.

In testimony whereof I affix my signature.

ALFRED WOELM.

CERTIFICATE OF CORRECTION.

Patent No. 1,762,317. Granted June 10, 1930, to

ALFRED WOELM.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 1, line 86, after the word "is" insert the words "slotted so as to pass, and be"; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 22nd day of July, A. D. 1930.

(Seal)

Wm. A. Kinnan,
Acting Commissioner of Patents.