

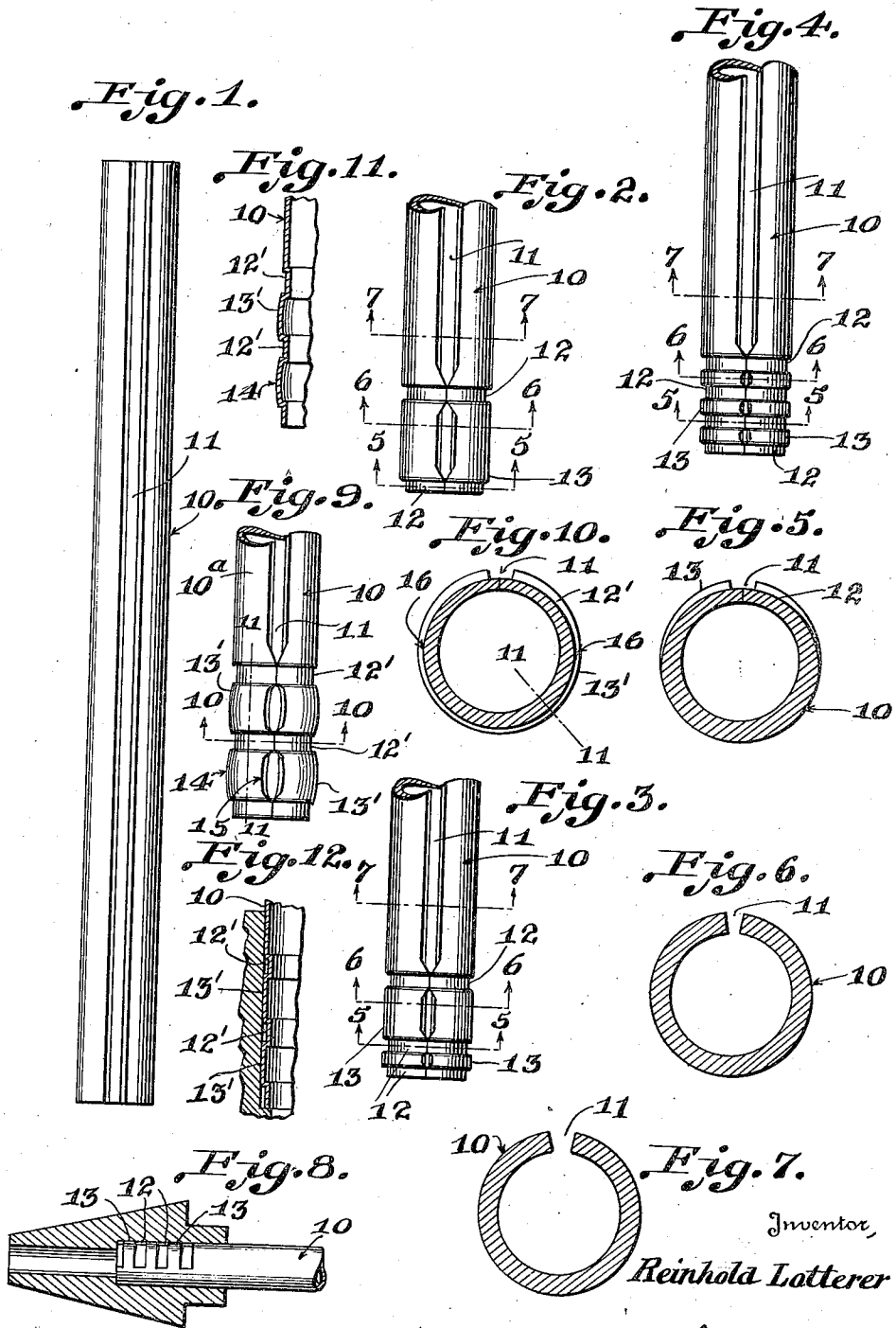
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R. LOTTERER

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RUNNER TUBE FOR MECHANICAL PENCILS

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Inventor,

Reinhold Lotterer

By

Juan P. Tashof,

Attorney

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## RUNNER TUBE FOR MECHANICAL PENCILS

Reinhold Lotterer, Newark, N. J., assignor to  
David Kahn, Inc., North Bergen Township,  
Hudson County, N. J., a corporation of New  
Jersey

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This invention relates to mechanical pencils of the type shown and described in the patent to Julius Kahn, No. 2,009,182, granted July 23, 1935.

More particularly, the invention relates to the runner tube and tip of such pencils.

Runner tubes for such pencils are commonly formed from thin sheet metal rolled or otherwise mechanically bent to constitute an elongated tube having the edges of the strip of metal somewhat spaced to provide a slot extending from end to end of the tube. Such runner tubes are fitted at one end into the pencil tips and the latter are provided with seats to receive the runner tube ends. It is desirable that there may be tight frictional engagement of the tube end in its seat, whether the seat be cylindrical or tapering, both such seat forms being used.

One important object of the present invention is to provide a novel form of runner tube of this class wherein improved provision is made for ensuring a tight fit of the tube in the pencil tip.

When a runner tube, slotted from end to end, is inserted in a seat formed in the tip, the edges of the slot at the inserted end may move toward each other and such a tube is therefore held in its seat solely by the friction developed by the resilience of the tube in a transverse direction. The friction thus obtained is not always sufficient to properly hold the tube and tip together.

A second important object of this invention is to provide a runner tube having the lower or tip end of the slot closed so that it may be forced into the seat of the tip without transverse yielding, thus obtaining a tighter fit than possible with such lower end normally open.

A third important object of the invention is to provide the lower or tip end of such a runner tube with a corrugated or ribbed portion to increase the frictional grip of the tube on the wall of its seat.

A fourth important object of the invention is to so form such corrugations or ribs that the lower end of the slot in the tube will be closed by the process of formation.

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 pointed out in the appended claims.

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

Figure 1 is a side elevation of a runner tube of

the usual form, such a tube constituting one step in the formation of this invention.

Figure 2 is an enlarged detail side elevation of one form of the lower end of such a runner tube as developed in accordance with this invention.

Figure 3 is a view similar to Fig. 2, but illustrating a modification of such tube end.

Figure 4 is a view similar to Fig. 3, but showing a second form.

Figure 5 is an enlarged section on the line 5—5 of Figs. 2, 3 and 4.

Figure 6 is an enlarged section on the line 6—6 of Figs. 2, 3 and 4.

Figure 7 is an enlarged section on the line 7—7 of Figs. 2, 3 and 4.

Figure 8 is a view showing a runner tube constructed in accordance with this invention assembled with a pencil tip.

Figure 9 is a side elevation of the lower portion of a runner tube showing a modified form of the invention.

Figure 10 is a cross section of a modified form of a runner tube taken on the line 10—10 of Figure 9.

Figure 11 is a longitudinal cross section taken on line 11—11 of Figures 9 and 10.

Figure 12 is a similar section showing the device as inserted in a tip, only a portion of the tip and the runner tube being shown.

In the embodiment of the invention as here shown, there is disclosed a runner tube 10 of the usual form as to its major part. That is, the tube is made from a thin sheet metal strip to provide a cylindrical body having the longitudinal edges of the strip brought close to each other but spaced to provide a longitudinally extending slot 11.

After forming the tube in the manner shown in Fig. 1 one end of the tube is especially treated, that being the end which is to fit in the tip T of the pencil. At this end, the tube is subjected to a stamping or pressing operation to produce a plurality of parallel reduced portions 12. Each of these portions consists of a groove extending either way from the slot 11 circumferentially around the outer surface of the tube for about 90°, each groove gradually decreasing in depth from the slot 11 to the end remote from said slot, where it merges into the outer surface of the tube. There may be two pairs of such grooves, as in Fig. 2, three pairs as in Fig. 3, or a greater number as in Fig. 4. In any case, there remains between each pair of adjacent grooves a rib 13, which may be of greater or less width according to the spacing of the grooves 12.

The effect of pressing or stamping the grooves 12 is that the metal of the tube is displaced or caused to flow longitudinally of the grooves. That is, the portions of metal on each side of the slot 11 flow toward each other so that the slot is substantially closed at these points, as clearly shown in Figures 2, 3, 4 and 5, while the edges of the metal between the grooves, that is the rib ends, are not forced together.

With the construction thus formed, the lower or tip end of the runner tube becomes a substantially closed tube at the abutting ends of the grooved portions, yet is slightly yieldable circumferentially due to the fact that the rib ends do not abut. When such an end is forced into the socket S of the tip T, it will form a tight frictional fit with respect to that socket and will be substantially immovable with reference to the tip after the parts have once been assembled.

There has thus been provided a novel method of forming a runner tube to insure its tight frictional contact with a tip socket and a simple and efficient friction joint between such a tube and tip.

As shown in Figures 9, 10 and 11, the grooves 12' extend from the slot 11 circumferentially around the entire surface of the tube. When the grooves 12' are stamped and pressed, the metal of the tube is displaced and caused to flow longitudinally of the grooves. It is to be noted that the ribs 13' are thereby bulged out adjacent the slot 11 to form a slightly curved convex surface having its maximum diameter at the point 14, said ribs curving gently away from said point and towards the grooves 12'. Each rib portion thus is of the shape of a spindle truncated at each end. The rib ends at the slot 15 also assume curves concave with respect to the center line of the longitudinal slot 11. When the grooves extend only circumferentially around the outer surface of the tube for about 90°, the rib portions formed may also assume the specific convex shape set forth in Figures 9 and 10.

The bulging out of the ribs 13' serves a useful purpose in the assembling of the runner tube in the pencil tip. As is well known, the passageway of the pencil tip has just a slightly larger diameter than the diameter of the runner tube. If the diameter of the passageway should happen to be a little greater than it should be, the runner tube and the pencil tip can still be successfully frictionally assembled since the rib portions 13' adjacent the slot 11 may protrude a little beyond the runner tube surface 10a. When so protruding, these ribs become somewhat distorted in assembling. However, broadly, the ribs 13 may be, in some cases, substantially flush with the runner tube surface 10a, the only requirement being that the ribs be somewhat distorted in assembling the lower end of the runner tube with the tip member.

In the form of the invention shown in Figures 9 and 10, each groove may taperingly decrease in depth from the slot 11, and still extend circumferentially around a part of or the entire outer surface of the runner tube, or each groove may have a constant depth circumferentially of the entire surface of the runner tube. Owing to the metal of the runner tube having less resistance adjacent the slot 11, the depth of the grooves 12' is greater adjacent the slot and gradually decreases in depth circumferentially of the tube.

It is to be noted that the metal of the tube at the bottoms of the grooves is deformed to close

the slot while the bottom walls of the grooves are kept substantially concentric with the axis of the tube.

As shown in Figure 10, the grooves 12' gradually decrease in depth around the outer surface of the tube from their inner ends for about 90° on either side of their inner ends, that is, to the point 16, and then the groove has a constant depth circumferentially around the remaining outer surface of the tube.

What is claimed is:—

1. A runner tube for mechanical pencils adapted to be immovably seated in the tip member of the pencil, said runner tube having a portion of its tip end provided with segments of circumferentially extending and longitudinally spaced grooves arranged in planes extending transversely to the axis of the tube and at right angles thereto.

2. A runner tube for mechanical pencils adapted to be immovably seated in the tip member of the pencil, said runner tube comprising a tubular member having a slot extending from its tip end, said slot adjacent said end being closed by longitudinally spaced portions of the tube material extending from one side wall of the slot towards the other side wall thereof.

3. A runner tube for mechanical pencils adapted to be immovably seated in the tip member of the pencil, said runner tube comprising a metallic tubular member having a slot extending from its tip end, which slot near said end is closed by circumferentially aligned longitudinally spaced portions of the tube material extending from the side walls of the slot towards each other.

4. A runner tube for mechanical pencils adapted to be immovably seated in the tip member of the pencil, said runner tube comprising a metallic tubular member having a slot extending from its tip end and having circumferential grooves formed on the opposite sides of the slot, the metal of the tube adjacent the wall of the slot extending transversely of the slot to close the slot.

5. A runner tube for mechanical pencils adapted to be immovably seated in the tip member of the pencil, said runner tube comprising a metallic tubular member having a slot extending from its tip end and having aligned grooves formed on opposite sides of the slot, the metal of the tube adjacent the wall of the slot extending transversely of the slot to close the slot.

6. A runner tube for mechanical pencils adapted to be immovably seated in the tip member of the pencil, said runner tube comprising a metallic tubular member having a slot extending from its tip end and having segments of circumferential grooves formed on opposite sides of the slot, the metal of the tube adjacent the wall of the slot extending transversely of the slot to close the slot.

7. A runner tube for mechanical pencils adapted to be immovably seated in the tip member of the pencil, said runner tube comprising a metallic tubular member having a slot extending from its tip end and having a pair of opposed circumferentially aligned groove portions formed at the tip end on the opposite sides of the slot, the metal of the tube adjacent the wall of the slot in alignment with said groove portions extending transversely of the slot to close the slot.

8. A runner tube for mechanical pencils adapted to be immovably seated in the tip member of the pencil, said runner tube comprising a metallic tubular member having a slot extending from its

tip end and having a pair of opposed circumferentially alined groove portions formed at the tip end on opposite sides of the slot, the metal of the tube adjacent the wall of the slot in alinement with said groove portions extending transversely of the slot to close the slot, said groove portions gradually decreasing in depth from said slot to their opposite ends.

9. A runner tube for mechanical pencils adapted to be immovably seated in the tip member of the pencil, said runner tube having a slot extending from its tip end, the latter being provided with circumferentially extending grooves of less than 180° each in extent and each decreasing in depth from said slot to its other end.

10. A runner tube adapted to be immovably seated in the tip member of a mechanical pencil, said runner tube comprising a metallic tubular member having a slot extending from its tip end, the edges of the slot adjacent said end abutting at spaced intervals and slightly spaced apart therebetween.

11. A runner tube adapted to be immovably seated in the tip member of a mechanical pencil, said runner tube comprising a metallic tubular member having a slot extending from its tip end, the edges of the slot adjacent said end abutting at spaced intervals and slightly spaced apart therebetween, said runner tube at its tip end being slightly circumferentially yieldable.

12. A runner tube for mechanical pencils adapted to be immovably seated in the tip member of the pencil, said runner tube comprising a metallic tubular member having a slot extending from its tip end and having aligned grooves and opposed ribs formed on the opposite sides of the slot, the metal of the tube extending trans-

versely of the slot to close the slot in alinement with the grooves while leaving the rib ends separated, the rib portions adjacent the rib ends being curved convexly with respect to the center line of the runner tube.

13. A runner tube for mechanical pencils adapted to be immovably seated in the tip member of the pencil, said runner tube comprising a metallic tubular member having a slot extending from its tip end and having opposed groove portions and opposed ribs formed on the opposite sides of the slot, the metal of the tube extending transversely of the slot to close the slot in alinement with the groove portions while leaving the rib ends separated, the rib portions adjacent the rib ends being curved convexly with respect to the center line of the runner tube, said groove portions adjacent the slot gradually decreasing in depth from said slot.

14. A runner tube for mechanical pencils adapted to be immovably seated in the tip member of the pencil, said runner tube comprising a metallic tubular member having a slot extending from its tip end and having opposed groove portions and opposed ribs formed on the opposite sides of the slot, the metal of the tube extending transversely of the slot to close the slot in alinement with the groove portions while leaving the rib ends separated, the rib portions adjacent the rib ends being curved convexly with respect to the center line of the runner tube, said groove portions adjacent the slot gradually decreasing in depth from the slot, the remainders of the groove portions having a constant depth.

REINHOLD LOTTERER.