

PATENT SPECIFICATION

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(54) WRITING INSTRUMENTS

(71) We, YA-MEI HUNG and YEN-PING Hsiao Liu, both Chinese citizens, residing at 52 Sec. 1, Hsin Sheng N. Road, Taipei, Taiwan, Republic of China and 33 Lane 170, Tung Hwa Street, Taipei, Republic of China respectively, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to writing instruments of the kind that are provided with a supply of replacement writing units, for example leads in the case of propelling pencils and refills in the case of ball-point pens.

According to the invention such a writing instrument comprises a tubular casing, a writing unit held in a readily removable manner within one end of the casing and having a writing point or nib projecting from the casing, and a supply of replacement writing units stored within the tubular casing apart from the said writing unit, the end of the tubular casing adjacent to said writing unit being provided with a bore which tapers inwardly away from the said end, and each of the writing units have an external surface shaped to make a stable force fit with the tapered bore.

As will become clearer subsequently, provision of this particular kind of force fit between the writing unit and the tubular casing makes for a particularly stable assembly which is therefore comfortable to use. Moreover it is simple and therefore cheap to manufacture.

Preferably the writing instrument has a tubular member slidably held within the casing and projecting therefrom at the end remote from the writing unit, the tubular member serving as an ejector for ejecting the said writing unit from the casing. Provision of the ejector member facilitates replacement of a used writing unit.

In this form of writing instrument it is also preferable if the ejector member at its end remote from the said writing unit has an enlarged portion provided with inwardly extending flexible members which serve to retain the supply of writing units within the

ejector member until required. If the writing units each have a generally cylindrical portion projecting from the said external surface away from the said writing point or nib, and the generally cylindrical portion of the rearmost writing unit is capable of projecting through the flexible members so that it can be grasped by hand and pulled from the ejector member against the flexibility of the said members, a particularly easy to use writing instrument results.

By way of example two writing instruments in accordance with the invention will now be described with reference to the accompanying drawings in which:—

Figure 1 is a perspective view of one of the writing instruments;

Figure 2 is an enlarged vertical longitudinal sectional view through the writing instrument of Figure 1;

Figure 3 is an enlarged longitudinal sectional view through the writing unit of the instrument of Figures 1 and 2;

Figure 4 is a partial sectional view of the instrument of Figures 1 and 2 illustrating a writing unit being ejected from the front end of the casing;

Figure 5 is an inverted view of the instrument of Figures 1 and 2 with the used writing unit ejected and illustrating one of the replacement writing units stored in the ejector tube ready to be pulled out and inserted into the front end of the casing;

Figure 6 is a longitudinal sectional view of the other writing instrument; and

Figure 7 is a perspective view of a writing unit that can be used in the writing instrument of Figure 6.

Referring to Figures 1 to 5 the writing instrument comprises a writing unit 10 of circular cross-section, a tubular casing 20 and a slidably mounted ejector-tube 30. Identical replacement writing units also designated 10 are stored as shown.

Each writing unit has a front section 12, a middle section 13 and a rear section 14. The outer diameters of the front section 12 and the rear section 14 are substantially equal. The inner diameters of the rear section 14 and the middle section 13 are

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larger than that of the front section 12. The front section 12 holds the writing point 11, for example a sharpened lead. The rear section 14 serves to permit the writing unit to be easily grasped when the writing unit is to be replaced. The external surface of the middle section 13 of the writing unit carries a step adjacent the front section 12. Rearward of this step the external surface is conically shaped, tapering rearwardly.

The front end of the tubular casing 20 is formed with a conically shaped bore 21 shaped to receive the conically shaped part of the writing unit such that the latter is held in a force-fit in the bore in a stable manner. This is such as to prevent relative movement or vibration between the writing unit and casing and of course prevents the writing unit retracting into the casing.

As shown in Figures 2 and 4 the bore 21 continues rearwardly with a portion 22 and a conically shaped portion 23. The front end of the slidably mounted ejector-tube 30 has a narrow portion shaped to pass through the bore such that forward movement of the ejector-tube ejects a writing unit in the bore 21. The portion 32 of the ejector-tube abuts the bore portion 23 when the ejector-tube is in its forward position, thus limiting this movement.

The ejector-tube is enlarged at its rear end as shown at 35. Inwardly extending flexible members 36, as shown in Figure 1, effectively close the end of the ejector-tube to prevent the stored writing units slipping out of the tube. These flexible members, however, permit the section 14 of a writing unit to pass, as shown in Figure 5, when the writing instrument is inverted. This section can then be grasped and then pulled out of the tube. The flexibility of the members 36 permits this.

The ejector-tube also has an enlarged rear portion 34 which frictionally engages with the casing 20. This prevents movement of the ejector-tube until force is applied to it.

The writing instrument shown in Figure 6 differs from that just described in that it has no ejector-tube. A used writing unit is removed by pulling it from the casing.

Figure 7 shows a writing unit which is particularly suited to the writing instrument shown in Figure 6 in that it is easy to pull from the casing. This is because it is provided with a number of projecting axially extending ridges 15. These serve to reduce the friction between the writing unit and the conically shaped surface 21.

WHAT WE CLAIM IS:—

1. A writing instrument comprising a tubular casing, a writing unit held in a

readily removable manner within one end of the casing and having a writing point or nib projecting from the casing, and a supply of replacement writing units stored within the tubular casing apart from the said writing unit, the end of the tubular casing being provided with a bore which tapers inwardly away from the said end, and each of the writing units having an external surface shaped to make a stable force fit with the tapered bore.

2. A writing instrument according to claim 1 having a tubular member slidably held within the casing and projecting therefrom at the end remote from the writing unit, the tubular member serving as an ejector for ejecting the said writing unit from the casing.

3. A writing instrument according to claim 2 in which the ejector member at its end adjacent the said writing unit has a narrow portion shaped to pass through the said bore to eject the said writing unit.

4. A writing instrument according to claim 2 or 3 in which the ejector member at its end remote from the said writing unit has an enlarged portion provided with inwardly extending flexible members which serve to retain the supply of writing units within the ejector member until required.

5. A writing instrument according to claim 4 in which each writing unit has a generally cylindrical portion projecting from the said external surface away from the said writing point or nib, the generally cylindrical portion of the rearmost writing unit projecting through the flexible members so that it can be grasped by hand and pulled from the ejector member against the flexibility of the said members.

6. A writing instrument according to any one of the claims 2 to 5 in which the ejector member is a friction fit within the tubular casing.

7. A writing instrument according to any one of the preceding claims in which the said external surfaces of the writing units are each tapered.

8. A writing instrument according to any one of claims 1 to 6 in which the said external surfaces of the writing units are in the form of projecting axially extending ridges superimposed on a conical surface.

9. A writing instrument substantially as herein described with reference to and as illustrated in Figures 1 to 5 of the accompanying drawings or as modified by either of Figures 6 and 7.

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larger than that of the front section 12. The front section 12 holds the writing point 11, for example a sharpened lead. The rear section 14 serves to permit the writing unit to be easily grasped when the writing unit is to be replaced. The external surface of the middle section 13 of the writing unit carries a step adjacent the front section 12. Rearward of this step the external surface is conically shaped, tapering rearwardly.

The front end of the tubular casing 20 is formed with a conically shaped bore 21 shaped to receive the conically shaped part of the writing unit such that the latter is held in a force-fit in the bore in a stable manner. This is such as to prevent relative movement or vibration between the writing unit and casing and of course prevents the writing unit retracting into the casing.

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The ejector-tube is enlarged at its rear end as shown at 35. Inwardly extending flexible members 36, as shown in Figure 1, effectively close the end of the ejector-tube to prevent the stored writing units slipping out of the tube. These flexible members, however, permit the section 14 of a writing unit to pass, as shown in Figure 5, when the writing instrument is inverted. This section can then be grasped and then pulled out of the tube. The flexibility of the members 36 permits this.

The ejector-tube also has an enlarged rear portion 34 which frictionally engages with the casing 20. This prevents movement of the ejector-tube until force is applied to it.

The writing instrument shown in Figure 6 differs from that just described in that it has no ejector-tube. A used writing unit is removed by pulling it from the casing.

Figure 7 shows a writing unit which is particularly suited to the writing instrument shown in Figure 6 in that it is easy to pull from the casing. This is because it is provided with a number of projecting axially extending ridges 15. These serve to reduce the friction between the writing unit and the conically shaped surface 21.

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2. A writing instrument according to claim 1 having a tubular member slidably held within the casing and projecting therefrom at the end remote from the writing unit, the tubular member serving as an ejector for ejecting the said writing unit from the casing.

3. A writing instrument according to claim 2 in which the ejector member at its end adjacent the said writing unit has a narrow portion shaped to pass through the said bore to eject the said writing unit.

4. A writing instrument according to claim 2 or 3 in which the ejector member at its end remote from the said writing unit has an enlarged portion provided with inwardly extending flexible members which serve to retain the supply of writing units within the ejector member until required.

5. A writing instrument according to claim 4 in which each writing unit has a generally cylindrical portion projecting from the said external surface away from the said writing point or nib, the generally cylindrical portion of the rearmost writing unit projecting through the flexible members so that it can be grasped by hand and pulled from the ejector member against the flexibility of the said members.

6. A writing instrument according to any one of the claims 2 to 5 in which the ejector member is a friction fit within the tubular casing.

7. A writing instrument according to any one of the preceding claims in which the said external surfaces of the writing units are each tapered.

8. A writing instrument according to any one of claims 1 to 6 in which the said external surfaces of the writing units are in the form of projecting axially extending ridges superimposed on a conical surface.

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