June 9, 1925. 1,540,920

H. BERRYMAN

SELF FILLING PENCIL

Filed June 7, 1924

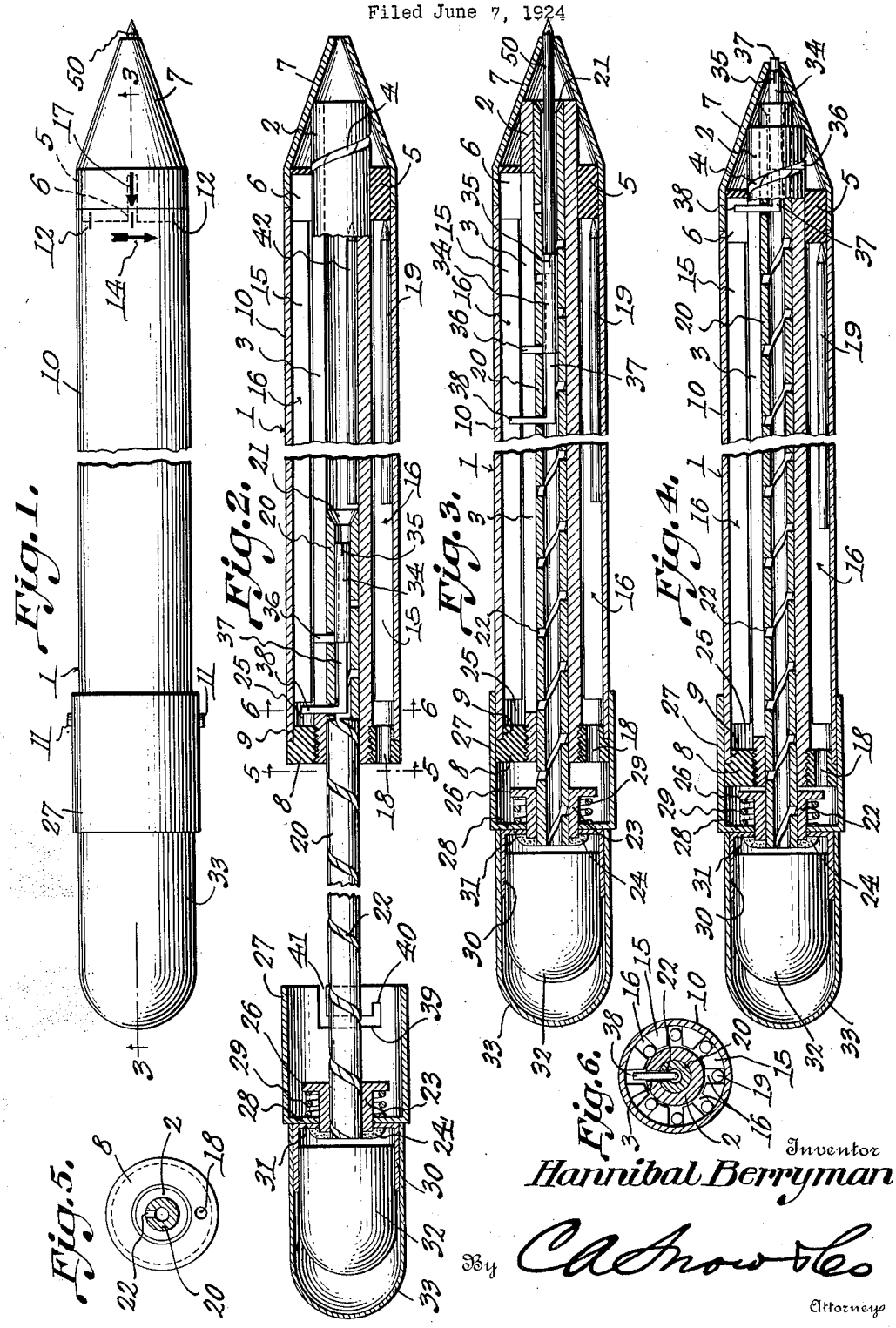


Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

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Patented June 9, 1925. 1,540,920

UNITED STATES PATENT OFFICE.

HANNIBAL BERRYMAN, OF CENTERVILLE, MONTANA.

SELF-FILLING PENCIL.

Application filed June 7, 1924. Serial No. 718,603.

To all whom it may concern:

Be it known that I, HANNIBAL BERRYMAN, a citizen of the United States, residing at Centerville, in the county of Silver Bow and State of Montana, have invented a new and useful Self-Filling Pencil, of which the following is a specification.

This invention aims to provide novel means for charging a lead pencil with leads, and to provide novel means for feeding a lead forwardly in the pencil, as the lead is worn away.

It is within the province of the disclosure to improve generally and to enhance the utility of devices of that sort to which the invention appertains.

Although a preferred form has been shown, it will be understood that a mechanic, working within the scope of what is claimed, may make such changes as his skill may suggest, without departing from the spirit of the invention.

In the drawings:—Figure 1 shows in elevation, a pencil constructed in accordance with the invention, parts being broken away in this and in the remaining views; Figure 2 is a longitudinal section, the plunger having been retracted; Figure 3 is a section showing the parts in writing position; Figure 4 is a longitudinal section showing the parts in lead-ejecting position; Figure 5 is a cross section on the line 5—5 of Figure 2; Figure 6 is a cross section on the line 6—6 of Figure 2.

The pencil comprises a body 1 which is a composite structure, the body including an intermediate tube 2 provided with a longitudinal opening or slot 3 communicating with a spiral slot 4 formed in the body 1 at the forward end thereof. A ferrule 5 receives the forward end of the tube 2 and is secured thereto, the ferrule having a longitudinal slot 6. A point 7 is secured to the ferrule 5, the ferrule projecting beyond the rear end of the point 7. The point 7 is provided with an external index 17. A nut 8 is threaded on the rear end of the tube 2 and is provided with a longitudinal opening 18, the nut 8 having a reduced neck 9.

A tubular shell 10 is journaled on the neck 9 of the nut 8 and on the rear end of the ferrule 5, the shell being provided near its rear end with lateral projections 11. At its forward end, the shell 10 has marks 12 adapted to cooperate with the index 17 on the point 7, the shell having an external mark, such as an arrow 14, indicating that the shell may be rotated. The shell 10 has internal longitudinal ribs 15 forming internal longitudinal lead compartments 16, the lead in one of the compartments being marked by the numeral 19.

Within the tube 2 of the body 1 is located a hollow plunger 20 having a flared mouth 21. The plunger 20 is provided with a spiral slot 22, terminated short of the forward end of the plunger. The pitch of the slot 22 is quicker than the pitch of the slot 4 in the tube 2 of the body 1. A collar 23 surrounds the rear end of the plunger 20 and is connected thereto by solder 24, or otherwise. At its inner end, the collar 23 has a flange 26. A cap 27 receives the rear end of the shell 10 and the nut 8, the cap having an end wall 28 journalled on the collar 23. A compression spring 29 surrounds the collar 23, one end of the spring abutting against the flange 26 of the collar, and the other end of the spring abutting against the end wall 28 of the cap 27. The cap 27 has bayonet slots 39, the mouths of which are denoted by the numeral 41, the inner ends of the bayonet slots extending longitudinally of the cap, as shown at 40. The projections 11 on the shell 10 are adapted to cooperate with the bayonet slots 39. The numeral 30 designates a socket fixed to the collar 23 by the solder or other connection 24, the socket having an end wall 31 surrounding the collar 23 and engaged immediately by the solder or other connection 24. An eraser 32 is seated in the socket 31. A cover 33 for the eraser 32 is provided and is seated on the socket 30 with a strong frictional hold, so that, as hereinafter explained, the plunger 20 may be rotated by torsion applied to the cover 33.

A tubular lead holder 34 is mounted for reciprocation in the tubular plunger 20, the holder 34 being split as at 35, to hold the lead. The holder 34 has a lateral finger 36 extended through the spiral slot 22 of the plunger 20 and into the longitudinal slot 3 of the tube 2, the finger being adapted to move into the spiral slot 4 of the member 2. A combined abutment and ejector 37 is located in the plunger 30 and extends into the holder 34. The abutment and ejector 37 has a transverse finger 38 extended through the spiral slot 22 of the plunger 20, through the longitudinal slot 3 of the tube 2 and into

one of the longitudinal compartments 16 of the shell 10, to hold the shell against rotation, the shell being provided at its rear end with a circumferential recess 25 adapted to receive the finger 38, as shown in Figure 2, thereby setting the shell 10 free for rotation. The fingers 38 and 36 of the abutment 37 and the holder 34, respectively, are spaced apart by one turn of the spiral slot 22 in the plunger 20, and throughout the major portion of the movement of the parts 37 and 34, these parts travel in fixed relation to each other, although, as hereinafter explained, the members 37 and 34 have differential longitudinal movement when they arrive in the point 7.

The first operation to be considered is the feeding of the lead during the ordinary use of the pencil for writing, and when the pencil is in shape to be used for writing, the pencil will appear as shown in Figure 3. Then the plunger 20 is advanced, the nut 8 and the rear end of the shell 10 are received in the cap 27, the projections 11 of the shell 10 are held in the parts 40 of the bayonet slots 39 of the cap 27 by the spring 29, the rear end of the lead 50 is in the forward end of the lead holder 34 and in abutment with the member 37, and the forward end of the lead 50 protrudes from the point 7. Through the instrumentality of the cover 33, the socket 30 and the connection 24, the plunger 20 may be rotated, and when the plunger is rotated, the lead 50 will be fed forwardly, for use, through the medium of the holder 34 and the abutment 37, these parts moving forwardly because the finger 36 of the holder 34 is engaged with the spiral groove 22 of the plunger 20 and is received slidably in the longitudinal opening 3 of the intermediate tube 2, the finger 38 of the abutment 37 being engaged with the spiral groove 22 of the plunger 20, and being received slidably in the longitudinal opening 3 of the intermediate tube 2. The finger 38 is also received slidably in one of the internal longitudinal compartments 16 of the shell 10, to hold the shell against rotation for two purposes, one of which is to enable the operator to hold the pencil by means of the shell whilst the operator is rotating the plunger 20. The other reason for holding the shell against rotation has to do with the delivery of the lead, and will be taken up hereinafter. The foregoing description covers the operation of advancing the lead as it is used away.

The next operation to be considered is a final feeding of the lead, ending in an ejection of the stub. Noting Figure 4, it will be observed that, when the plunger 20 is rotated, the finger 38 of the ejector 37 at length moves into the longitudinal slot 6 of the ferrule 5 in the point 7. By this time, the finger 36 of the lead holder 34 will have arrived at the spiral slot 4 of the intermediate tube 2, and will traverse the slot 4 because the finger 36 is still engaged with the spiral slot 22 of the tube 20, which is being rotated, the finger 36 ultimately arriving at the end of the spiral slot 22 in the plunger 20. The pitch of the slot 22 in the plunger 20 is quicker than the pitch of the spiral slot 4 in the tube 2, and the result is that a differential movement between the ejector 37 and the holder 34 is produced, the ejector 37 advancing with respect to the holder 34, as shown in Figure 4. If, now, reverse rotation is imparted to the plunger 20, the finger 36 of the holder 34 will be carried back through the spiral groove 4 of the tube 2, into the longitudinal opening 3 of the tube 2, because the finger 36 is engaged with the spiral slot 22 of the plunger 20, the ejector 37 being carried backwardly because the finger 38 of the ejector is engaged with the spiral slot 22 of the plunger 20, the fingers 36 and 38 ultimately assuming their normally spaced relation, as shown, for instance, in Figure 3.

Assuming that the parts are in the position of Figure 3, but with no lead 50 in the point 7, the cap 27 is slid to the right, to disengage the projections 11 on the shell 10 from the parts 40 of the bayonet slots 39 in the cap, and the cap then is rotated, until the projections are aligned with the mouths 41 of the bayonet slots. Suppose, further, that the plunger 20 has been retracted until the finger 38 on the ejector 37 is in the recess 25 of the shell 10, as shown in Figure 2. Since the finger 38 no longer is in one of the longitudinal compartments 16 of the shell, the shell can be rotated in the direction of the arrow 14 until one of the marks 12 on the shell lines up with the index 17. Under such circumstances, one of the compartments 16 of the shell is in line with the longitudinal opening 3 in the tube 2, and the lead drops from that compartment, through the opening 3, into the tube 2, as shown at 42 in Figure 2, The plunger 20 then may be advanced, the flared mouth 21 of the plunger picking up the lead and carrying it back into the plunger, in engagement with the holder 34, the frictional drag of the point 7 on the lead serving to seat the lead in the holder 34. The cap 27 is assembled again with the shell 10, and the parts appear as shown in Figure 3.

In order to fill the pencil, the shell 10 may be rotated when the parts are arranged as in Figure 2, the compartments 16 being brought, one after another, into registration with the opening 18 in the nut 8, and leads being inserted into the compartments, through the opening 18.

What is claimed is:—

1. A lead pencil comprising a body having a longitudinal opening, a plunger movable

longitudinally in the body and having a spiral slot, a shell journaled on the body and having a plurality of internal longitudinal lead compartments adapted to be brought one at a time into registration with the opening to permit a lead to be discharged through the opening and into the body when the plunger is retracted, and a lead feeding means movable in the plunger and having a finger engaged in the slot, the opening, and in one compartment, the body having a recess for the reception of the finger when the lead feeding means and the plunger are retracted, thereby to permit a rotation of the shell.

2. A device of the class described, constructed as set forth in claim 1, and further characterized by the fact that the body has an end opening through which leads may be introduced into the compartments of the shell, and a cap covering the opening and journaled on the plunger, the cap and the shell having detachably interengaged elements.

3. A lead pencil comprising a body having a longitudinal opening and provided with a spiral slot communicating with the opening, a plunger movable longitudinally in the body and having a spiral slot, a shell journaled on the body and having a plurality of internal longitudinal lead compartments adapted to be brought one at a time into registration with the opening to permit a lead to be discharged through the opening and into the body when the plunger is retracted, a lead holder slidable in the plunger and provided with a finger received in the opening of the body and adapted to traverse the spiral slot of the body, and a lead ejector and abutment slidable in the holder and having a finger extended through the spiral slot of the plunger, through the longitudinal opening of the body and into one of the lead compartments of the shell, the body having a recess for the reception of the finger of the ejector when the ejector and the plunger are retracted, the pitch of the spiral slot of the plunger being greater than the pitch of the spiral slot of the body.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

HANNIBAL BERRYMAN.

Witnesses:

PERCY VOGWILL,

JOSEPH WILLIAMS.