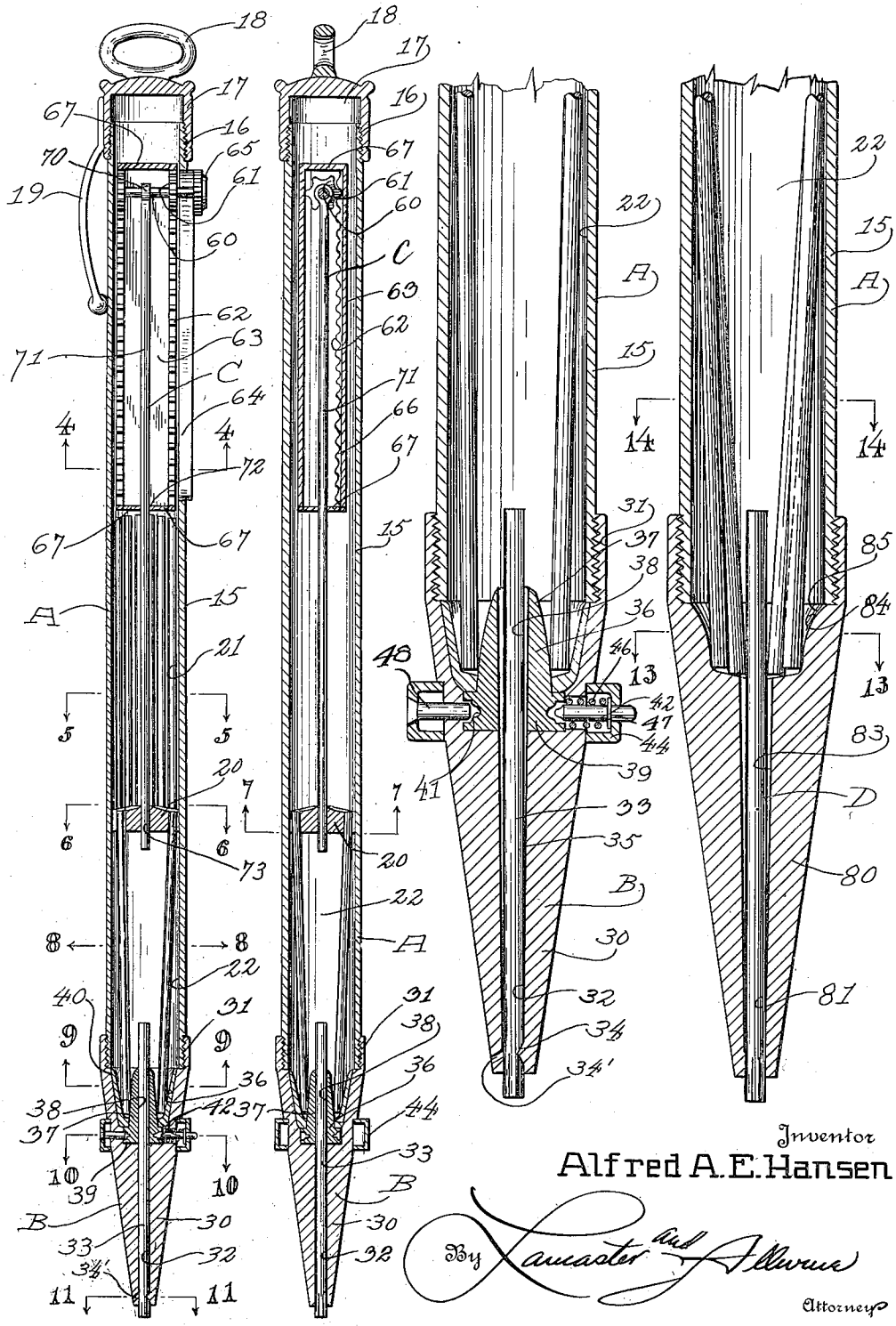
Jan. 29, 1924. 1,482,300

A. A. E. HANSEN

SELF FEEDING AND SELF SHARPENING PENCIL

Filed Oct. 13, 1921 2 Sheets-Sheet 1

Fig. 1. Fig. 2. Fig. 3. Fig. 12.



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Fig. 4.

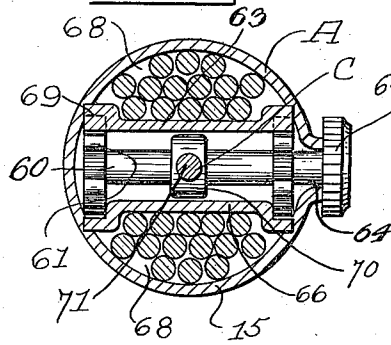


Fig. 5.

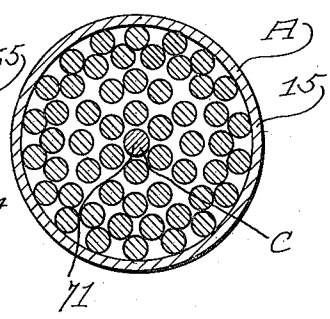


Fig. 6.

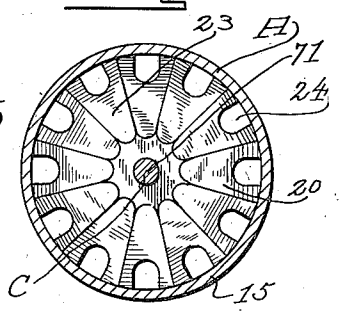


Fig. 7.

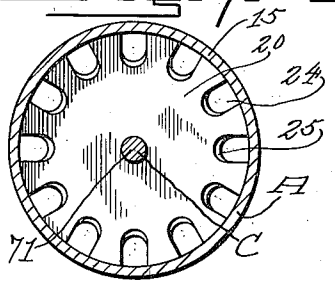


Fig. 8.

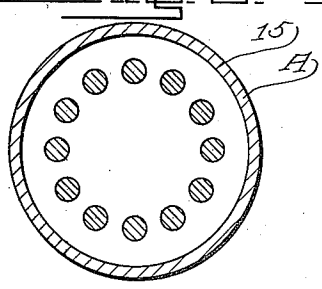


Fig. 9.

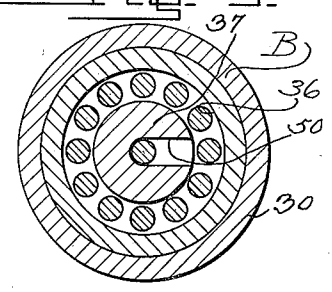


Fig. 10.

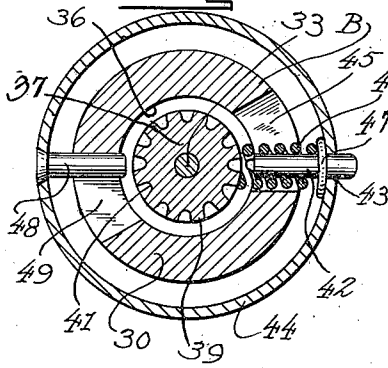


Fig. 13.

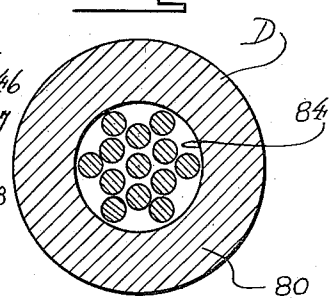


Fig. 14.

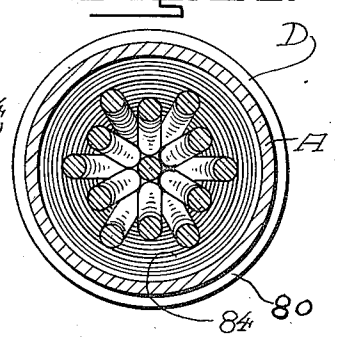
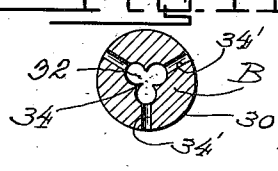


Fig. 11.



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UNITED STATES PATENT OFFICE.

ALFRED A. E. HANSEN, OF PHILADELPHIA, PENNSYLVANIA.

SELF-FEEDING AND SELF-SHARPENING PENCIL.

Application filed October 13, 1921. Serial No. 507,513.

To all whom it may concern:

Be it known that I, ALFRED A. E. HANSEN, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Self-Feeding and Self-Sharpening Pencils, of which the following is a specification.

This invention relates to pencils of the type capable of receiving independent leads and the primary objects of the present invention are, first, to provide a novel barrel or body for receiving the leads, whereby a relatively large supply of leads can be kept within the pencil; second, to provide a novel tip or head for the barrel for receiving the lead which is being used, said tip or head embodying means for holding the mentioned lead against accidental displacement and for sharpening the lead as the same is forced outwardly of the tip; third, to provide a novel means for feeding the lead carried by the head or tip exteriorly of the head or tip; fourth, to provide a novel means whereby the lead will be automatically fed to the head when the lead in the head has been used; and fifth, to provide a novel detachable cap carried by the barrel or body, which may have secured thereto a means for engaging the pocket of the user, or means, for permitting the pencil to be suspended from a chain or the like.

With these and other objects in view, the invention consists in the novel construction, arrangement and formation of parts, as will be hereinafter more specifically described, claimed and illustrated in the accompanying drawings, forming a part of this specification, in which drawings:

Figure 1 is a longitudinal section through one form of the improved pencil.

Figure 2 is a longitudinal sectional view through the improved pencil taken at right angles to Figure 1.

Figure 3 is an enlarged longitudinal section through the outer end of the pencil showing the novel tip or head portion thereof.

Figure 4 is a detail transverse section through the barrel of the pencil taken on the line 4—4 of Figure 1, showing the means of arranging the leads around the operating portion.

Figure 5 is a detail section taken through the barrel of the pencil, on the line 5—5 of Figure 1, illustrating the arrangement of the leads in the main portion of the barrel.

Figure 6 is a detail transverse section taken on the line 6—6 of Figure 1, illustrating the formation of the partition disc for controlling the feeding of the leads from the main portion of the barrel to the outer portion of the barrel.

Figure 7 is a detail transverse section taken on the line 7—7 of Figure 2, showing a bottom plan view of the disc partition.

Figure 8 is a detail section taken on the line 8—8 of Figure 1, illustrating the arrangement of the leads in the forward end of the pencil.

Figure 9 is a detail section through the inner portion of the head of the pencil, taken on the line 9—9 of Figure 1.

Figure 10 is a similar section taken through a different plane on the line 10—10 of Figure 1.

Figure 11 is a detail section taken through the extreme outer end of the tip or head of the pencil, on the line 11—11 of Figure 1.

Figure 12 is an enlarged fragmentary longitudinal section through the pencil showing a modified form of head or tip therefor.

Figure 13 is a detail transverse section taken on the line 13—13 of Figure 12 showing an inner view of the head and the means for arranging the leads in the head.

Figure 14 is a similar section taken on the line 14—14 of Figure 12.

Referring to the drawings in detail, wherein similar reference characters designate corresponding parts throughout the several views, the letter A indicates the barrel of the pencil; B, the head or tip therefor; and C, the means for feeding the lead outwardly of the head or tip at the will of the user; and D, a modified form of head.

The barrel A includes a relatively long hollow cylindrical shell 15, which can be formed of any desired material, but preferably of metal. If the shell 15 is formed of metal, the same may be plated with precious metal, such as gold or silver, or the shell may be provided with a second skin or shell of solid gold or silver. The outer end of the shell 15 is provided with male threads 16 for the reception of the cap 17. The cap 17 may be constructed as shown in the drawing, and may be of the type illustrated in my copending application for self

feeding and interchangeable eraser attachment executed at an even date herewith, and as shown the cap may be provided with an eye 18, for the reception of a chain or the like, whereby the pencil can be hung around the neck of the user, or may be provided with a clip 19 for engaging the pocket of the user. In the drawings, the cap 17 is provided both with the clip 19 and with the eye 18. The inner wall of the cap 17 is provided with female threads for the reception of the threaded end 16 of the barrel or shell 15. The forward end of the shell 15 is provided with external male threads for the reception of the tip or head B, which will be hereinafter more fully described.

The shell 15 has disposed therein the disc partition 20. This disc can be secured in place in any preferred manner and is disposed inwardly of the forward end of the shell, and forms a main compartment 21 for the leads and a forward compartment 22 for the leads. The leads disposed in the compartment 22 are adapted to be automatically moved as will be hereinafter described, through the bore of the head or tip B when the lead therein has been used up. This disc partition 20 forms an important part of the invention and is so shaped, as will be now described, as to feed the leads from the main chamber 21 into the chamber 22, as the leads are used therefrom. The upper surface of this disc may be simply convexed, or as shown in the drawings, the inner face thereof is provided with a series of radially extending grooves, 23, which are gradually flared outwardly toward their outer ends so as to feed the leads within the main chamber 21 toward the openings 24 formed in the disc at the periphery thereof. The forward or outer face of the disc 20 may have the inner wall of the opening 24 enlarged at their lower or outer ends 25, in order to facilitate the moving of the leads toward the central portion of the head, the purpose of which will also be hereinafter more fully apparent.

The tip or head B is preferably formed of relatively hard metal, such as steel or the like and the outer surface thereof can be plated to conform to the metal from which the shell or barrel A is made. As shown, the tip or head B includes a solid conical body 30, the upper end of which is provided with a cylindrical sleeve extension 31 which is provided with female threads for the reception of the forward end of the barrel or shell 15. As heretobefore stated, the conical body 30 forming the head or tip B is provided with an axial way 32, for the reception of the lead, which is designated by the reference character 33, and which constitutes the writing point. This bore 32 is provided adjacent to its outer or free end with three inwardly extending projections or cutting points 34. These points 34 are primarily intended for digging into the pencil lead 33 and sharpening the same so that a plurality of writing points will be provided. Thus, no matter at what angle the pencil is turned, a sharpened point will always be presented. These cutting points also form a clutch, so as to hold the lead 33 in position, and thereby prevent the accidental sliding thereof in the bore 32. The bore 32 above the cutting points 34 is enlarged in diameter, as at 35, so that a new lead can easily slide into the same. The diameter of the enlarged portion of the bore 35 is greater than the diameter of the lead, so that the lead will not bind the same. The diameter of the bore 32 below the cutting points 34 is formed relatively small, or is constructed as to form a snug tight engagement with the lead and thereby prevent accidental movement thereof. It is to be noted that after the lead reaches the points 34, the same is pushed forcibly through the bore 32, by means of the operating mechanism C, which will be hereinafter more fully described. The inner end of the tip or head B is also provided with a forwardly extending substantially conical shaped depression 36, which acts to feed the lead toward the bore 32. As shown in Figures 1, 2, and 9 of the drawings, a nipple 37 is fitted within the conical shaped depression at the central portion thereof, and this nipple is provided with a bore 38, which is of substantially the same diameter as the portion 35 of the bore 32. This nipple also has its outer surface inclined so as to act as a guide for the lead, and the forward end thereof may be provided with an annular base 39, which is adapted to be engaged by a retaining sleeve 40, which has a snug fit with the wall of the depression 36. This holding sleeve 40 may be secured in place in any preferred manner, and it can be seen that this sleeve conforms to the configuration of the depression 36. The head 39 is provided with a plurality of sockets 41, which are adapted to be engaged by the sliding pin 42, the outer end of which is slidably mounted in a suitable recess 43, formed in the rotatable collar 44. This pin 42 slidably extends through a slot 45 formed in the body 30 forming the tip or head B. The inner end of the head is provided with a tooth for engaging in one of the depressions 41 formed in the head or base 39. An expansion spring 46 is coiled around the pin 42, and this spring has its opposite terminals bearing respectively against the head or base 39 and a collar 47, which is secured in any preferred manner to the pin. This collar 47 engages the inner surface of the rotatable collar 44. This rotatable collar 44 can be mounted in any preferred manner upon the head or tip B, and as shown the tip or head B is provided with a guide groove for the reception

of the same. A guide pin 48 is also carried by the ring or rotatable collar 44, and engages in a slot 49 formed in the head or tip B diametrically opposite the slot 45. The inner end of the nipple 37 is provided with a radially extending longitudinally disposed inlet slot 50, which serves as means for guiding a new lead into the bore 32 of the head, when the writing lead 33 in the same has all been used up. The sliding pin 42 is utilized for turning the nipple, so that the entrance slot 50 can be brought into alignment with any one of the leads arranged within the chamber 22. When it is desired to rotate the nipple, it is merely necessary to press inwardly upon the sliding pin 42 until the tooth end thereof is seated within any one of the sockets 41, at which time the collar 44 is rotated. When the collar 44 is rotated, the nipple 37 will be rotated therewith, and the distance through which the nipple can be rotated is governed by the width of the slot 45, and this distance is just sufficient to bring the slot 50 into alignment with a new lead, as clearly shown in Figures 1, 2, and 9 of the drawings. After a new lead falls into the slot 50, the plunger or pin 42 is released and the same is moved back by the expansion spring 46 into normal position and the ring or collar 44 can then be turned in a retrograde direction to move the same back to its normal position.

When the lead has been exhausted within the bore 32, it can be seen that it is merely necessary to give the pencil a slight shake, after the slot 50 has been brought into alignment with one of the leads in the compartment 22 and the lead will slide within the bore 32, owing to the fact that the upper end of the bore is formed relatively large as at 35, as heretobefore stated. After the lead falls into the bore, it is merely necessary to operate the means C for feeding the same externally of the head or tip B, which will now be described.

The shape of the head or tip B is such as to form substantially a continuation of the point of the pencil as is readily apparent by referring to Figures 1 to 3 and 12 of the drawings.

The operating means C includes a transversely extending stub shaft 60. This stub shaft 60 has secured thereto in any preferred manner at spaced points, the rack or gear wheels 61, which are adapted to engage rack bars 62, formed on the frame 63 which is mounted within the barrel A of the pencil. The barrel A of the pencil is provided with a longitudinally extending slot 64 through which protrudes one end of the stub shaft 60, and this end shaft is provided with a suitable finger piece 65, whereby the shaft may be readily turned or manipulated. The frame 63 includes side walls 66, which are connected by the end walls 67. The inner wall 67 forms one end wall for the compartment 21. The side walls 66 form side compartments 68 for additional reservoir of lead, and these compartments communicate with the compartment 21, so that when the lead is exhausted from the compartment 21, the lead from the compartments 68 will fall into the compartment 21. The ends of the walls 66 are bent outwardly as at 69 and anchored in the inner surface of the body of the shell or barrel A. The struck out portions 69 of the walls 66 are in substantial alignment with the slot 64, and certain of the same have the rack bars 62 formed thereon. The stub shaft 60 rotatably carries the eye 70, which is formed on the rear end of the operating rod 71, which will now be described. This operating rod 71 extends through an axial opening 72, in the inner end wall 67 and an axial opening 73 in the disc partition 20 and is adapted to engage the lead 33 to force the same through the bore 32, and it can be seen that the rod is adapted to ride through said bore. When it is desired to feed the lead out of the pencil, it is merely necessary to rotate the thumb piece, 65, which will turn the shaft 60 and consequently turn the pinions 61 which ride down the rack bars 62. This movement of course feeds the rod 71 outwardly.

In use of the improved pencil, the cap 17 is removed and lead is placed into the compartments 68, and this lead will fall into the compartment 21, and thence into the compartment 22 through the openings 24 in the disc partition 20. When the pencil is filled with the lead the cap is placed on the barrel in its normal position. One of the leads will ride into the guide slot 50 in the nipple 37 and into the bore 32, and upon movement of the rod 71, this lead will be forced outwardly and the outer end thereof will be sharpened, by means of the points 34. After this lead in the bore 32 has been about used up, the collar 44 can be rotated, so that a new lead will be brought into position in the bore 32. In order to accomplish this the rod 71 is returned to its rearmost position. When one of the leads has been used in the chamber 22, one of the leads from the chamber 21 will be guided into the chamber 22 by means of the formation of the grooves 23

While I have shown a nipple 37 and means for rotating the nipple so as to position a new lead in the bore 32, this is not absolutely necessary as good results can be obtained by eliminating the nipple, and in Figures 12, 13 and 14 I have shown a head or tip D in which the nipple is eliminated. This tip or head D includes the solid conical body 80, which is provided with a bore 81, the diameter of which is enlarged above the cutting points. These points have been constructed the same as the points 34 and have identically the same function. The

enlarged portion of the bore is designated by the numeral 83 and communicates with the inwardly extending depression 84, formed in the inner end of the tip or head D. This depression has inclined sides 85, which tend to feed the leads which are in the chamber 22 toward the axial bore 81, and owing to the enlarged part of the bore 83 the lead will have free access into the same as soon as the operating rod 71 is moved to its rearmost position. If the leads become stuck in the way 81, it is merely necessary to shake the pencil or give the same a slight movement so as to agitate the leads and thus permit one of the same to fall into the enlarged portion 83 of the bore 81.

In order to convey the shavings from the lead 33 as the same is cut by the points 34, so as to prevent the axial way from becoming jammed radially extending passageways 34′ are provided.

From the foregoing description, it can be seen that a novel pencil has been constructed, which is so constructed as to hold a large supply of lead, so that the necessity of refilling the pencil every few months is eliminated, and which embodies a novel means for feeding new leads to the tip, when the lead in the tip has been used up, and which has a novel means for sharpening the point of the lead as the same is fed exteriorly of the pencil and for holding the lead against accidental sliding and rotary movement.

Changes in details may be made without departing from the spirit or scope of this invention; but,

I claim:

1. A pencil comprising a barrel arranged to receive a plurality of independent leads, a tip having an axial bore, means for disposing the leads about the bore in the barrel, the bore being adapted to receive a single lead and having its diameter enlarged at the inner end thereof, the inner end of said tip being provided with a conical depression for receiving certain of the leads in said barrel, means controlled by the operator for feeding the lead in the tip exteriorly of the same, the other leads disposed in the barrel adapted to be moved into the place occupied by the leads grouped around the bore in the tip when one of the leads grouped around the bore is moved into said bore.

2. A pencil comprising a barrel, a tip carried by the barrel having a longitudinally extending axial bore therethrough, means for feeding the lead through the barrel and tip, the bore of the barrel having disposed therein adjacent to its outer end cutting points for sharpening said lead said points being formed integral with the barrel.

3. A pencil comprising a barrel, a tip carried by the barrel having a longitudinally extending bore therethrough arranged to receive a lead, a plurality of inwardly extending cutting points disposed in the bore for cutting said lead formed integral with the barrel, the cutting points being disposed in spaced relation, whereby a plurality of independent writing points on the outer end of said lead will be formed.

4. A pencil comprising a barrel, a tip detachably carried by the outer end of the barrel having a longitudinally extending bore therethrough arranged to receive a lead, a plurality of equi-distantly spaced cutting points formed on the inner surface of the bore and extending toward the axial center of the bore to cut said lead to provide a plurality of independent writing points on the outer end thereof, and ways extending radially through the tip adjacent to said cutting points for conveying the matter cut from said lead to the exterior of said tip.

5. A pencil comprising a barrel arranged to receive a plurality of independent leads, a tip carried by the forward end of the barrel having a longitudinally extending way therein arranged to receive a single lead, a plurality of cutting points formed in said way adjacent to the outer end thereof, the way having the bore thereof enlarged inwardly of said cutting points to permit free movement of a lead therein, the way forwardly of the cutting points being formed smaller than the diameter of the inner portion of the bore for snugly engaging the lead, and means disposed in said barrel for feeding the mentioned lead through the way in said tip.

6. A pencil, comprising a barrel for receiving a plurality of independent leads, a tip carried by the forward end of the pencil having a longitudinally extending axial bore therethrough for receiving one of the leads, a portion of the bore being enlarged in diameter to permit a free access of the lead thereto, the inner end of the tip being provided with a conical shaped depression for receiving a plurality of leads for grouping the leads about said bore, a rotatable axially disposed nipple carried by the tip having a laterally extending groove communicating with the bore thereof, and means disposed exteriorly of the pencil for rotating said nipple for moving the radially extending guide groove therein into alignment with one of the leads of the reserve supply of leads grouped in said barrel.

7. A pencil comprising a barrel, a tip carried by the outer end of the barrel having an axial way therethrough arranged to receive a single lead, the inner end of said way being enlarged in diameter, the inner end of the tip being provided with an inwardly extending conical depression, a disc shaped partition disposed in said barrel forming compartments for the reserve supply of lead, the periphery of the disc having

a plurality of guide ways therein for receiving the leads, the rear face of the disc being provided with a plurality of guide grooves extending to said ways for guiding the leads in one of said compartments toward said ways, and means carried by the barrel for feeding the lead in said way of the tip exteriorly of the tip at the will of the operator.

8. A pencil, comprising a barrel, a partition, disposed in the barrel forming a pair of compartments for holding a reserve supply of lead, a tip carried by the forward end of the pencil having an axial longitudinally extending way therein arranged to receive a single lead, the inned end of the tip being provided with a conical depression for feeding the lead toward the way, a rotatable conical nipple carried by the central portion of the inner end of the tip, said nipple having a laterally extending guide way formed therein communicating with the bore thereof, the partition having the periphery thereof provided with a plurality of openings for receiving the leads, the rear face of the partition having outwardly extending inclined guide ways for feeding the lead from one of the compartments toward the ways in said partition, means for feeding the lead in the way of the tip through the tip at the will of the operator, the rotatable nipple having a plurality of sockets therein arranged in annular formation, a rotatable collar carried by the exterior of said tip, a sliding pin carried by the collar arranged to fit in any one of said sockets in the nipple and means carried by the collar, for holding the pin away from said sockets.

9. A pencil comprising a barrel, a tip carried by the outer end of the barrel having a longitudinally extending axial way therein for the reception of a lead, a rack bar arranged in the barrel of the pencil, a stub shaft rotatably and slidably mounted within the barrel having one end extending outwardly of the barrel, a thumb piece disposed upon the outwardly extending end of the stub shaft, a pinion secured to the stub shaft arranged to engage the rack bar, an operating rod slidably mounted in the barrel and adapted to engage the lead in the bore of the tip and to extend through said bore to force the lead through the tip, and an eye formed on the inner end of the operating rod arranged to rotatably receive the stub shaft.

10. A pencil, comprising a hollow cylindrical barrel arranged to receive a reserve supply of independent leads, a tip detachably carried by one end of the barrel having a longitudinally extending axial way therein for the reception of one of the leads, a removable cap carried by the opposite end of the barrel, a disc shaped partition disposed within the barrel for dividing the barrel into independent compartments for the reception of the reserve supply of the leads, the partition having a plurality of openings in the periphery thereof for permitting the reserve supply of leads to pass therethrough, the partition being also provided with an axial guide opening in direct alignment with said bore, an operating rod slidably mounted in said axial guide opening, a casing disposed within said barrel including parallel side walls, and connecting end walls, the side walls having their ends anchored in said barrel and forming compartments in relation to the inner surface of the barrel for a reserve supply of the leads, the last mentioned compartments communicating with one of the compartments formed by the partition, certain of the inner ends of the side walls being provided with rack bars, a rotatable stub shaft, the barrel having a longitudinally extending slot arranged to receive one end of the stub shaft, a thumb piece carried by said end of the stub shaft, pinions secured to said stub shaft engaging said rack bars, and an eye formed on the inner end of said operating rod for rotatably receiving said stub shaft.

11. A pencil comprising a holder, a tip carried by the holder, means for feeding the lead to the tip, and means within the tip to sharpen said lead.

12. A pencil comprising a barrel, a tip detachably carried by the outer end of the barrel, means within said tip to receive a lead, means within said tip to sharpen said lead, means within the barrel to feed leads to the tip, the barrel having a longitudinally extending guide slot therein, and means including a rack and gear for feeding the lead to the bore of the tip, certain of the means being disposed in said guide slot.

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