

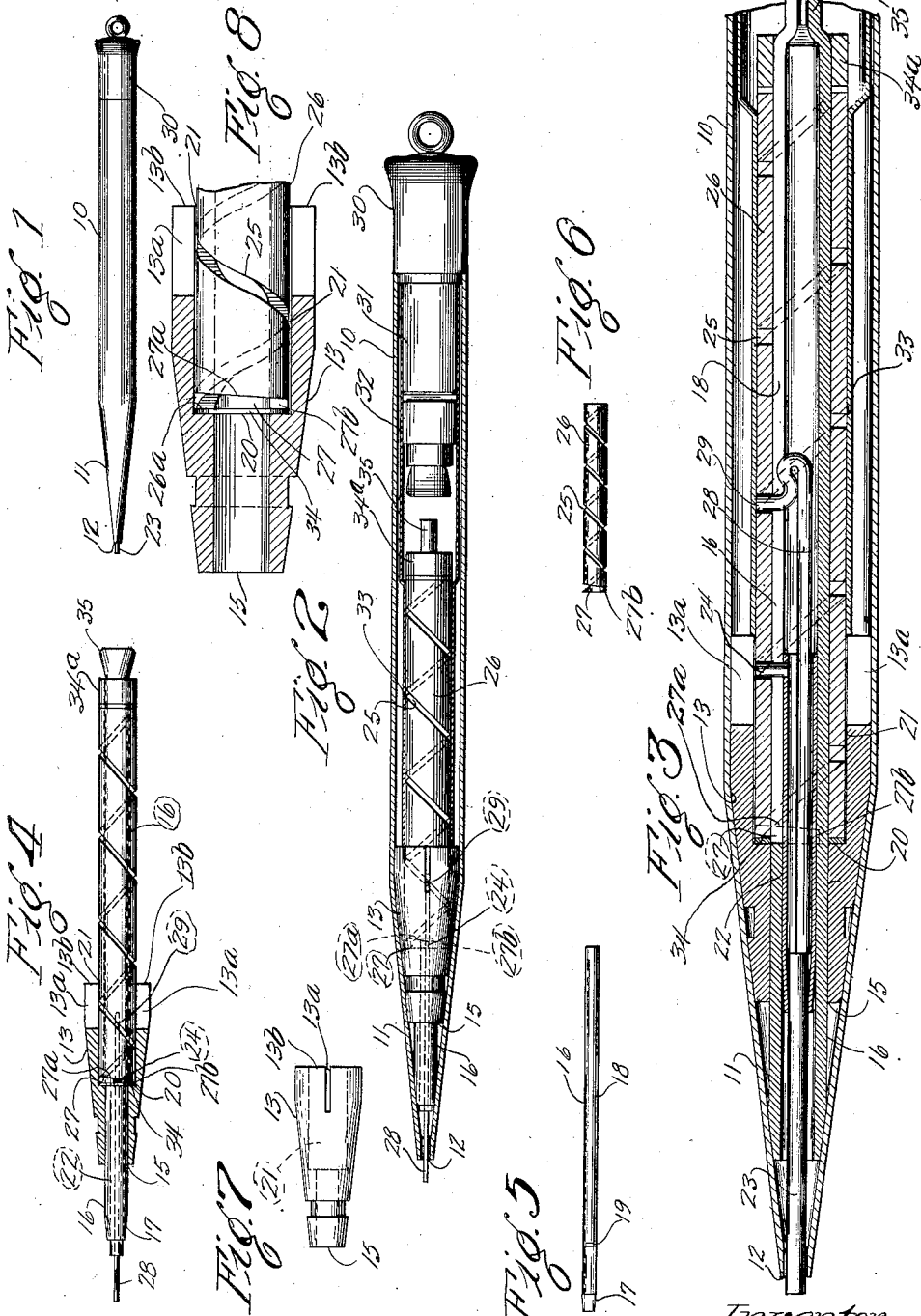
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PENCIL

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UNITED STATES PATENT OFFICE.

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PENCIL.

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Our invention relates to that type of pencil employing mechanism for propelling and repelling the ends of individual leads beyond the end of the pencil barrel and for completely expelling the pencil lead therefrom.

The primary object of our invention is to improve devices of this character generally, the improvements embodying the present invention being more particularly directed to the particular means of anchoring the lead propelling, repelling and expelling mechanism within the pencil casing and the construction of the slotted screw sleeve for moving the pencil lead within the casing.

One of the novel features of our invention is the means for arresting the pencil lead socket or clutch in its outward movement and then expelling the pencil lead from the clutch by a continuous rotation of the cap of the pencil barrel.

Other objects of the invention will appear from the following description, which is directed to the preferred embodiment of the invention, reference being had to the accompanying drawings forming a part of the specification.

In the said drawings, Fig. 1 is an elevational view of a pencil embodying our invention.

Fig. 2 is an enlarged longitudinal sectional view thereof.

Fig. 3 is an enlarged detail sectional view of the lower portion of the barrel of a pencil embodying the invention.

Fig. 4 is an enlarged detail sectional view of the anchoring block and the pencil lead moving mechanism assembled and removed from the pencil casing.

Fig. 5 is a detail view of the guide tube.

Fig. 6 is a detail view of the screw sleeve.

Fig. 7 is an enlarged detail view of the anchoring block.

Fig. 8 is an enlarged detail view of the anchoring block showing the screw sleeve journaled therein, a portion of the screw sleeve being broken away.

Referring now to the drawings, the pencil embodying the invention as illustrated therein comprises an outer casing or barrel 10, which terminates at one of its ends in the conically shaped or tapered portion 11. The conically shaped or tapered portion 11 is provided with an axial opening 12 therein of such contour and size in cross section as will permit the pencil lead or crayon that it

is proposed to use in the pencil to have free reciprocal movement therethrough. The barrel or outer casing forms a housing for the reception therein of the pencil lead propelling, repelling and expelling mechanism.

We shall now proceed to describe our improved pencil lead propelling, repelling and expelling mechanism, which may be made of any suitable material, preferably brass and aluminum, and which comprises an anchoring block 13, which in the interest of lightness of weight, we preferably make of aluminum. The upper portion of block 13 like the main body of the pencil casing is cylindrical and the lower portion thereof is tapered or conical in shape in order to conform to the surface of the periphery of the inner face of the tapered or conical portion 11 of the pencil barrel or casing 10 in order that the block may establish a friction grip with the barrel or outer casing 10 when forced into contact with the inner walls of the conical portion 11 thereof, thus tending to anchor the block against movement with relation to the outer casing or barrel 10, as clearly shown in Figs. 2 and 3. Block 13 has a plurality of kerfs 13^a in the upper wall thereof, preferably four in number, forming yieldable or resilient portions 13^b therebetween, which are forced outwardly or spread at their upper ends after the kerfs are cut, and which yieldably engage the inner wall of casing 10 securely anchoring the block 13 therein. Central bore 15 passing longitudinally through block 13 is of such diameter as to snugly receive in a tight push fit the guide tube 16 and rigidly hold the tube in frictional engagement with the block. Bore 15 is enlarged at its upper end as at 21 to form a bearing on its bottom 20 for screw sleeve 26. The outer wall of the tube 16 is bevelled or tapered at its lower end as at 17 to conform to and frictionally engage with the surface of the inner wall of the tapered portion 11 of the outer casing or barrel 10, and is provided with a longitudinal slot 18 which intersects a slot 19 lying at right angles thereto and extending around the tube 16 approximately 180 degrees with the lower wall of slot 19 flush with the bottom 20 of bore 21 of block 13 when the parts are assembled.

In order to prevent distortion of tube 16 we prefer to unite the tube with block 13 before cutting the slot 18 therein, as the slot

has a tendency to weaken the tube, which weakness is apt to result in distortion of the tube under the strain necessary in forcing the tube into engagement with block 13, with
 5 which it must have an exceedingly snug or tight fit in order to form an efficient union therewith. After uniting the block and the tube we use a cutter for forming the slot 18 in the tube, thus preserving the perfect alignment of the guide tube. The block and guide
 10 tube may of course be made of one piece of any suitable material, although in the interest of economy of manufacture we prefer to make them separately and assemble them, as described. The tubular lead socket or clutch
 15 22 which is carried within the guide tube 16 and adapted to have free reciprocal movement therein may be kerfed or otherwise made resilient at its lower end in order to
 20 grip the inner end of a pencil lead 23 when the lead is introduced thereinto, and is provided with a stud 24 adjacent its upper end, which stud is adapted to extend through longitudinal slot 18 of guide tube 16 and slidably engage the spiral slot 25 of screw sleeve
 25 26, as clearly shown in Fig. 3.

It will be noted by reference to Figs. 2, 3, 4 and 6 that the spiral slot 25 of screw sleeve 26 extends from a point a short distance below the upper end of screw sleeve 26 and terminates in a slot 27 running at right angles to the axis of the sleeve at the lower end thereof, leaving a shoulder or flange 27^b on the lower end of the screw sleeve 26; which
 30 shoulder or flange extends around the screw sleeve approximately 180 degrees and contacts with and is adapted to rotate on the bottom 20 of bore 21 of block 13, thereby forming a guide way at right angles to the axes of guide tube 16 and screw sleeve 26 for the reception therein of stud 24 of the clutch
 40 22, as clearly shown in Figs. 2 and 4.

It will be noted that the upper wall 27^a of slot 27 slopes upwardly from flange 27^b to the point of its juncture with spiral slot 25 making the slot 27 wider at this point. This construction is for the purpose of providing an unobstructed passageway to prevent binding or jamming of the stud 24 of tubular
 45 lead socket 22 at its point of entry into slot 25 when the point 26^a of screw sleeve 26 engages the stud to feed it upwardly of the screw sleeve to withdraw the pencil lead inwardly of the pencil casing.

It will be noted by reference to Figs. 3 and 5 that the course of slot 27 of screw sleeve 26 is in a diametrically opposite direction to the right angular slot 19 of guide tube 16 with which it registers, thereby permitting
 50 approximately one complete revolution of screw sleeve 26 after stud 24 of clutch 22 contacts with the bottom 20 of bore 21 of block 13 in its outward movement, thereby permitting the plunger 28 to be moved forwardly of the pencil barrel to completely expel

the lead therefrom by the engagement of stud 29 with slot 25 of screw sleeve 26 when the sleeve is rotated in the right hand direction. Rotatable cap 30 has tubular inwardly extending portion 31, the outer walls of
 70 which are in frictional engagement with rotatable sleeve 32 having at its end reduced portion 33 frictionally engaging screw sleeve 26 in such manner as to rotate the sleeve therewith.

After the guide tube 16 has been introduced into the block 13, as heretofore described, and the clutch 22 and plunger rod are properly inserted within the guide tube, washer 34 is slipped thereon and the screw
 80 sleeve 26 placed over the assembled pieces when the washer 34^a is placed on the end of screw sleeve 26 and around guide tube 16 and the protruding end of guide tube 16 is flared outwardly, as clearly shown at 35, Fig. 4, thus securely holding the assembled parts in proper operative relation. We then insert the parts thus assembled in the barrel 10 forcing them inwardly until block 13 is forced into frictional engagement with the inner wall of the tapered or conical portion 11 of the barrel 10. Inasmuch as the outer diameter of block 13 at its outer kerfed portion, is greater than the inner diameter of casing 10, it will be readily understood
 95 that when block 13 is forced into the inner casing the yieldable or spring-like portions 13^b intermediate the kerfs 13^a will be forced inwardly and will exert an outward pressure against the inner walls of the casing, thereby positively and definitely securing the assembled parts against movement with relation to the casing. This construction of an anchoring block for anchoring the lead propelling, repelling and expelling mechanism
 100 within the casing of a lead pencil affords means by which the parts can be efficiently and securely assembled with the minimum expenditure of time, labor and cost, and solves a difficult problem in the manufacture of such pencils. Heretofore in pencils of this general type it has been customary to anchor the working parts for propelling, repelling and expelling the lead by soldering some part of the inner working parts of the pencil analogous to the block 13 to the pencil casing or shell corresponding to the part 10. Since this soldering operation must take place near the tip of the pencil, which is preferably closed, considerable difficulty and loss in manufacture has resulted, because of the inaccessibility of these parts and there has also been some difficulty in removing soldered parts at inaccessible portions of the casing for making repairs or replacing parts. The present invention provides a construction and method for anchoring the working parts in the pencil casing that is simple and economical and is not liable to permit the parts to get in wrong positions
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of adjustment during use and provides a form of locking the mechanism together that is not liable to be disturbed on account of jars or jolts to the pencil casing while in service.

In order that the invention might be understood we have shown the details of the embodiment of the invention that has been found most successful and that is preferred by us, but it is not desired to be limited to the details of the invention except as defined in the claims, since it will be apparent that persons skilled in the art may resort to various modifications without departing from the purpose and spirit of the invention.

We claim:

1. A lead pencil of the character described comprising an outer casing, a cap carried by one end of the casing and rotatably related thereto, an anchoring block having an axial bore extending therethrough carried within and secured to the casing, the upper portion of said bore being enlarged, a guide tube extending through the bore, a pencil lead engaging socket adapted to have reciprocal movement within the tube, a stud carried by the socket, a plunger rod adapted to have reciprocal movement within the socket, and a sleeve rotatably seated in the enlarged portion of the bore, the sleeve having a spiral slot through the walls thereof from a point below the upper end of the sleeve and terminating in a slot at right angles to the axis thereof, thereby forming a guideway for the movement therein of the stud carried by the pencil lead engaging socket, which stud engages the spiral slot.

2. A lead pencil of the character described comprising an outer casing, a cap carried by one end of the casing and rotatably related thereto, an anchoring block having an axial bore extending therethrough carried within and secured to the casing, the bore being enlarged at its upper portion, a guide tube extending through the bore, a pencil lead engaging socket adapted to have reciprocal movement within the guide tube, a plunger rod adapted to have reciprocal movement within the socket, and a sleeve rotatably seated in the enlarged portion of the bore, the sleeve having a spiral slot

through the walls thereof from a point below the upper end of the sleeve and terminating in a slot at right angles to the axis thereof, thereby forming a guideway between the upper wall of the right angle slot and the bottom of the enlarged portion of the bore.

3. A lead pencil of the character described, comprising an outer casing, an anchoring block having an axial bore extending therethrough and secured within the casing, the upper portion of the bore being enlarged, a guide tube extending through the bore, a pencil lead engaging socket adapted to have reciprocal movement within the tube, a stud carried by the socket, a plunger rod adapted to have reciprocal movement within the socket, a sleeve rotatably seated in the enlarged portion of the bore, the sleeve having a spiral slot through the walls thereof from a point below the upper end of the sleeve and terminating in a slot at right angles to the axis thereof and extending partway around the sleeve, the last named slot being wider at its point of juncture with the spiral slot than at its closed end, thereby forming a guideway for the movement therein of the stud carried by the pencil lead engaging socket, which stud engages the spiral slot, and means carried by the casing for rotating the sleeve.

4. A lead pencil of the character described comprising an outer casing having a conically shaped end, an anchoring block conically shaped at one of its ends and having an axial bore therethrough, the bore being enlarged from the upper end of the block to a point intermediate its ends where an internal shoulder is produced forming a flat bottom, the walls of the enlarged portion of the bore being kerfed from their outer ends inwardly, a spirally slotted sleeve for imparting movement to a pencil lead, journalled within the enlarged portion of the bore and seated on the bottom thereof, and means carried by the casing for imparting rotary movement to the sleeve.

In testimony whereof we have signed our names to this specification on this 21st day of March, A. D. 1922.

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