

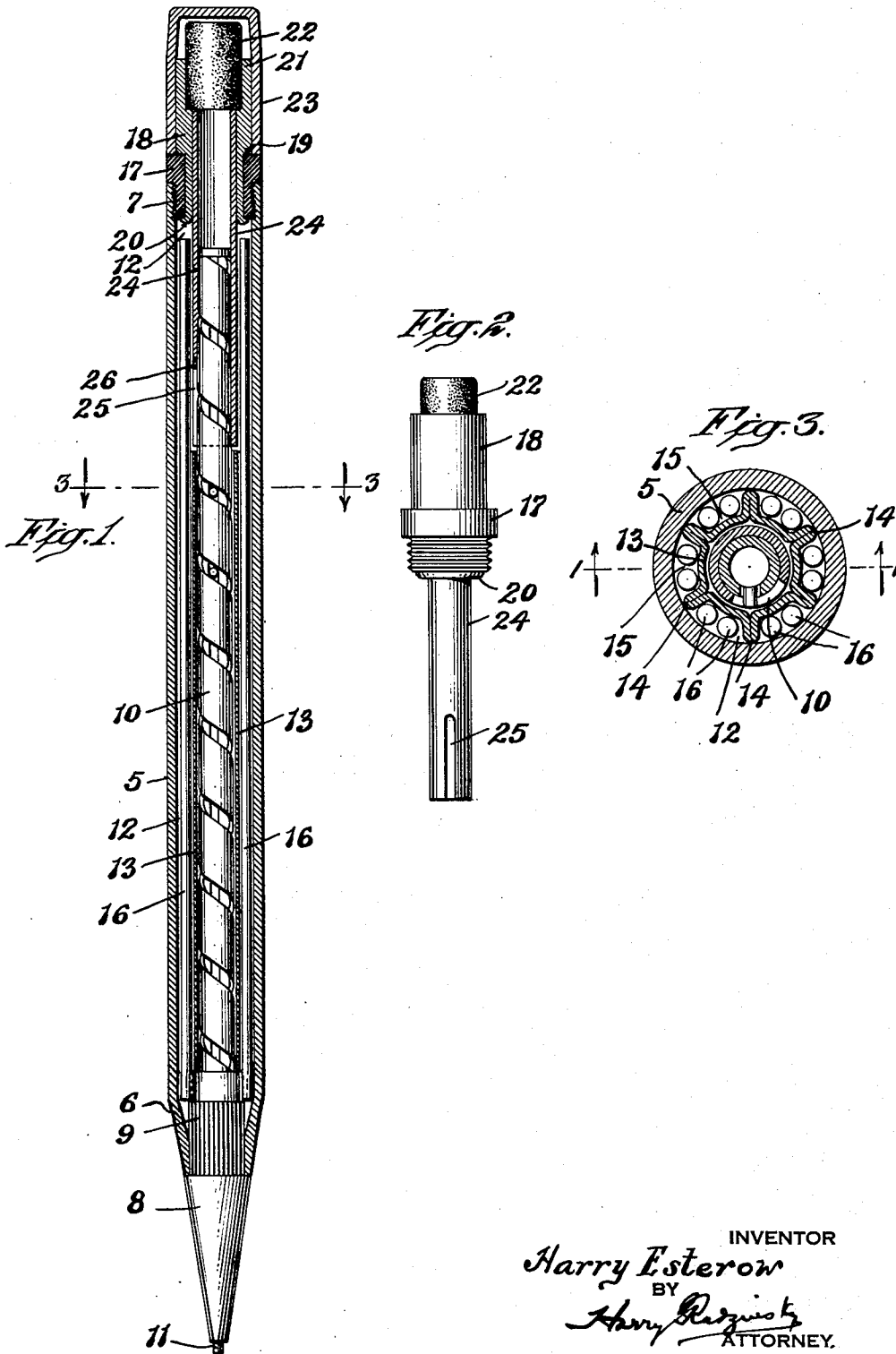
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PENCIL

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This invention relates to pencils of the so-called "mechanical" type wherein a lengthy section of writing substance or "lead" is propelled or repelled by the rotative movement of a spiral member forming part of the lead propelling and repelling mechanism.

The primary object of the invention is to provide a pencil of this character in which lengthy sections of lead are used; in which a storage compartment or chamber for containing a substantial number of these leads is provided, and in which the propelling and repelling movement of the lead is performed by the rotative movement of an actuating member provided at the rear end of the barrel of the pencil.

As is well known, pencils of the general character of that forming the subject matter of this invention are divided into two classes, namely, those in which the lead-moving mechanism is actuated by rotative movement of the pencil tip portion, and those in which the lead is moved by rotative movement of an extremity provided on the rear end of the barrel of the pencil. Those in the latter class are usually so constructed that insufficient storage space for spare leads results, while those in the former class are not the most convenient to operate due to the inability of the fingers to easily and firmly grasp and rotate the smooth conical tip portion of the pencil. Of the two kinds of pencils just described, that in which the lead-propelling mechanism is actuated at the rear end of the pencil body is preferred, primarily for ease in operation, and this despite the fact that such type of pencil has heretofore failed to provide the convenience of satisfactory lead-storage space.

This invention provides a "rear-actuated" pencil of the preferred character, at the same time providing a construction in which a lead-storage chamber of large containing capacity is produced, so that the recognized advantages of the several types of pencils now in use are combined in a single, simple and efficient device.

In the accompanying drawing, wherein an embodiment of the invention is shown, Fig. 1 is a longitudinal sectional view of the improved pencil on the line 1—1 of Fig. 3, looking in the direction of the arrows; Fig. 2 is a side elevation of the actuating member and attached closure plug; and Fig. 3 is a sectional view on the line 3—3 of Fig. 1, looking in the direction of the arrows.

In the drawing, 5 indicates the body portion or barrel of the pencil which is in the form

of an elongated tubular member slightly tapered at 6, and internally threaded at its opposite end, as indicated at 7. The barrel may be made of any suitable material, such as metal, hard rubber, "Celluloid", "Bakelite", or the like. At 8 is shown the conical tip portion of the lead propelling mechanism, and which is provided with a knurled or ribbed part 9 forced into the end portion 6 of the barrel and frictionally held therein. This arrangement is such that the tip portion 8 is non-rotatively held within the barrel 5.

Extending through the barrel 5 is the lead-propelling mechanism which is of conventional structure, consisting in part, of an outer spiral member 10 which, when rotated in one direction, propels the lead 11 out of the end of the tip 8, and when rotated in the opposite direction, retracts the lead. The structure of this lead-propelling mechanism is well known in the art, and consequently no novelty is claimed therefor.

The outer spiral member 10 of the lead-propelling mechanism extends longitudinally through the barrel 5 for the greater part of the length of the barrel, so that a lengthy lead 11, approximately as long as the barrel 5, is accommodated in the lead-propelling mechanism. The diameter of the spiral member 10 is considerably less than the internal diameter of the barrel 5 so that an annular lead-storage chamber 12 is thus provided between the spiral member 10 and the inner surface of the barrel 5. To maintain leads in orderly relationship in said storage chamber, a separating device 13 is located therein. The separating device consists of an elongated tube fitting loosely about the spiral member 10 and permitting the spiral member to rotate within it, and provided with spaced longitudinally extending ribs 14 (Fig. 3) which provide recesses 15 between them, in which one or more leads 16 are stored.

If desired, the lead separator 13 may be eliminated and the leads may be merely dropped into the storage space 12. The separator is found useful since it keeps the leads disposed vertically in proper spaced relationship and avoids the possibility of the same, if accidentally broken, becoming clogged in the spiral member 10.

The rear, internally threaded, end of the barrel 5 is closed by means of a threaded plug 17 which engages the internal threads 7 on the barrel. Plug 17 is mounted free upon a tubular member or bushing 18 which confines the plug between its annular shoulder 19 and its upset

end 20. With this arrangement, the plug 17 is mounted so that it can be manually rotated on the bushing 18, and reversely, the bushing 18 can be rotated within the plug 17 when the plug is threaded into the end of the barrel, as shown in Fig. 1. The arrangement also prevents movement of bushing 18 longitudinally of the barrel while permitting rotative movement of said bushing.

The bushing 18 has a projecting portion 21 which extends beyond the end of the barrel and has a recess in which an eraser 22 is held. A removable closure cap 23 fits on the part 21 of bushing 18 with a frictional fit to cause the bushing 18 to be rotated when the cap 23 is manually rotated.

At 24 is shown a sleeve tightly fitted within the bushing 18 or otherwise secured thereto and which extends inwardly therefrom into the barrel 5. The fit of the sleeve 24 in bushing 18 or the attachment thereto, is such that said bushing and sleeve constitute an integral unit, and the sleeve 24 will rotate with the bushing 18. The projecting end of the sleeve 24 is slotted at 25 and the slot fits over a pin 26 projecting laterally from the spiral member 10. This pin and slot engagement constitutes a coupling between the sleeve 24 and spiral member 10, so that by rotation of bushing 18 and attached sleeve 24, the spiral 10 will be rotated to propel or repel the lead 11. If desired, the pin and slot connection may be dispensed with, and a frictional connection only had between the spiral member 10 and sleeve 24.

It will be seen in Fig. 1 that the sleeve 24 surrounds only the upper end portion of the spiral member 10. This sleeve may, if desired, be made of a length sufficient to extend downwardly for a considerable distance to embrace and enclose all or the greater part of the spiral. In such case, the internal diameter of the lead separator 13 is made larger to permit the sleeve 24 to project down within it.

From the foregoing, the operation of the pencil will be readily understood. The lead 11 located in the propelling mechanism is propelled or repelled by manual rotation of the closure cap 23 at the rear end of the barrel, said cap being frictionally held on bushing 18, rotates the same and the attached sleeve 24. Sleeve 24, being coupled to the spiral member 10, either by the pin and slot connection consisting of the elements 25 and 26, or by frictional fit between the sleeve 24 and spiral 10, causes the spiral to be rotated, and the lead moved in the desired direction. The spiral 10 freely rotates within the lead separator 13, which remains stationary, and holds a large number of leads, each of which may be of a length equal to the length of the barrel. The lead-holding capacity of the pencil is thus very large. To replenish a consumed lead, the plug 17 is unthreaded from the end of the barrel, and when the plug is drawn away from the barrel, it carries with it the bushing 18, sleeve 24, eraser 22 and cap 23. After one of the leads 16 is removed from the storage chamber and placed in the propelling mechanism, the plug 17 is threaded into the end of the barrel 5, this action causing an engagement of the pin 26 and the slot 25 so that the lead may be propelled and expelled by rotative movement of the closure cap 23.

The combined actuating member and closure plug, consisting of the elements 17, 18 and 24 connected together and removable as a unit,

permit the ready removal of the stored leads, and does not encroach upon the lead-storage space. Therefore ample space is provided to permit the use of lengthy leads both in the propelling mechanism and in the storage chamber. Additionally, the location of the actuating member at the rear end of the barrel provides the desired "rear-end feed" heretofore not obtained in pencils providing relatively large lead-storing space.

What I claim is:

1. A pencil of the character described comprising, a barrel, a lead-moving mechanism located in said barrel and rotative therein, said lead-moving mechanism being spaced from the inner surface of the barrel whereby an annular lead-storing chamber is provided between the lead-moving mechanism and the barrel, an actuating member engaging the lead-moving mechanism and extending out of the rear end of the barrel for manual engagement and rotation, a closure member surrounding the actuating member and mounted freely thereon and preventing movement thereof longitudinally of the barrel, said closure member having means for removably engaging the rear end of the barrel.

2. A pencil of the character described comprising, a barrel, a lead-moving mechanism located in said barrel and rotative therein, an actuating member fitted over the lead-moving mechanism and engaging the same to rotate it, a closure member having means for removably engaging the rear end of the barrel, said closure member being freely rotatable on the actuating member but preventing movement of the actuating member longitudinally of the barrel, the actuating member having a part extending beyond the closure member for manual engagement and rotation to rotate the lead-moving mechanism.

3. A pencil of the character described comprising, a barrel, a lead-moving mechanism located within said barrel and rotative therein, said lead-moving mechanism being spaced from the inner surface of the barrel whereby an annular lead-storing chamber is provided between the lead-moving mechanism and the barrel, a grooved lead-holder non-rotatively located in said chamber and extending for substantially the greater portion of the length of the barrel, an actuating member fitted over the lead-moving mechanism and extending out of the rear end of the barrel for manual engagement, and means for preventing movement of the actuating member longitudinally of the barrel while permitting rotative movement thereof, said means comprising a closure member threaded into the rear end of the barrel and surrounding the actuating member.

4. A pencil of the character described comprising, a tubular barrel, lead-moving mechanism located in said barrel and rotative therein, said mechanism including a spiral member centrally positioned within the barrel and extending therethrough for the greater portion of the length of the barrel, said spiral member being spaced from the inner surface of the barrel whereby an annular lead-storing chamber is provided between said spiral member and the barrel, an elongated grooved tubular lead-separator surrounding the spiral member and situated in the lead-storing chamber, a closure member for the rear end of the barrel comprising a plug portion threaded into the end of the barrel and a rotatable part secured to and rotat-

able within the plug portion, said rotatable part having a portion extending into the barrel within the lead separator and engaging the spiral member, said rotatable part also having a portion projecting beyond the end of the barrel for manual engagement and rotation.

5 5. A pencil of the character described comprising, a tubular barrel, lead-propelling means therein, a closure member comprising a plug threaded
10 into the rear end thereof, a rotatable member passing through and held by the plug and freely rotatable in said plug, a tubular portion on said rotatable member extending into the barrel for detachable engagement with a part of the lead-
15 propelling means whereby the plug and rotatable member may be detached and removed as a unit from the end of the barrel, leaving the lead-propelling means completely therein, a projection on the lead-propelling means for detachable engagement with said tubular portion, and a projecting end part on said rotatable member located externally of the barrel for manual engagement and rotation.

20 6. A pencil of the character described comprising, a tubular barrel, lead-moving mechanism located in said barrel and rotative therein, said mechanism including a spiral member extending through the barrel for the greater portion of the length of the barrel, said spiral member being spaced from the inner surface of the barrel
30 whereby an annular lead-storing chamber is provided between said spiral member and the barrel, an elongated grooved tubular lead-separator substantially as long as the spiral member surrounding the spiral member and situated in the lead-storing chamber, a closure member for the rear end of the barrel comprising a plug portion threaded into the end of the barrel and a rotatable part secured in and rotatable within
40 the plug portion, said rotatable part having a tubular portion extending into the barrel within the lead separator and fitting over the end portion of the spiral member, said rotatable part also having an eraser-holding part projecting beyond the end of the barrel for manual rotation.

45 7. In a pencil of the character described, a barrel, an actuating member fitted on the rear end of said barrel, said member comprising a threaded plug received into the end of the barrel and having a rotatable part mounted within it,
50 a portion of said part projecting within the barrel for detachable engagement with lead-

propelling mechanism located therein permitting removal of the actuating member and plug as a unit without removing any part of the lead-propelling mechanism, and another portion of said rotatable part projecting beyond the end of the barrel for manual rotative manipulation.

8. In a pencil of the character described, a barrel, a closure member for the rear end of the same comprising a threaded plug, a bushing rotatably mounted within said plug and held
10 against axial movement therein, said bushing projecting beyond the end of the barrel and provided with an eraser holding recess, and a sleeve portion on said bushing projecting into the barrel and provided with means for effecting a
15 detachable engagement with the lead-propelling means located therein.

9. In a pencil of the character described, a barrel, a closure member for the rear end of the same comprising a plug removably fitted on the
20 end of the barrel, a bushing rotatably mounted within said plug and held against axial movement therein, said bushing being provided with a part projecting beyond the end of the barrel for manual engagement to rotate the bushing, said
25 bushing also having a slotted part extending within the barrel, and lead-propelling means located within the barrel and having means fitting the slotted part to cause said lead-propelling means to be rotated upon manual rotary
30 movement of the bushing.

10. In a pencil of the character described, a barrel, lead-propelling means located within the barrel, a closure member threaded into the rear end of the barrel, an actuating member rotatably
35 mounted within the closure member, and means on one end of the actuating member and located within the barrel for coupling with the lead-propelling means to rotate the same upon manual rotation of the actuating member.

40 11. In a pencil of the character described, a barrel, a grooved lead-separator of tubular formation non-rotatively held within the barrel, a lead-propelling mechanism extending through the lead-separator and rotatable within the
45 same, a closure plug removably fitted into the rear end of the barrel, and an actuating member rotatably mounted in the closure plug and having a part extending into the barrel and removably fitted on the lead-propelling mechanism within the lead-separator.

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