Sept. 25, 1945. H. HOFFMAN 2,385,442

PENCIL

Filed Oct. 11, 1944 3 Sheets-Sheet 1

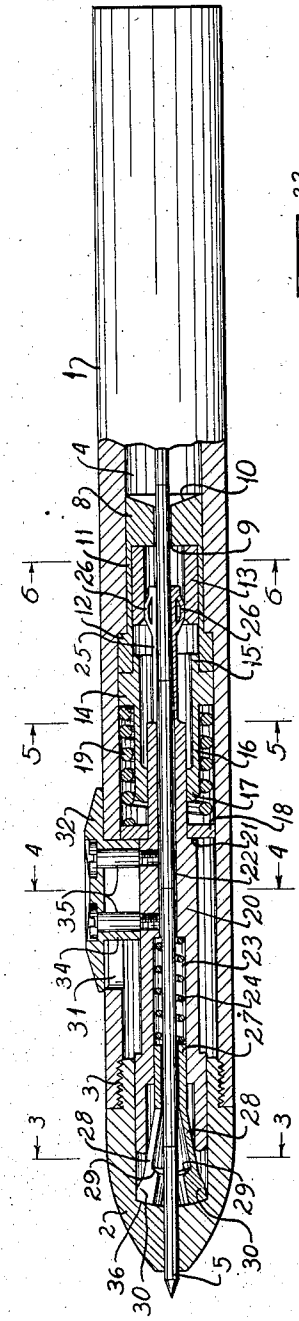


FIG. 1

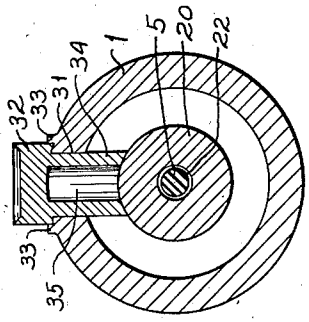


FIG. 4

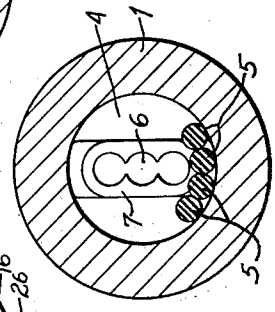


FIG. 7

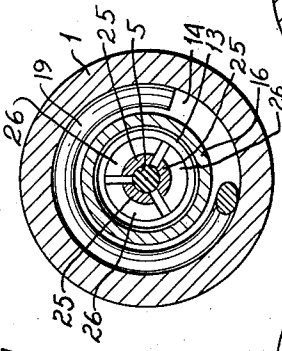


FIG. 5

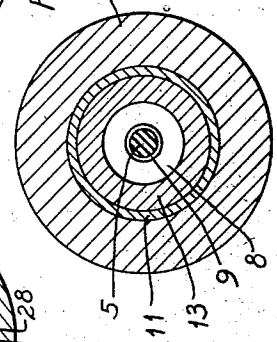


FIG. 6

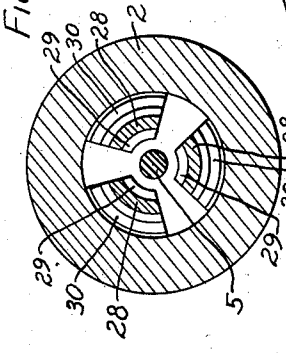


FIG. 3

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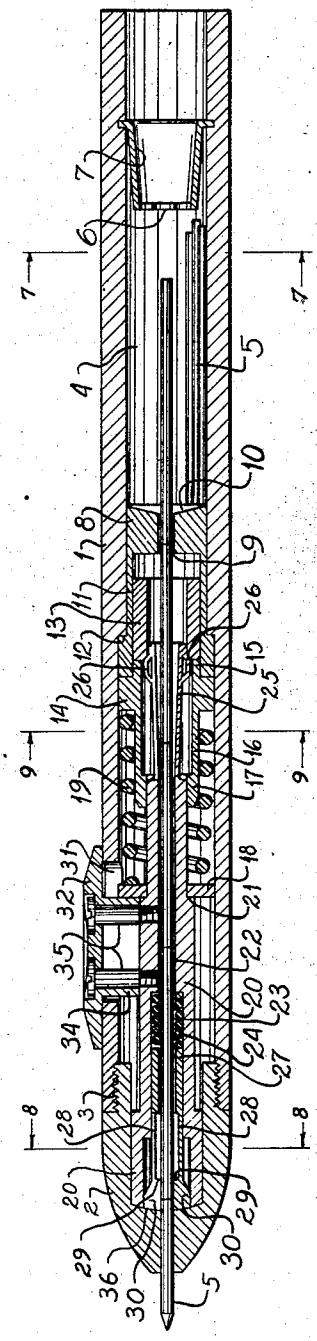


FIG. 2

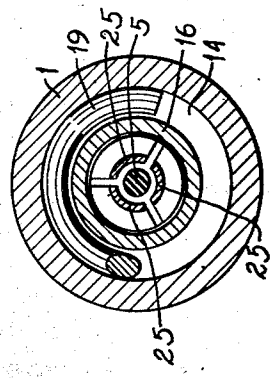


FIG. 9

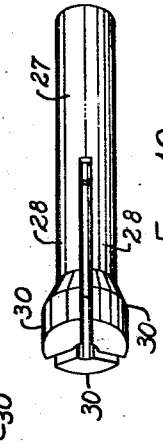


FIG. 10

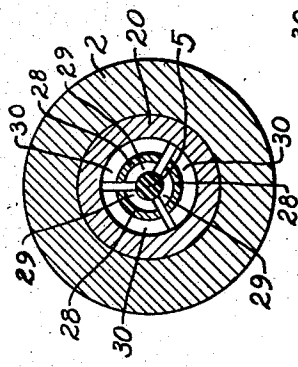


FIG. 8

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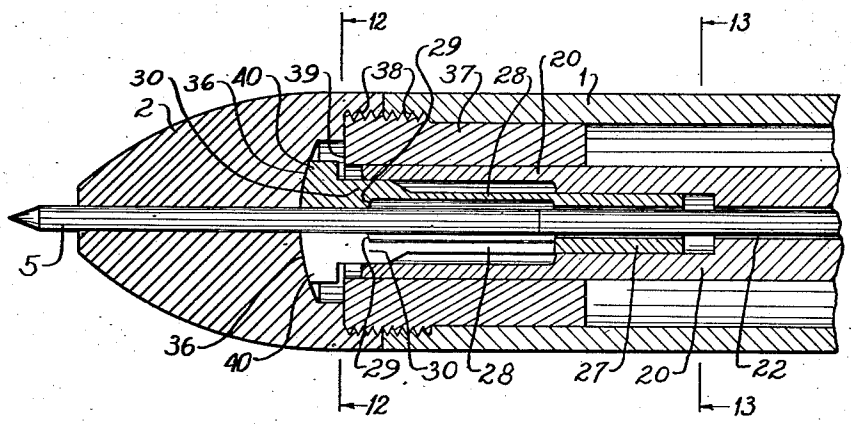


FIG. 11

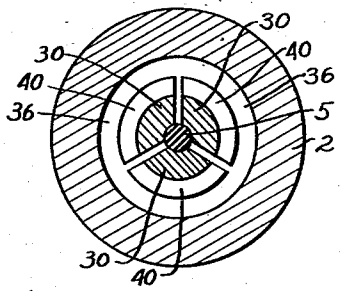


FIG. 12

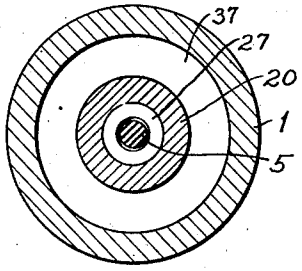


FIG. 13

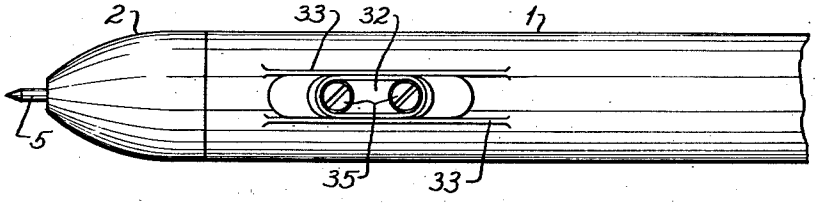


FIG. 14

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Patented Sept. 25, 1945 2,385,442

UNITED STATES PATENT OFFICE

2,385,442

PENCIL

Harry Hoffman, Denver, Colo.

Application October 11, 1944, Serial No. 558,140

6 Claims. (Cl. 120—17)

This invention relates to pencils and particularly to pencils having means for feeding the lead out through and projecting it beyond the tip of the pencil and means for normally preventing the lead being pushed back from such projected position.

Objects of the invention are to provide a pencil, of the class indicated, which shall have (a) means for projecting the lead a predetermined distance responsive to a slight movement of the finger of the user's hand when holding the pencil in writing position and without change of the position of the pencil in such hand; (b) a chamber for a supply of leads designed to feed leads successively into a central passage by gravity combined with means for moving a succession of leads along said passage in intermittent steps of predetermined equal length (c) said moving means being operable responsive to slight movement of the tip of the writers' finger while holding the pencil in writing position.

With these and other objects in view, as will hereinafter more fully appear, the invention comprises certain novel constructions, combinations and arrangements of parts as hereinafter described and as defined in the appended claims and illustrated, in preferred embodiment, in the accompanying drawings in which

Fig. 1 is a longitudinal, central sectional view, partly in elevation, of a pencil according to the present invention, with parts in position when the finger piece is drawn back to start the projection of the lead.

Fig. 2 is a view like Fig. 1, but all in section, showing the parts in position when projection of the lead is completed.

Figs. 3, 4, 5 and 6 are sections respectively on lines 3—3, 4—4, 5—5 and 6—6 of Fig. 1.

Figs. 7, 8 and 9 are sections respectively on lines 7—7, 8—8 and 9—9 of Fig. 2.

Fig. 10 is a perspective view of the front chuck.

Fig. 11 is a longitudinal central section of the forward fragment of the pencil showing a modification of the structure shown in the previous figures.

Figs. 12 and 13 are sections respectively on lines 12—12 and 13—13 of Fig. 11.

Fig. 14 is a plan view of the forward fragment of the pencil shown in all previous figures.

The parts of the pencil are positioned within or associated with a barrel 1 which carries at its forward end a tapered cap 2 engaged to the barrel in suitable manner as by interengaged threads 3. The rear portion of the barrel is hollow, forming a magazine 4 for holding a supply of leads 5 which may be inserted through irregular orifice 6 in the bottom of the hollow frusto-conical plug 7. If desired, a cap, not shown, may cover the rear end of the barrel.

At the forward end of the magazine 4 is a plug 8 having a central bore 9 for the leads and a conical upper surface 10 on which the forward ends of the leads rest and which, by its inclination, slides a lead into central bore 9 whenever the preceding lead has been projected forwardly sufficiently to permit the entry of another lead.

Plug 8 carries a forwardly extending sleeve 11 which has a shoulder co-mating with a shoulder on the interior of barrel 1 as at 12. Sliding sleeve 13 is mounted within sleeve 11. Bushing 14 fits snugly within the bore of barrel 1 and abuts against the forward end of sleeve 11 and has an interior diameter less than sleeve 11 but greater than sleeve 13 and carries a projection 15 serving as a stop to limit the forward movement of sleeve 13. Bushing 14 also carries a forwardly extending guide 16 which carries bearing 17. Ring 18 has a sliding fit in barrel 1 and coiled spring 19 surrounds guide 16 and its ends seat against bushing 14 at the rear and ring 18 at its front end, the forward movement of ring 18 being limited as hereinafter described.

Slidably mounted in bearing 17 and cap 2, there is provided a chuck grip 20, externally shouldered as at 21 to seat, and limit the forward movement of, ring 18 and having a central bore 22, aligned axially with bore 9 to form a central passage for the leads forwardly from magazine 4. Bore 22 is forwardly enlarged into cylinder 23 to accommodate coiled spring 24 and the rear portion of the front chuck, hereinafter described.

The rear portion of chuck grip 20 is drawn out, or otherwise formed, into a chuck here illustrated as formed of three spring members 25 adapted to normally spring out of contact with leads 5, as shown at Fig. 2, but to be brought into encircling gripping contact with said leads when inclined lugs 26, carried by members 25, are moved rearwardly and forced within sleeve 13, as shown at Fig. 1. It will be noted that when in position shown at Fig. 2 the lugs 26 contact the forward end of sleeve 13 and that the inclination of the rear ends of lugs 26 is sufficiently steep so that a rearward movement of the chuck will cause the lugs 26 to shove sleeve 13 rearwardly until it abuts plug 8 whereafter the continued rearward movement of the chuck will force the lugs within sleeve 13 resulting in compressing the chuck into gripping contact with the lead which lies within the chuck. There-

after, the forward movement of the chuck will draw with it the gripped lead and also sleeve 13 until sleeve 13 abuts projection 15 whereafter continued forward movement of the chuck will withdraw lugs 26 from sleeve 13 allowing the members 25 to spring outwardly and into the position shown at Fig. 2.

The front chuck is shown at Fig. 10 and comprises a hollow stem 27, forwardly divided into a plurality of spring fingers 28 each of which has a forward interior lug 29, for gripping the lead when compressed, and an exterior inclined lug 30 adapted to cooperate with the chuck grip 20 for compressing the chuck when grip 20 is moved forward. In practice the interior lug 29 and exterior lug 30 on each finger are formed as a unitary member comprising an enlargement or extension both inwardly and outwardly of the forward end of finger 28, as shown in the drawings.

Slot 31 is provided in the barrel at a point normally beneath the tip joint of the index finger of the writer when holding the pencil in writing position. Finger piece 32, adapted to slide longitudinally of the barrel 1, and preferably between ribs 33, and covering the slot 31, has depending hollow lug 34 having a sliding fit in the slot. Screws 35 secure the piece 32 to chuck grip 20, lug 34 resting against grip 20 and serving as a spacer to prevent screws 35 drawing piece 32 into binding contact with the barrel.

The top surface of finger piece 32 may be provided with any suitable means for convenient engagement by the tip of the finger, a simple depression being illustrated, which will answer the purpose under ordinary conditions.

When the finger piece is slid backward by the tip of the writer's finger, the front chuck releases its grip on the lead and the rear chuck grips the lead which projects through plug 8 and when the finger releases the finger piece spring 19 forces chuck grip 20 forward and carries forward, to the length equal to the permitted movement of sleeve 13, all of the leads in the central passage resulting in the projection of the front lead, beyond the point of cap 2, a distance equal to said movement of sleeve 13. As grip 20 moves into its forward position it compresses the front chuck and grips the front lead preventing ilts being pushed back into the pencil by the writing pressure exerted thereon.

Spring 23 resiliently holds the front chuck in its forward position at all stages of movement of grip 20 and also serves as a cushion to soften the forward movement of grip 20 resulting from the action of spring 19.

It will be noted that bore 9, bore 22 and hollow stem 27 forms a substantially continuous central passage for the leads from magazine 4 to the point of cap 2, members 25 and spring 24 cooperating therewith and acting as guides in the spaces intervening between said bores and said stem.

For simplicity in drawing, the front chuck is shown at Fig. 10 with a flat front end, but it will be noted at Figs. 1, 2 and 11 that the end wall 36 in cap 2 is slightly curved and that the forward ends of lugs 29—30 are correspondingly curved, the radius of the curve being that taken by the ends of lugs 29—30 in their movement between gripping or compressed position and full releasing position as shown at Fig. 1.

The modification illustrated at Figs. 11, 12 and 13 comprises a combined bushing and connecting member 37 which connects the barrel and cap by screw threads as at 38 and extends inwardly to form a stop 39 for extensions 40 of lugs 30 whereby any substantial rearward movement of the front chuck is prevented. In this embodiment the spring 24 is eliminated. Should the front chuck be drawn rearwardly by the rearward movement of chuck grip 20, such movement will be stopped by stop 39 and when the chuck reaches that point the grip of member 20 thereon will be released and, as the pencil is in substantially upright position, the chuck will drop by gravity to its most forward position in contact with wall 36. Bushing 37 serves as a bearing for grip 20 in place of the threaded rearward extension of cap 2 as shown at Figs. 1 and 2.

While many of the details of construction have been illustrated and described, it will be understood that the invention is not limited thereto and that many changes of detail will occur to those skilled in the art which will be within the spirit of the foregoing description and scope of the appended claims and protection is not to be limited to details.

I claim:

1. In a pencil having a barrel with a tapered tip at one end, a magazine adapted to hold leads in the other end, and a central passageway leading from the magazine forwardly through the tip and adapted to accommodate a succession of leads, means adapted to intermittently move said succession of leads along said passageway in steps of equal predetermined length, said moving means comprising a front chuck within the tip end of the pencil and a second chuck within said pencil spaced rearwardly of said front chuck and a longitudinally slidable member within said pencil adapted to compress said front chuck to grip the lead in the passageway when moved forwardly and to release said front chuck and compress the rear chuck to grip leads in said passageway when moved rearwardly.

2. In a pencil having a barrel with a tapered tip at one end, a magazine adapted to hold leads in the other end, and a central passageway leading from the magazine forwardly through the tip and adapted to accommodate a succession of leads, means adapted to intermittently move said succession of leads along said passageway in steps of equal predetermined length, said moving means comprising a front chuck within the tip end of the pencil and a second chuck within said pencil spaced rearwardly of said front chuck and a longitudinally slidable member within said pencil adapted to compress said front chuck to grip the lead in the passageway when moved forwardly and to release said front chuck and compress the rear chuck to grip leads in said passageway when moved rearwardly, and means for normally but yieldingly holding said moving means in forward, front-chuck-compressing position.

3. In a pencil having a barrel with a tapered tip at one end, a magazine adapted to hold leads in the other end, and a central passageway leading from the magazine forwardly through the tip and adapted to accommodate a succession of leads, means adapted to intermittently move said succession of leads along said passageway in steps of equal predetermined length, said moving means comprising a front chuck within the tip end of the pencil and a second chuck within said pencil spaced rearwardly of said front chuck and a longitudinally slidable member within said pencil adapted to compress said front chuck to grip the lead in the passageway when moved for-

wardly and to release said front chuck and compress the rear chuck to grip leads in said passageway when moved rearwardly and a plug fixed in said barrel to limit the rearward movement of said moving means and providing a bottom for said magazine, said plug having a central passage for leads and a conically concave upper surface adapted to slide the magazined leads into said passage.

4. In a pencil having a barrel with a tapered tip at one end, a magazine adapted to hold leads in the other end, and a central passageway leading from the magazine forwardly through the tip and adapted to accommodate a succession of leads, means adapted to intermittently move said succession of leads along said passageway in steps of equal predetermined length, said moving means comprising a front chuck within the tip end of the pencil and a second chuck within said pencil spaced rearwardly of said front chuck and a longitudinally slidable member within said pencil adapted to compress said front chuck to grip the lead in the passageway when moved forwardly and to release said front chuck and compress the rear chuck to grip leads in said passageway when moved rearwardly, said rear chuck being carried by said longitudinally slidable member and said front chuck being slidably engaged by said longitudinally slidable member.

5. In a pencil having a barrel with a tapered tip at one end, a magazine adapted to hold leads in the other end, and a central passageway leading from the magazine forwardly through the tip and adapted to accommodate a succession of leads, means adapted to intermittently move said succession of leads along said passageway in steps of equal predetermined length, said moving means comprising a front chuck within the tip end of the pencil and a second chuck within said pencil spaced rearwardly of said front chuck and a longitudinally slidable member within said pencil adapted to compress said front chuck to grip the lead in the passageway when moved forwardly and to release said front chuck and compress the rear chuck to grip leads in said passageway when moved rearwardly, said rear chuck being carried by said longitudinally slidable member and said front chuck being slidably engaged by said longitudinally slidable member and resilient means for retaining said front chuck at its most forward position.

6. In a pencil having a barrel with a tapered tip at one end, a magazine adapted to hold leads in the other end, and a central passageway leading from the magazine forwardly through the tip and adapted to accommodate a succession of leads, means adapted to intermittently move said succession of leads along said passageway in steps of equal predetermined length, said moving means comprising a front chuck within the tip end of the pencil and a second chuck within said pencil spaced rearwardly of said front chuck and a longitudinally slidable member within said pencil adapted to compress said front chuck to grip the lead in the passageway when moved forwardly and to release said front chuck and compress the rear chuck to grip leads in said passageway when moved rearwardly, said rear chuck being carried by said longitudinally slidable member and said front chuck being slidably engaged by said longitudinally slidable member and fixed means for limiting the rearward movement of said front chuck.

HARRY HOFFMAN.