

PATENT SPECIFICATION



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COMPLETE SPECIFICATION.

Improvements in Pencil Holders.

I, WILLIAM PRICE DEWITT, of No. 5, Boylston Street, City of Cambridge, in the County of Middlesex, State of Massachusetts, Dentist, a citizen of the United States of America, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

10 This invention relates to pencil holders with adjustable and removable leads and especially the invention relates to that class of pencil holders in which the lead is of very small diameter so that the same may be used without sharpening.

15 The object of the invention is to provide a pencil holder of the class set forth in which the mechanism for advancing or feeding forward the lead and also for ejecting the lead from the pencil holder when used up is so constructed and arranged that the head of the pencil holder by the rotation of which the lead is fed forward and ejected, can be rotated continuously even after the lead is ejected from the pencil holder without injury to the mechanism, and furthermore, the object of the invention is to provide a pencil holder of the class described in which by reversing the rotatory movement of the head the feeding and ejecting members of the pencil holder will be caused to retreat toward the rear end of the pencil holder in order that a new lead may be inserted, and after said members have retreated to the extreme rear end of their path of movement a continued rotation of the head of the pencil holder will cause no damage to the operating parts.

20 The object of the invention is further to simplify and cheapen the construction of the pencil holder by entirely eliminating any soldered or brazed parts.

25 The invention involves the use of an

outer casing, a head rotatably mounted on the rear end of said casing, a stationary guide tube within said casing, a carrier tube for leads slidable in said guide tube and a push-rod slidable in said carrier tube and consists in the provision of a rotary propeller tube fast to said head extending longitudinally within said casing and provided with an interior screw thread, a collar fast to said carrier tube and slidably and non-rotatably mounted upon said guide tube and having screw-threaded engagement with said interior screw thread of the propeller tube, another collar fastened to said push-rod and slidably and non-rotatably mounted upon said guide tube and having screw-threaded engagement with said interior screw thread and a spring interposed between said collars.

The invention also comprises the combination and detail arrangement of parts all as hereinafter set forth in the specification and particularly, pointed out in the claims.

Referring to the drawings:

Figure 1 is an enlarged sectional elevation of my improved pencil holder.

Figure 2 is a sectional plan taken on the line 2—2 of Figure 1.

Figure 3 is a sectional plan taken on the line 3—3 of Figure 1.

Figure 4 is a side elevation as viewed from the right of Figure 1, illustrating a portion of the lead feeding mechanism.

Figure 5 is a detail elevation of a spring.

Figure 6 is a side elevation of a connecting member.

Figure 7 is a side elevation of a screw-threaded collar.

Figure 8 is a side elevation of a push-rod.

Figure 9 is a side elevation of another screw-threaded collar.

Figure 10 is a side elevation of the lead carrier tube.

Fig. 11 is a side elevation of the guide tube.

Fig. 12 is a detail section taken on the line 12—12 of Fig. 9.

5 Fig. 13 is a detail section taken on the line 13—13 of Fig. 10.

Fig. 14 is a detail section taken on the line 14—14 of Figure 11.

10 Fig. 15 is a detail view of a spline with a lateral projection.

Like numerals refer to like parts throughout the several views of the drawings.

In the drawings, 15 is the outer casing of the pencil holder which terminates at its front end in a conical end portion 16, through an opening 17 in the front end of which the lead 18 is fed. At the rear end of the outer casing 15 an annular flange 19 projects into an annular groove 20 provided in a tube 21 which is rotatably mounted in the casing 15 and projects rearwardly outside thereof to receive upon its outside a head 22 and upon its inside at its rear end a tube 23 is provided which contains an eraser 24. At its forward end the tube 21 is reduced in diameter at 25 forming a frustro-conical portion and terminates in a cylindrical portion 26 which is a tight fit upon the propeller tube 27, said propeller tube for a portion of its length as at 28 is cylindrical and for the remainder of its length, except as hereinafter set forth, is provided with an interior screw thread 29, while at its front end and at its rear end at 30 and 31 respectively said propeller tube has a smooth bore.

The front end of the propeller tube 27 40 bears against the inner wall of an alignment tube 32; said alignment tube consists of a frusto-conical portion 33 against which the front end of the propeller tube bears and which forms a bearing therefor, a cylindrical portion 34 45 tightly fitting into the casing 15 at the rear end thereof and a cylindrical portion 35 at the front end thereof. The frustro-conical portion 33 fits against the 50 inner wall of the conical forward end 16 of the casing 15 and thus positions the alignment tube 32 longitudinally of the casing. The cylindrical portion 35 terminates adjacent to the inner wall of the 55 conical portion 16 of said casing and forms a holder for a guide tube 36 which fits tightly into said cylindrical portion 35 and extends rearwardly therefrom in the interior of the propeller tube 27 until 60 at its rear end it bears against a disc 37 which is a close fit in the portion 28 of the propeller tube and bears against an inwardly projecting annular flange 58 on said propeller tube.

The tube 36 bears at its forward end 65 against the inner wall of the conical portion 16 of the casing and forms a guide for a lead carrier tube 39 in which the lead 18 is placed and by which it is fed longitudinally of the pencil holder. This 70 carrier tube 39 is provided with a spline 40 which is fast in a slot 40¹ provided in the tube 39. Said spline 40 has a laterally extending projection 42 which when the several parts are assembled, as 75 illustrated in Figure 1, extends into a hole 43 in the collar 44. A push-rod 45 slides in the tube 39 and terminates at its upper end in a lateral arm 46 which when the parts are assembled extends 80 into a hole 47 in a collar 48.

The collars 44 and 48 are each provided with a screw thread upon their peripheries and are joined together by a connecting member 49 which is provided at 85 its rear end with a T-shaped head 50 and at its front end with a T-shaped head 51, said T-shaped heads being connected by a shank portion 52 with ears 51¹ thereon and this shank portion is located in slots 90 53 and 54 provided in the screw-threaded collars 48 and 44 respectively.

A spiral spring 55 encircles the guide tube 36 and is slidable thereon, said spring serving to hold the guide member 95 49 in position in the slots 53 and 54.

It will be understood that the collars 44 and 48 are slidably mounted upon the guide tube 36, that they are connected together by the connecting member 49 100 and that they are forced apart until they strike the heads 51 and 50 respectively, by the spiral spring 55.

The diameter of the bore of the carrier tube 39 is slightly smaller than the diameter of the lead intended to be used 105 therewith. The tube 39 is countersunk at 56 and is slit a slight distance at 57 so as to allow the lead to enter the tube 39 and wedge itself into the tube. 110

The general operation of the device hereinbefore specifically described is as follows: Assuming the parts to be in the relative positions illustrated in Figures 1 115 and 4 and that the head 22 is given a rotary clockwise movement then the tube 21 will be rotated, thereby causing the propeller tube 27 to rotate. The rotation of said propeller tube will cause the collars 44 and 48 to be fed forwardly in 120 said tube and this forward movement of the collars will carry forward the carrier tube 39 with the lead 18 and the push rod 45. When the carrier tube 39 has been moved forwardly in this manner until the 125 collar 44 is moved out of the screw-threaded portion 29 of the propeller tube 27 into the smooth bore portion 30 thereof,

the collar 48 will continue to be fed forward by the screw-threaded portion of the propeller tube 27 and the spring 55 will push the collar 44 and the tube 39 forwardly, until the end of the carrier tube abuts against the forward portion of the conical end 16, and during this forward movement the collar 48 and the push-rod 45 will continue their forward movement until the spring 55 is sufficiently compressed to allow the collar 48 to enter the smooth bore portion 30. During this last part of the movement of the collar 48 the spring 55 will be still more compressed and the connecting member 49 will slide in the collar 48.

It is evident that after the carrier tube has been moved to its extreme forward position and the push-rod has been also moved to its extreme forward position thus expelling the lead from the carrier tube that a continued rotation of the propeller tube 27 by the head 22 will have no further effect upon the movement of the collars and consequently the carrier tube and push-rod will remain practically stationary until the head 22 is rotated in the opposite direction or in a counter-clockwise direction, whereupon the collar 48 being pressed against the forward end of the screw thread 29 by the spring 55 will enter said screw-threaded portion and commence to be fed toward the rear end of the pencil holder carrying with it the push-rod 45. As soon as the collar 48 has been moved rearwardly until the head 50 on the connecting member abuts against the rear face of the collar 48 and the head 51 abuts against the front face of the collar 44 then the collar 44 will be drawn backwardly by the continued rotation of the propeller tube until it enters the screw-threaded portion of said propeller tube, whereupon both the collars 45 will be moved rearwardly together with the push-rod and the carrier tube.

A new lead may be inserted in the carrier tube at any time after the push-rod has been drawn backwardly therein. The collars 44 and 48 and the lead carrier 39 and push-rod 45 together with the spring 55 and the connecting member 49 will be now moved backwardly in the pencil holder until the collar 48 enters the smooth bore portion 31 of the propeller tube, and then a continued rotation of the head 22 will cause the collar 44 to be moved toward the rear and the spring 55 will push the collar 48 along the smooth bore 31 until said collar 48 engages an inwardly extending flange 59 on said propeller tube, whereupon further rearward movement of the collar 44 will com-

press the spring 55 and the shank 52 will slide in the collar 48 until said collar 44 enters the bore portion 31, whereupon further rotation of the head 22 in a counter-clockwise direction will have practically no effect upon the collars 44 and 48 and none of the parts of the pencil holder will be broken by a continued counter-clockwise rotation of said head.

Now upon rotating the head 22 clockwise the collars will be caused to enter the screw-threaded portion of the propeller tube in a manner similar to that hereinbefore described in relation to the movement of the collars from the smooth bore portion 30 into the screw-threaded portion of the propeller tube.

It will be understood that it is not necessary to cause the collars 44 and 48 to move backwardly into the smooth bore portion 31, the distance to which said collars should be moved back being regulated by the length of the new lead, but in case that anyone using the pencil holder did continue rotating the head, either clockwise or counter-clockwise beyond the time necessary for the parts of the pencil holder to perform their different functions, then the smooth bore portions 30 and 31 will prevent injury to the different parts of the pencil holder.

The different parts of the pencil holder hereinbefore described are assembled as follows: The carrier tube 39 is placed in the guide tube 36 with the collar 44 placed in position on said guide tube and with the lateral projection 42 extending into the hole 43. Next, the connecting member 49 is placed in position on the collar 44 with the head 51 bearing against the forward face of said collar and the lateral prongs 51 thereon bearing against the rear face of said collar. The spiral spring 55 is then placed in position upon the guide tube 36 over the connecting member and bearing against the collar 44, then the collar 48 is placed on the push-rod 45 with the arm 46 projecting in the hole 47, and the push-rod is inserted in the hole in the carrier tube 39, then the spring 55 is compressed and the head 50 on the connecting member 49 is slipped over the rear end of the collar 48, while at the same time the shank portion 52 enters the slot 53 in said collar 48.

The several parts hereinbefore described are now in the relative positions illustrated in Figure 4. The guide tube 36 is then forced into the cylindrical portion 35 of the alignment tube 32 and the alignment tube, with the guide tube in position therein, is then forced into the casing 15 until the frustro-conical portion

33 is seated against the conical portion 16 of the casing, as illustrated in Figure 1. The disc 37 is then forced into the propeller tube 27 and down against the annular rib 58. The cylindrical portion 26 of the tube 21 is then forced on to the rear end of the propeller tube. The propeller tube with the tube 21 attached thereto is now inserted in the casing 15 and is rotated in a counter-clockwise direction until the collars 48 and 44 enter the screw-threaded portion of said propeller tube and the propeller tube is then advanced to the position shown in Figure 1, and the rear end of the casing is spun into the annular groove 20 in the tube 21. The leads are then placed in the propeller tube in the chamber at the rear of the disc 37. The eraser 24 is then forced into the tube 23 and the tube 23 is placed in the rear end 21 with which it has a snug friction fit. The head 22 is then pushed upon the rear end of the casing with which it has a tapered fit until it assumes the position illustrated in Figure 1 with its forward edge contacting with the rear end of the casing and just in advance of the flange 19.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A pencil holder having, an outer casing, a head rotatably mounted on the rear end of said casing, a stationary guide tube within said casing, a carrier tube for leads slidable in said guide tube and a push-rod slidable in said carrier tube, characterized by a rotary propeller tube fast to said head extending longitudinally within said casing and provided with an interior screw thread, a collar fast to said carrier tube and slidably and non-rotatably mounted upon said guide tube and having screw-threaded engagement with said interior screw thread of the propeller tube, another collar fastened to said push-rod and slidably and non-rotatably mounted upon said guide tube and having screw-threaded engagement with said interior screw thread and a spring interposed between said collars.

2. A pencil holder as in Claim 1 characterized by the fact that the collars are connected together by a connecting member which limits the distance to which they can be moved apart while allowing them to be moved toward each other.

3. A pencil holder as in Claim 2 characterized by the fact that the connecting member has a head at each end thereof adapted to engage the front face of one

of said collars and the rear face of the other of said collars respectively.

4. A pencil holder as in Claim 1 characterized by the fact that the interior screw thread of the propeller tube terminates at a point removed from the forward end thereof and from the rearward end thereof whereby when the screw-threaded collars enter the smooth bore portion of the propeller tube further reciprocatory motion of the carrier tube and of the push-rod will cease.

5. A pencil holder as in Claims 1 to 3 having a member which connects the carrier tube to the push-rod slidable in slots provided in the collars.

6. A pencil holder as in Claim 1 and 5, characterized by the fact that the spring encircles the guide tube and connecting member.

7. A pencil holder as in Claim 1 characterized by the fact that the carrier tube is fastened to its collar by a projection extending laterally from said carrier tube into a hole provided in the collar, and the push-rod is connected to its collar by a lateral arm which projects into a hole in said collar.

8. A pencil holder as in Claim 1 having an alignment tube adapted to engage and hold in alignment the guide tube and the propeller tube at the forward end of said pencil holder.

9. A pencil holder as in Claim 1 characterized by the fact that a tube is attached to the rear end of the propeller tube and is rotatably mounted in the casing.

10. A pencil holder as in Claim 8 in which the alignment tube has a tight fit in the forward end of the casing and in which the guide tube has a tight fit.

11. A pencil holder having, in combination, a casing with a conical forward end portion and a cylindrical body portion, and alignment tube having a cylindrical portion tightly fitting the forward end of the cylindrical body portion of said casing and terminating at its forward end in another cylindrical portion of smaller diameter, and a frustro-conical portion connecting said cylindrical portions and fitting against the inner wall of the conical forward end of said casing, a guide tube tightly fitting said last-named cylindrical portion, a push rod slidable in said guide tube, and means to impart a reciprocatory motion to said push-rod substantially as described.

12. A pencil holder having, in combination, a casing a guide tube, a push-rod slidable in said guide tube, a propeller tube rotatably mounted in said

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5 casing adapted to impart a reciprocatory motion to said push-rod, and an alignment tube adapted to engage and hold in alignment said guide and said propeller tube on the forward end of said pencil.

13. A pencil holder having in combination, a casing, a guide tube, a push-rod slidable in said guide tube, and an alignment tube having a tight fit in the for-

ward end of said casing and in which said guide tube has a tight fit. 10

Dated this 6th day of August, 1920.

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[This Drawing is a reproduction of the Original on a reduced scale.]

