

## PATENT SPECIFICATION

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### COMPLETE SPECIFICATION

#### Improvements in and relating to Writing Implement having Interchangeable Leads

I, KURT FEND, of German nationality, of 24, Maximilianstrasse, Pforzheim, Germany, 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:—

A writing implement having interchangeable leads or the like is already known which has two casings movable inside of each other, one of which hereinafter designated as a feed casing carries the feed action arrangement, while the other is known as the guide casing and contains the leads and their carriers. In the known arrangements, in order to select the desired lead carrier, the feed casing is rotated. Furthermore, the lead carrier when pushed out is held in place by the feed casing which is also pushed out and held in that position. In order to change the lead carrier, the feed casing must be pushed back, rotated in the guide casing, must engage the other lead carrier and then be again pushed forward. The withdrawn lead carrier is released from the feed casing or pushed back by springs during this process.

This manipulation is comparatively bothersome and has led to a preference for a device in which the lead carrier is provided with an individual guide button by which it can be easily brought to an operative position, and by which it can be withdrawn by the unhooking of a catch and by being pushed back manually, or by the action of a spring which throws it back. Such a device has the disadvantage that its surface is not smooth, since it has the aforementioned buttons. In addition, the catch of the lead carrier, when brought in the position for use, is likely to be released unintentionally and the lead carrier withdrawn prematurely.

All these disadvantages have been eliminated by the device of this specification which provides a smooth surface on the device and also enables the manipulation of the lead carrier from an operative to an inoperative position, or vice versa, to be accomplished by a single manipulation. The invention comprises a device having two casings which are

movable one inside the other and in which the one (the feed casing) carries the feed action arrangement, while the other (the guide casing) contains the lead carrier. The device is made in such a manner that on the front end of the feed casing, which cannot be turned, a push bar is attached by its rear end in such a manner that the front end thereof is freely movable. Thus, when the lead pencil is not vertical, gravity acts on the push bar and adjusts it.

Through this arrangement, any special adjustment of the lead carrier when being pushed out is eliminated. The only manipulation which is necessary, therefore is the simple act of turning the device so that a mark indicating the desired lead carrier lies uppermost where it is visible to the eye of the user. In this position, the push bar automatically engages the desired lead carrier, so that the only manipulation required is the pressing of the feed casing to bring the lead carrier into position.

The push bar can be suspended at its rear end in such a manner that it can swing freely in all directions or that it can describe a cylinder with the greater part of its length. In particular the push bar may have at its rear end a head which runs in an annular channel at the end of the feed casing. A construction is also possible in which the rear end of the push bar is cranked and the bar is mounted by means of a ball head in a socket arranged in the middle of the front end of the feed casing. Also the push bar could be suspended by means of a crank on a bolt in the middle of the front end of the feed casing. The feed casing is preferably acted upon by a return spring which forces it back into its rearmost position. This has the result that the feed casing is always in the position for use and does not have to be pushed back to engage a lead carrier but need only be pushed forward. Otherwise the construction of the pencil according to the invention may be as desired. Thus the lead carriers may be acted upon by return springs and may be guided each in a compartment of a front sleeve which

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is fixed in an outer sleeve together forming the guide casing. In this case it is advisable for the partitions between the compartments to have reinforcements at the rear end which are stepped at the front and made with a knife-edge at the rear. The reinforcements then form stops for the lead carriers when moved back by the springs and owing to their knife-edge formation, enable the end of the push bar to enter the desired compartment. The lead carriers which are acted upon by return springs may each be provided with a guide pin moving in a long slot of the lead carrier casing and also slidable through a slot of a casing which is attached to the guide casing and which is turnable with the help of the guide pin acting through the slot and which also serves to lock and unlock the lead carriers when in use. This will eliminate a special movement for the uncoupling of the lead carrier. All that is required for operation of the device is to press on the feed casing which releases the lead carrier at the front of the device and positions the next carrier for use.

With the foregoing and other objects in view, the invention consists in the details of construction, and in the arrangement and combination of parts to be hereinafter more fully set forth and claimed.

In describing the invention in detail, reference will be had to the accompanying drawings, wherein like characters denote corresponding parts in the several views, and in which

Figure 1 illustrates a longitudinal section through a pencil embodying my invention;

Figure 2 illustrates a fragmentary elevation of a portion of the device with the casing shown in longitudinal section;

Figure 3 illustrates a transverse section of line 3—3 of Figure 1 on a larger scale;

Figure 4 illustrates a transverse section of line 4—4 of Figure 1 on a larger scale;

Figure 5 illustrates an elevation of a detail of the invention;

Figure 6 illustrates a plan view of the detail of Figure 5;

Figure 7 illustrates a fragmentary view with parts broken away and parts shown in longitudinal section;

Figure 8 illustrates a plan view of a detail showing a modification;

Figure 9 illustrates a fragmentary elevation of Figure 8;

Figure 10 illustrates a plan view of a detail showing a further modification;

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Figure 11 illustrates a fragmentary elevation of Figure 10.

The embodiment of Figures 1 to 7, inclusive, has an inner guide casing 1 provided with four straight and longitudinally extending slots 2. In casing 1, four compartments are formed by the insertion therein of the cross-shaped member 3 (Figures 1, 5, 6), in each of which compartments is carried a lead carrier 4, 4<sup>1</sup>, 4<sup>11</sup> (Figure 4), two of which lying opposite each other, 4<sup>1</sup> and 4<sup>11</sup>, are shown in Figure 1. Each lead carrier 4, 4<sup>1</sup>, 4<sup>11</sup> has at its rear end an enlargement 5 which carries a lateral guide lug 6 which slides in one of the slots 2. Surrounding each lead carrier 4, 4<sup>1</sup>, 4<sup>11</sup> is a thrust coil spring 7, one end of which seats against the enlargement 5 and the other end of which seats against a cap 8 which is carried by the casing 1. Under pressure of the springs 7, the enlargements 5 engage a reinforced rim 9 of the cross-shaped member 3. The rear ends of the partitions of the member 3 are sharpened for a purpose to be stated later.

A rotatable casing 10 is carried by the guide casing 1 and has four longitudinal slots 11 formed therein, in which the guide lugs 6 are slidable. Each slot 11 has at the front end thereof a lateral offset 12 (Figure 2) formed with a sloping tightening surface 13 and a shoulder 14 and at the rear end with a triangular enlargement 15 with a sloping edge 16.

The front rim of the casing 10 abuts the rear rim of the cap 8. The rear end of the casing 10 is braced against shifting by being seated against the front rim of a casing 17 mounted on the rear end of the casing 1. In this casing 17 is seated a feed casing 18. The feed casing 18 is closed at the front end by a plate 19 which carries in its center a bar 20 with an enlarged end 21. The front end of the feed casing 18 sits on an inwardly directed annular shoulder 22<sup>a</sup> of a short casing 22 which is drawn in at the end and has an inwardly directed beveled front edge 23. The shoulder of the casing 22 is spaced from the front beveled edge 23 to provide a space 24 through which extends the mushroom-shaped bar 20, 21 and in which sits loosely the enlarged rear end 25 of a push bar 26. The underside of the shoulder 22<sup>a</sup> of the casing 22 acts as a seat for a spiral spring 27, the front end of which extends into the casing 1 and seats against the front of insert 3. The action of the spring 27 tends to push the feed casing 18 rearwardly. Its movement is held in check by reason of the fact that an inwardly directed rear edge 28 of the casing 17 overlies the rear edge of the casing 22.

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On casing 17 an octagonal ring 29 is secured, upon which is soldered the rear end of a jacket 30 with a tapering front end 31. The casing 30, 31 encloses the entire forepart of the mechanism.

The feed casing 18 has on its rear end an outside thread 32. Before this thread an octagonal catch-ring 33 is suitably attached to the outside of the casing 18. Outside the casing 18 is a covering casing 34, which is formed with an inwardly directed rear edge 35 which overlies and seats upon the ring 33. The front edge of the casing 34 has a telescopic connection with the rear end of the jacket 30. The casing 34 is held in place on the ring 33 by a clip 36 which is screwed on thread 32 and by the screw cap 37. The inner chamber of the feed casing 18 serves as a lead container 38, access to which can be had by unscrewing cap 37.

On the outside of the device, preferably on the covering casing 34, there is provided a multi-coloured indicator 39, in such a manner that each colour thereof corresponds with a related lead carrier on the inside of the device.

When the device is placed in a sloping or horizontal position as is shown in Figure 7, the push bar 26 which is freely movable by reason of the loose connection of its rear end 25 in the space 24 and which moves through an annular path around the head 21 of the pin 20 seeks the lowermost position in the casing 22 by reason of the law of gravity. Therefore, in this position, the front end of bar 26 is immediately behind that lead carrier which is then positioned lowermost in the device, but whose colour is uppermost and visible. When the feed casing 18 is pushed forwardly against the action of the spring 27, the push bar 26 enters the respective section of the insert 3 of the guide casing 1 and pushes the lead carrier 4<sup>1</sup> therein into the position shown in Figures 1 and 7, thereby causing spring 7 to be compressed. At the same time, the guide lug 6 of the respective lead carrier slides along the straight slot 2 of the guide casing 1, along the sloping edge 16 of the slot 11 and turns the casing 10 to the right. Through further pushing along slot 11, the guide lug 6 slides along the sloping slot edge 13 until it reaches the forepart of the offset 12 and turns back the casing 10 to the left, as shown by the position in Figure 2. When next the feed casing 18 is released, it returns to its original position shown in Figure 1 through the action of the spring 27, whilst the guiding lug 6 of the engaged lead carrier is resiliently seated against the jib headed catch 14 of the

rotating casing 10 through the action of the partly compressed spring 7.

If a lead carrier is in the operative position and is to be replaced by another lead carrier, the rotating casing 10 turns in the same manner. With the first turn of the casing 10 to the right, the guide lug 6 of the lead carrier to be replaced, which cannot move sideways because of its being guided through slot 2 of the guide casing 1, is disengaged from the jib headed catch 14, and that lead carrier snaps back to its original position by pressure of spring 7. The lead to be brought into working position can, in the meantime, be pushed forward until its guide lug 6 catches behind the jib headed catch 14 of its slot. Each time a lead carrier is pushed forward, the casing 10 makes a short turn first to one side and then to the other. When all the lead carriers are to be brought into the inoperative position, it is only necessary in engaging one lead carrier to push it forward a little by a short pressure of the feed casing 18. The resultant turning of the casing 10 releases the front lead carrier, which returns to its position of rest, to which, after the pressure on the feed casing ceases, the lead carrier which the former had moved also returns.

The movements necessary for selecting a certain lead carrier consist only in the natural and simple turning of the entire interchangeable device to such position as causes the colour mark 39 of the desired lead carrier to lie uppermost and visible to the user. The modus operandi can be described concisely as follows:

Look at the desired colour mark and press on the feed casing 18. If by reason of the fact that the device is held on a slant, the colour mark is not exactly at the top, this does not interfere with perfect operation. Because the rear reinforced edges 9 of the cross-shaped insertions 3 are sharpened at the ends, the forepart of the push bar is enabled to glide easily into the desired section of the guide casing 1 even when slightly slanting and pushes the desired lead carrier forward.

In Figures 8, 9 and 10, 11, two modified arrangements of the forward movement are pictured. In both, the push bar 26<sup>a</sup>, 26<sup>b</sup> is crank-shaped and situated at the front of feed casing 18<sup>a</sup> to which it is pivotally attached. According to the method in Figures 8, 9, the push bar 26<sup>a</sup> is crank-shaped and carries at its rear end a ball-shaped head 40 which is freely movable in a shoulder piece 41 of the feed casing 18<sup>a</sup>.

In the arrangement of Figures 10, 11, the push bar 26<sup>b</sup> has a crank 42 soldered

to it which turns on a pin 43 which is soldered on the front end of the feed casing 18<sup>b</sup>.

In both of these modifications, the push bars 26<sup>a</sup>, 26<sup>b</sup> can move freely through an annular path and can engage the lowest positioned lead carrier by reason of the force of gravity.

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

1. A writing implement having interchangeable leads, comprising two casings capable of sliding with respect to one another, of which the rear casing or feed casing carries a push bar capable of being set to engage the lead carrier which is to be pushed forward and of which the forward casing or guide casing contains the lead carriers, characterised by the feature that the push bar is attached to the front end of the feed casing so as to be freely movable in such a manner that, on the writing implement being turned into an inclined or horizontal position, the forward end of the bar moves under gravity into its lowest position and in this position lies opposite the lead carrier which is to be pushed forward, the appropriate lead carrier being indicated by a mark provided diametrically opposite to it on the outside of the writing implement casing.

2. A writing implement as claimed in claim 1, characterised by the feature that the bar is suspended by its rear end in the middle part of the end wall of the feed casing in such a manner that it can swing in all directions.

3. A writing implement as claimed in claim 1, characterised by the feature that the bar is suspended at its rear end in such a manner that with at least the greater part of its length it can describe a cylindrical surface.

4. A writing implement as claimed in claim 3, characterised by the feature that

the bar is provided at its rear end with a head capable of moving in an annular slot in the end wall of the feed casing.

5. A writing implement as claimed in claim 3, characterised by the feature that the bar is cranked at its rear end and is journaled by means of a ball head in a socket provided in the middle of the end wall of the feed casing.

6. A writing implement as claimed in claim 3, characterised by the feature that the bar is suspended by means of a crank member from a pin provided in the middle of the end wall of the feed casing.

7. A writing implement as claimed in claim 1, characterised by the feature that the feed casing is under the influence of a recoil spring which forces it back into its rearmost position.

8. A writing implement as claimed in claim 1, characterised by the feature that the lead carriers which are acted on by recoil springs are guided in compartments of a fixed guide casing and that the walls separating the compartments are provided at their rear end with thickened parts which are offset at the front to form abutments for the lead carriers, when pushed back by their springs, and are formed as knife edges at the rear side, for ensuring that the bar will enter the desired compartment.

9. A writing implement as claimed in claim 8, characterised by the feature that the lead carriers slide each with a guide pin in a straight longitudinal slot of the guide casing containing the lead carriers and in a shaped slot of a locking casing which is rotatable on the guide casing and which is rotated by the guide pins with the aid of the shaped slots and serves for locking and unlocking the lead carriers in the operative position.

10. The improved writing implement having interchangeable leads, substantially as hereinbefore described with reference to the accompanying drawing.

Dated this 14th day of July, 1937.

MARKS & CLERK.

[This Drawing is a reproduction of the Original on a reduced scale.]

