MECHANICAL PENCIL EMPLOYING CLIP IN ASSEMBLY

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The present invention relates to mechanical pencils particularly of the character which select an individual color from a plurality of available colors of leads.

This application is a division of application Serial No. 189,309, filed October 15, 1950, for Mechanical Pencil. Subject matter also divided from the same parent application appears in copending application Serial No. 236,975, filed July 16, 1951, for Collet Guiding in Mechanical Pencil, and Serial No. 236,976, filed July 16, 1951, for Lead Reservoir for Mechanical Pencil.

A purpose of the invention is to provide a tank extending through the barrel of a pencil from a clip and to hold the clip in place with a band surrounding the barrel.

A further purpose is to extend a tang from the clip into an annular recess on the adjacent head of the helix to position the helix.

Further purposes appear in the specification and in the claim.

In the drawings I have chosen to illustrate a few only of the numerous embodiments in which my invention may appear, selecting the forms shown from the standpoint of convenience in illustration, satisfactory operation and clear demonstration of the principles involved.

Figure 1 is a side elevation of the preferred embodiment of the invention partially broken away to show the reservoir for spare leads inside the tip.

Figure 2 is an exploded perspective, partially broken away, of the helix and nut assembly of Figure 1.

Figure 3 is an exploded perspective partially broken away, of the segments, collets and leads of Figure 1.

Figure 4 is an exploded perspective of the barrel, clip and tip of Figure 1.

Figure 5 is an axial section of the pencil of Figure 1.

In the drawings like numerals refer to like parts throughout.

The present invention is directed to pencils in which a plurality of colors are available, and especially to those in which a multiplicity of color selections can conveniently be made. In the prior art, where a variety of colors have been available for selection in a mechanical pencil, the mechanism has been complicated and expensive and the operation has often been inconvenient or unreliable.

In accordance with the invention, the assembly of the components is very conveniently accomplished by using the clip as a fastener to secure the helix to the barrel. The clip is also used to retain the helix in rotatable relation to the barrel.

The movement of the lead carriers and related mechanism is described in copending application Serial No. 189,309 filed Oct. 10, 1950, and the detail of this subject matter will not be here repeated.

The pencil of the invention includes a barrel 40, a tip 41, a helix 42, a clip 43, a barrel band 44, a friction spacer 45, a nut or shoe 46, segments 47 and collets 48.

The barrel is very desirably made from a clear or transparent plastic, such as polystyrene or methyl methacrylate, and includes a generally tubular barrel portion 50, suitably of cylindrical exterior contour as shown, having a polygonal interior cross section 51.

Forward of the generally uniform polygonal cross section as just described, a forward extension 52 is provided of reduced external and internal diameter.

An abrupt inward cam surface is provided at 53 between the sides of the polygon of portion 53 and of portion 52, desirably disposed at some steep angle to the axis preferably of the order of 45°.

The forward end of the barrel is provided with the tip 41 which is fastened to the barrel in any suitable manner preferably by a snap action as later explained. The tip has an inner bore 64 which surrounds the reduced portion 52 of the barrel, which then gradually tapers or converges at 55 toward a collet well 66 near the forward end which again tapers or converges at 67 into a center lead guiding opening 58 best seen in Figure 5. The exterior portion of the tip gradually converges at 70 toward the forward end.

To render the tip readily removable and at the same time permit it to be inserted easily into position, the interior bore 64 of the rearward portion of the tip is provided with grooves 72 as best seen in Figure 4 which correspond in placement to the positions of the ribs 62 and are sufficiently deep to allow the tip to slide longitudinally over the ribs without undue friction when the grooves 72 are aligned circumferentially with the ribs 62. Between the grooves 72 are flats or lands 73 which are comparatively shallow, suitably being of the order of a few thousandths of an inch, so that after the tip is inserted in place on the barrel with the grooves 72 corresponding in position with the ribs 62, a slight twisting of the tip with respect to the barrel will lock the tip on the barrel by jamming the outer circumferential
The helix 42 comprises an adjustment head 74 having a socket 75 which fits an eraser 16 and a central inwardly extending screw portion 77 extending through the interior to the forward end of the barrel portion 59 and provided with a helical thread 78 which may extend in either direction but which, to agree with the direction of ratchets used, is left hand as shown.

The forward end of the adjustment head 74 is shouldered at 80 as best seen in Figure 2 and between the shoulder and the screw portion 71 is located a hub 81 of reduced cross section compared to the head and which is suitably positioned immediately inside the rear end of the barrel. The hub has an annular outside groove 82 intermediate between the ends of the hub.

The barrel portion 50 at one position in the circumference as best seen in Figure 4 has an inwardly extending slot 83 and is suitably provided with a recess 84 forward of the slot. The clip 43, suitably of resilient metal such as brass or bronze, has a base portion 85 which fits in the recess 84 and has a transverse tang 86 which engages through the slot 83 and its inner end engages in the annular groove 82 on the hub 81 of the helix. A suitable U-shaped resilient friction spacer 87 as best seen in Figure 2 is placed around the hub between the hub and the barrel with the open portion of the U spanning the tang 36. The spacer 87 frictionally engages the parts by an amount which is readily predetermined, retards the helix against excessively free rotation in the barrel and prevents plastic from running on plastic.

The press-fitting barrel band 44 surrounds the base portion 83 of the clip and holds the tang in position in the groove 82, and the tang prevents the helix from moving longitudinally as it turns with respect to the barrel.

In operation, the device is assembled by threading the shoe on the helix, and running the helix up close to the rear end. The collets are mounted on the segments. The various segments are then placed around the helix with the aligning projections against the rear end of the shoe, and the driving projection in one of the driving recesses. The spacer 61 is slipped over the hub 81 as by springing from the side, and then the barrel is slipped over the segments, the helix and the spacer, turning the barrel until the barrel slot 83 corresponds in position with the open side of the spacer. The tang of the clip is then inserted through the slot 83 and into the annular groove 82 on the hub of the helix. The barrel band 44 is then pushed over the head of the helix into place around the base of the clip.

The assembly is facilitated by using the tang of the clip to retain the parts in assembled relation and to permit relative rotation of the helix with respect to the barrel.

In view of my invention and disclosure variations and modifications to meet individual whim or particular need will doubtless become evident to others skilled in the art, to obtain all or part of the benefits of my invention without copying the structure shown, and I, therefore, claim all such insular as they fall within the reasonable spirit and scope of my claim.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

In a mechanical pencil, a barrel having an open end at one end and a tip adapted to guide leads at the opposite end, there being an opening in the side of the barrel near the open end, lead carriers in the barrel moveable longitudinally, adjustment means for the lead carriers including an adjustment head having a portion protruding beyond the open end, extending into the open end and having an outwardly directed circumferential groove in line with the opening in the side of the barrel, a clip located outside the barrel and having a tang which extends through the opening in the barrel and into the groove in the adjustment head and a band extending around the barrel adjacent the open end and around the clip outside the tang, holding the clip in place.

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