

W. P. DE WITT AND D. J. LA FRANCE.

PENCIL.

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1,434,684.

Patented Nov. 7, 1922.

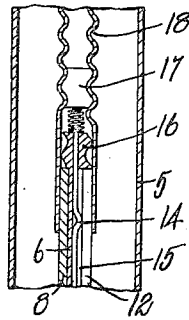
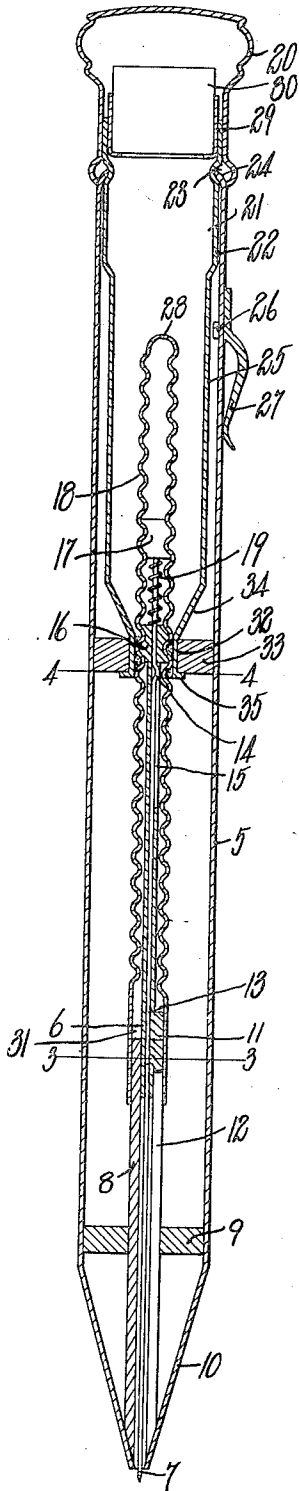


FIG. 2.

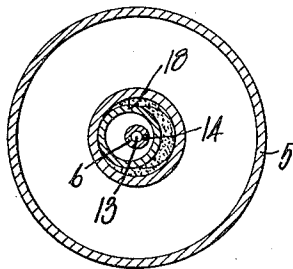


FIG. 4.

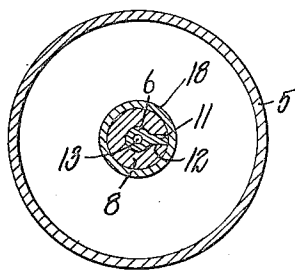


FIG. 3.

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UNITED STATES PATENT OFFICE.

WILLIAM P. DE WITT, OF SOMERVILLE, AND DAVID J. LA FRANCE, OF CAMBRIDGE, MASSACHUSETTS, ASSIGNORS, BY MESNE ASSIGNMENTS, TO DE WITT-LA FRANCE CO., OF CAMBRIDGE, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

PENCIL.

Application filed October 2, 1919. Serial No. 327,840.

To all whom it may concern:

Be it known that we, WILLIAM P. DE WITT and DAVID J. LA FRANCE, citizens of the United States, residing, respectively, at Somerville and Cambridge, in the county of Middlesex and State of Massachusetts, have invented new and useful Improvements in Pencils, of which the following is a specification.

This invention relates to pencils with removable leads and especially to that class of pencils in which the lead is of very small diameter so that the same may be used without sharpening.

The object of this invention is to provide a pencil of the class set forth in which the lead can be fed forward for use until it is almost entirely used up and the small remaining butt end of the lead ejected from the pencil casing.

The invention consists in the combination and arrangement of parts set forth in the following specification and particularly pointed out in the claims thereof.

Referring to the drawings:

Figure 1 is an enlarged sectional elevation of our improved pencil.

Fig. 2 is a detail section illustrating certain parts of the pencil in their relative positions when the lead is being expelled from the pencil by the push-rod.

Fig. 3 is a detail section taken on line 3—3 of Fig. 1.

Fig. 4 is a detail section taken on line 4—4 of Fig. 1.

Like numerals refer to like parts throughout the several views of the drawings.

In the drawings, 5 is the outer casing, 6 is a tube constituting a holder for a lead 7 and the bore of said tube is of slightly smaller diameter than the diameter of said lead 7, so that when the lead 7 is inserted in said tube it is firmly locked therein.

The tube 6 is mounted to slide in a guide tube 8 which is fastened to a collar 9, said collar 9, in turn, being fastened to the interior wall of the outer casing 5. The forward end of the guide tube 8 is also fastened to the forward end of a conical portion 10 forming a nozzle at the front end of the pencil casing. The tube or lead holder 6 has a rib 11 projecting laterally therefrom and extending into a slot 12 in the guide tube 8,

A push-rod 13 is mounted to slide in the lead holder 6 and said push-rod has a lateral projection 14 thereon which projects into a slot 15 extending longitudinally of the holder 6. Thus the push-rod 13 is prevented from rotating relatively to the holder 6 and the holder 6 is prevented from rotating relatively to the guide tube 8.

The rear end of the holder 6 has an exteriorly screw-threaded member 16 thereon and the rear end of the push-rod 13 has an exteriorly screw-threaded head 17 fast thereto, and both of these screw-threaded members have screw-threaded engagement with the interior of an interiorly screw-threaded sleeve 18. Said sleeve is rotatably mounted upon its forward end upon the guide tube 8 and the interior bore of said sleeve is smooth and free from screw-threads for a short distance at 31 adjacent to the rear end of the guide tube 8.

A spiral spring 19 encircles the push-rod 13 between the rear end of the holder 6 and the front end of the head 17.

A hollow head 20 is rotatably mounted upon the rear end of the casing 5 and is detachably fastened by means of a snug fit to the rear end of a magazine 21. The magazine 21 is rotatably mounted at 22 within the exterior casing 5 and is provided with an annular groove 23 into which a flange 24, provided upon the rear end of the casing 5, projects, thus preventing any longitudinal movement of the magazine 21 and also of the head 20. The magazine 21 is reduced in diameter at 25 to make room for projections 26 provided on a clip 27, said projections extending from the clip through the outer casing 5 and being riveted or clinched to the inner wall of said casing. The clip 27 is also soldered along the rear portion thereof to said casing, whereby it is firmly attached thereto and forms a means for supporting the pencil in a pocket and attaching it to the cloth of the garment containing the pocket.

The front end of the magazine 21 is again reduced in diameter at 32 to closely fit the screw-threaded sleeve 18 to which it is brazed or soldered. The reduced portion 32 of the magazine tube 21 is rotatably mounted in a collar 33 which is fastened to the casing 5. It will be noted that said reduced portion 32 is connected to the re-

duced portion 25 of the magazine tube 21 by a conical portion 34 and that the forward end of the magazine tube terminates in a flange 35 which is located adjacent to the front face of the collar 33. It will be understood that the conical portion 34 and the flange 35 form shoulders upon opposite sides of the collar 33 which prevent any longitudinal movement of the magazine tube 21 in said collar and also within the outer casing 5. From this construction it will be seen that the parts are firmly supported within the casing, the magazine tube being supported at its rear end in the casing 5 and at its front end in the collar 33, while the screw-threaded sleeve 18 is supported in the reduced portion 32 of the magazine tube and at its forward end upon the guide tube 8 while the guide tube 8 is fastened to the collar 9 and has its forward end fastened to the forward end of the conical portion 10 of the outer casing 5.

The rear end of the sleeve 18 is closed at 28 to prevent any of the leads contained in the magazine 21 from accidentally entering said sleeve.

The rear end of the magazine 21 has a tubular cup 29 therein within which is enclosed an eraser 30 which projects from said cup into the head 20.

The outer casing, clip, head, magazine, cup and eraser of the present application form a portion of the subject-matter of another application No. 327,839 for pencil filed by us of even date herewith.

The general operation of the pencil hereinbefore specifically described is as follows: Assuming the parts to be in the relative positions illustrated in Fig. 1, with the lead 7 gripped in the forward end of the holder 6, a rotary motion is imparted to the head 20 which imparts a rotary motion to the magazine 21 and to the sleeve 18. Since the exteriorly screw-threaded member 16 and the screw-threaded head 17 cannot rotate, it follows that they must be moved longitudinally within the screw-threaded sleeve 18. This results in moving the holder 6 longitudinally thereof within the guide tube 8 and toward the conical end 10 of the casing, thus causing the lead to project from the front end of said conical casing and as the pencil lead is worn, the head 20 is rotated from time to time to advance the lead toward the conical end of the casing. When the lead is almost entirely used up the front end of the holder 6 abuts against the interior wall of the front end of the conical portion 10 of the casing. At this time the screw-threaded member 16 has passed out of the interiorly screw-threaded portion of the sleeve 18 and into the smooth bore portion 31 of said sleeve and upon further rotation of the head 20 it is evident that the sleeve 18 will cause the screw-threaded head 17 of the rod 13

to advance. This will advance the push-rod 13 and will compress the spiral spring 19 between the head 17 and the rear end portion of the holder 6. The push-rod 13 will then be advanced until it has entirely expelled the lead 7 from the pencil (Fig. 2). Now, upon reversing the direction of rotation of the head 20 the head 17 will be moved rearwardly in the pencil by the rotation of the screw-threaded sleeve 18 and will, upon continued rotation of said head, cause the push-rod to be drawn rearwardly until the projection 14 thereon engages the head 17 and at that time the compression of the spring 19 will have been removed, whereupon the holder 6 will be pushed against the front end of the interior screw-thread in the sleeve 18 and the exterior screw-threads upon the member 16 will engage the interior screw-thread of said sleeve, and upon further rotation of the head 20 the two exteriorly screw-threaded members 16 and 17 will be drawn backwardly in the pencil, thus causing the holder 6 to be also drawn backwardly, with the front end of the push-rod 13 retracted within the front end of said holder, ready to receive the rear end portion of a new lead. After a new lead has been inserted, further rotation of the head 20 will draw the lead holder and the lead, together with the push-rod, backwardly into the sleeve 18 and into the retracted position illustrated in Fig. 1.

Having thus specifically described our invention, what we claim and desire by Letters Patent to secure is:

1. A pencil having, in combination, an outer casing open at its rear end and including a nozzle at its front end stationary relatively thereto, a head rotatably mounted on the rear end of said casing, a reciprocatory holder for a pencil lead, means to guide said holder and prevent it from rotating, means including an interiorly screw-threaded rotatable sleeve operable by rotating said head and adapted to move said holder longitudinally of said casing whereby said lead may be advanced and positive means adapted to eject said lead from said holder, said holder and its guide and the screw-threaded sleeve being located entirely within said casing.

2. A pencil having, in combination, an outer casing open at its rear end and including a nozzle at its front end stationary relatively thereto, a head rotatably mounted on the rear end of said casing, a reciprocatory holder for a pencil lead, means to guide said holder and prevent it from rotating, means including an interiorly screw-threaded rotatable sleeve operable by rotating said head and adapted to impart a reciprocatory motion to said holder longitudinally of said casing whereby said lead may be advanced or retracted and positive

means including said interiorly screw-threaded sleeve operable by rotating said head to eject said lead from said holder, said holder and its guide and the screw-threaded sleeve being located entirely within said casing.

3. A pencil having, in combination, an outer casing open at its rear end and including a nozzle at its front end stationary relatively thereto, a head rotatably mounted on the rear end of said casing, a reciprocatory holder for a pencil lead, a tube constituting a guide for said lead holder and fixedly positioned relatively to said casing, means operated by rotating said head to impart a reciprocatory motion to said lead holder whereby said lead may be moved forwardly and backwardly in said casing and positive means operated by rotating said head to eject said lead from said holder, said holder and guide tube being located entirely within said casing.

4. A pencil having, in combination, an outer casing open at its rear end and including a nozzle at its front end stationary relatively thereto, a head rotatably mounted on the rear end of said casing, a reciprocatory holder for a pencil lead, a tubular guide fast to said casing adjacent the front end thereof, in which guide said lead holder is adapted to slide and with which it contacts, a rib on said lead holder adapted to project into a slot provided in said guide, a push-rod in said lead holder adapted to engage the rear end of said pencil lead, and means to prevent said push rod at all times from rotating, means operated by rotating said head to impart a reciprocatory motion to said lead holder and means operated by rotating said head to impart an independent reciprocatory motion to said push-rod whereby said lead may be advanced or retracted by said holder and may also be ejected from said holder by said push-rod, said holder and guide tube being located entirely within said casing.

5. A pencil having, in combination, an outer casing, a head rotatably mounted on the rear end of said casing, a reciprocatory holder for a pencil lead, a tubular guide fast to said casing adjacent the front end thereof, in which guide said lead holder is adapted to slide, a rib on said lead holder adapted at all times to project into a longitudinal slot in said guide, a push-rod in said lead holder, a lateral projection on said push-rod projecting into a slot provided in said lead holder, means operated by rotating said head to impart a reciprocatory motion to said lead holder and means operated by rotating said head to impart an independent reciprocatory motion to said push-rod whereby said lead may be advanced or retracted by said holder and may also be ejected from said holder by said push-rod

said holder and guide tube and push rod being located entirely within said casing.

6. A pencil having, in combination, an outer casing, a head rotatably mounted on the rear end of said casing, a reciprocatory lead holder, a guide for said lead holder, a push-rod adapted to slide in said lead holder, a non-rotatable screw-threaded member on said lead holder, a screw-threaded member on said push-rod and an interiorly screw-threaded sleeve adapted to engage both of said screw-threaded members, the interior screw-thread of said sleeve terminating at a point removed from the forward end thereof, means operated by rotating said head to impart a rotary motion to said sleeve and means to prevent the rotation of said lead holder and of said rod, whereby reciprocatory motion may be imparted to said lead holder and an independent reciprocatory motion imparted to said rod said lead holder, guide and push rod being located entirely within said casing.

7. A pencil having, in combination, an outer casing, a head rotatably mounted on the rear end of said casing, a reciprocatory lead holder, a non-rotatable guide for said lead holder, a non-rotatable push-rod adapted to slide in said lead holder, an annular screw-threaded member on said lead holder, an annular screw-threaded member on said push-rod, a spring interposed between said screw-threaded members, and an interiorly screw-threaded rotary sleeve adapted to engage both of said screw-threaded members, the forward end of said sleeve having a smooth bore, means to impart a rotary motion to said sleeve and means to prevent the rotation of said lead holder and of said rod, whereby a reciprocatory motion may be imparted to said lead holder and an independent reciprocatory motion imparted to said rod.

8. A pencil having, in combination, an outer casing, a reciprocatory lead holder, a guide for said lead holder, a push-rod adapted to slide in said lead holder, a screw-threaded member on said lead holder, a screw-threaded member on said push-rod, a spring interposed between said screw-threaded members, and an interiorly screw-threaded sleeve adapted to engage both of said screw-threaded members, the forward end of said sleeve having a smooth bore, means to prevent the rotation of said lead holder and of said rod, a head rotatably mounted upon said casing and means connecting said head to said sleeve, whereby a rotary motion may be imparted to said sleeve, a reciprocatory motion to said lead holder and an independent reciprocatory motion to said push-rod.

9. A pencil having, in combination, an outer casing, a reciprocatory lead holder, a guide for said lead holder, a push-rod adapt-

ed to slide in said lead holder, a screw-threaded member on said lead holder, a screw-threaded member on said push-rod, a spring interposed between said screw-threaded members, and an interiorly screw-threaded sleeve adapted to engage both of said screw-threaded members, the forward end of said sleeve having a smooth bore, means to prevent the rotation of said lead holder and of said rod, a head rotatably mounted upon said casing, and a tube fast to said head, rotatably mounted within said casing and fastened at its forward end to said sleeve, whereby a rotary motion may be imparted to said sleeve, a reciprocatory motion to said lead holder and an independent reciprocatory motion to said push-rod.

10. A pencil having, in combination, an outer casing, a tube constituting a guide fastened to said casing adjacent the forward end thereof and having a slot extending longitudinally thereof, another tube constituting a lead holder slidable within said guide tube and having a lateral projection thereon extending into said slot whereby said lead holder is prevented from rotating, said lead holder being provided with a slot extending longitudinally thereof, a screw-threaded member on the rear end of said lead holder, a push-rod mounted to reciprocate in said lead holder, a lateral projection on said push-rod extending into said last-named slot, whereby said push-rod is prevented from rotating, a screw-threaded head on the rear end of said push-rod, a spring interposed between said push-rod head and the screw-threaded member on said lead holder, an interiorly screw-threaded sleeve rotatably mounted at its forward end on said guide tube and having screw-threaded engagement with said screw-threaded head and screw-threaded member, the forward end of said sleeve having a smooth bore, a head rotatably mounted upon said casing and means connecting said head with said sleeve whereby said sleeve may be rotated, a reciprocatory motion imparted to said lead holder and an independent reciprocatory motion imparted to said push-rod.

11. A pencil having, in combination, an outer casing, a reciprocatory lead holder, a guide for said lead holder, a push-rod adapted to slide in said lead holder, a screw-threaded member on said lead holder, a screw-threaded member on said push-rod and an interiorly screw-threaded sleeve adapted to engage both of said screw-threaded members, the forward end of said sleeve

having a smooth bore, a head rotatably mounted on the rear end of said casing, a tube fast at its forward end to said screw-threaded sleeve and at its rear end detachably fastened to said head, and means to prevent the rotation of said lead holder and of said rod, whereby a reciprocatory motion may be imparted to said lead holder and an independent reciprocatory motion imparted to said rod.

12. A pencil having, in combination, an outer casing, a reciprocatory lead holder, a guide for said lead holder, a push-rod adapted to slide in said lead holder, a screw-threaded member on said lead holder, a screw-threaded member on said push-rod and an interiorly screw-threaded sleeve adapted to engage both of said screw-threaded members, the forward end of said sleeve having a smooth bore, a head rotatably mounted on the rear end of said casing, a tube fast at its forward end to said screw-threaded sleeve and at its rear end detachably fastened to said head, a collar fast to said casing in which said tube is rotatably mounted, and means to prevent the rotation of said lead holder and of said rod, whereby a reciprocatory motion may be imparted to said lead holder and an independent reciprocatory motion imparted to said rod.

13. A pencil having, in combination, an outer casing, a reciprocatory lead holder, a guide for said lead holder, a push-rod adapted to slide in said lead holder, a screw-threaded member on said lead holder, a screw-threaded member on said push-rod and an interiorly screw-threaded sleeve adapted to engage both of said screw-threaded members, the forward end of said sleeve having a smooth bore, a head rotatably mounted on the rear end of said casing, a tube fast at its forward end to said screw-threaded sleeve and at its rear end detachably fastened to said head, a collar fast to said casing in which said tube is rotatably mounted, said tube being provided with shoulders on opposite sides of said collar, whereby longitudinal movement of said tube is prevented, and means to prevent the rotation of said lead holder and of said rod, whereby a reciprocatory motion may be imparted to said lead holder and an independent reciprocatory motion imparted to said rod.

In testimony whereof we have hereunto set our hands.

WILLIAM P. DE WITT.
DAVID J. LA FRANCE.