

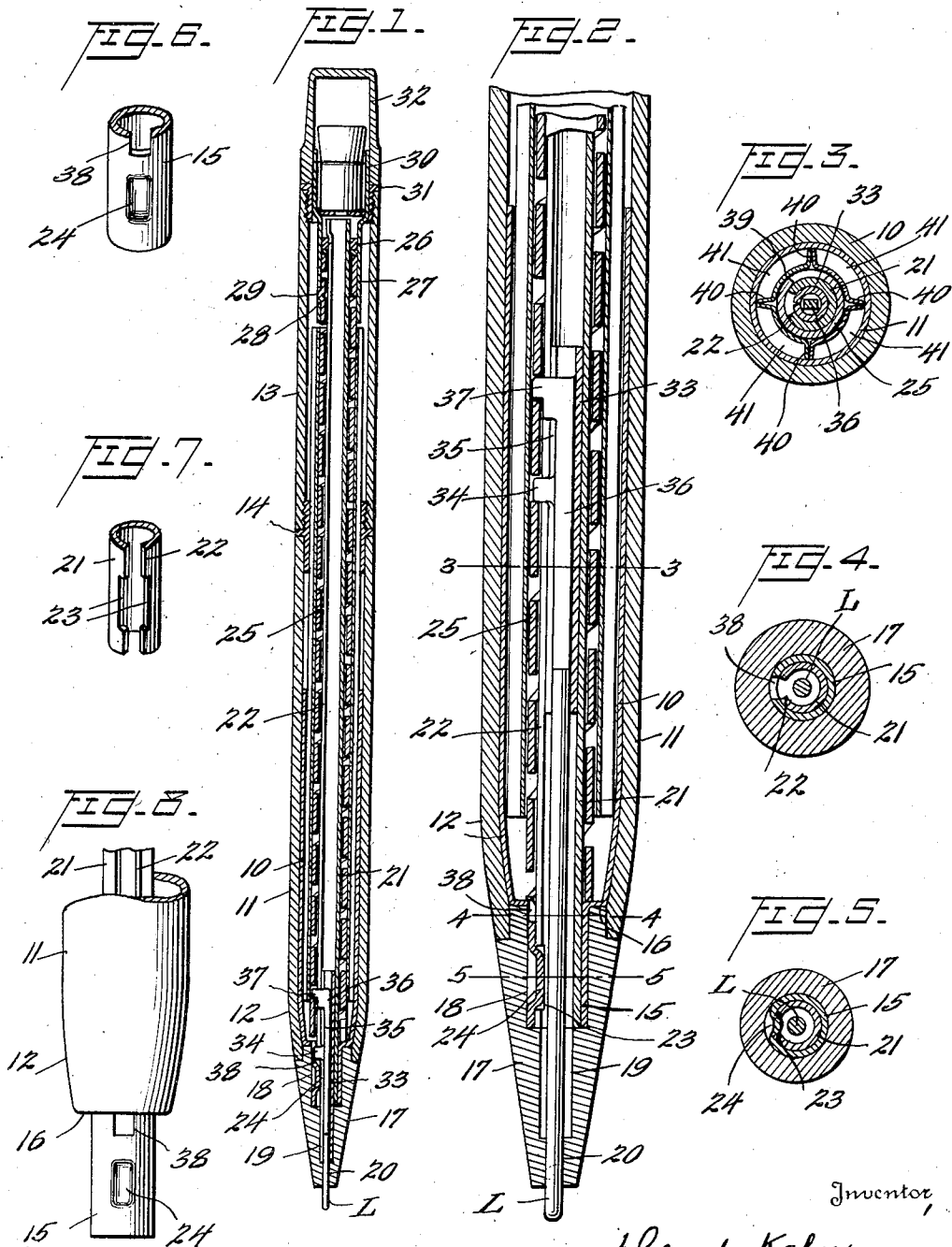
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D. KAHN

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MECHANICAL PENCIL

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Inventor,

David Kahn

By

Ivan P. Tashof

Attorney

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MECHANICAL PENCIL

David Kahn, North Bergen, N. J., assignor to
David Kahn, Inc., North Bergen Township,
N. J., a corporation of New Jersey

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This invention relates to mechanical pencils of the type wherein a movable lead is employed, the lead being held by a carrier movable toward and from the tip of the pencil by the rotation of a spiral member.

In pencils of this character, it is quite common to construct the exterior of the barrel of Celluloid, a phenol condensation product or other moldable material. For various reasons, especially in pencils in which the barrel is used for storage of spare leads around the working parts, it is advisable and even necessary that the outer shell of the barrel be quite thin. With such thin outer shells, unless they are reinforced, breakage is apt to occur. Furthermore, it is difficult with thin outer shells to properly attach the usual metallic point directly to the lower end of the thin shell.

Furthermore, the barrel of such pencils are commonly made of plastic material such as Celluloid, pyroxylin, or cellulose acetate, and such material has a tendency to warp. By the use of the reinforcing shell, this tendency to warpage is eliminated.

One important object of the invention is to provide a novel barrel arrangement wherein at least the lower portion of the barrel is provided with a metallic inner shell forming a reinforcement for a thin outer finishing shell, which will prevent cracking and warping of the shell. Furthermore, for certain purposes of the invention, it is not necessary that the inner shell have any great extent in the outer shell, but it is important that the inner shell be provided for the secure attachment of the runner tube. It is to be noted that such a shell may be made from a single piece of sheet metal, the material being preferably brass, or the like, which is capable of being drawn, spun or swaged, to provide an extension member so that a slot may be formed therein by a simple punching operation, and a boss struck in by a single stamping operation, thus making an extremely economical construction.

A second important object of the invention is to provide a novel barrel arrangement wherein the working parts of the pencil and also the tip are fixed to or supported from the lower end of this reinforcing shell.

Pencils of this type include a runner tube which must be held securely against rotation in the barrel.

A third important object of the invention is to provide a novel form of reinforcing shell for the barrel of such pencils having means at its lower

or point end for supporting the lower or point end of a runner tube.

A fourth important object of the invention is to provide novel means for attaching a runner tube immovably to such a shell.

With the above and other objects in view, the invention consists in general of certain novel details of construction and combinations of parts hereinafter fully described, illustrated in the accompanying drawing, and specifically claimed.

In the accompanying drawing, like characters of reference indicate like parts in the several views, and:—

Figure 1 is a longitudinal section taken diametrically through a pencil constructed in accordance with this invention;

Figure 2 is a similar section showing the lower end of the pencil to an enlarged scale and with certain of the working parts in somewhat different positions from the showing in Fig. 1;

Figure 3 is a section on the line 3—3 of Fig. 2;

Figure 4 is a section on the line 4—4 of Fig. 2;

Figure 5 is a section on the line 5—5 of Fig. 2;

Figure 6 is a perspective view of the lower end of the reinforcing shell to a greatly enlarged scale;

Figure 7 is a similar perspective view of the lower end of the runner tube as used herein;

Figure 8 is a perspective view to a somewhat smaller scale and showing the reinforcing shell and runner tube assembled.

In the embodiment of the invention as illustrated in the drawing, the pencil is provided with a two part body or barrel which includes a lower inner shell 10 of suitable metal, and on this shell 10 is fitted an outer shell 11 of any desired material. To insure this outer shell 11 from movement upwardly out of place on the shell 10, the lower ends of these two shells are tapered as at 12. Above the shell 11 is an upper shell 13 which has a ferrule 14 which is screwed into the shell 13 and frictionally fitted into the upper end of the lower shell 11 so that the two sections of the barrel may be separated when desired.

The lower end 15 of the shell 10 is abruptly reduced in diameter from the body of the shell, a shoulder 16 being formed between the body of the shell 10 and the lower end 15. The pencil is provided with a conical point member or tip 17, the outer surface of which forms a continuation to the outer surface of the taper 12. This point or tip is provided with a socket 18 in its upper end wherein is tightly fitted the lower end 15, the two parts being immovably connected. Extending downward from the socket is a bore 19

having a reduced lower end 20 of proper size to fit closely around a lead L while allowing the lead to move longitudinally therein.

The pencil is provided with a runner tube 21 having a slot 22 extending longitudinally thereof and adjacent the lower end of this tube the edges of the slot are cut away to provide recesses 23, the bottoms of which lie in the same plane. The lower end 15 of the shell 10 is of such diameter as to fit closely on the lower end of the runner tube and the lower end 15 is deformed to provide an inwardly extending boss 24 which engages in the recesses 23 to fit closely therein and thus to prevent both rotative and longitudinal movement of the runner tube 21 relative to the inner shell 10. Fitted on this runner tube is the usual spiral actuating tube which rests at its lower end on the shoulder 16 and bears at its upper end against a collar 26 fixed on the upper end of the runner tube 21. On the upper end of the actuating tube 25 is fitted a tube 27 having an opening 28 in its side and a lug 29 on the actuating tube engages in this opening so that, by rotating the tube 28, the actuating tube will be rotated. The upper end of the tube 27 is enlarged to form an eraser socket 30 which rotatably fits in a ferrule 31 screwed into the upper end of the shell 13. The socket 30 extends above this ferrule and on the upwardly projecting part is frictionally fitted a cap 32 which is sufficiently tight that rotation of the cap will effect rotation of the actuating tube 25.

A tubular lead carrier 33 is slidably mounted in the runner tube 21 and is provided intermediate its ends with a lug 34 which projects through the slot 22 of the runner tube and engages in the slot formed between the convolutions of the spiral actuating tube 25. This lead carrier is provided above the lug 34 with a slot 35. The internal diameter of the lead carrier is such as to tightly grip the upper end of the lead L. A lead ejector 36 is slidably mounted in the lead carrier and is provided with a stepped lug 37 which extends through the slots 35 and 22 and engages in the slot formed between adjacent convolutions of the spiral actuating tube 25. Normally, the lugs 34 and 37 will be spaced, the lug 34 engaging in one convolution of the actuating tube slot and the lug 37 engaging in a higher convolution. The reduced end 15 of the shell 10 is provided with a slot 38 which is aligned above the boss 15 and extends through the inner part of the shoulder 16. Being thus aligned above the boss 15, the slot 38 registers with the lower end of the slot 22 of the runner tube 21. The slot 38 is sufficiently deep to receive the lug 34 and allow it to rest below the end of the actuating tube 25.

With this construction, rotation of the actuating tube 25 in the lead propelling direction will feed both the lead carrier and the lead ejector downwardly until finally the lead carrier lug passes into the slot 38 and is thus free from further action by the actuating tube. Further, rotation of the actuating tube in the same direction will cause the lead ejector to move downwardly in the lead carrier and push the lead out of the carrier. Upon reversing the direction of rotation of the actuating tube 25, the lug 27 will move up until it engages the upper end of the slot 35 in the lead carrier 33, whereupon the lead carrier will also move up and its lug 34 will be moved out of the slot 38 and engaged by the actuating tube to move the lead carrier 33 and lead ejector 36 upwardly in unison.

The barrel of the pencil here shown is con-

centrically spaced from the actuating tube to form a magazine for spare leads and between the barrel and the actuating tube is a tubular magazine wall 39 carrying radial ribs 40 which engage against the inner surface of the barrel and thus hold the wall spaced therefrom. The wall 39 and ribs 40 form pockets 41 for the reception of spare leads. Access to the magazine is had by separating the barrel at the ferrule 14.

It is to be noted that the shell 10 may be made of a thin tube of brass or other suitable material, the tube being drawn, spun or swaged to provide the extension member 15. It is also to be noted that the slot 38 may be formed by a simple punching operation, and that the boss 24 may be struck-in by a stamping operation.

There has thus been provided a simple and efficient device of the kind described and for the purpose specified.

It is obvious that changes may be made in the form and construction of the invention without departing from its material principles. It is not, therefore, desired to confine the invention to the exact form herein shown and described, but it is desired to include all such as come within the scope of the appended claims.

What is claimed is:

1. In a mechanical pencil, a barrel including a shell having an abruptly reduced extension at its lower end, a runner tube having a longitudinal slot and provided with oppositely disposed recesses at the edges of the slot adjacent the lower end of the tube, said lower end of the tube being fitted in said extension, and an inwardly projecting boss on said extension engaging in said recesses and holding the runner tube immovably to the shell.

2. In a mechanical pencil, a barrel including a shell having an abruptly reduced extension at its lower end, a runner tube having its lower end fitted in said extension, a lug on said extension cooperating with a slot in said runner tube for holding the runner tube immovably in said extension, said shell having a shoulder between the lower end of the shell and its extension, and an actuating tube revolubly mounted on said runner tube and bearing at its lower end on said shoulder.

3. In a mechanical pencil, a barrel including a shell having an abruptly reduced extension at its lower end, a runner tube having a longitudinal slot and provided with oppositely disposed recesses at the edges of the slot adjacent the lower end of the tube, said lower end of the tube being fitted in said extension, an inwardly projecting boss on said extension engaging in said recesses and holding the runner tube immovably to the shell, said shell having a shoulder between the lower end of the shell and its extension, and an actuating tube revolubly mounted on said runner tube and bearing at its lower end on said shoulder.

4. In a mechanical pencil, a barrel including a shell having an inwardly extending shoulder at its lower end and provided with a reduced extension projecting downwardly from the shoulder, said extension having a slot in its upper part opening upwardly through the shoulder, a runner tube having a longitudinal slot, said tube having its lower end immovably fixed in said extension with the slots of the tube and extension in registry, an actuating tube revolubly mounted on said runner tube and resting at its lower end on the shoulder, and a tubular lead carrier slidably mounted in the runner tube and having a lug projecting through the slot of the runner tube

and engaged by said actuating tube, the slot in the extension being proportioned to permit said lug to lie therein below the lower end of the actuating tube.

5 5. In a mechanical pencil, a barrel including a shell having an inwardly extending shoulder at its lower end and provided with a reduced extension projecting downwardly from the shoulder, said extension having a slot in its upper
10 part opening upwardly through the shoulder, a runner tube having a longitudinal slot, said tube having its lower end immovably fixed in said extension with the slots of the tube and extension in registry, an actuating tube revolubly
15 mounted on said runner tube and resting at its lower end on the shoulder, a tubular lead carrier slidably mounted in the runner tube and having a lug projecting through the slot of the
20 runner tube and engaged by said actuating tube, the slot in the extension being proportioned to permit said lug to lie therein below the lower end of the actuating tube, said lead carrier having a slot therein aligned with said lug and a lead
25 ejector slidably mounted in the lead carrier and having a lug projecting through the slots in the lead carrier and runner tube and engaged by the actuating tube in normal spaced relation above the lug of the lead carrier.

30 6. In a mechanical pencil, a barrel shell consisting of a metallic tube having one end formed to provide a shoulder and a reduced tubular extension extending integrally from the shoulder, said shell having an inwardly struck boss on the
35 extension and having a slot above the boss and aligned therewith.

40 7. In a mechanical pencil, a barrel shell consisting of a metallic tube having a lower reduced tubular extension extending from said metallic tube, said shell having an inwardly projecting
45 boss on the extension member and having a slot above the boss, the latter being aligned with the former.

50 8. In a mechanical pencil, operating mechanism including a runner tube having a longitudinal slot, a tubular lead carrier slidably mounted in the runner tube and having a lug projecting
45 through the slot of the runner tube, a barrel including an inner metallic shell having an extension member at its lower end into which the lower end of the runner tube is fitted, said extension member being provided with a lug engaging slot adapted to receive the lug of the lead
55 carrier, said runner tube and extension member being provided with coating means mechanically holding the runner tube immovably in the extension member.

60 9. In a mechanical pencil, a barrel having a tip at its lower end provided with an axial opening extending therethrough, said opening having an enlarged cylindrical upper end of less diameter
65 than the lower internal diameter of the barrel, said tip forming an annular shoulder within the barrel, an inner shell fitting in said barrel and provided at its lower end with an abruptly reduced extension fitting in the enlarged upper end of said opening, a shoulder being formed on said shell and resting on the first mentioned shoulder, and a runner tube fitting within said extension and having a slot therein opposite said extension, said extension having an internal lug engaging in said slot.

75 10. In a mechanical pencil, a barrel having a tip at its lower end provided with an axial opening extending therethrough, said opening having an enlarged cylindrical upper end of less diam-

eter than the lower internal diameter of the barrel, said tip forming an annular shoulder within the barrel, an inner shell fitting in said barrel and provided at its lower end with an abruptly reduced extension fitting in the enlarged upper end of said opening, a shoulder being formed on said shell and resting on the first mentioned shoulder, and a runner tube fitting within said extension and having a slot therein opposite said extension, said extension having an internal lug engaging in said slot, said opening having a shoulder at the lower end of the enlarged portion and against which the lower ends of the extension and runner tube rest.

11. In a mechanical pencil, a barrel having a tip at its lower end provided with an axial opening extending therethrough, said opening having an enlarged cylindrical upper end of less diameter than the lower internal diameter of the barrel, said tip forming an annular shoulder within the barrel, an inner shell fitting in said barrel and provided at its lower end with an abruptly reduced extension fitting in the enlarged upper end of said opening, a shoulder being formed on said shell and resting on the first mentioned shoulder, a runner tube fitting within said extension and having a slot therein opposite said extension, said extension having an internal lug engaging in said slot, and an actuating tube revolubly mounted on said runner tube and resting at its lower end on the shoulder of said inner shell.

12. In a mechanical pencil, a barrel having a tip at its lower end provided with an axial opening extending therethrough, said opening having an enlarged cylindrical upper end of less diameter than the lower internal diameter of the barrel, said tip forming an annular shoulder within the barrel, an inner shell fitting in said barrel and provided at its lower end with an abruptly reduced extension fitting in the enlarged upper end of said opening, a shoulder being formed on said shell and resting on the first mentioned shoulder, a runner tube fitting within said extension and having a slot therein opposite said extension, said extension having an internal lug engaging in said slot, said opening having a shoulder at the lower end of the enlarged portion and against which the lower ends of the extension and runner tube rest, and an actuating tube revolubly mounted on said runner tube and resting at its lower end on the shoulder of said inner shell.

13. In a mechanical pencil, a barrel having a tip at its lower end provided with an axial opening extending therethrough, said opening having an enlarged cylindrical upper end of less diameter than the lower internal diameter of the barrel so as to form an annular shoulder within the barrel, an inner shell fitting in said barrel and provided at its lower end with an abruptly reduced extension member fitting in the enlarged upper end of said opening, a shoulder being formed on said shell and resting on the first mentioned shoulder, and a runner tube member fitting within said extension member, one of said members being provided with a slot and the other of said members with an internal lug engaging in said slot.

14. In a mechanical pencil, a barrel having a tip at its lower end provided with an axial opening extending therethrough, said opening having an enlarged cylindrical upper end of less diameter than the lower internal diameter of the barrel so as to form an annular shoulder within

the barrel, an inner shell member fitting in said barrel and provided at its lower end with an abruptly reduced extension member fitting in the enlarged upper end of said opening, a shoulder
5 being formed on said shell member and resting on the first mentioned shoulder and means to connect the two members.

15. In a mechanical pencil, a barrel of a relatively fragile plastic material, a tip member at
10 the lower end of said barrel provided with an axial opening extending therethrough and en-

larged above to form a socket, an inner shell member fitted within said socket and closely conforming in size and shape to the interior of the barrel and being adapted to act as a reinforcing member therefor, a runner tube member fitted
5 within said inner shell member, and means to immovably attach the runner tube member to the inner shell member comprising a slot in one member and a lug in the other member cooperating with each other.

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DAVID KAHN.