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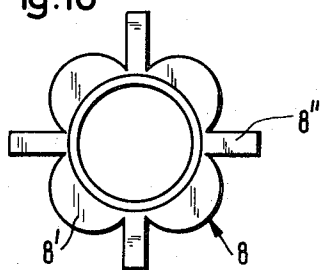


Fig.11

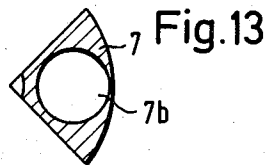
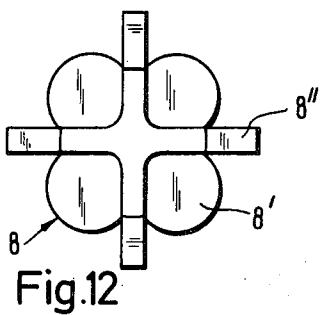
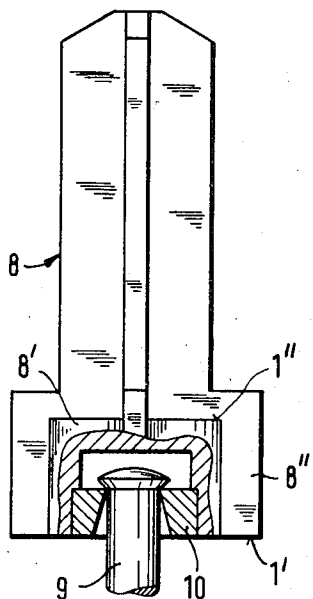


Fig.14

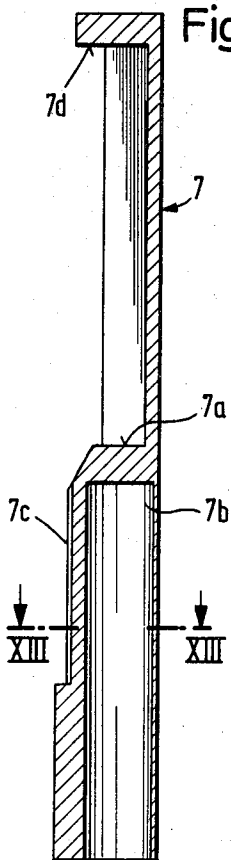


Fig.16

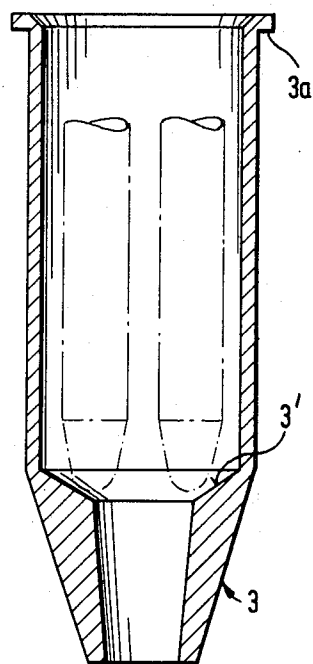
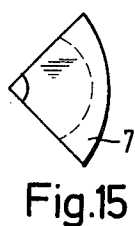
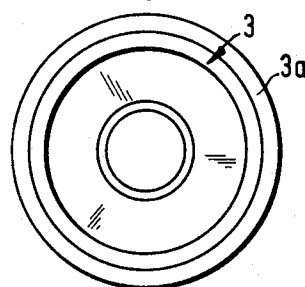
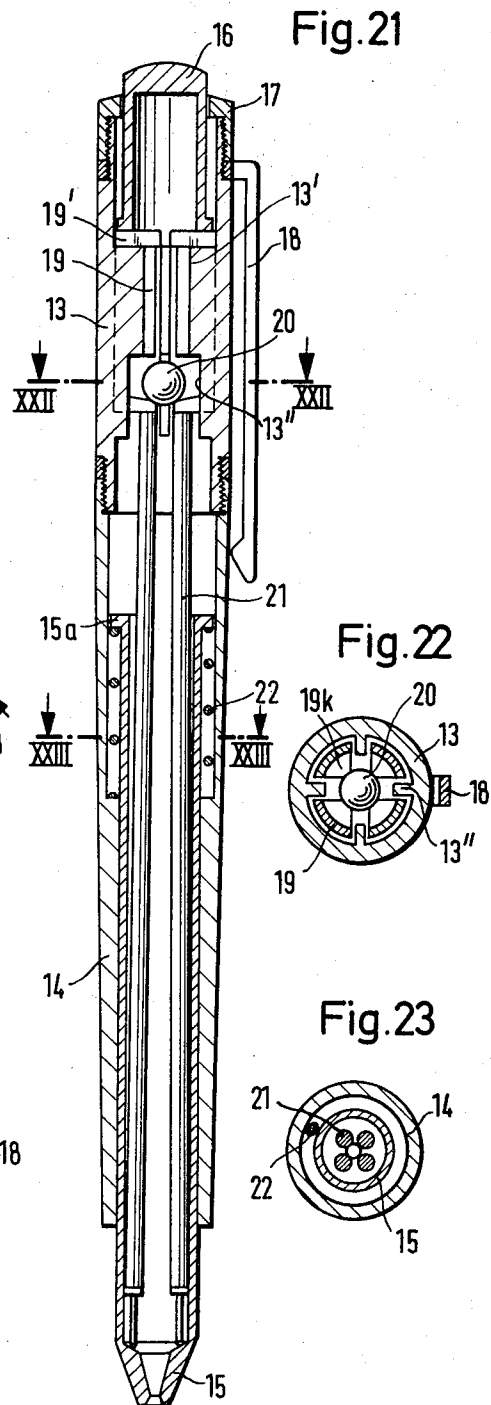
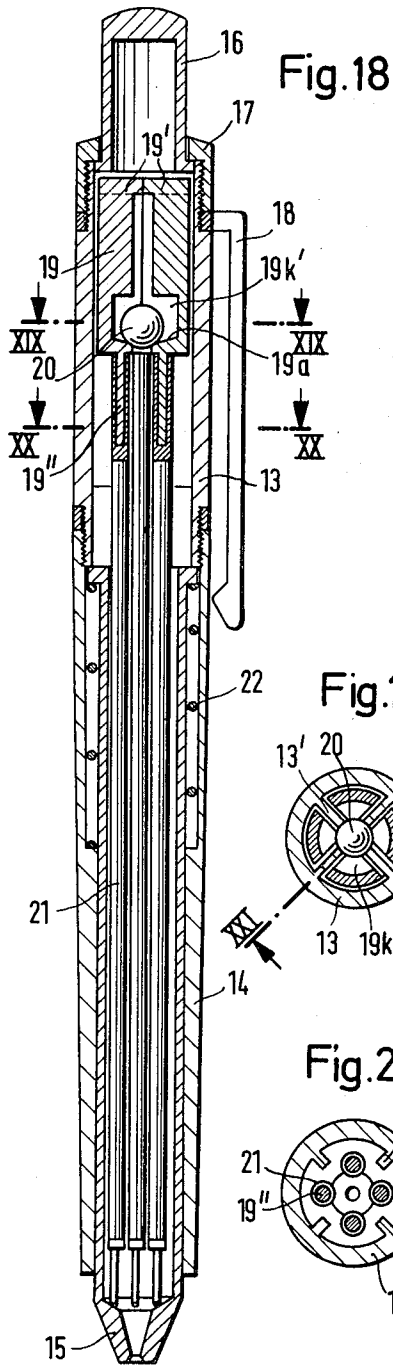


Fig.17





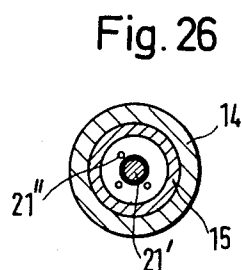
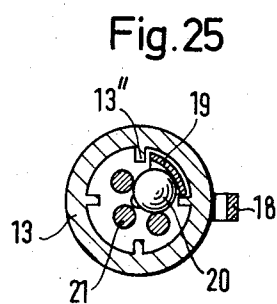
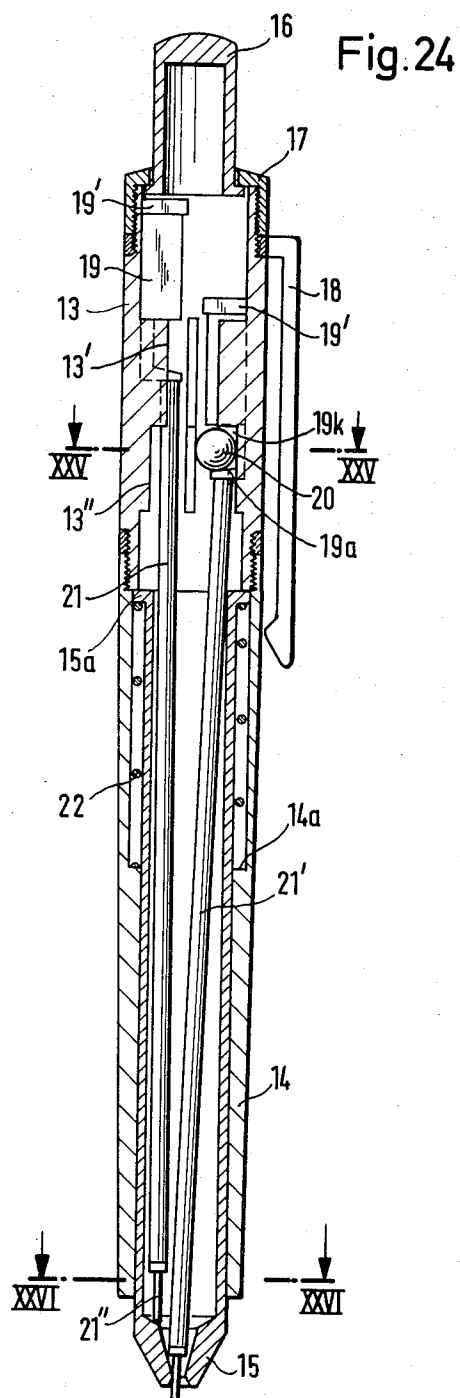


Fig. 27

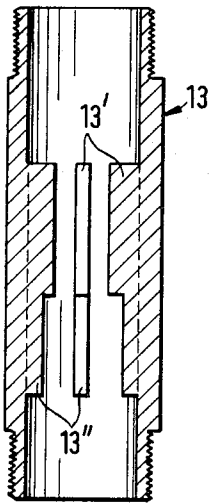


Fig. 28

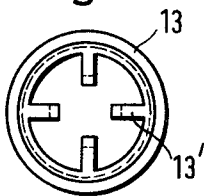


Fig. 29

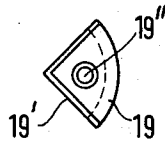


Fig. 30

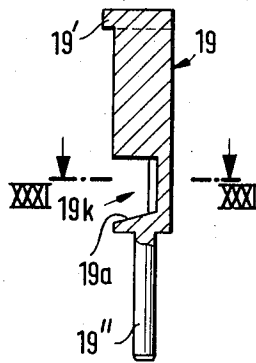


Fig. 31



Fig. 32

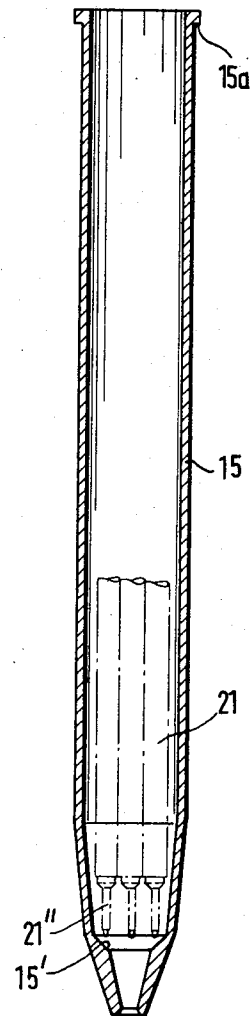
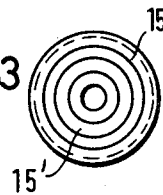


Fig. 33



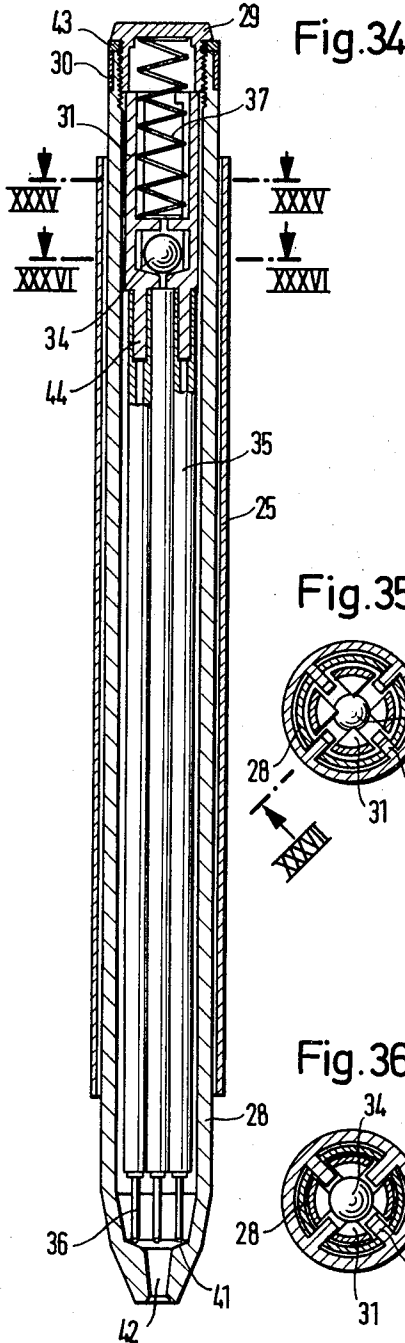


Fig. 35

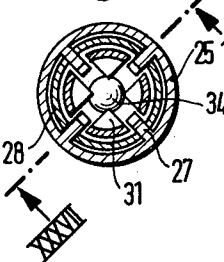


Fig. 36

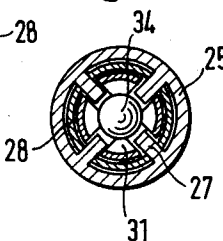


Fig. 37

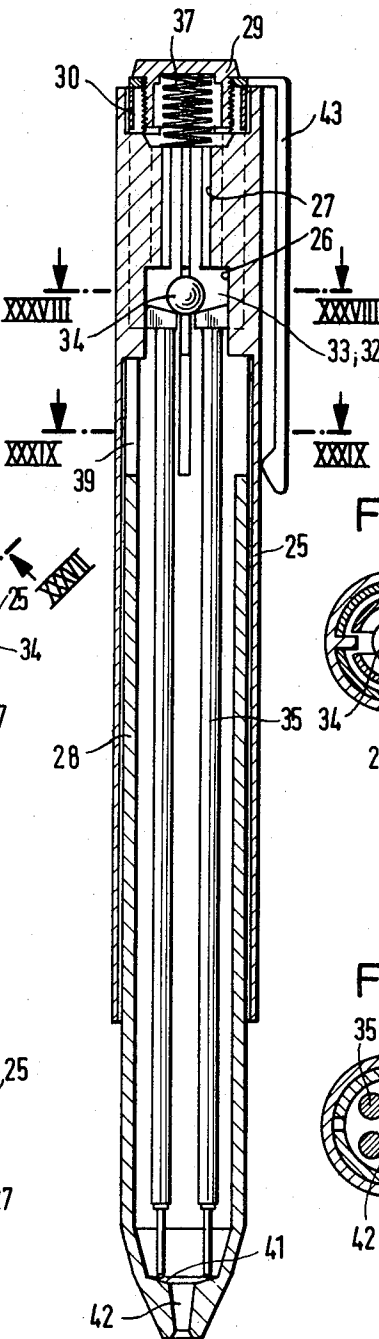


Fig. 38

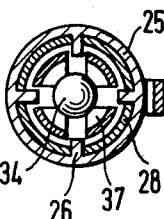
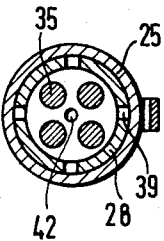


Fig. 39



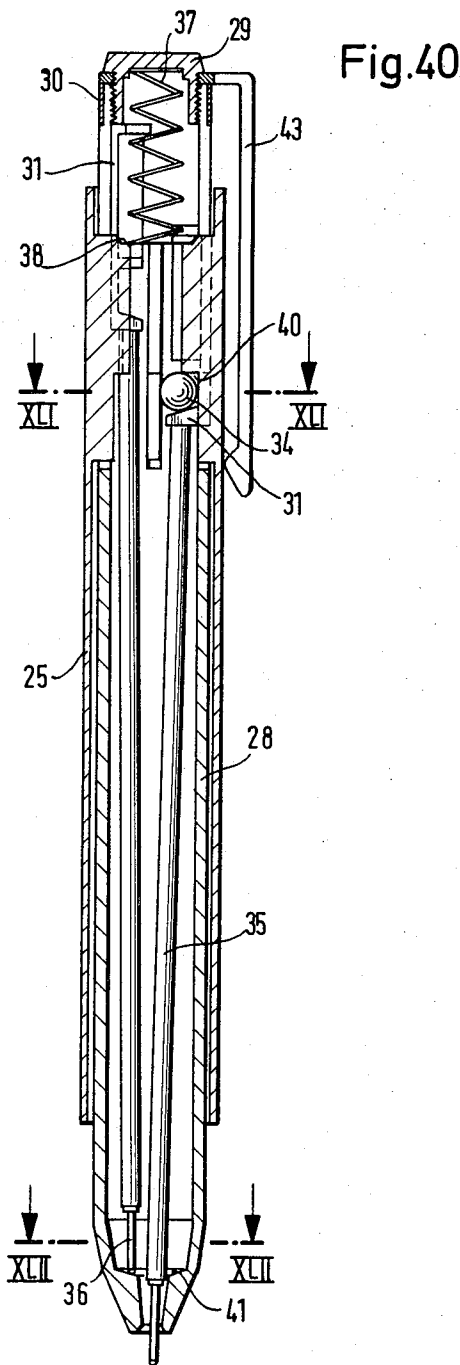


Fig.41

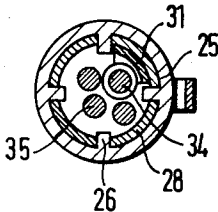
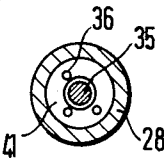
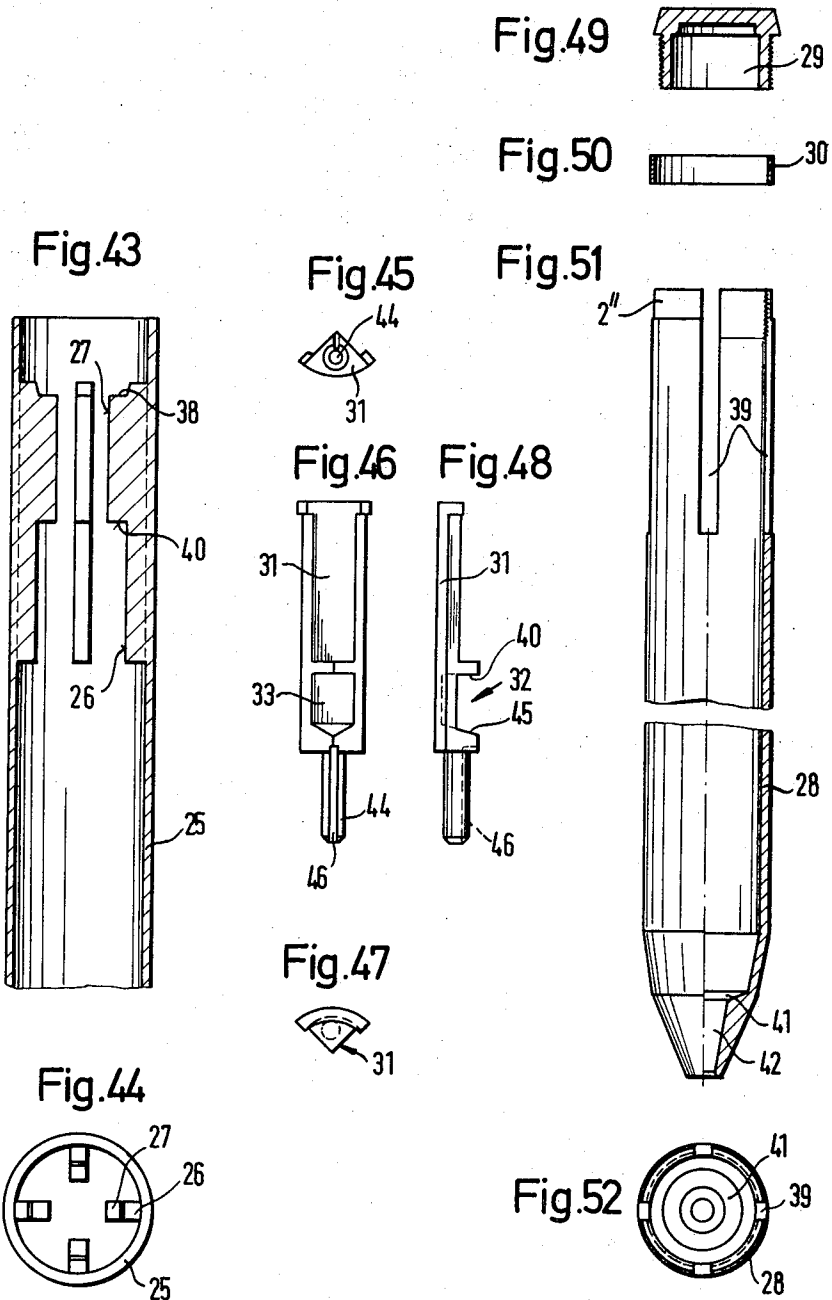


Fig.42





WRITING INSTRUMENT

The present invention relates to a writing instrument, and more especially to a multiple color retractable ball point pen, having a plurality of ink tubes which are arranged in holders and are axially displaceable by pressure on a pressure member, and can be retained in a forwardly displaced writing position, the selection of the ink tube to be moved into the writing position being effected by holding the pen at an angle and by the consequential radial displacement of a weight member under the effect of gravity.

It is the purpose of the invention to provide a writing instrument with automatic return of the tube in the writing position when a newly selected tube is moved forwardly which, with a comparatively simple construction, can be readily manufactured and assembled but which also provides reliable operation and can be quickly prepared for use.

Writing instruments are known in which selection of the required color is effected by holding the instrument at an inclination and by the consequential radial displacement of a weight member under the effect of gravity, the selected ink tube then being moved forwardly by a pressure member, and the ink tube already disposed in the forwardly displaced position being automatically moved back. With these writing instruments having automatic return of the ink tubes, rotary ratchet sleeves with indexing slots or cross-shaped ratchet members or ratchet discs are employed for the engagement and disengagement of the forwardly displaced tube or its carrier. Due to the use of such special engaging elements, which are arranged around the tubes, the instrument is somewhat unhandy and moreover of comparatively complicated construction.

According to the present invention there is provided a writing instrument comprising a plurality of writing members, each of which is arranged in a holder, an axially displaceable tip projection sleeve having an opening therein of a size sufficient to allow only one writing member to pass therethrough, a return spring acting on the tip projection sleeve, a pressure member adapted to exert pressure on all the writing members to thereby axially displace all the writing members and the tip projection sleeve toward a writing position against the action of the return spring, a weight member adapted to be displaced radially under the action of gravity to move a selected one of the writing members into the writing position when the writing instrument is inclined in a selected direction, the tip projection sleeve and writing members being arranged such that on release of the pressure member the non-selected writing members and the said sleeve are urged back into their retracted positions by the return spring while the selected writing member passes through the opening in the sleeve to assume a final writing position.

The weight member displaced by inclination of the pen can be constructed as a pendulum rod. In this case, in contrast to known constructions, the pendulum rod is connected by means of retainer member to the casing in such a manner that it is not axially slidable. With this arrangement, a retainer member carrying the pendulum rod and connected to the casing is advantageously also formed, by an arrangement of guide ribs and guide edges, as a guide member and rest position abutment for the tube holders. The holders have corresponding

engagement edges which the pendulum rod can engage with its freely swingable end on displacement in a radial direction. To allow return of all four holders, the holders have segmental recesses which, when the holders are at the same axial height, define a cylindrical recess.

If the radially displaceable weight member is formed in known manner as a ball, then preferably the ball is disposed in a chamber formed by segment-like recesses in the holders. In contrast to previously known arrangements, the ball is axially moved when the holders are axially displaced together. The upper part of the instrument has stepped ribs for guiding the holders, the rib steps being formed so that the ball deflected from the central position when the pen is held at an inclination engages behind these steps and holds the required tube in the forwardly displaced position. Advantageously, the holders have at the upper part of their segment-like cross-section abutment shoulders which act as abutments against the upper edge of the ribs of the upper part of the pen.

In both of the above embodiments of the writing instrument there is provided a tip projection sleeve which is subject to the action of a return spring and has an upper collar as a counter-support for the return spring. The other end of the return spring is supported on an annular ledge on the front of the pen. Advantageously, the tip projection sleeve is so formed that it has a conical portion extending around an opening, which conical portion serves as a counter-support for the tips of the tubes. The diameter of the opening is so dimensioned that it allows only one tube to pass therethrough.

The tip projection sleeve and the pressure member may be constructed as a one-piece projection part which is closed by a closure knob, engagement ribs on the casing of the pen extending through longitudinal slots in the projection part, and the return spring being disposed within the projection part, and in particular between the closure knob and the upper edges of the ribs. In this case the engagement ribs extending through the longitudinal slots in the projection part advantageously serve as catches for the ball and also as guide ribs for the holders. The holders have segmental sections which, when the holders are moved together to the same axial height, form a chamber serving to receive the ball. The engagement ribs are formed with different heights in the radial direction and thereby form engagement edges behind which the ball can engage in the free space between two adjacent ribs when the holders are forwardly displaced, the ball being supported at its other side on the engagement edge of the corresponding holder.

Since the axial slots of the projection member extend to the upper end, where a ring is provided in an annular groove and retained by a threaded closure knob, the securing of the ring clip is advantageously effected between the closure knob and the end of the projection part or the ring.

Illustrative embodiments of the invention will now be described with reference to the accompanying drawings, in which:

FIG. 1 shows a longitudinal section through a four-color retractable ball point pen having a pendulum arrangement for color selection;

FIG. 2 shows a cross-section through the pen of FIG. 1 taken along the section line II—II;

FIG. 3 shows a cross-section through the pen of FIG. 1 along the section line III—III;

FIG. 4 shows a longitudinal section through the pen of FIG. 1, in which all four tubes are forwardly displaced;

FIG. 5 shows a cross-section taken along the section line V—V of FIG. 4;

FIG. 6 shows a cross-section taken along the section line VI—VI of FIG. 4;

FIG. 7 shows a longitudinal section through the pen of FIG. 1 but with a pre-engaged ink tube;

FIG. 8 shows a cross-section taken along the section line VIII—VIII of FIG. 7;

FIG. 9 shows a cross-section taken along the section line IX—IX of FIG. 7;

FIG. 10 shows a view from underneath of the retainer member carrying the pendulum of the pen shown in FIG. 1;

FIG. 11 shows a longitudinal section of retainer member shown in FIG. 10 with the pendulum broken away;

FIG. 12 shows a view from above of the retainer member shown in FIG. 10;

FIG. 13 shows a tube holder in cross-section along the section line XIII—XIII of FIG. 14;

FIG. 14 shows a longitudinal section through the tube holder shown in FIG. 13;

FIG. 15 shows a view from above of the tube holder of FIG. 13;

FIG. 16 shows a cross-section through the tip projection sleeve;

FIG. 17 shows the tip projection sleeve of FIG. 16 viewed from above;

FIG. 18 shows a longitudinal section through a four color ball point pen with ball engagement;

FIG. 19 shows a cross-section through the pen of FIG. 18 along the section line XIX—XIX;

FIG. 20 shows a cross-section through the pen of FIG. 18 along the section line XX—XX;

FIG. 21 shows the pen of FIG. 18 with all four tubes in their forwardly displaced positions;

FIG. 22 shows a cross-section taken along the section line XXII—XXII of FIG. 21;

FIG. 23 shows a transverse section taken along the section line XXIII—XXIII of FIG. 21;

FIG. 24 shows the pen of FIG. 18 but with a pre-engaged ink tube;

FIG. 25 shows a transverse section taken along the section line XXV—XXV of FIG. 24;

FIG. 26 shows a cross-section taken along the section line XXVI—XXVI of FIG. 24;

FIG. 27 shows the upper part of the writing instrument of FIG. 18 in longitudinal section;

FIG. 28 shows the upper part shown in FIG. 27 viewed from above;

FIG. 29 shows a view from below of a tube holder;

FIG. 30 shows the tube holder of FIG. 29 in longitudinal section;

FIG. 31 shows a cross-section taken along the section line XXXI—XXXI of FIG. 31;

FIG. 32 shows a longitudinal section through a tip projection sleeve;

FIG. 33 shows the tip projection sleeve of FIG. 32 viewed from above;

FIG. 34 shows a longitudinal section through a modified embodiment of the four color ball point pen employing a ball for color selection;

FIG. 35 shows a transverse section through the pen of FIG. 34 along the section line XXXV—XXXV;

FIG. 36 shows a transverse section through the pen of FIG. 34 along the section line XXXVI—XXXVI;

FIG. 37 shows a longitudinal section along the section line XXXVII—XXXVII of FIG. 35 with the projection sleeve in its forwardly displaced position;

FIG. 38 shows a cross-section taken along the section line XXXVIII—XXXVIII of FIG. 37;

FIG. 39 shows a cross-section taken along the section line XXXIX—XXXIX of FIG. 37;

FIG. 40 shows a longitudinal section through the four color ball point pen with a pre-engaged ink tube;

FIG. 41 shows a cross-section taken along the section line XLI—XLI of FIG. 40;

FIG. 42 shows a cross-section through the pen of FIG. 40 taken along the section line XLII—XLII;

FIG. 43 shows a longitudinal section through the casing of the writing instrument;

FIG. 44 shows a view from below of the casing of FIG. 43;

FIG. 45 shows a tube holder viewed from below;

FIG. 46 shows the tube holder of FIG. 45 in front elevation;

FIG. 47 shows the tube holder of FIG. 46 viewed from above;

FIG. 48 shows the tube holder of FIG. 46 in side view;

FIG. 49 shows the closure button in side elevation;

FIG. 50 shows the slip-on ring in longitudinal section;

FIG. 51 shows the projection part formed in one piece with the pressure member in longitudinal section; and

FIG. 52 shows a view from above of the projection part of FIG. 51.

Referring now to FIGS. 1 to 17 there is shown a writing instrument which includes:

- a. A two-part ball point pen casing 1, 2 having a retainer member 8 which is slidable relative thereto and which carries a pendulum pin 9;
- b. Four tube holders 7, which are guided axially relative to and in the retainer member 8;
- c. A pressure member 4 formed as a press button which is displaceable relative to the casing 1, 2;
- d. A tip projection sleeve 3 subject to the action of a return spring 12 and displaceable relative to the casing 1, 2; and
- e. Four writing members in the form of ball point pen ink tubes 11 which are comparatively long and of four different colors.

The pressure member 4 is in the form of a hollow knob and, when depressed, presses with its under edge against all four tube carriers. The hollow pressure member 4 is prevented from falling out by a threaded bush 5 which also retains a ring clip 6 in the normal manner. The tip projection sleeve 3 is axially displaceably inserted into the front part 2 of the ball point pen casing. A return spring 12 seated at one end on the front edge of the front part 2 and at its other end on a collar 3a on the tip projection sleeve 3 ensures that the tip projection sleeve 3 is resiliently returned. The retainer member 8 is prevented from being axially displaced by ribs 8'' in the casing. The lower ends of the ribs 8'' are disposed at the height of an abutment edge 1' on the retainer member 8. The under-edge 5' of the threaded bush 5 serves as an upper limit for the ribs 8''.

By means of curved lateral guide surfaces 8' on the retainer member 8, it is ensured that the tube holders 7 are properly guided during their axial movement. In the lower part of the retainer member 8, by means of an insert ring 10, the pendulum pin 9 is movably held so that it can pivot to any side laterally or in the radial direction.

Each tube holder 7 is so constructed that it is readily axially displaceable relative to the retainer member 8. It has a segment-like recess 7c. The segment-like recesses of the holders 7 define, when the holders 7 are all in the same axial position, a cylindrical recess 7c' (FIG. 4). An ink tube is inserted in the usual manner into a cylindrical recess 7b in each holder 7 and there retained. An engagement edge 7a serves for retaining the holder 7 in the forwardly displaced position by means of the pendulum pin 9 swung in the radial direction and engaged in this position behind this edge. An edge 7d serves as an upper abutment on the holder against an abutment edge 1'' on the retainer member 8.

By pressure on the pressure member 4, all four holders 7 with the ink tubes 11 are moved forwardly together, the tips of the ink tubes 11 pressing against inclined edges 3' on the tip projection sleeve 3 which extend inclined in the direction towards a central opening which is provided at the lower end of the tip projection sleeve 3 and which allows only one ink tube to pass therethrough. In this way, the tip projection sleeve 3 is simultaneously shifted against the action of the return spring 12 from the casing front part 2, as shown in FIG. 4. If the writing instrument is now held at an angle, then the pendulum pin 9 is pivoted sideways in a radial direction so that the free end of the pendulum pin 9 engages behind the engagement edge 7a of the holder 7 of the required ink tube 11'. When the pressure on the pressure member 4 is released, the remaining three tubes 11 are moved back from the tip projection sleeve 3, retaining their axial orientation, by the action of the return spring 12, while the selected tube retained in the forwardly displaced position by the free end of the pendulum pin is prevented from moving backwardly and, during the rearward movement of the tip projection sleeve 3, presses its tip over the inclined surface 3' downwardly and through the opening in the tip projection sleeve 3. The pen now has the required last-mentioned ink tube in its position of use.

By rotating the pen into a different inclined position a different color can be selected. By pressure on the pressure member 4 the holders 7 in the reserve position and the tip projection sleeve 3 are again moved into the forwardly displaced position, where they are at the same height as the tube previously located in the writing position, the tip of which is now drawn back through the opening and disposed above the inclined edge 3'. The pendulum pin is released and can swing, in accordance with the newly selected inclined position of the pen, behind the engagement edge 7a of the holder 7 of the newly selected ink tube 11 and there engage. The return operation is then effected in the above-described manner.

If it is desired to bring all four tubes 11 into the rearward rest position shown in FIG. 1, then with the pen held upright and with pressure on the pressure member 4, all four holders 7 and the tubes 11 are moved into the forwardly displaced position and in this way the

pendulum pin previously engaged behind one of the tubes is released. The pendulum pin 9 swings in the space above the cylindrical recess 7c' formed by the segment-like recesses 7c. When the pressure on the pressure member 4 is released, all four tubes are returned by the returning tip projection sleeve 3 into their initial positions (FIG. 1).

The writing instrument shown in FIGS. 18 to 33 includes:

- a. A two-part casing 13, 14;
- b. A pressure member 16, which acts on four holders 19, which have ink tubes 21;
- c. A selector ball 20; and
- d. A tip projection sleeve 15, which is axially displaceably disposed in the front part of the casing and which, analogous to the tip projection sleeve 3, is subject to the action of a return spring 22. The pressure member 16, which is formed as a press button, is prevented from falling out by a threaded sleeve 17, which also retains the clip 18.

In the casing upper part 13, corresponding to the four holders 19, there are provided four stepped ribs 13', 13'', which serve both to guide the holders 19 and also as engagement edges for the selector ball 20.

The holders 19 have segment-like recesses 19k which, when the holders are disposed in the same axial height, define a cylindrical space 19k'. The lowermost edges 19a of these recesses 19k are preferably formed inclined as engagement edges for the ball 20. The tubes 21 are fixed in known manner to the holders 19 by pins 19'' and longitudinal grooves can be provided in the pins 19'' for better ventilation of the tubes. At the upper ends, abutment edges 19' are advantageously provided, which limit the forward movement by abutment against the ribs 13'.

The tip projection sleeve 15 is constructed similarly to that in the preceding embodiment, but in this case has a somewhat greater length. Also, in this case, an upper collar 15a is provided for abutment of the return spring 22. Moreover, the conical support surface for the tips 21'' of the ball point ink tubes 21 is provided in the front part of this tip projection sleeve 15.

By pressure on the pressure member 16, all four holders 19 with their tubes 21 are brought into the forwardly displaced position, the selector ball 20 lying within the cylindrical space 19k' formed by the segment-like recesses 19k in the holders 19. At the same time, the tip projection sleeve 15 is displaced forwardly against the action of the return spring 22. In this forwardly displaced position, by inclination of the pen, the selector ball 20 is deflected sideways so that it comes to lie within the holder of the selected color between the engagement edge 19a and the step formed between the ribs 13' and 13''. When the pressure on the pressure member 16 is released, by means of the tip projection sleeve 15 under the action of the return spring 22, the remaining three tubes are moved backwardly, while the selected tube 21' remains in the forwardly displaced position and projects from the opening of the tip projection sleeve 15. In this way, the pen is brought into readiness for use as shown in FIG. 24. If the pen is rotated into a new inclined position and the pressure member 16 is pressed, then the selector ball 20 can move into the corresponding chamber 19k of the newly selected tube, whereby after return of the remaining tubes the new tube remains in the writing position.

By holding the pen erect and releasing the pressure on the pressure member 16, the selector ball can return in the axial direction. It then comes to lie between the four ribs 13'', whereby the initial position shown in FIG. 18 is reached.

The advantages obtained by the present pen in particular are that the construction of the pen is comparatively simple, and the same elements are used for the devices for color selection and for engaging the selected color, whereby a comparatively short construction is obtained which enables correspondingly long ink tubes to be employed. Moreover, both the production and the assembly of the pen are substantially simplified so that the pens can be manufactured comparatively inexpensively.

The multiple color ball point pen shown in FIGS. 34 to 52 includes:

- a. A writing instrument casing 25 with ribs 26 and 27;
- b. A projection part 28 which is formed in one piece with the pressure member and which is closed by means of a closure button 29 with a slip-on ring 30 therebetween;
- c. Four ink tube holders 31 with segment-like recesses 32 which, when all of the holders 31 with segment-like recesses 32 which, when all of the holders are moved together to the same axial height, define a chamber 33;
- d. A selector ball 34 in the chamber 33;
- e. Four ink tubes 35 having ball points 36; and
- f. A return spring 37 which is arranged within the projection part 28 and which is supported between the closure button 29 and the rib upper edge 38.

FIG. 34 shows the multiple color ball point pen in its initial position with the ink tubes 35 retracted. In this initial position the tip projection sleeve 28 is retracted and the four tube holders 31 are located in an upper rest position, this position being defined by abutment of the lower edges of slots 39 in the tip projection sleeve 28 against the lower edge of engagement ribs 26 extending through longitudinal slots 39 in the projection part 28 under the action of the return spring 37. The selector ball 34 is disposed in the chamber 33 formed by segment-like recesses 32 in the holders 31.

If, as shown in FIG. 37, the projection part 38 is now moved forwardly against the action of the return spring 37 by pressure on the closure button 29, then both the holders 31 with their tubes 35 and also the selector ball 34 are moved axially.

In the furthest forward position, due to inclination of the writing instrument, gravity affects the selector ball 34. The ball 34 rolls sideways under rib edges 40 within the segment-like recesses 32 in the selected holder 31. On release of the pressure on the closure button, and as a result of the action of the return spring, the projection part 28 with the three remaining tubes and their associated holders are pressed backwardly in the manner described in the other embodiment, while the selected ink tube remains in the forwardly displaced position, i.e., in the writing position, and therefore projects through the opening which is provided in the projection part 28 and which can receive only one ink tube.

By pressure on the closure button 29, the position shown in FIG. 37 is again obtained. By corresponding inclination of the pen, the newly required ink tube can be selected.

The return of the ink tubes into the initial position as shown in FIG. 37 is brought about by holding the multiple color ball point pen vertically as shown in FIG. 37, whereby the selector ball 34 remains in its central position, and on return of the projection part 38, all four ink tubes are retracted until the position shown in FIG. 34 is again obtained.

41 indicates inclined internal conical surfaces, already known from the above-described embodiments, which converge downwardly to the opening 42. As in the above-described embodiment the diameter of the opening 42 is so dimensioned that only one ink tube 35 can pass therethrough.

43 indicates a clip retained by the closure button 29.

44 indicates ink tube holder pins projecting into the open ends of the ink tubes and fixed or formed on the tube holders. The inclined surfaces 45 on the holders 41 correspond to the inclined surfaces 19a, and the pins 44 to the pins 19'' of FIG. 31.

Each pin 44 is provided with a groove 46 for ventilating the tubes 35.

The advantages obtained by the present pen are, in particular that the construction of the pen is comparatively simple, and the incorporation of the return spring 37 in the upper part of the projection part makes possible a particularly slim shape for the writing instrument. Moreover, the production and assembly of the pen are very simple, so that the pens can be manufactured comparatively inexpensively.

I claim:

1. A writing instrument comprising a plurality of writing members, a holder, for each of the writing members, an axially displaceable tip projection sleeve, said sleeve having means thereon defining an opening of a size sufficient to allow only one said writing member to pass therethrough, a return spring, said return spring acting on the tip projection sleeve, a pressure member, said pressure member being adapted to exert pressure on all the writing members and holders to thereby axially displace all the writing members and the tip projection sleeve toward a writing position against the action of the return spring, a weight member, said weight member being adapted to be displaced radially under the action of gravity to move a selected one of the writing members into the said writing position when the writing instrument is inclined in a selected direction, said tip projection sleeve and said writing members being arranged such that on release of said pressure member the non-selected writing members and the said sleeve are urged back into their retracted positions by said return spring while the selected writing member passes through the means defining the opening to assume a final writing position.

2. A writing instrument according to claim 1, in which said tip projection sleeve has an upper collar, said upper collar providing a countersupport for one end of said return spring, the writing instrument further comprising a fixed annular projection for the other end of the return spring.

3. A writing instrument according to claim 1, in which said weight member is in the form of a pendulum pin, said pendulum pin being fixed against axial movement.

4. A writing instrument according to claim 3, which includes a retainer member, said retainer member car-

rying the pendulum pin, the retainer member being provided with an arrangement of guide ribs and guide edges, said guide ribs and guide edges respectively constituting guide members and rest position abutments for said tube holders.

5. A writing instrument according to claim 3, in which each said tube holder is provided with an engagement edge, and said pendulum pin is provided with a freely swingable end of the pendulum pin, said freely swingable end being adapted to engage the said engagement edge of each tube holder when displaced radially.

6. A writing instrument according to claim 3, in which each tube holder is provided with a segment-like recess, the said recesses forming a cylindrical chamber when said tube holders are disposed at the same axial height.

7. A writing instrument according to claim 1, in which said weight member is in the form of a ball, and each tube holder being provided with a segment-like recess, said ball being arranged such that as said tube holders are moved forward together, the said ball is disposed in a chamber formed by said segment-like recesses in the tube holders.

8. A writing instrument according to claim 7, which includes spaced ribs, said spaced ribs being arranged at the end of the writing instrument remote from the writing end thereof, said ribs serving to guide the tube holders and, by means of steps are adapted to engage said ball in the free space between two ribs when the tube holders position have been displaced by said pressure member.

9. A writing instrument according to claim 7, in which said tube holders are provided at their segment-like cross-sections with abutment shoulders, said abutment shoulders serving as abutments against the edge portion of said ribs.

10. A writing instrument according to claim 1, in which said tip projection sleeve is provided with an in-

terior conical ledge, said ledge surrounding the said opening and extending downwardly toward the opening.

11. A writing instrument according to claim 1, in which the tip projection sleeve and the pressure member are formed as a one-piece projection member, a closure button, said closure button closing said projection member, engagement ribs, said engagement ribs extending through longitudinal slots in the one-piece projection member and the return spring being disposed within the said projection member between the closure button and the upper edges of the ribs.

12. A writing instrument according to claim 11, in which said engagement ribs extending through the longitudinal slots in the said projection member serve as catches for a ball of the weight member and are also formed as guide ribs for the tube holders.

13. A writing instrument according to claim 11, in which the tube holders have segment-like recesses which, when the tube holders are moved together to the same axial height, define a chamber for receiving the weight member.

14. A writing instrument according to claim 11, in which the engagement ribs are formed with different radial heights and thereby form engagement edges behind which weight member can engage in the free space between two adjacent ribs when the tube holders are forwardly displaced, the ball being supported at its other side on the engagement edge of the corresponding tube holder.

15. A writing instrument according to claim 11, in which the upper end of the said projection member carries a ring engaged in an annular recess and retained by a threaded closure button.

16. A writing instrument according to claim 11, in which a ring clip is secured between the closure button and the end of the projection part.

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