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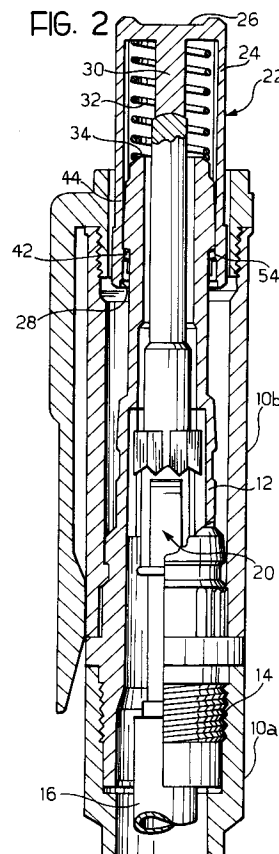
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I-10152 Torino (IT)(54) **A simplified-assembly ball point pen.**

(57) The ball point pen comprises an elongate, hollow barrel (10), a tubular element (12) arranged coaxially within the upper portion of the barrel (10), a writing point (18) and a push-button (22) arranged to control the extension/withdrawal of the writing point (18) relative to the barrel (10). At least one longitudinal rib (40) and an annular projection (42) are formed either on the inner surface of the sleeve (24) of the push-button (22) or on the outer surface of the tubular element (12) and, correspondingly, at least one raised, shaped element (44) is formed either on the outer surface of the tubular element (12) or on the inner surface of the sleeve (24) so as to interfere radially with the annular projection (42) and to define at least one longitudinal groove (46) adapted to form a seat for the rib (40) when the sleeve (24) is fitted onto the tubular element (12).

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The present invention relates to a ball point pen of the type including:

- an elongate hollow barrel,
- a tubular element located coaxially within the upper portion of the barrel,
- a writing point fixed to an ink-container tube, this tube being located coaxially within the lower portion of the barrel and the tubular element and this point being arranged at the lower end of the barrel, and
- a push-button formed by a sleeve having an end surface at one end and an open end at the other, this push-button being assembled coaxially at the upper end of the pen and arranged to control the extension/withdrawal of the writing point relative to the barrel.

The object of the present invention is to provide a pen of the type described above in which the push-button may be assembled with the other components in an automated assembly process.

This object is achieved by means of a pen of the type described above, characterised in that either the inner surface of the sleeve or the outer surface of the tubular element has at least one longitudinal rib and an annular projection and in that, correspondingly, the outer surface of the tubular element or the inner surface of the sleeve has at least one raised, shaped element which interferes radially with the annular projection and defines at least one longitudinal groove arranged to form a seat for the rib when the sleeve is fitted onto the tubular element.

During the assembly of the pen of the invention, the push-button is positioned along the axis defined by the remaining components of the pen, which have already been fitted together, and is subsequently fitted onto the tubular element with the at least one longitudinal rib inserted in the corresponding groove defined by the at least one raised, shaped element.

This insertion movement also causes the annular projection to pass over the at least one raised, shaped element as a result of resilient deformation, and to position itself beyond the lower edge of the projection. When the pen is assembled, this lower edge thus forms a stop shoulder for the annular projection and prevents the push-button from sliding off the tubular element.

The annular projection and a plurality of longitudinal ribs, equiangularly spaced around the circumference, are preferably formed on the inner surface of the push-button sleeve of the pen of the invention, while a plurality of raised, shaped elements are equiangularly spaced around the outer surface of the tubular element so as to define between them the same number of grooves as there are ribs and having pointed tips at their ends facing the push-button such that the inclined sur-

faces defining the tips constitute lead-in surfaces for facilitating the entry of the ribs into the corresponding grooves.

This embodiment has the advantage that, during the assembly of the push-button with the other components of the pen, the ribs of the push-button are obliged to fit into the grooves in the shaped element, even if they were not originally aligned, thanks to the inclination of the surfaces defining the pointed tips of the shaped elements facing the ribs, which facilitates the insertion of the latter into the corresponding grooves.

This characteristic simplifies the automatic assembly of the pen, eliminating the need to orient the push-button correctly relative to the other components as this occurs automatically during the insertion operation.

The engagement of the ribs with the grooves also has the added advantage of preventing any relative rotation of the push-button and the tubular element during use of the pen, thus avoiding possible damage due to this movement.

In addition, during the assembly of the pen of the invention, the insertion of the push-button may be carried out as the final operation and may therefore test the snap mechanism for the writing point, which has previously been assembled with the other components, by means of the continuing travel of the push-button.

This gives the advantage of eliminating the need for a separate operation to test the pen, thereby clearly saving time and cutting costs.

The push-button of the pen of the invention has means within it, such as the annular projection and the ribs, which allow it to be fitted together with the other components. As these means do not project outside the push-button, the transverse dimensions of that portion thereof which is intended to project from the barrel of the pen are not subject to any particular limitations.

The pen of the invention thus has an aesthetic advantage as the portion of the push-button intended to project from the barrel extends the line of the latter as its radial dimensions are only slightly smaller.

In a preferred embodiment of the pen of the invention, resilient means are interposed between the end surface of the push-button sleeve and the upper end of the tubular element.

In this way, when the user is not exerting any pressure on it, the push-button is always extended relative to the other components of the pen, giving the latter an aesthetically pleasing appearance.

Further advantages and characteristics of the present invention will become apparent from the detailed description which follows, with reference to the appended drawings, provided purely by way of non-limitative example, in which:

Figure 1 is an elevational view of a pen according to the invention,

Figure 2 is a cross-section of the upper portion of the pen of Figure 1,

Figure 3 is an exploded elevational view of a few components of the pen of the invention, and

Figure 4 is a plan view of a detail shown in Figure 3.

A ball point pen (Figures 1 and 2) includes an elongate hollow barrel 10 constituted by a lower part 10a and an upper part 10b. A tubular element 12 is housed coaxially within the latter and has threading 14 around its lower end onto which the lower part 10a is screwed.

A tube 16 containing ink is arranged coaxially within the latter part 10a with a writing point 18 fixed to its lower end. The assembly constituted by the tube 16 and the writing point 18 is usually known as a refill.

A mechanism, in itself known and generally indicated 20, is also housed in the barrel 10 and arranged to allow the writing point 18 to snap in and out of the barrel 10.

The snap mechanism 20 is controlled by a push-button 22 mounted on the upper end of the tubular element 12, as will be explained in detail below.

The push-button 22 (Figures 3 and 4) is formed by a sleeve 24 having an end wall 26 at one end, the other end 28 being open. A pin 30 for operating the snap mechanism 20 projects from the end wall 26 into the sleeve 24.

A helical spring 32 is interposed between the end wall 26 of the sleeve 24 and the upper end 34 of the tubular element 12.

The lower portion 36 of the outer surface of the sleeve 24, intended to remain always inside the barrel 10, projects slightly relative to the upper portion 38 which is intended to project from the barrel 10 so as to prevent the portion 38 from rubbing against the facing inner surface of the barrel 10 when the push-button 22 is operated.

The inner surface of the sleeve 24 has a plurality of longitudinal ribs 40 equiangularly spaced around its circumference and an annular projection 42 adjacent the open end 28.

The outer surface of the tubular element 12 has a plurality of raised, shaped elements 44 equiangularly spaced around its circumference so as to define the same number of grooves 46 between them as there are ribs 40.

Each shaped element 44 has a pointed tip 48 at its end facing the push-button 22 and a portion 50 the thickness of which increases as it approaches the end opposite that facing the push-button 22.

During the assembly of the pen, the push-button 22 is positioned along the axis defined by

the other components of the pen which have been assembled previously and is pushed against the upper end 34 of the tubular element 12.

The ribs 40 of the sleeve 24 easily enter the corresponding grooves 46 in the tubular element 12, even without deliberate prealignment, thanks to the inclination of the sides 52 defining the pointed tips 48 of the shaped elements 44 which form lead-in surfaces for the ribs 40 facilitating their entry into the corresponding grooves 46.

During this movement, the open end 28 of the sleeve 24 deforms slightly due to its resilience as there is interference between the annular projection 42 and the shaped elements 44 which gradually increases as the projection 42 slides over the portions 50 of the shaped elements 44.

During the insertion of the push-button 22, when the projection 42 passes the lower edges 54 of the shaped elements 44, the open end 28 of the sleeve 24 returns to its undeformed shape and the push-button 22 is thus definitively fixed to the tubular element 12 onto which it is fitted. In fact any movement to separate the push-button 22 from the tubular element 12 is prevented by the fact that the annular projection 42 is forced against the lower edge 54 of the shaped elements 44 (Figure 2).

On the other hand, the opposite movement, which the push-button 22 makes in order to operate the snap mechanism 20, is freely permitted.

When the push-button 22 is in its rest position, the annular projection 42 always bears against the lower edges 54 of the shaped elements 44 due to the presence of the spring 32. The upper portion 38 of the push-button 22 therefore always projects fully from the barrel 10, thus enhancing its appearance.

Naturally, the principles of the invention remaining the same, manufacturing details and embodiments may be varied widely compared to those described and illustrated without departing from the scope of the present invention. For example, the positions of the ribs 40 and the shaped elements 44 may be inverted, the latter being arranged on the inner surface of the sleeve 24 and the ribs 40 arranged on the outer surface of the tubular element 12 along with the annular projection 42.

Claims

1. A ball point pen comprising:
 - an elongate hollow barrel (10),
 - a tubular element (12) arranged coaxially within the upper portion of the barrel (10),
 - a writing point (18) fixed to an ink-container tube (16), this tube (16) being located coaxially within the lower portion of

the barrel (10) and the tubular element (12) and this point (18) being arranged at the lower end of the barrel (10), and

- a push-button (22) formed by a sleeve (24) having an end wall (26) at one end and an open end (28) at the other, the push-button (22) being assembled coaxially at the upper end of the pen and arranged to control the extension/withdrawal of the writing point (18) relative to the barrel (10),
the pen being characterised in that at least one longitudinal rib (40) and one annular projection (42) are formed on the inner surface of the sleeve (24) or on the outer surface of the tubular element (12) and in that, correspondingly, at least one raised, shaped element (44) is formed on the outer surface of the tubular element (12) or on the inner surface of the sleeve (24), the raised shaped element being arranged to interfere radially with the annular projection (42) and to define at least one longitudinal groove (46) arranged to form a seat for the rib (40) when the sleeve (24) is fitted onto the tubular element (12).

(32) are interposed between the end wall (26) of the sleeve (24) and the upper end (34) of the tubular element (12).

2. A pen according to Claim 1, characterised in that the inner surface of the sleeve (24) has the annular projection (42) and a plurality of longitudinal ribs (40) equiangularly spaced around its circumference and in that the outer surface of the tubular element (12) has a plurality of raised, shaped elements (44) equiangularly spaced around its circumference so as to define between them the same number of grooves (46) as there are ribs (40), each shaped element having a pointed tip (48) at its end facing the push-button (22) such that the inclined surfaces (52) defining the tips (48) constitute lead-in surfaces for facilitating the entry of the ribs (40) into the corresponding grooves (46).
3. A pen according to Claim 2, characterised in that each shaped element (44) has at least one portion (50) the thickness of which increases towards the end of the shaped element (44) opposite that facing the push-button (22).
4. A pen according to any one of the preceding claims 2 or 3, characterised in that the annular projection (42) is formed on the sleeve (24) adjacent its open end (28).
5. A pen according to any one of the preceding Claims, characterised in that resilient means

FIG. 1

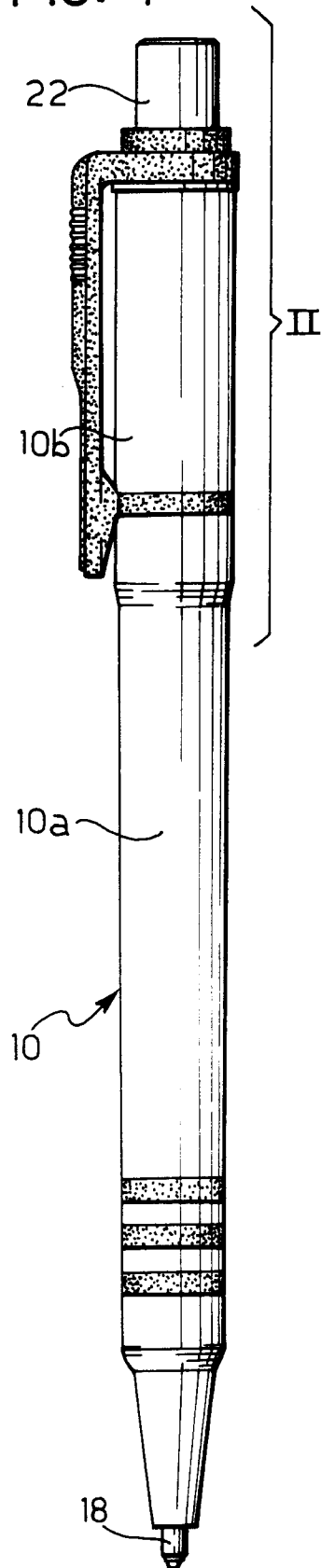


FIG. 2

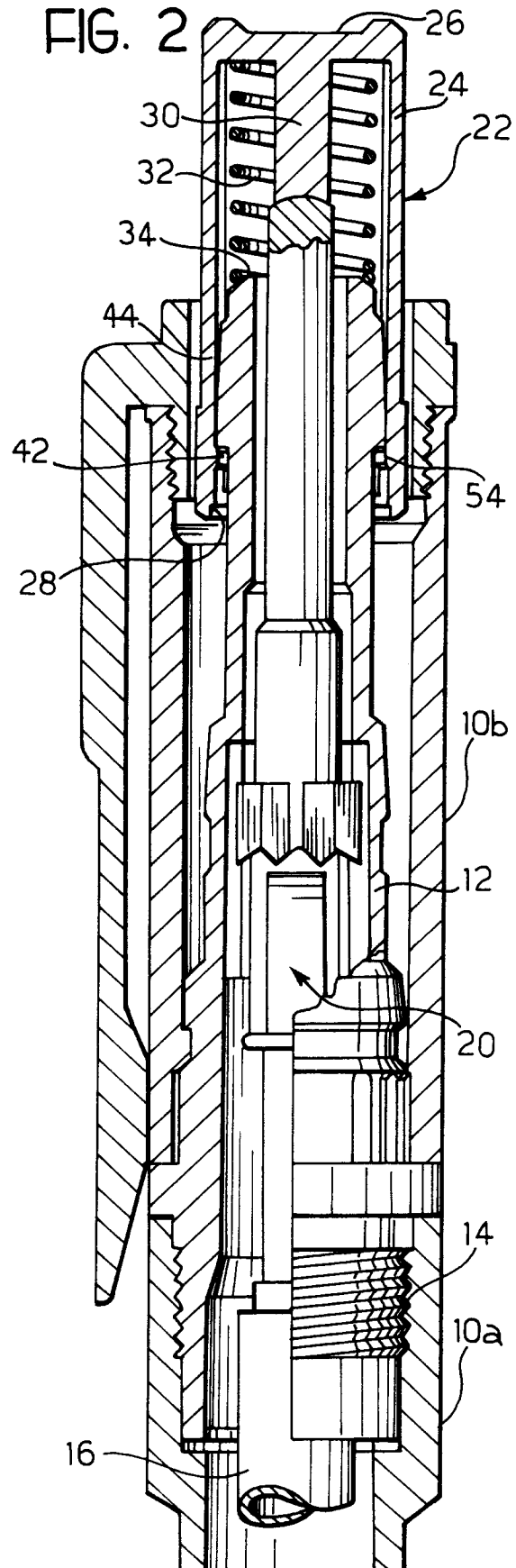


FIG. 3

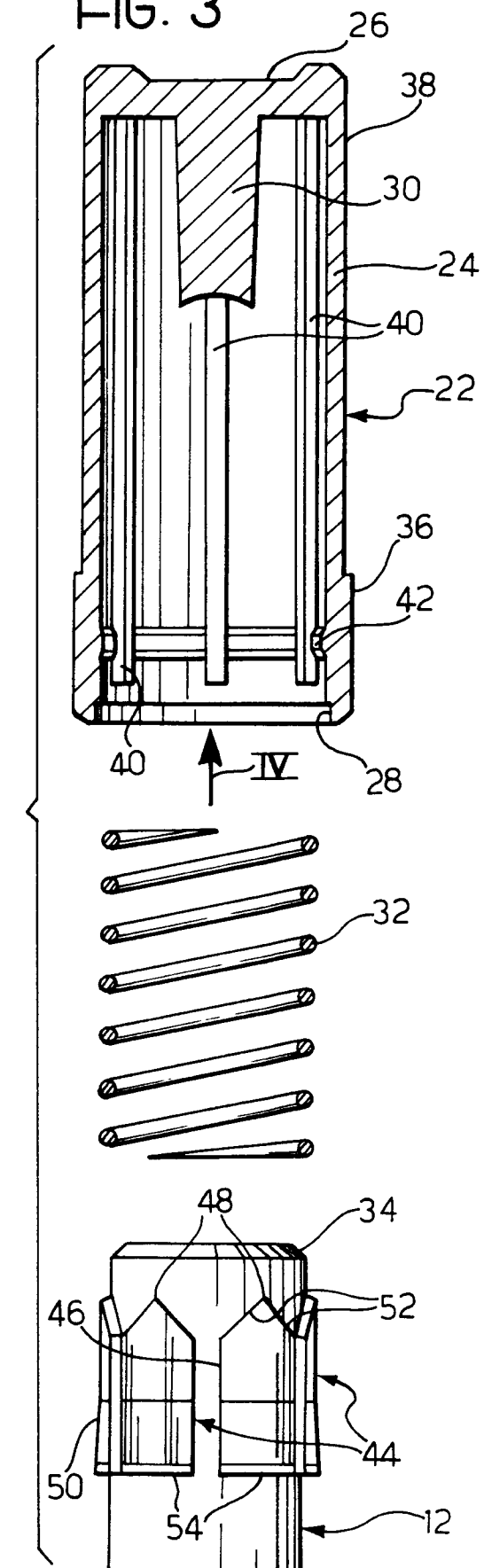
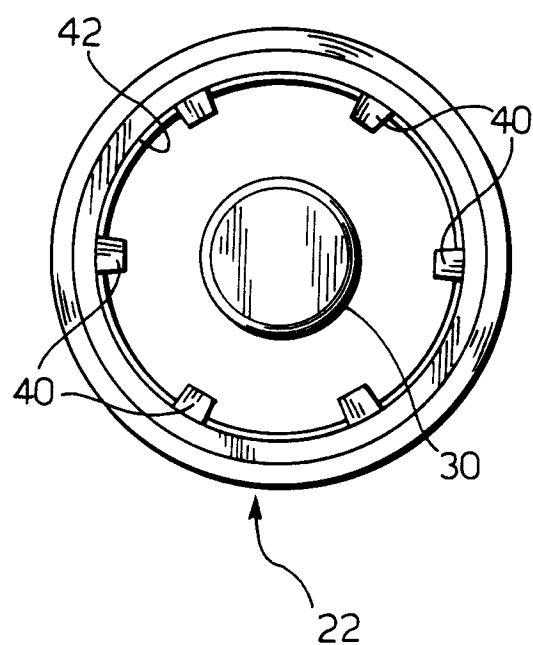


FIG. 4





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EUROPEAN SEARCH REPORT

Application Number
EP 94 10 5441

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.5)
Y	EP-A-0 538 503 (KOTOBUKI & CO) * column 3, line 27 - column 5, line 7; figures *	1-3	B43K24/08
Y	US-A-3 318 289 (MARYNISSEN) * column 6, line 18 - line 26; figures 8,13 *	1-3	
A	US-A-4 991 988 (SNELL ET AL.) * column 5, line 31 - line 36; figure 2 *	1	
A	US-A-5 004 364 (TOMURA ET AL.) * column 4, line 6 - column 5, line 15; figures 1,2C,3 *	1	
A	FR-A-1 439 827 (FAGARD) * figures 3,4 *	5	
			TECHNICAL FIELDS SEARCHED (Int.Cl.5)
			B43K
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
THE HAGUE		5 August 1994	Perney, Y
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application I : document cited for other reasons & : member of the same patent family, corresponding document	