March 15, 1960 C. BERGONZO 2,928,374

WRITING INSTRUMENT

Filed Feb. 12, 1957

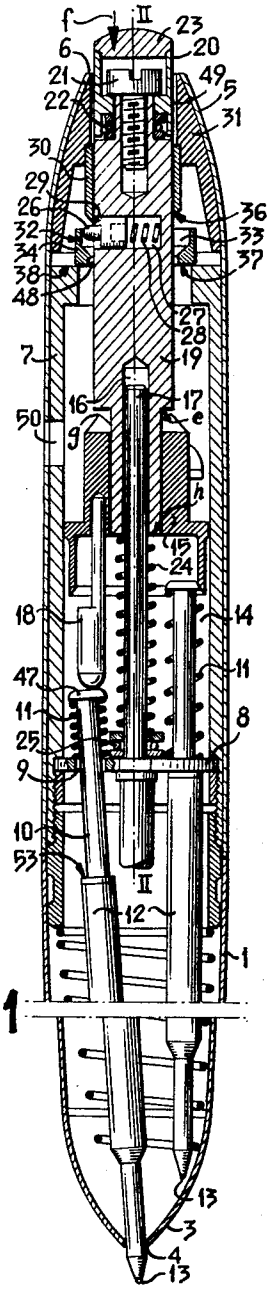


Fig.1

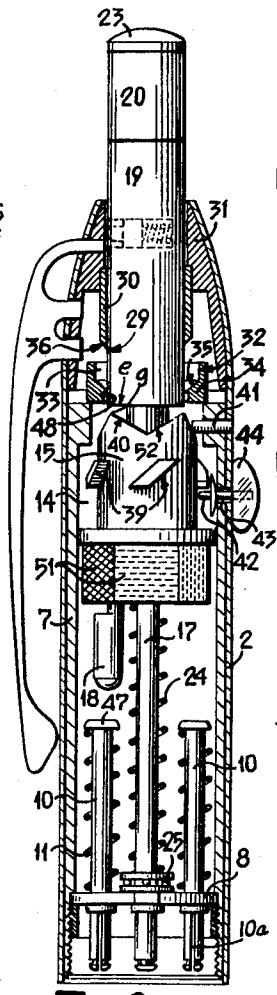


Fig.2

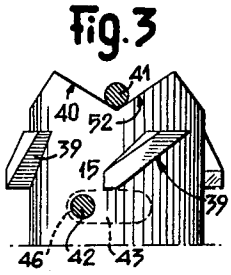


Fig.3

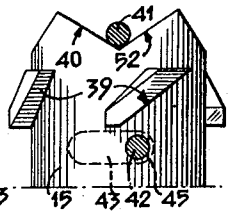


Fig.4

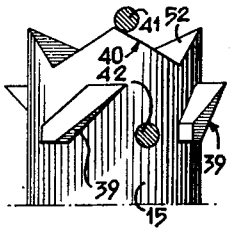


Fig.5

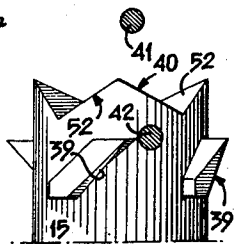


Fig.6

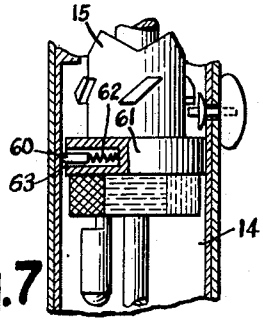


Fig.7

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WRITING INSTRUMENT

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3 Claims. (Cl. 120—42.13)

The present invention has for its object a writing instrument of the kind comprising an envelope enclosing several ink cartridges, each provided with a writing tip which may occupy a withdrawn position in the inner of said envelope and a writing position defined by means of a locking device and for which said tip emerges from an opening made in one of the extremities of the envelope, an actuating member emerging from the rear extremity of the envelope and allowing to bring, against the action of the spring, any one of said writing tips in the writing position, and a selection device allowing the choice of the writing tip desired, actuated by said actuating member out of its withdrawn position.

In the writing instruments of this kind now on the market, the selection device is generally constituted by a drum angularly displaceable and which carries an eccentric push rod. Said push rod displaces step by step in front of heads carried by rods sliding inside of guides provided in a guiding member rigidly fastened to the envelope. Each rod, submitted to the action of a return spring which tends to maintain said rod in its rest position, carries an ink cartridge provided with a writing tip. When the user desires to set in writing position a tip of a given colour, he is thus in the obligation to displace angularly the drum by actuating in rotation the actuating member until a reference mark of the desired colour appears in a window.

Now it seems, according to the last statements made, that the operations which are necessary in order to set in writing position a tip of a given colour, are too great in number and overall of too various kinds, so that the manufacturers of this kind of writing instruments with several colours meet very great difficulties in the diffusion of said writing instruments notwithstanding their evident advantages.

The writing instrument object of the invention tends to remedy to this drawback by the fact that it comprises a selection device presenting an eccentric push rod, carried by an indexing drum, the angular displacements of which are controlled by axial displacements of the actuating member emerging from the rear extremity of the envelope.

The attached drawing illustrates schematically and by way of example one form of execution of the writing instrument according to the invention.

Fig. 1 is an axial cross section, a writing tip being in the writing position.

Fig. 2 is a partial axial cross section along line II—II of Fig. 1.

Figs. 3 to 6 are views at a greater scale of the indexing drum and of its actuating members in different positions illustrating the working of the indexing operations.

Fig. 7 shows another stopping device for the indexing drum.

According to the attached drawing, the writing instrument comprises an envelope of a general cylindrical shape formed of a front part **1** and of a rear part **2**. The front extremity **3** of said envelope is tapered and provided with an opening **4** whilst its rear extremity **5** is slightly conical and comprises an opening **6**. In the rear part **2** of the envelope a frame **7** is driven in; said frame carries a guiding plate **8** provided with guides **9** in each of which slides a carrying member constituted by a rod **10** submitted to the action of a return spring **11**. In the example illustrated, the plate **8** comprises four guides **9** and each rod **10** comprises a split end **10***a* constituting an elastic carrier for a removable cartridge **12** provided at its front extremity with a writing tip **13**. The frame **7** presents a boring **14** in which slides and revolves an indexing drum **15** provided with an eccentric push rod **18**. Said indexing drum is rigidly fastened to an actuating member **19** constituted by a push rod coaxial to the axis of the envelope **1**, **2**; said push rod carries at its rear extremity a head **20** emerging from the envelope through the opening **6** and at its front extremity, a guiding boring **16** in which slides a central guide **17** fastened on the plate **8**. Said head **20** is retained on the extremity of the push rod **19** by means of a screw **21** and an axial bearing **22** allows the angular displacements between the push rod **19** and this head **20**. A plug **23** closes the rear extremity of the head **20**.

A locking device is provided in order to maintain the push rod **19** in working position, that is to say, in the writing position (position represented on Fig. 1) against the action of a return spring **24** bearing on the plate **8** by the intermediary of a ball-bearing **25** in order to reduce the friction of said spring which is driven in the angular displacement of said drum **15** and said push rod **19** by means of the friction of its rear end elastically applied against the end face *h* of said push rod. Said locking device comprises a pin **26** sliding in a radial housing **27** of the push rod **19** and submitted to the action of a spring **28** tending to make emerge said pin out of its housing **25**. In the locking position (Fig. 1), said pin is engaged under a circular edge **29** of a sleeve **30** rigidly fastened on a cap **31** coaxially to the axis of the envelope. The radial displacement of said pin **26** under the action of its spring **28** is limited by a circular wall **32** of a groove **33** made in a ring **34** sliding freely along the push rod **19** between two end positions defined, on the one hand, by a truncated surface **35** forming the bottom of the groove **33** and which rests on a truncated wall **36** forming the front end of the sleeve **30** and, on the other hand, by the front face **37** of said ring **34** resting on the front face **38** of the frame **7**.

The represented writing instrument comprises further an automatic releasing device of said locking device. Said releasing device comprises, on the one hand, said truncated surface **35** intended to push back the pin **26** in its housing **27** against the action of the spring **28** and, on the other hand, the sleeve **30** fastened onto the cap **31**.

The selection device is constituted by the indexing drum **15** provided with two sets of four cams constituted by inclined surfaces **39** and **40**. The cams **40** cooperate with a control finger **41** fastened to the frame **7**, whilst the cams **39** cooperate with a control finger **42** displaceable along an elongated slot **43** (Fig. 3) provided in the frame **7** and in the rear part **2** of the envelope. The control finger **42** carries an actuating member **44** enabling the displacement of said finger from an active position (Fig. 4) defined by the right extremity **45** of the slot **43**, to an inactive position defined by the other extremity **46** of said slot **43**. Each cam **39** and **40** extends substantially over one eighth of the periphery of the indexing drum **15** and besides said sets of cams **39** and **40** are angularly displaced one with respect to the other of about one eighth of a revolution.

The working of the described writing instrument is the following:

When the push rod **19** is in its rest position (Fig. 2)

all the cartridges **12** provided with their writing tips **13** are entirely withdrawn inside the envelope **1, 2** and maintained in this position defined by an abutment face **53** cooperating with the lower face of the plate **8** under the action of their respective return springs **11**.

By exerting a push in the direction of the arrow *f* on the head **20**, the user causes the axial displacement of said push rod **19**, the front face *e* of which comes in contact with radial edges *g* of the drum **15**, whereby said drum and said eccentric push rod **18** are driven by the axial displacement of said push rod **19**. Said eccentric push rod acts during its displacement on the head **47** of one of the rods **10** and actuates thus one of the cartridges **12** against the action of its return spring to its writing position (Fig. 1). This writing position is defined by the pin **26** which engages under the edge **29** of the sleeve **30** which then opposes to a backward displacement of the push rod **19** and maintains thus one of the writing tips **13** in writing position against the action of the return springs **11** and **24**.

In order to allow the engagement of the pin **26** under the edge **29** it is necessary to exert a push in the direction of the arrow *f* on the head **20** by maintaining the writing instrument with its tapered extremity pointing downwards in order that the ring **34** may slide, under the action of its own weight, along the push rod **19** until the position represented on Fig. 1, defined by the front face **37**, rests on the rear face of the frame **7**.

In order to cause the releasing of the locking device and thus the return of said writing tip to its withdrawn position, it is sufficient to exert anew a push *f* on the head **20** in order to cause an axial displacement of the push rod **19** beyond the writing position in order to bring the pin **26** to cooperate with the conical surface **35**. Said conical surface then pushes back the pin **26** in the inner of its housing **27**. This foreposition of the push rod **19** is defined by a circular groove **48** made in the ring **34** and in which the pin gets engaged under the action of its spring **28**. When the user releases its action on the head **20**, the push rod **19**, actuated by its return spring **24**, comes back in its rest position (Fig. 2). Indeed, said push rod **19**, starting from its foreposition, drives said ring **34** in its return movement by means of the pin **26** maintained by its spring **28** in engagement with the groove **48**. During said displacement, the truncated bottom **35** of said ring abuts on the truncated extremity **36** of the sleeve **30**. The ring **34** is then stopped in its movement and the pin **26**, which can no more mesh with the groove **33** for said groove is obturated by the sleeve **30**, slides along the internal surface of said sleeve **30** and then along the wall of a guiding drilling **49** made in the cap **31** until the writing tip **13** reaches its withdrawn position.

When all the writing tips **13** are in their withdrawn position, and user is desirous to set in writing position a given writing tip **13**, he sets the control member **42** in active position, that is to say in the extremity **45** of the slot **43**. He exerts then an axial push on the head **20** in order to cause an axial displacement of the push rod **19** of an amplitude which is sufficient in order to let slide one of the cams **39** along the control member **42** and to cause thus an angular displacement of the drum **15** of one eighth of revolution and to bring thus said indexing drum, at least, to the axial position, represented by Fig. 6. The user releases then his action on the head **20** and the spring **24** brings back the push rod **19** to its start position. During this backward movement, one of the cams **40** carried by the indexing drum **15**, comes in engagement with the control finger **41** (Fig. 5). Said cam **40** slides then under said control finger **41** and causes, thereby, an angular displacement of the indexing drum **15**, of a value which is equal to about one eighth of revolution. When the push rod **19** reaches anew its rest position, the control finger **41** is located at the lower extremity of the cam **40** as represented by Fig. 4.

Consequently the indexing drum **15** has been displaced twice of one eighth of revolution, that is to say, on the whole, of one fourth of a revolution, so that its eccentric push rod **18** is now located opposite to the head **47** of the next rod **10**. By making successively several times the above described operations, the user causes, step by step, a rotation of the indexing drum which allows him to choose, at will, the writing tip **13** which he desires to set in writing position. A window **50** made in the envelope **2**, allows the user to verify during the actuating of said push rod **19**, the angular position of the indexing drum. These angular positions are marked by means of sectors **51** of colours corresponding to the colours of the writing instruments **12**. Each of said sectors appears successively in the window **50**, each time the drum **15** is in its rest position.

A stopping device maintains said indexing drum in an angular position for which its eccentric push rod **18** is located opposite the rear extremity of one rod **10**. Said stopping device is constituted, in the form of execution illustrated, by a control finger **41**, the cam **40** and inclined surfaces **52** connecting said cams **40** between them. Each working position of the indexing drum is defined by said finger **41** located in the groove formed by two successive inclined surfaces **40** and **52** (Figs. 3 and 4). This control finger **41** cooperating with two inclined surfaces **40, 52**, defines also the rest position (Figs. 3 and 4) of the push rod **19**.

When the sector **51** of the desired colour appears in the window **50**, the user acts on the actuating member **44** in order to bring the control finger **42** from its active position to its inactive position (Fig. 3). Said control finger **42** is then located in a diametral plane of the drum **15** which does not cut any of the cams **39**. Consequently, when the user actuates the push rod **19** from its rest position to the writing position, none of the cams comes in mesh with the finger **42**, so that the indexing drum **15** remains in its angular position and said eccentric push rod **18** actuates, to its writing position, the writing tip corresponding to the colour of the sector **51** appearing in the window **50**. The selection device being thus set out of working, this same writing tip may be withdrawn in the inner of the envelope, then returned in its writing position so many times as desired and as long as said control finger **42** is not reset in its active position in order to cause the change of colour.

Thus the writing instrument with several tips described and illustrated on the drawing allows selection of the writing tip desired by a simple push in the direction of arrow *f* exerted on the head **20** of the push rod **19**, followed by a releasing of said head in order to allow the return movement of said head until its rest position under the action of its return spring. The ball-bearings **22** and **25** insure a smooth and exact working of the selection device and avoid especially any angular back movement of the drum **15** due, for instance, to a torsion torque stored, during the first angular displacement of one-eighth of revolution of indexing drum **15**, into the return spring or into the skin of the finger of the user.

The working of the writing instrument is entirely automatic and the user has no more any possibility of executing a false operation, which represents a real advantage with respect to the writing instruments of the kind described and now on the market.

In a variant, the described stopping device could be, for instance as shown by Fig. 7, constituted by a pin **60** sliding in a radial housing **61** provided in the indexing drum **15** and submitted to the action of a spring **62** in order to cooperate with longitudinal grooves **63** made in the walls of the boring **14**. Thus, the indexing drum **15** would be retained in various working positions not only when the writing tips **13** are in their withdrawn position, but also when one of said writing tips is in its writing position.

One form of execution of the writing instrument with

several writing tips, object of the invention, has been described here, by way of example and with reference to the attached drawing, but it goes without saying that all the members and elements described may be without any difficulty and without departing from the scope of the claimed protection substituted by their equivalents.

I claim:

1. A writing instrument comprising an envelope, a plurality of ink cartridges spaced equidistant about and from a common axis, said cartridges enclosed in said envelope and each having a writing tip, spring means urging each of said cartridges to a withdrawn position in which the tip thereof is within said envelope, means for moving and retaining a selected one of said cartridges to writing position in which the tip thereof extends from one end of said envelope, said last-mentioned means including an actuating member extending from the other end of said envelope, an indexing drum, means mounting said drum for rotational and longitudinal movement, said drum carrying an eccentric axially extending pusher rod for engaging said cartridges one at a time, a locking device movable into locking position upon actuation of said actuating member towards said one end of said envelope, means to cause the withdrawal of said locking device upon further actuation of said member toward said end and the subsequent release thereof, means to cause at least part of said moving and retaining means to progress step by step to move and retain each cartridge successively in writing position upon actuation of said actuating member, and means to render ineffective said last-mentioned means to permit successive repeated movement and retention of a selected cartridge upon repeated actuation of said actuating member.

2. A writing instrument according to claim 1, locking device comprising a pin slidable in a radial bore in said moving means, a spring urging said pin outwardly for engagement with an abutment carried by said envelope, said means causing withdrawal of said pin comprising a ring having an interior sloping surface engaged by said pin upon said further actuation of said actuating member.

3. A writing instrument comprising an envelope, a plurality of ink cartridges enclosed in said envelope and each having a writing tip, spring means urging each of said cartridges to a withdrawn position in which the tip thereof is within said envelope, means for moving and retaining a selected one of said cartridges to writing position in which the tip thereof extends from one end of said envelope, said last-mentioned means including an actuating member extending from the other end of said envelope, spring means acting on said moving means and urging said moving means towards a rest position in which said actuating member emerges from said end of said envelope, selection means to effect stepwise rotation of said moving means and comprising a first control member displaceable from an active position to an inactive position, and first cam means causing, when said first control member is in active position and upon actuation of said actuating member, a rotation of said moving means through a partial revolution, and a second control member and second cam means causing, upon releasing said actuating member and backward movement of said moving means to rest position, a second rotation of said moving means through a partial revolution, whereby upon repeated actuation of said actuating member, said moving means comes successively in positions for actuation of any one of said cartridges, and upon displacement of said first control member to inactive position, said first control member may not come in mesh with said first cam means upon actuation of said actuating member, and whereby upon actuation of said actuating member said moving means move a selected cartridge in writing position and whereby upon repeated actuation of said actuating member said selected cartridge is repeatedly moved into writing position.

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