May 10, 1966 C. GERSPACHER 3,250,254

MECHANICAL PENCIL WITH ECCENTRIC MEANS FOR EXTENDING LEADS FROM OPPOSITE ENDS THEREOF

Filed July 24, 1964

FIG. 1

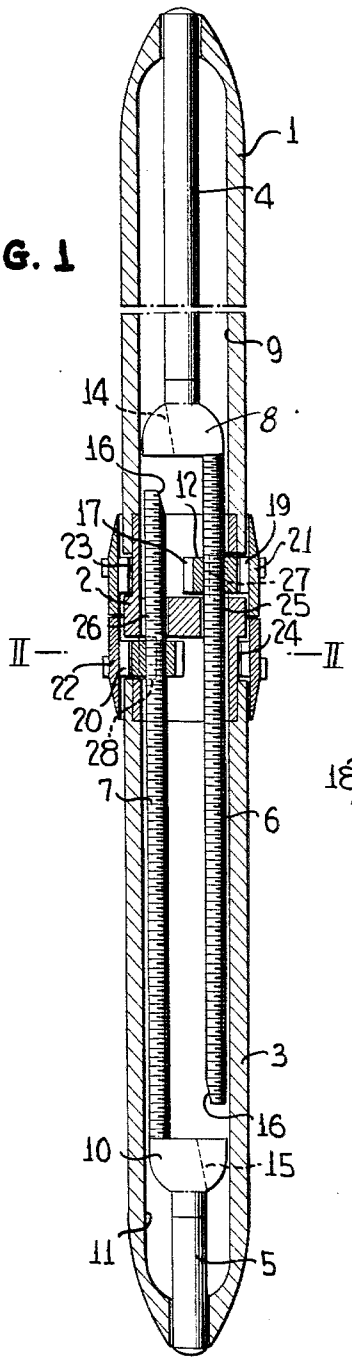


FIG. 2

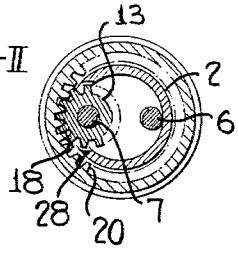


FIG. 3

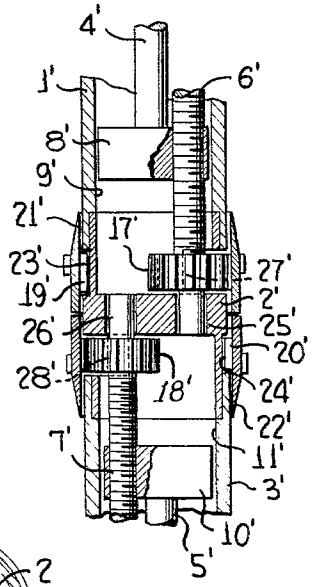
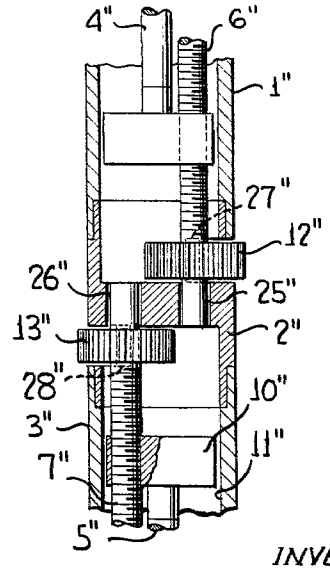


FIG. 4



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MECHANICAL PENCIL WITH ECCENTRIC MEANS FOR EXTENDING LEADS FROM OPPOSITE ENDS THEREOF

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This invention relates to mechanical pencils, pens, or other writing instruments. More particularly, the invention has reference to an article of this type which will be double-ended, to permit the extension of a pencil, crayon, pen point, or stylus from either end thereof.

Among important objects of the invention are the following:

To provide a double-ended writing instrument as described that will be characterized by its compact construction;

To incorporate, in a double-ended mechanical pencil, a particularly simplified means for extending or retracting the tip;

To provide a writing instrument of the type stated that will be relatively small in diameter, considering the fact that it incorporates a double-ended construction with overlapped, extendable tip means; and

To provide, in a writing instrument of the type stated, an eccentrically disposed tip-projecting mechanism, whereby to impart greater stability to the extendable means, while at the same time aiding in the provision of a compact structure, through the utilization of a bearing partition common to the tip extension means of the respective ends of the instrument.

Other objects will appear from the following description, the claims appended thereto, and from the annexed drawing, in which like reference characters designate like parts throughout the several views, and wherein:

FIG. 1 is a longitudinal sectional view through a writing instrument according to the present invention;

FIG. 2 is a transverse sectional view substantially on line 2—2 of FIG. 1;

FIG. 3 is a fragmentary, longitudinal sectional view of a modified form; and

FIG. 4 is a view similar to FIG. 3 showing a second modification.

Referring to the drawing in detail, in the embodiment of the invention shown in FIGS. 1 and 2, I provide a double-ended writing instrument including opposite but identical, elongated, tubular barrel sections **1, 3** having spaced, confronting inner ends connected by a ferrule or connecting sleeve **2**. In the illustrated example, the connecting sleeve has its respective ends frictionally engaged in counterbores provided at the inner end portions of the respective barrel sections. However, it will be apparent that any of various means can be employed for connecting the barrel sections, according to the desires of the manufacturer.

Extending longitudinally and centrally of the respective barrel sections **1, 3** are tip elements **4, 5** respectively. These could be crayons, pencil leads, ball-point pens, cartridges, or any combination of these. In the illustrated example, the tip element **4** is of substantially greater length than the tip element **5**, this being permitted due to

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the eccentric disposition of the propulsion or extending mechanisms incorporated in the device.

The tip elements, at their outer ends, extend through openings provided in tapered outer end portions of the respective barrel sections, and as will be apparent, the tip elements are freely slidable in the opening of the barrel section.

At their inner ends, the tip elements **4, 5** are secured to elongated drive rods **6, 7** respectively offset from the common longitudinal center line of the writing tips. The rods extend in parallel relation, and are diametrically opposed, as seen in FIG. 2. The rods are extended in closely spaced relation to the side walls of the barrel sections **1, 3** and are non-rotatably connected to the writing tips through the provision of connecting elements or heads **8, 10** respectively. These are of circular form, and are concentric with the inner diameters **9, 11** of the barrel sections **1, 3** respectively.

Rotatably supported in the connecting sleeve are pinions **12, 13**, which have portions of their circumferences projecting outwardly through notches formed in the connecting sleeve (see FIG. 2). The pinions have threaded center openings, engaging complementary threads formed upon the drive rods **6, 7**. Thus, on rotation of a pinion, the rod associated therewith will be shifted longitudinally of the barrel defined by the ferrule **2** and barrel sections **1, 3** to extend or retract the writing tip secured to the driving rod, depending upon the direction of rotation of the pinion.

In order to prevent retraction of the writing tip into the barrel beyond a point at which the writing tip is still centered within its associated opening provided in the outer end of the barrel, I utilize means for engaging each connecting head against the adjacent end of the drive rod of the tip mechanism that projects from the opposite end of the barrel. Thus, heads **8, 10** are provided with recesses **14, 15** respectively, adapted to engage beveled ends **16, 16** of the respective drive rods **6, 7**.

It will be apparent, thus, if for example the writing tip **4** is being retracted, ultimately the connecting head **8** will receive, in its recess **14**, the beveled end **16** of the drive rod **7**.

The pinions **12, 13** are provided with gear teeth **17, 18** respectively, meshing with internal ring gear teeth **19, 20** formed on the inner surfaces of drive rings **21, 22** respectively, rotatably mounted upon the ferrule **2** and on the inner end portions of the barrel sections **1, 3**. The rings **21, 22** are held assembled with the barrel sections and the ferrule, by reason of the provision of reduced end portions **23, 24** of the ferrule, defining an external shoulder or collar on the ferrule medially between the opposite ends thereof. The respective drive rings are held against movement toward each other by the shoulders defined by the collar, and are held against movement away from each other by shoulders defined on the respective, adjacent end portions of the barrel sections. These confronting shoulders on the barrel sections and on the ferrule cooperate to define external, annular recesses on the barrel of the device, receiving the internal ring gear teeth **19, 20** to hold the drive rings against longitudinal deviation from their assigned positions, in either direction.

Freely rotatable in diametrically opposed guide openings provided in a center bearing partition of the ferrule

are overlapping portions 25, 26 of the respective drive rods. In this connection, as will be seen from FIG. 1, the pinion-receiving notches or recesses 27, 28 of the ferrule are disposed immediately adjacent the respective opposite faces of the bearing partition. This disposes the pinions in positions where they will be supported against axial deviation from their assigned positions, in engagement with the internal ring gears previously described herein.

In use of the form of the invention shown in FIGS. 1 and 2, either of the rings 21 or 22 can be rotated in a selected direction, to extend or retract the writing tip associated therewith. For example, if it is desired to extend the tip 4, the ring 21 will be turned in one direction, to rotate the pinion 12, thereby to shift the rod 6 in a direction to extend the writing tip. Rotation of the drive ring 21 in the opposite direction will cause the tip to be retracted.

The same is true of the ring 22. It is turned in either direction to extend or retract the writing tip 5 as desired.

By reason of this arrangement, a highly compact structure is produced, resulting from the eccentric disposition of drive rods associated with the respective writing tips, said drive rods being of course held against rotation themselves due to the fact that they are connected eccentrically to connecting elements or heads 8, 10 that are centered in the barrel.

Referring now to the form of the invention shown in FIG. 3, barrel sections 1', 3' house writing tips 4', 5' of equal length, advanced or retracted by eccentrically disposed drive rods 6', 7' having threads engaging in threaded eccentric openings of heads 8', 10' mounted on the inner ends of the writing tips 4', 5'. The heads are centered in and are freely slidable along the inner surfaces 9', 11' of the respective barrel sections.

Rigid with the drive rods are pinions or collars 17', 18', the teeth of which are in mesh with internal ring gear teeth 19', 20' of drive bands or rings 21', 22' respectively.

Provided upon the drive rods 6', 7' are stud ends 25', 26' respectively, freely rotatable in bearing openings formed in the partition of ferrule 2' medially between the barrel sections 1', 3'.

As in the first form of the invention, the pinions have portions of their circumferences projecting through recesses 27', 28' that are provided in the ferrule 2'.

In this form of the invention, as in the first form, rotation of a selected drive ring, in a desired direction, will produce extension or retraction of a writing tip, in that the rotation of the pinion in mesh with the selected drive ring will cause corresponding rotation of the drive rod secured to their pinion. This will advance the writing tip, or retract the same due to the thread engagement between the driving rod and the head 8' or 10' as the case may be.

In FIG. 4, parts that are analogous to parts found in the first and second forms of the invention have been designated by corresponding numerals, plus the mark". Accordingly, it is unnecessary to describe the parts in detail, where they are common to at least one of the other forms of the invention. It is sufficient to note that in the FIG. 4 construction, the drive rings are eliminated, and the use of gears is rendered unnecessary, due to the provision of drive wheels 12", 13", connected to the drive rods 6", 7" for rotation therewith in recesses 27", 28". The wheels project, for part of their circumferences, beyond the outer surface of the connecting ferrule 2", so that one can rotate a selected wheel with the thumb. Here again, the drive rods are threaded, and are engaged in threaded openings in the heads 8", 10" of the writing tips.

In all forms of the invention, there is the common characteristic wherein the drive rods are eccentrically disposed, and are overlapped at least for portions of their lengths, with the overlapped portions bearing in diametrically opposed openings provided in a bearing partition

of the connecting ferrule of the barrel sections. A compact, highly stable arrangement results, which desirably maintains a writing tip in a centered position during use of the writing instrument, and eliminates excessive lateral pressures within the housing, such as might normally tend to break the writing tip.

Further, the construction permits long extension distances for the two writing tips of a double-ended writing instrument, in relation to a relatively short overall length of the barrel, and a relatively small barrel diameter. Still further, the invention is characterized by the ease with which the selected tip can be extended or retracted, since one can simply grasp the barrel in one hand, and rotate the drive ring or drive wheel as the case may be, with the thumb.

Of course, it is to be understood that with the possible exception of a writing instrument utilizing a permanent marker or stylus as the tip, the tip elements would be replaceable in the same manner as the pencil leads or refill cartridges of conventional mechanical pencils or ball-point pens.

It is believed apparent that the invention is not necessarily confined to the specific use or uses thereof described above, since it may be utilized for any purpose to which it may be suited. Nor is the invention to be necessarily limited to the specific construction illustrated and described, since such construction is only intended to be illustrative of the principles of operation and the means presently devised to carry out said principles, it being considered that the invention comprehends any changes in construction that may be permitted within the scope of the appended claims.

I claim:

1. A writing instrument comprising:
(a) a barrel having openings at opposite ends thereof;
(b) tip elements extending longitudinally and centrally of the barrel, said elements being extendable from and retractable into the barrel through said openings; and
(c) means carried by the barrel and engaged with the respective tip elements for extending and retracting each tip element independently of the other, said means for each tip element including a threaded rod eccentric to and having a fixed connection to the tip, a pinion having a threaded center opening engaging the rod to shift the rod longitudinally responsive to rotation of the pinion, and a drive ring rotatably mounted on the barrel and having internal ring gear teeth meshing with the pinion for rotating the same responsive to rotation of the drive ring, said barrel including a transverse partition having bearing openings in which said rods are journalled.

2. A writing instrument comprising:
(a) a barrel having openings at opposite ends thereof;
(b) tip elements extending longitudinally and centrally of the barrel, said elements being extendable from and retractable into the barrel through said openings; and
(c) means carried by the barrel and engaged with the respective tip elements for extending and retracting each tip element independently of the other, said means for each tip element including a head on the tip element centered in the barrel and having a threaded opening eccentric to the tip element, a drive rod threadedly engaged in said opening of the head for shifting the head and tip element longitudinally of the barrel responsive to rotation of the rod, a pinion rotatable with the rod, and a drive ring rotatably mounted on the barrel and having internal ring gear teeth in mesh with the pinion for rotating the same in response to rotation of the ring.

3. A writing instrument comprising:
(a) a barrel having openings at opposite ends thereof;
(b) tip elements extending longitudinally and centrally of the barrel, said elements being extendable from

and retractable into the barrel through said openings; and

(c) means carried by the barrel and engaged with the respective tip elements for extending and retracting each tip element independently of the other, said means for each tip element including a head on the tip element centered in the barrel and having a threaded opening eccentric to the tip element, a drive rod threaded for engagement in said opening of the head to shift the same longitudinally of the barrel in response to rotation of the rod, and a wheel rotatable with the rod and projecting partially out of the barrel for rotation by a user, said barrel including a bearing partition having bearing openings in which the respective drive rods are journalled.

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LAWRENCE CHARLES, *Primary Examiner.*