

# PATENT SPECIFICATION

DRAWINGS ATTACHED

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## COMPLETE SPECIFICATION

### Improvements in and relating to Writing Instruments of the Ball Point Type

We, BALLOGRAF-VERKEN AB, a company organized under the laws of Sweden, of Krokslattsgatan 25, Mölndal, Sweden, 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:—

The present invention relates to a writing instrument of the ball point type in which an ink container or cartridge is axially slidable in a barrel or housing by a spring loaded plunger mechanism whereby the ink container can be selectively moved from a position in which the ball point lies retracted in the barrel, into a projected writing position, and vice versa, according to the users' requirements.

A writing instrument of the above type has been suggested in which in the retracted and projected positions of the ink container, the latter is moved longitudinally and laterally into oppositely inclined aside positions of the axis of the instrument.

Our invention is based upon the principle that the ink container has a truly axial movement into its alternative positions of retraction and ejection, and it has for its primary object to provide an improved writing instrument in which the ink container is provided with adequate support inside the barrel in its writing position and which permits of the public using ink containers of substantial volume or storage capacity, i.e. the so-called magnum refills.

The term 'truly axially movement' used in this specification means that the container coincides at all times with the axis of the barrel.

According to the present invention, in a writing instrument of the type referred to, the interior of the barrel is provided with a guiding sleeve having an axial guide bore of a non-circular cross section for a correspondingly shaped releaser carried by said plunger,

said guiding sleeve being also provided with two axially spaced abutments for coacting with a coupling pin adapted to be brought into two predetermined positions, in one of said positions being urged by a spring to cause a collar on the pin to engage against one of the said abutments and in the other position against the other abutment due to one end of said coupling pin being engaged by the inner end of said releaser, whereas the other end of said coupling engages a concave centering slide which is axially movable in the guiding sleeve and rests against the rear end of the ink container.

For a better understanding of the invention, a ball point writing instrument according to the invention is illustrated, by way of example, on the accompanying drawing, wherein:—

Fig. 1 is a longitudinal section of the writing instrument of the ball point type, according to the invention,

Fig. 2 is a similar longitudinal section but only showing the mechanism of the pen when the ink container is in the non working position,

Fig. 3 illustrates on an enlarged scale a cross section through the mechanism on the line III—III in Fig. 2 (the centering slide of the mechanism not being shown),

Fig. 4 illustrates a cross section similar to Fig. 3 without showing the centering slide but showing the coupling pin of the mechanism in the position shown in Fig. 1, and

Fig. 5 is a perspective view on a still larger scale of the inner end of the releaser of the mechanism.

A sheet metal sleeve 1 is by means of an inwardly pressed protuberance 2 connected with one end of a screw bush 3 of thermoplastic material. The bush 3 can be screwed into the rear end of a pen barrel 4. An ink container 6, having a writing ball 5, is inserted in the barrel 4, said ink container being provided with an annular shoulder 7.

A helical spring 9 is interposed between the shoulder 7 on the ink container 6 and a shoulder 8 on the inner surface of the barrel 4. A protective cover 10, with a clip 11, is frictionally engaged over the sleeve 1 to be described hereafter.

A guiding sleeve 12 is arranged in the sleeve 1. The guiding sleeve 12 is provided in its upper part with a guide bore 13 of rectangular cross section and a correspondingly shaped releaser 14 is axially slidable in the guide 13. The releaser 14 is connected with a plunger 16 having a cap 15, and the plunger 16 passes through the rear end of the cover 10. A helical spring 19 is inserted between a shoulder near the upper end 17 of the guiding sleeve 12 and a flange 18 on the plunger 16.

As is obvious from Fig. 5, the releaser 14 is essentially rectangular and its inner end has two inclined surfaces 20, 21 extending in opposite directions. One of these surfaces 20 situated adjacent to one of the narrow longitudinal surfaces of the releaser inclines towards one of the broad longitudinal surfaces of the releaser 14 and the other surface 21 situated adjacent to the opposite narrow surface of the releaser inclines towards the other broad longitudinal surface of the releaser 14. In its interior the guiding sleeve 12 is provided with two abutment shoulders 22 and 23 situated at different levels, the shoulder situated nearest to the writing point of the pen being provided with a stop member 24. The shoulders 22 and 23 are situated at the lower ends of the narrower surfaces 25 and 26, respectively, of the guide 13. The guiding sleeve 12 is provided adjacent to each of the longitudinal surfaces 27, 28 of the guide 13 with slide surfaces 29 and 30 respectively, which incline inwards, i.e. towards the guide 13, the surface 29 also inclining towards the surface 25 and the surface 30 also inclining towards the surface 26. A concave centering slide 31, constructed as a bowl which is axially slidable in the guiding sleeve 12 rests against the rear end of the ink container 6. The centering slide 31 is at the surface which is turned towards the ink container 6 provided with a transverse narrow slot 32 which extends on both sides of the inner end of the ink container for feeding air to the ink container 6. The slide is at its opposite surface provided with a cavity 33 which is engaged by one end 34 of a coupling pin 35 the other end 36 of which extends into the interior of the guide 13. The coupling pin 35 is at its centre portion provided with a collar 37. The latter is at its backwardly directed surface provided with an annular depression 38 thus forming an edge flange 39.

The operation is as follows. The coupling pin is assumed to be in the position shown in Figs. 2 and 3, the ink container with its writing point being then completely hidden

in the pen barrel 4. When the plunger 16 is pushed in, the inclined surface 21 of the releaser 14 will force the coupling pin 35 axially in the guiding sleeve 12 until the rear end 36 of the coupling pin reaches the slide surface 30 (Fig. 3). In this position, the collar 37 with the edge flange 39 will be situated in front of the shoulder 23. The end 36 of the pin 35 is by means of the surface 21 of the releaser 14 forced out onto the surface 30 and slides on this surface 30 in the direction of the arrow in Fig. 4 to the narrow surface 26 of the guide 13 where it once again enters the opening of the guide. Due to the fact that the collar 37 with its edge flange 39 by the action of the spring 9 is pressed against the shoulder 23 in such a way that the stop member engages the depression 38, the coupling pin is engaged in the opening of the guide 13. As this occurs, the ink container with the writing point will be in the position shown in Fig. 1. There is no risk that the coupling pin will leave its position if the pen is pushed upon or dropped, e.g. on a table. This is prevented by the stop member 24.

When the pen is not required for use, the plunger 16 is again actuated and the releaser will by means of its surface 20 advance the coupling pin 35 thereby causing the end 36 to leave the guide 13 and to be forced over the slide surface 29 along which the end will slide by the action of the spring 9 to the surface 25 of the guide (see the arrow in Fig. 3) where it once again enters the opening of the guide. In the course of the retracting operation the end 36 of the coupling pin abuts against the side wall of the releaser adjacent to the surface 21 until the plunger is allowed to return under the influence of the spring 19, the end 36 then entering the guide-bore 13 and the pin adopting the Fig. 2 position. When the plunger thereupon is allowed to return, the ink container 6, the centering slide 31 and the coupling pin 35 are pressed back to their initial position in which position the collar 37 is pressed against the shoulder 22 and the plunger 16 is simultaneously returned to its outer position by the spring 19.

As is obvious from the foregoing description and as shown on the accompanying drawing, the whole mechanism including the plunger 16 with the cap 15, the releaser 14, the guiding sleeve 12 with its guide 13, the coupling pin 35, and the slide 31 which parts are all enclosed in the sleeve 1, and the screw bushing 3 connected with the sleeve 1 by means of the protuberance 2 form a unit which can be screwed to the barrel 4. The portion of the sleeve 1 situated radially outside the guiding sleeve 12 is provided with longitudinal slots (not shown on the drawing) and the portions of the sleeve 1 situated between the slots are slightly bent outwards.

The cover 10 with the clip 11, said cover engaging over the sleeve 1, is maintained in position by means of the friction of the portions situated between the slots of the sleeve 1, as said portions will be pushed inwardly when the cover 10 is put over the sleeve 1.

The cover 10 may be manufactured of precious metal, e.g. gold, and the part of the cover directed towards the writing point may be given any desired form, for instance, it may be bevelled. If the barrel 4 has an advertising text, it is easy to arrange the cover 10 in such a way that the clip 11 will be situated just in front of said advertising text.

An important advantage of the assembling of all the portions of the mechanism in one unit is that the mechanism can easily be removed for service or repair. If the mechanism for any reason should be out of order, the cover 10 is removed and the sleeve 1 and the mechanism replaced, the new mechanism being screwed into the barrel and the pen is then ready for use.

The embodiment described is to be regarded only as an example, and modifications may be made to the instrument without departing from the scope of the invention as set out in the appended claims.

#### WHAT WE CLAIM IS:—

1. A writing instrument of the ball point type in which an ink container or cartridge is truly axially slidable in a barrel or housing by a spring loaded plunger mechanism whereby the ink container can be selectively moved from a position in which the ball point lies retracted in the barrel, into a projected writing position, and vice versa, whereas the barrel has a guiding sleeve having an axial guide bore of a non-circular cross section for a correspondingly shaped releaser carried by said plunger, said guiding sleeve being also provided with two relatively spaced abutments for coacting with a coupling pin adapted to be brought into two predetermined positions each of which is inclined to the axis of the barrel, in one of said positions being urged by a spring to cause a collar on the pin to engage against one of the said abutments, and in the other position against the other abutment due to one end of said coupling pin being engaged by the inner end of said releaser, characterised in that the other end of said coupling pin engages a concave center-

ing slide which is axially movable in the guiding sleeve and rests against the rear end of the ink container.

2. A writing instrument according to claim 1, having a guide bore of rectangular cross section, characterised in that two slide surfaces adjacent to the inner end of the guide-bore are arranged to be engaged by the end of the coupling pin adjacent to the releaser, said slide surfaces respectively inclining inwardly towards two opposite surfaces of said rectangular guide-bore, one of the slide surfaces further inclining towards one other surface of the guide-bore and the other of said slide surfaces further inclining towards the remaining surface of the guide-bore.

3. A writing instrument as set forth in claim 1, characterised by the fact that the inner end of the releaser has a rectangular cross section and is provided with two surfaces inclining in opposite directions, said surfaces extending between two longitudinal surfaces of the releaser.

4. A writing instrument as set forth in claim 1, characterised by the fact that the surfaces of the centering slide directed towards the ink container is provided with a transverse narrow slot for the admission of air, which extends on both sides of the inner end of the ink container and is provided for feeding air to the ink container.

5. A writing instrument as set forth in any of claims 1—4, characterised by the fact that the shoulder in the guiding sleeve nearest to the ball point is provided with a stop member which engages a depression in the collar when the latter is pressed against said shoulder.

6. A writing instrument as set forth in any of the preceding claims, characterised by the fact that the entire projecting mechanism is assembled into a unit in which condition it can be removed from the pen barrel.

7. A writing instrument of the ball-point type, substantially as described with reference to the accompanying drawing.

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