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F. LE VOIN

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WRITING INSTRUMENT, ESPECIALLY BALL-POINT PEN

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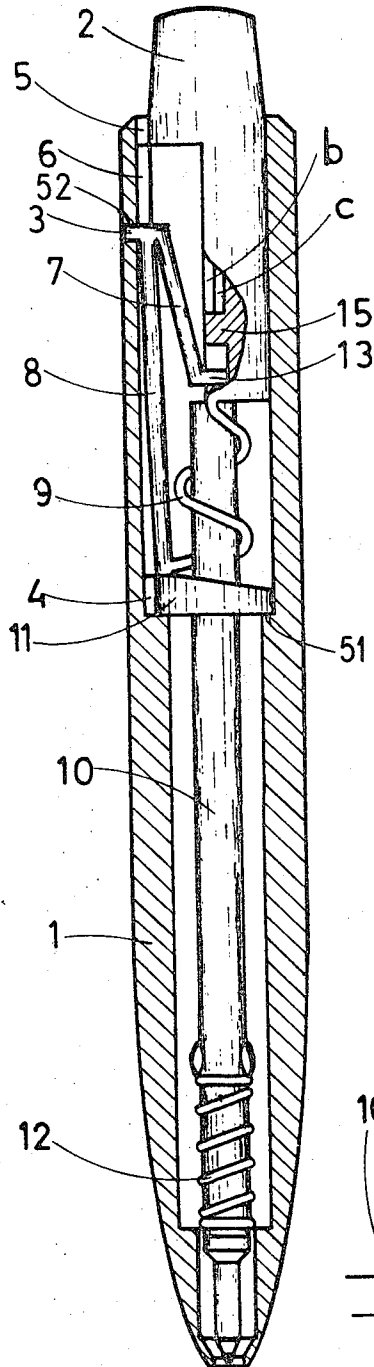


Fig. 1

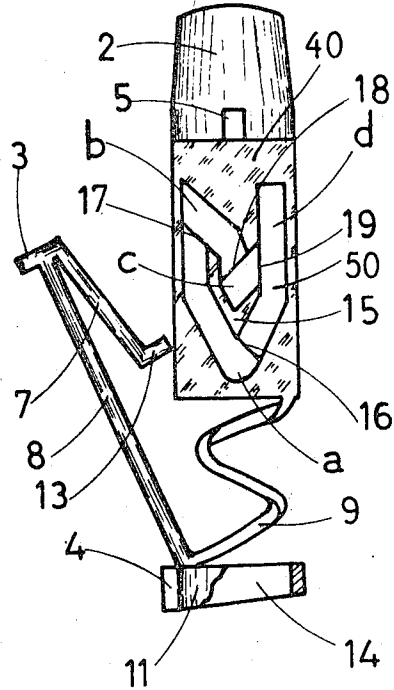


Fig. 2

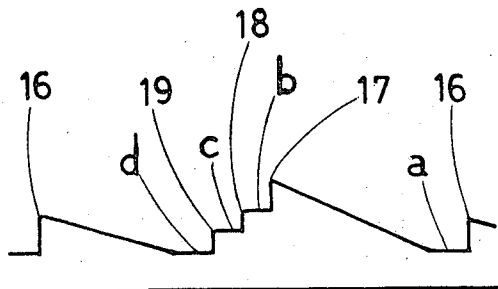


Fig. 3

INVENTOR

FRANCIS LEVOIN

BY

Jacobi & Davidson

ATTORNEYS

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Francis Levoine, Lugano, Switzerland, assignor to Cado
Etablissement, Vaduz, Liechtenstein, a corporation of
Liechtenstein

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4 Claims 10

ABSTRACT OF THE DISCLOSURE

There is disclosed a writing instrument, in particular a ball-point pen which comprises a housing sleeve member and a writing cartridge displaceably arranged in such housing sleeve member. Means are disposed in the housing sleeve member for controlling the displacement of the writing cartridge. The displacement controlling means incorporate a push button protruding from the upper region of the housing sleeve member and acting directly upon the writing cartridge. Furthermore, such displacement controlling means additionally incorporates groove means provided at a surface movably connected with the push button, such groove means defining an endless track. There is also provided a resilient tongue, and a guide pin is secured to the resilient tongue and is supported against axial displacement at the housing sleeve member. This guide pin engages with the groove means defining the closed track. Furthermore, means serve to prevent a relative rotation about the axis of the ball-point pen between the surface equipped with the groove means and the guide pin.

OBJECTS OF THE INVENTION

The present invention relates to a new and improved writing instrument, and in its more specific aspects, concerns itself with an improved construction of ball-point pen or the like.

It is a primary object of the present invention to provide an improved ball-point pen equipped with mechanism for reliably controlling the displacement of the writing cartridge.

Another, more specific object of the present invention concerns improved mechanism for controlling the displacement of the writing cartridge of a ball-point pen or the like in a fashion which effectively ensures for proper displacement of such writing cartridge into its operable writing position and also retraction of such writing cartridge into its ineffectual position when the pen is not being used.

Still a further significant object of the present invention relates to an improved construction of ball-point pen which is economical to manufacture, incorporates a novel type of mechanism for reliably advancing and retracting the writing cartridge into its writing position and inoperable position, respectively, and for positively retaining such writing cartridge in the aforesaid writing position and ineffectual position.

Now, in order to implement these and still further objects of the invention, which will become more readily apparent as the description proceeds, the inventive writing instrument, especially ball-point pen, embodies a housing sleeve member and a writing cartridge displaceably arranged in the housing sleeve member. Furthermore, means disposed in the housing sleeve member serve to control the displacement of the writing cartridge and include a push button projecting from the upper region of the housing sleeve member and acting directly upon the writing cartridge. According to an important aspect of the invention, such means for controlling the displacement of the

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writing cartridge further includes groove means provided at a surface movably connected with the push button, such groove means defining an endless track. Additionally, resilient tongue means are provided and a guide pin is secured to the resilient tongue means and supported against axial displacement at the housing sleeve member. The guide pin engages with the groove means of the endless track, and furthermore, means are provided for the purpose of preventing a relative rotation about the axis of the ball-point pen between the surface provided with the groove means and the guide pin.

BRIEF DESCRIPTION OF THE DRAWING

The invention will be better understood and objects other than those set forth above, will become apparent when consideration is given to the following detailed description thereof. Such description makes reference to the annexed drawing wherein:

FIG. 1 is a longitudinal sectional view through a preferred embodiment of ball-point pen designed according to the teachings of the present invention;

FIG. 2 is a front view of the mechanism used in the ball-point pen shown in FIG. 1 for displacing and locking the writing cartridge; and

FIG. 3 is a graphic representation of the different depths of the individual paths of the closed track defined by the groove means and in which there is guided the guide pin.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Describing now the drawing, the exemplary embodiment of inventive writing instrument, in particular a ball-point pen, is shown in FIG. 1 partially in sectional view, and will be seen to incorporate a housing sleeve member 1 in which there is located a writing cartridge 10 which is displaceably arranged for movement in its lengthwise direction. A return spring member 12 engages with the lower end of this writing cartridge 10, as shown, and this return spring member always urges such writing cartridge upwards against the lower face or side of a push button or press knob 2. This push button 2 possesses a laterally extending wedge member or key 5 which is guided in a groove or keyway 6 extending in axial direction at the inside of the housing sleeve member 1 and prevents turning of the push button 2 about its own axis.

Furthermore, it will be seen that the portion of the push button 2 which is arranged inside of the housing sleeve member 1 possesses a flattened or planar surface 40 at which there has been machined a groove or recess 50 defining an endless track and which is composed of a number of groove or track sections *a*, *b*, *c*, and *d*. The lower end of the push button 2 is operably connected with a spring member 9 which is wound to possess a substantially helical or screw shape, and the radius of which is large enough so that this helically wound spring member 9 does not contact the writing cartridge 10, therefore does not hinder displacement of the latter. The end of the spring member 9 which is facing away from the push button 2 is provided with a mandrel or tongue structure, more specifically, such spring end is connected with a substantially linear, resilient upwardly extending first tongue 8, at the upper end of which there is secured an arresting pin member 3 which extends practically transverse to the lengthwise axis of the ball-point pen. This arresting pin member 3 is inserted in an appropriate bore 52 provided at the housing sleeve member 1 and prevents rotation of the tongue 8 about the lengthwise axis of the ball-point pen and, at the same time serves as a stop means for the components connected therewith and arranged in the sleeve member. Furthermore, it will be recognized that at the upper end of the first tongue 8 there is secured a second tongue 7 which extends downwardly at an acute angle. This second tongue 7 is about

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one half of the length of the first tongue 8 and at its lower end there is secured a guide pin 13 which is arranged transverse to the lengthwise axis of the ball-point pen.

Continuing, it will be recognized that the lower end of the helical spring member 9 and the lower end of the first tongue 8 connected therewith are supported upon a support ring member 11 which, in turn, is seated upon a shoulder 51 machined at the inner wall of the sleeve member 1. This support ring member 11 exhibits a laterally arranged wedge or key 4 which is guided in the extension of the groove or keyway 6 and secures the support ring 11 against rotation. The central bore 14 of the support ring 11 is large enough to guide the writing cartridge 10 without obstruction through such support ring 11.

FIG. 2 shows details of the mechanism used for displacing and locking the writing cartridge 10 and for convenience in illustration has omitted the housing sleeve member 1. Furthermore, in order to facilitate understanding the concepts of the invention the guide pin 13 together with the first and second tongue members 8 and 7 serving as support means have been rotated through 90° with respect to the push button 2, thereby more clearly revealing in such FIG. 2 the details of such structure. As will be apparent from such figure, an endless groove means 50 defining a closed track is machined at the flat surface 40 provided at the lower region of the push button 2. This endless groove means or closed track 50 is subdivided into four groove or track sections *a*, *b*, and *c* and *d*. The individual track sections *a*, *b*, *c*, and *d* of the closed track possess different depths with respect to the flat or planar surface 40, as will be explained more fully hereinafter, so that the transition from one track section to the other is step-like. The different depths of the track sections of the closed groove means 50 and the step-like transition are schematically indicated in FIG. 3. As will be explained in greater detail shortly, in this manner it is assured that the guide pin 13 guided in the endless groove or track means 50 can only travel in a predetermined direction through the closed guide curve or track formed by such groove means 50.

When the ball-point pen is completely assembled the first tongue member or means 8 will be retained against displacement by the support ring 11 and the arresting pin 3. Consequently, the position of the guide pin 13 along the lengthwise axis of the ball-point pen is also fixed. However, this guide pin 13 can be laterally displaced owing to its attachment at the resilient second tongue member 7. The displaceable writing cartridge 10 will always be pressed by the return spring member 12 upwardly against the push button 2. The extent of possible displacement of the push button 2 is defined by the cooperation of the guide pin 13 engaging in the endless groove means 50 with such groove means.

With the individual components of the ball-point pen assuming the position shown in FIG. 1, the writing cartridge 10 is in its rest or inoperable position and the push button 2 is retained against an upward displacement against the upwardly directed guide pin 13. Upon pressing upon the push button 2 the latter is displaced downwardly against the force of the spring member 9, and the guide pin 13 passes through the track section *a* of the closed groove means 50 and then jumps over the step 17 down into the lower situated track section *b*. Since the lower face or end of the push button 2 bears directly upon the upper end of the writing cartridge 10, this writing cartridge 10, during this displacement of the push button, will also be pushed downwardly against the force of the spring 12, so that the ballpoint will be displaced out of the housing sleeve member 1. As soon as an external force no longer acts upon the push button 2 then the latter will be upwardly displaced through the action of the force of the spring member 12 transmitted to the writing cartridge 10, whereby the guide pin 13 travels through the track section *b* of the closed groove

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means 50 and at the end of such track section jumps over the step 18 into the lowermost region or location of the track section *c*. Consequently, the writing cartridge 10 will be displaced out of its rest or inoperable position into a stable operable writing position through a distance measured in axial direction of the points *a* and *c* shown in FIG. 2.

Upon the next application of downward pressure upon the push button 2 the guide pin 13 will be displaced through the track section *c* of the closed groove or track 50 and jumps over the step 19 into the track section *d*. As soon as this downwardly directed pressure terminates, then, the push button 2 will again be upwardly displaced by the force of the spring member 12 transmitted via the writing cartridge 10. As a result, the guide pin 13 passes through the track section *d* of the groove 50 in the downward direction, jumps over the step 16 and lands at the lower situated track section *a*, whereby the stable starting position has again been reached in which the writing cartridge 10 is again retracted into the sleeve member 1.

As should be evident from the foregoing description, the extent of possible displacement of the push button in the direction of the lengthwise axis of the ball-point pen is limited by the cooperation of the four sectional-groove means 50, surrounding the surface 15, with the guide pin 13. Moreover, the stepped arrangement between the individual track sections of the closed groove means determines the direction in which it is possible to travel about the surface 15.

Although in the preceding discussion of the inventive ball-point pen it has been stated that the push button 2 and the spring member 9 and the first and the second resilient tongues 8 and 7 and the pin members 3 and 13 are connected with one another, these components can naturally also be constructed as a single or integral element.

It should be apparent from the foregoing detailed description, that the objects set forth at the outset to the specification have been successfully achieved.

Accordingly, what is claimed is:

1. A writing instrument, particularly a ball-point pen, comprising a housing sleeve member, a writing cartridge displaceably arranged in said housing sleeve member, and means disposed in said housing sleeve member for controlling the displacement of said writing cartridge, said controlling means being constructed of one piece and including a push button projecting from the upper region of said housing sleeve member and acting directly upon said writing cartridge, said controlling means further including groove means provided at a surface movably connected with said push button, said groove means defining a closed track, a resilient tongue means, a guide pin secured to said resilient tongue means and supported against axial displacement at said housing sleeve member, said guide pin engaging with said groove means defining said closed track, a substantially helically shaped spring member for operably interconnecting said push button with said resilient tongue means carrying said guide pin, and means for preventing a relative rotational movement about the lengthwise axis of said ball-point pen between said surface provided with said groove means and said guide pin.

2. A writing instrument, particularly a ball-point pen, as defined in claim 1, wherein said means for preventing said relative rotational movement between said surface provided with said groove means and said guide pin comprises a groove provided at said housing sleeve member which extends in axial direction and a wedge member arranged at said push button and slideable in said groove, and further includes a bore provided at said housing sleeve member and an arresting pin retained in said bore, said arresting pin being situated at the end of said tongue means opposite said guide pin.

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3. A writing instrument, particularly a ball-point pen, as defined in claim 1, wherein said groove means defining said closed track is composed of individual track sections which are separated by substantially step-shaped shoulders.

4. A writing instrument, particularly a ball-point pen, as defined in claim 1, wherein said groove means is provided at a flattened portion of said push button, said flattened portion defining said surface provided with said groove means.

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LAWRENCE CHARLES, Primary Examiner