

PATENT SPECIFICATION



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COMPLETE SPECIFICATION.

Propelling Pencil.

We, PAUL KOHLER and CHRISTIAN SCHAEFER, both of No. 21, Ispringerstrasse, Pforzheim, Germany, and both of German nationality, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to a propelling pencil, comprising a number of leads of different colours connected with sliding elements by means of springs so that a lead of desired colour can be selected to be brought into the position for use, the lead which is pushed forward engaging with a guide so that it projects in the direction of the central axis from the point of the propelling pencil.

The invention has for its object the following improvements in propelling pencils. The sliding elements and the guide-sleeves for the same are octagonal in cross-section in order to secure against rotation those individual pencil elements which have not to be rotated and the sliding elements of the same. The guide-springs for the leads are formed by the flattened rear extensions of the guide-tubes. Two rings, having oblique teeth and held in engagement the one with the other by spring-action, serve for accurately adjusting the selected lead to be propelled. The selected lead is locked in the position for writing either by rotating a push-ring so that a pin fixed to this ring comes into engagement with notches of the longitudinal slots of the guide sleeve and of the outer casing, or automatically by the spring-power of its adjusting element, said spring-power being produced by the backward rotation of the group of guide-sleeves. The adjusting device together with the magazine for spare leads are arranged in the pencil-head, and the whole inner mechanism can be removed from the casing after two screw-pins have been unscrewed.

Owing to these improvements the propelling pencil, according to the invention, fulfils all requirements as regards durability, secure operation, low price and maintenance.

The improved propelling pencil accord-
[Price 1/-]

ing to the invention is illustrated in the accompanying drawing in which:

Fig. 1 is an elevation showing the propelling pencil.

Fig. 2 is a longitudinal section.

Fig. 3 is a longitudinal section taken at 90° with regard to Fig. 2.

Fig. 4 is a cross-section on larger scale, taken at the height of the advanced ring.

Fig. 5 is a similar cross-section taken at the height of the push-ring when the same is pushed back.

Fig. 6 is a longitudinal section showing a rotatable pencil element with a lead.

Fig. 7 is an elevation of Fig. 6.

Fig. 8 is a cross-section through Figs. 6, 7 on larger scale.

The pencil-casing 1 is of octagonal cross-section and has at its front end a conical point 2 which has in its rear end a conical cavity extended by a cylindrical central bore 3. In the rear end of the casing 1 a bearing collar 4 is fixed by means of a screw 5. The screw 5 serves further to hold the end of a clip 6, fixed on the outer side of the casing 1.

In the bearing collar 4 a sleeve 7 is rotatably mounted, the inner space 8 of which serves as magazine for spare leads. On the front end of sleeve 7 four guide-sleeves 9 of octagonal cross-section are soldered. Each guide-sleeve 9 has in its outer side a longitudinal slot 10 and close to its rear end a circumferential slot 11 into which the longitudinal slot 10 merges with its enlarged V-shaped rear portion 12. Notches 13 are arranged in the left edge of the slot 10 near the front end of the same (Fig. 3).

In each guide-sleeve 9 a guide element 14 of octagonal cross-section is shiftably mounted which has near its rear end a transverse slot 15 corresponding to the circumferential slot 11 of the guide-sleeve 9. Each guide element 14 is connected at its front end with a short pencil element 17 by means of a plate-spring 16, possessing great flexibility.

The short pencil elements 17 (Figs. 6 to 8) contain each a lead 18, adapted to be pushed forward by means of a push-pin 19. The leads 18 of different colours and their push-pins 19 are guided in the

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pencil elements 17 each by means of a sleeve 20 slit in longitudinal direction. The rear ends of the guide-sleeves 20 for the leads, projecting from the rear end of the pencil elements 17, are compressed to form flat plate-springs 16. The rear end of each plate-spring 16 is enlarged and soldered on the back of the corresponding guide element 14.

In each pencil element 17 a metal band 21 is wound in spirals around the guide-sleeve 20 and secured against shifting in longitudinal direction by two collars 22, fixed by soldering the one near the front end and the other near the rear end on the guide-sleeve 20. A projection 23 of the push-pin 19 projects through the slot of the corresponding guide-sleeve 20 into the spiral groove of the metal band 21 so that it is pushed forward or backward when said metal band 21 is being rotated. The metal band 21 is rotated by the rotation of the front part 24a of the pencil element 17, said front part 24a being connected with the metal band 21 by soldering. The rear part 24b of the pencil element 17 is connected by soldering with the rear collar 22 so that it is not rotatable as the rear collar 22, the guide-sleeve 20, the plate spring 16 and the sliding element 14 are soldered together, said sliding element 14 being secured against rotation as it is of octagonal cross-section and engages with the corresponding guide-sleeve 9 which is also of octagonal cross-section. In the circumferential slot 11 a locking ring 25 is loosely mounted which, by its octagonal circumference engaging with the octagonal pencil-casing 1, is secured against rotation, the sliding elements 14 gripping with their notches 15 over said ring, whereby accidental advancing of the pencil elements 17 and jamming of the same in the conical bore of the point 2 of the pencil-casing 1 are prevented. The locking ring 25 has a cut-out portion 26 which forms a passage for the sliding element 14 of the pencil element 17 which has to be pushed into the position for writing (Figs. 2 and 5).

A push-ring 27, mounted on the casing 1, so that it can be shifted in longitudinal direction and having an inwardly directed pin 28, serves for pushing forward said pencil elements 17. When the push-ring 27 is in its rear position, shown in Fig. 1, the pin 28 projects through a longitudinal slot 29 of the casing 1 and through the cut-out portion 26 of the locking ring 25 into the circumferential groove 11 of the guide-sleeves and into the notch 15 of the guide-element 14 of that pencil element 17 which is actually in the adjusted position, and it slides in the longitudinal slot 29 of the casing and in the longitudinal slot 10 of the adjusted guide-sleeve 9 and pushes forward the guide element 14 of the adjusted pencil element 17 and also this pencil element 17 (Fig. 2).

At this forward movement, the pencil element 17 is, owing to its spring 16, directed into the conical cavity of the point 2 of the casing so that it enters into the central bore 3 of said point and projects from the front end of casing 1. The lead 18 is advanced from the point of the pencil element 17 by rotating the part 24a of said pencil element.

The pin 28 registers in its extreme forward position with the notch 13 in the left edge of the longitudinal slot 10 of the guide-sleeve 9 (Fig. 2), and at the corresponding end of the longitudinal slot 29 of the casing 1 a notch 30 turned to the left is arranged (Fig. 1). When the ring 27 is rotated, the pin 28 is brought into engagement with the corresponding notch 13 and with notch 30, the pencil element 17 which has been brought into the position for writing being thereby secured against backward movement due to the pressure exerted during writing.

In order that the one or other of the pencil elements 17 may be selected for writing, the group of guide-sleeves 9 with the short pencil elements 17 is rotatably mounted in the bearing collar 4, in the front end of the casing 1 and in the locking ring 25 so that any of the pencil elements 17 can be adjusted so that the slot 10 in its guide-sleeve 9 registers with the pin 28 of push-ring 27 and with the passage 26 in the locking ring 25.

The group of guide-sleeves 9 is secured in this adjusted position by means of locking teeth 31 in the bearing collar 4 engaging with locking teeth 31a of a ring 32. Said ring 32 has a slot 33, forwardly extending from the rear edge and designed to engage over a pin 34 of the bearing sleeve 7, so that said ring 32 can be shifted longitudinally on said bearing sleeve but not rotated on the same. A spring 35, inserted between the rear edge of ring 32 and a collar 36 on the rear end of the bearing sleeve 7 presses the teeth 31a of ring 32 into engagement with the corresponding teeth 31 of the bearing collar 4.

On the rear collar 36 of the bearing sleeve 7 a screw-threaded sleeve 37 is fixed by soldering, which is set off several times and extends in forward direction over the spring 35, the locking ring 32 and the locking teeth 31 of the bearing collar 4, and engages with the rear end of the casing 1. On this threaded sleeve 37 an internally threaded cap 38 is screwed which closes the lead-magazine 8. On the set off portion of octagonal cross-section of the threaded sleeve 37 coloured

marks 39 are arranged, the colour of which corresponds to the colour of the lead 18 in the short pencil element 17 which registers with the colour mark 39, said colour-marks being brought into register with the longitudinal slot 29 of the casing 1 to select the corresponding pencil element 17 the cap 38 having to be rotated for this purpose. As the cap 38 has right-hand thread, the locking teeth 31, 31a of the bearing collar 4 and of the locking ring 32 respectively, are inclined from the right to the left and to the rear so that, when the cap 38 is rotated in the direction of screwing on, the teeth 31, 31a, slide the one over the other, but are locked when cap 38 is being unscrewed.

In the form of construction shown in Fig. 2 the vertical faces of the teeth 31a of the ring 32 are situated in the direction of the central line of the longitudinal slots 10 so that, when the locking ring 32 is in the position of rest, the selected longitudinal slot 10 stands accurately behind the longitudinal slot 29 of casing 1.

The locking ring 32 might however be slightly displaced to the left (Fig. 3), and in this case the longitudinal slot 10 of the selected guide-sleeve 9 of the group of sleeves would be slightly displaced in the position of rest to the right with regard to the longitudinal slot 29 of casing 1 under the pressure of the spring 35 and under the rotating effect of the inclined faces of the locking teeth 31, 31a. When the adjusted pencil element 17 is then being pushed forward, the group of guide-sleeves would be turned to the left from its position of rest, in opposition to the action of spring 35. This deflecting is produced by the pin 28 of the push-ring 27 and with the aid of the V-shaped enlargement 12 of the longitudinal slot 10 of the guide-sleeve 9 at the point where this slot merges into the cross-slot 11. During the forward movement of the push-ring 27, the left edge of the slot 10 of the corresponding guide-sleeve 9 is pressed by the action of the spring 35 against the pin 28.

This action can then be utilised for automatically producing the locking of the advanced pencil element 17, as the group of sleeves will rotate to the right, as soon as the pin 28 comes into register with the notch 13 in the left edge of the slot 10, whereby said slot 10 is shifted to the right, with regard to the longitudinal slot 29 of the casing, the pin 28 being locked in its position by the notch 13, the advanced pencil element 17 being consequently locked also in its advanced position. The notch 30 of the longitudinal

slot 29 turned to the left would then not be necessary. Instead of the notches 13 in the left edge of the slots 10 of the guide-sleeves 9, the slot 29 might have a notch 40 directed to the right with which the pin 28 is automatically brought into engagement to be locked.

When the push-ring 27 is rotated to the left, the pin 28 is unlocked.

To remove the inner mechanism from the casing 1, it is merely necessary to unscrew the pin 28 of the push-ring 27 and the fixing screw 5 of the bearing collar 4, whereupon the whole inner mechanism can be pulled out through the rear end of the pencil-casing 1.

In order to give a sufficiently long guiding to the pencil elements 17, the locking rings 31, 32 are so arranged on the bearing sleeve 7 that they are overlapped by the screw-threaded sleeve 37 which is also overlapped by the cap 38, these elements thus occupying the smallest possible space on the head of the propelling pencil.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. Propelling pencil, characterized in that in the casing of the same a number of small size screw-propelling elements 17 are arranged so that, by means of guide-elements 14 and guide-sleeves 9, they can be moved in longitudinal directions, their rear portions 24b being secured in the guide-sleeves 9 against rotation, said pencil elements being adapted to be selected by means of an adjusting device arranged in the end of the casing and working by means of spring-controlled toothed locking rings 31—32, the selected pencil elements 17 being adapted to be projected to writing-position or retracted by means of a ring 27 shiftable on the casing 1, the projected elements 17 being secured in writing-position by rotating the shiftable ring 27 either by hand or automatically.

2. Propelling pencil as claimed in Claim 1, characterised in that the guide-sleeves 9 of the short pencil elements are of octagonal cross-section, the sliding elements 14 of said pencil elements being shiftable in said guide-sleeves in longitudinal direction and the part of said pencil elements to be locked, together with the sliding elements 14, being thereby secured against rotation with regard to the rotatable parts of the pencil elements.

3. Propelling pencil as claimed in Claims 1 and 2, characterised in that between the pencil elements and their

sliding elements flexible springs 16 are inserted, and in the point 2 of the pencil casing a central guide 3 is arranged which is conical at the rear and cylindrical at the front, and into which the short pencil element can be conducted at the forward movement owing to the deflecting spring 16 so that it is centered and projects from the point.

4. Propelling pencil as claimed in Claims 1 to 3, characterised in that the springs 16 between the pencil elements 17 and the sliding elements 14 are formed by an extension of the corresponding guide tube 20 for the lead said extension being pressed flat at the portion projecting from the guide tube and enlarged at the rear end and soldered on the back of the corresponding sliding element 14.

5. Propelling pencil as claimed in Claims 1 to 4, characterised in that around each slit guide tube 20 for a lead a metal band 21 is wound in spirals, secured against movement in longitudinal direction by collars 22 on the guide tube 20, so that a push pin 19, the transverse pin 23 of which projects through the longitudinal slot of the guide tube 20 for the lead, engages with the spiral shaped groove of the metal band 21 and, guided in the guide tube for the lead, is moved forward or backward by rotating the front part of said pencil element 17 whereby the lead 18 is pushed forward or pushed back.

6. Propelling pencil as claimed in Claims 1 to 5, characterised in that the sliding elements 14 of the pencil elements 17 have, near the rear end a transverse slot 15 to which corresponds a circumferential slot 11 near the rear end of the group of guide-sleeves, that each guide-sleeve has in its outer side a longitudinal slot 10 and the main casing 1 of the pencil has a longitudinal slot 29, a push-ring 27 being shiftably mounted on the casing 1 and having an inwardly directed pin 28 projecting through said longitudinal slot 29, through the longitudinal slot 10 of the guide-sleeve 9 and into the cross slot 15 of the guide element 14 guided in said guide-sleeve so that by shifting said push-ring 27 in longitudinal direction the selected pencil element 17 may be pushed forward or pulled back.

7. Propelling pencil as claimed in Claims 1 to 6, characterised in that a flat slit ring 25 engages with the circumferential slot 11 of the group of guide-sleeves, said ring being secured against rotation in the circumferential slot 11 by its octagonal circumference corresponding to the octagonal cross-section of the main casing 1 and having its cut out portion 26 registering with the slot 29 of the casing

1, the pencil elements 17 being suspended on said ring by the cross slot 15 of their sliding elements and locked in this position while the sliding element of the selected pencil element to be pushed forward passes freely through the cut out portion 26 of the ring 25.

8. Propelling pencil as claimed in Claims 1 to 7, characterised in that the guide-sleeves of the group are connected at the rear end by soldering with a bearing sleeve 7 and rotatable with said sleeve in a bearing collar 4 in the rear end of the casing 1 so that, when all pencil elements are pulled back, the group of guide-sleeves can be adjusted, with regard to the pin 28 of the push-ring 27, so that any desired guide-sleeve 9 of the corresponding pencil element 17 and the sliding element 14 guided in this sleeve register with said pin and can be pushed forward.

9. Propelling pencil as claimed in Claims 1 to 8, characterised in that, on the end of the bearing sleeve 7, a collar 36 is fixed to which is soldered a sleeve 37 extending into the rear end of the casing 1, a cap 38, serving to close the lead-magazine and to rotate the group of guide-sleeves, being screwed on said sleeve 37 and that on the octagonal portion of this sleeve 37 which corresponds with the octagonal cross-section of the casing 1 coloured marks 39 are arranged, the colour of said marks corresponding to the colour of the leads in the corresponding pencil elements, said marks being designed to be adjusted on the slot 29 of the casing 1 in order to bring the desired coloured lead into the operative position.

10. Propelling pencil as claimed in Claims 1 to 9, characterised in that the bearing collar 4 of the group of guide-sleeves has in its upper edge teeth 31 directed in anti-clockwise direction and corresponding with the position of the longitudinal slots 10 in the guide sleeves 9 and that with these teeth 31 the teeth 31a of a ring 32 engage, said ring being shiftably mounted in a longitudinal direction on the bearing sleeve 7 by means of a longitudinal slot 33 extending in forward direction from the rear end of said ring, and by a pin 34, so that it can rotate with the bearing sleeve and is exposed to the pressure of a pressure spring 35 inserted between the collar 36 of said bearing sleeve and the rear end of said toothed ring 32, said ring 32 being turned by said pressure spring owing to the inclined faces of the teeth 31, 31a up to the complete engagement with the teeth 31, in order that the desired individual pencil 17 with its guide-sleeve 9 be accurately adjusted to the longitudinal

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slot 29 of the outer sleeve 1 and secured in this position.

11. Propelling pencil as claimed in Claims 1 to 10, characterized in that the longitudinal slots 10, 29 of the guide-sleeves 9 and of the casing 1 have corresponding lateral notches 13, 30 at the extreme front end, with which the pin 28 of the ring 27 is brought into engagement by rotation of said push-ring so that the advanced pencil element is secured against pushing back.

12. Propelling pencil as claimed in Claims 1 to 10, characterised in that the toothed ring 32 is slightly displaced on the bearing sleeve 7 with regard to the guide-sleeves 9 in clockwise direction, so that the slots 10 of said guide-sleeves are displaced, with regard to the pin 28, to the right, and that the longitudinal slots 10 have each a V-shaped enlarged portion merging into the circumferential slot 11, in order that the pin 28 must turn in opposite direction the group of guide-sleeves by directing the corresponding longitudinal slot 10 of the corresponding guide-sleeve in opposition to the action of the adjusting teeth 31, 31a and of the pressure-spring 35, so that the group of guide-sleeves and the pin 28 are under mutual pressure designed to bring the notches 13 of the longitudinal slot 10 of the corresponding guide-sleeve automatically into engagement with the pin 28, when this pin is in the extreme front position, and to secure thereby the advanced short pencil element in the position for writing.

13. Propelling pencil as claimed in Claims 1 to 10, and 12, characterised in that, instead of the notches 13 of the slots 10 of the guide-sleeves, one single notch 40 directed to the right is arranged in

the longitudinal slot 29 of the casing 1, with which the pin 28 is automatically brought into engagement, when it is in the extreme front position, by the group of guide-sleeves being turned to the right, the advanced short pencil element being thus locked in its position.

14. Propelling pencil as claimed in Claims 1 to 13, characterised in that the bearing sleeve 7 for the group of guide-sleeves serves at the same time as magazine for spare leads, that by the arrangement of the locking rings 31, 32 on the bearing sleeve 7, by the overlapping of the locking rings by the screw-threaded sleeve 37 having the adjusting marks 39 for the cap 38, and the overlapping of the cap over the screw-threaded sleeve 37, these devices are arranged so that they occupy the smallest possible space on the head of the propelling pencil, in order to give a sufficiently long guiding to the short pencil elements 17.

15. Propelling pencil as claimed in Claims 1 to 14, characterised in that the pin 28 is screwed into the push ring 27, and the bearing collar 4 in the rear end of the main casing 1 is fixed in this casing by means of a screw 5 which serves at the same time for holding a clip 6, the locking ring 25 being loosely inserted into the groove 11 of the group of guide-sleeves so that the whole inner mechanism can be pulled out at the rear end of the main casing after unscrewing of the pin 28 and of the screw 5.

Dated this 28th day of October, 1927.
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[This Drawing is a reproduction of the Original on a reduced scale.]

