

UNITED STATES PATENT OFFICE

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INTERCHANGEABLE LEAD PENCIL

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16 Claims. (Cl. 120—14)

5 A writing instrument 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 instrumentalities, 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 The withdrawn lead carrier is released from the feeding case or pushed back by springs during this process.

20 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with an individual guide button by which it can be easily brought to an operative position, and by which it can be withdrawn by the unhooking of a catch and by being pushed back manually, or by the action of a spring which throws it back.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catch of the lead carrier when brought in position for use is likely to be loose unintentionally and the lead carrier withdrawn prematurely.

35 All of these disadvantages have been eliminated by the device of this application which provides a smooth surface on the device and so 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 inside of each 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 feed 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, gravitation forces the feed bar and adjusts it.

50 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 feed 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.

5 The feed bar can be supported in such a manner that it swings freely on a cylinder jacket or is freely swingable from its rear end in all directions. In the first instance, the feed bar rests on a rotating crank attached to the feed casing, or it can be set in a ring-like groove in the bottom of the feed casing so that its rear end is freely swingable. The feed casing is subject to action by a recoil spring which pushes it back to its innermost position. In this manner, the feed casing is always in position for use and does not have to be pushed back to engage a lead carrier but need only be pushed forward. The lead carriers, which are urged to non-use position by recoil springs, can have a spring catch which, when in action, snaps into a stay on the outer casing which can be released from the outside. Next, in switching the lead carrier, the one in use must be released before the other one can be pushed up. It is also possible and desirable that each lead carrier 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 which is in the forward position in the device and positions the next carrier for use.

40 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.

45 In describing the invention in detail, reference will be had to the accompanying drawing forming part of this application, wherein like characters denote corresponding parts in the several views, and in which—

50 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;

55 Figure 3 illustrates a slightly enlarged transverse section on line 3—3 of Fig. 1;

tion of rest, to which also returns the lead carrier which it had moved.

The movements necessary to select a certain lead carrier consist only in the natural and simple turning of the entire interchangeable device to such position as causes the color 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 color mark and press on the feed casing 18. If by reason of the fact that the device is held on a slant, the color mark is not exactly at the top, this does not interfere with perfect operation. Because the upper reinforced edges 9 of the cross-shaped insertions 3 are sharpened at the ends, the forward part of the feed bar 26 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 Figs. 8, 9 and 10, 11, two modified arrangements of the forward feeding means are pictured. In both, the feed bar 26^a, 26^b is crank-shaped and situated at the front of the feed casing 18^a to which it is pivotally attached. According to the method in Figs. 8, 9, the feed bar 26^a is crank-shaped and carries at its upper end a ball-shaped head 40 which is freely movable in a shoulder piece 41 of the feed casing 18^a.

In the arrangement of Figs. 10, 11, the feed bar 26^b has a crank 42 soldered to it which turns on a pin 43 which is soldered on the lower end of the feed casing 18^b.

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

While I have shown and described what is now thought to be the preferred embodiments of my invention, the disclosure is to be regarded as illustrative only and not limitative except as hereinafter claimed.

I claim:

1. A device of the class described, comprising a pair of casings telescopically connected together, a plurality of lead carriers mounted in one of said casings for independent sliding movement into and out of an operative position, means for moving a selected lead carrier into and out of an operative position, said means being carried by said other casing, said means comprising a feed bar freely mounted to permit at least the forward end thereof to move freely by gravity through an annular path, and means carried by said first casing and mounting said carriers in an annular ring adjacent the periphery of said first casing.

2. A device of the class described, comprising a pair of casings telescopically connected together, a plurality of lead carriers mounted in one of said casings for independent sliding movement into and out of an operative position, means for moving a selected lead carrier into and out of an operative position, said means being carried by said other casing, said means comprising a feed bar freely mounted to permit at least the forward end thereof to move freely by gravity through an annular path, means carried by said first casing and mounting said carriers in an annular ring adjacent the periphery of said first casing, and the connection between said feed bar and said second casing being at the end of said feed bar remote from said carriers.

3. A device of the class described, comprising

a pair of casings telescopically connected together, a plurality of lead carriers mounted in one of said casings for independent sliding movement into and out of an operative position, means for moving a selected lead carrier into and out of an operative position, said means being carried by said other casing, said means comprising a feed bar freely mounted to permit at least the forward end thereof to move freely by gravity through an annular path, means carried by said first casing and mounting said carriers in an annular ring adjacent the periphery of said first casing, and substantially all of said feed bar being movable by gravity through an annular path.

4. A device of the class described, comprising a pair of casings telescopically connected together, a plurality of lead carriers mounted in one of said casings for independent sliding movement into and out of an operative position, means for moving a selected lead carrier into and out of an operative position, said means being carried by said other casing, said means comprising a feed bar freely mounted to permit at least the forward end thereof to move freely by gravity through an annular path, means carried by said first casing and mounting said carriers in an annular ring adjacent the periphery of said first casing, the connection between said feed bar and said second casing being at the rear end of said feed bar, and substantially all of said feed bar being movable by gravity through an annular path.

5. A device of the class described, comprising a pair of casings telescopically connected together, a plurality of lead carriers mounted in one of said casings for independent sliding movement into and out of an operative position, means for moving a selected lead carrier into and out of an operative position, said means being carried by said other casing, said means comprising a feed bar freely mounted to permit at least the forward end thereof to move freely by gravity through an annular path, and means carried by said first casing and mounting said carriers in an annular ring adjacent the periphery of said first casing, said feed bar being formed to provide a crank having one end thereof rotatably mounted in said second casing axially thereof.

6. A device of the class described, comprising a pair of casings telescopically connected together, a plurality of lead carriers mounted in one of said casings for independent sliding movement into and out of an operative position, means for moving a selected lead carrier into and out of an operative position, said means being carried by said other casing, said means comprising a feed bar freely mounted to permit at least the forward end thereof to move freely by gravity through an annular path, means carried by said first casing and mounting said carriers in an annular ring adjacent the periphery of said first casing, and an annular chamber formed in said second casing, the rear end of said feed bar being formed to provide an enlargement, said enlargement being seated in said chamber to provide said connection between said bar and second casing.

7. A device of the class described, comprising a pair of casings telescopically connected together, a plurality of lead carriers mounted in one of said casings for independent sliding movement into and out of an operative position, means for moving a selected lead carrier into and out of an operative position, said means being carried by said other casing, said means comprising

a feed bar freely mounted to permit at least the forward end thereof to move freely by gravity through an annular path, means carried by said first casing and mounting said carriers in an annular ring adjacent the periphery of said first casing, and a spring means normally preventing the telescoping of said casings.

8. A device of the class described, comprising a pair of casings telescopically connected together, a plurality of lead carriers annularly carried by one of said casings for independent sliding movement into and out of an operative position with respect thereto, means for moving a selected lead carrier into and out of an operative position, and means connecting said carrier moving means to the other of said casings, said connecting means permitting free movement of said carrier moving means relative to said second casing, and said carrier moving means being movable by gravity to a carrier feeding position relative to that carrier nearest the lowermost side wall of said first casing when said pencil is held in any position other than substantially vertical.

9. A device of the class described, comprising a pair of casings telescopically connected together, a plurality of lead carriers annularly carried by one of said casings for independent sliding movement into and out of an operative position with respect thereto, means for moving a selected lead carrier into and out of an operative position, means connecting said carrier moving means to the other of said casings, said connecting means permitting free movement of said carrier moving means relative to said second casing, and said carrier moving means being movable by gravity to a carrier feeding position relative to that carrier nearest the lowermost side wall of said first casing when said pencil is held in any position other than substantially vertical, and said carrier moving means being operative upon rotation of said device when so held to position itself automatically and successively in positions to move all of said carriers.

10. A device of the class described, comprising a pair of casings telescopically connected together, a plurality of lead carriers annularly carried by one of said casings for independent sliding movement into and out of an operative position with respect thereto, means for moving a selected lead carrier into and out of an operative position, means connecting said carrier moving means to the other of said casings, said connecting means permitting free movement of said carrier moving means relative to said second casing, and said carrier moving means being movable by gravity to a carrier feeding position relative to that carrier nearest the lowermost side wall of said first casing when said pencil is held in any position other than substantially vertical, said carrier moving means whereby rotation of said device when so held automatically and successively positions said carrier moving means in positions to move all of said carriers, and indicating means for enabling an operator to position said carrier moving means in a position to move any selected carrier.

11. A device of the class described, comprising a pair of casings telescopically connected together, a plurality of lead carriers mounted in one of said casings for independent sliding movement into and out of an operative position, means for moving a selected lead carrier into and out of an operative position, said means being carried by said other casing, said means comprising a feed

bar freely mounted to permit at least the forward end thereof to move freely by gravity through an annular path, means carried by said first casing and mounting said carriers in an annular ring adjacent the periphery of said first casing, spring means normally preventing the telescoping of said casings, individual spring means normally maintaining each of said carriers in an inoperative position, and means carried by said first casing and engageable with a carrier when the same is moved to an operative position to maintain the same in such position against the action of said spring.

12. A device of the class described, comprising a pair of casings telescopically connected together, a plurality of lead carriers mounted in one of said casings for independent sliding movement into and out of an operative position, means for moving a selected lead carrier into and out of an operative position, said means being carried by said other casing, said means comprising a feed bar freely mounted to permit at least the forward end thereof to move freely by gravity through an annular path, means carried by said first casing and mounting said carriers in an annular ring adjacent the periphery of said first casing, spring means normally preventing the telescoping of said casings, individual spring means normally maintaining each of said carriers in an inoperative position, means carried by said first casing and engageable with a carrier when the same is moved to an operative position to maintain the same in such position against the action of said spring, and means automatically releasing said last named means to permit said carrier spring to retract said carrier when a second selected carrier is moved towards an operative position.

13. A device of the class described, comprising a pair of casings telescopically connected together, a member carried by one of said casings and dividing at least a portion of the same into a plurality of longitudinally disposed and annularly arranged carrier receiving chambers, a lead carrier in each chamber, spring means in each of said chambers and engageable with said carriers to maintain the same therein, means carried by said other casing and engageable with a selected carrier for moving the same out of the chamber thereof into an operative position against the action of said spring, means for maintaining said carrier in an operative position, means for disengaging said carrier from said last named means to permit said spring to return said carrier to its chamber, and a portion of said chamber being formed to provide shock taking means to receive the recoil of said retracted carrier.

14. A device of the class described, comprising a pair of casings telescopically connected together, a plurality of lead carriers mounted in one of said casings for independent sliding movement into and out of an operative position, means for moving a selected lead carrier into and out of an operative position, said means being carried by said other casing, said means comprising a feed bar freely mounted to permit at least the forward end thereof to move freely by gravity through an annular path, means carried by said first casing and mounting said carriers in an annular ring adjacent the periphery of said first casing, aligned slots through the overlapping portions of said casings, lugs on said carriers slidable in said slots, the slots of at least one casing being formed to provide offsets at one end thereof whereby rotation of the other casing when a

5 carrier and lug have been slid to said end forces the lug of said carrier into said offset to lock said carrier against sliding movement and where-
10 by rotation of said other casing in the reverse direction re-positions said lug for sliding movement in said slot.

15 15. A device of the character described comprising a casing, a plurality of lead carriers annularly carried thereby for independent movement into and out of an operative position at one end thereof, means for moving a selected lead carrier into and out of an operative position, means mounting said carrier moving means, said mounting means permitting free movement of
20 said carrier moving means relative thereto, and said carrier moving means being movable by gravity to a carrier feeding position relative to

that carrier nearest the lowermost side wall of said casing when said pencil is held in any position other than substantially vertical.

16. A device of the class described, comprising a casing, a plurality of lead carriers mounted in
5 said casing for independent sliding movement into and out of an operative position at one end of said casing, means for moving a selected lead carrier into and out of an operative position, said means comprising a feed bar freely mounted
10 to permit at least the forward end thereof to move freely by gravity through an annular path, and means carried by said casing and mounting said carriers in an annular ring adjacent the periphery of said casing. 15

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ZINC SULPHIDE AS A CERAMIC OPACIFIER

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8 Claims. (Cl. 106—36.2)

In the manufacture of opaque glazes, enamels, engobe glass or the like, a known opacifier is zinc sulphide, preferably added to the batch or in the operation of milling the frit or both to the batch and to the mill.

This invention is based on the observation that the effect of zinc sulphide is improved, both in producing a whiter glaze or enamel and in respect of the firing properties of the glaze, by the presence of zinc oxide, and the invention consists in improving the production of opaque glazes, enamels or the like by introducing zinc oxide into the glaze at some stage of its manufacture or application.

The obvious method of introducing the zinc oxide into the glaze is by mixing the compound itself with the constituents of the batch, or, preferably, adding it to the mill during the grinding of the frit made from the batch. However, it is also possible to introduce into the batch or milled frit a product which will yield zinc oxide during the smelting of the bath or the firing of the glaze, for instance zinc carbonate or zinc acetate; of course, in this case care must be taken that the decomposition or reaction which produces the zinc oxide in the glaze has no deleterious effect on the glaze.

The proportion of zinc oxide to zinc sulphide which gives the best result must be ascertained by trial, since it varies with the type of glaze that is to be produced and with the type of clay used for floating the glaze. The main result to be sought is maximum whiteness of the finished glaze, but in some cases this is only attainable with loss of capacity, so that the proportion of zinc oxide may be better selected slightly below that which produces maximum whiteness. Other opacifiers, including the so-called "gas opacifiers" may be simultaneously used with advantage to produce maximum opacity and whiteness.

The following is an example of the production of a white opaque enamel on metal hollow-ware, in accordance with the invention:

A batch consisting, in parts by weight of:

Borax	360
Felspar	448
Quartz	280
Soda ash	112
Sodium silicofluoride	112
Fluorspar	60

is mixed with 30 parts of zinc oxide and the mixture is smelted until the smelt is quiet; the mass is then quenched with water. The frit thus produced is dried and milled with, per 100 parts,

10 parts of white clay, 6 parts of zinc sulphide, 7 parts of zinc oxide and 45-50 parts of water, and further milled to a suitable grade of fineness. Other additions, for example sodium nitrite amounting to 1 per cent. of the weight of the frit, may be made to improve further the whiteness or setting properties, or both, of the enamel. The enamel is applied and fired in the usual manner.

An alternative procedure is to add part or all of the zinc sulphide to the batch before smelting and to add the desired quantities of zinc oxide as described above. The zinc sulphide may be formed by using an alkali sulphide and a suitable zinc compound as constituents of the batch or as additions to the mill.

It is not at present known whether the zinc oxide added to or produced in the glaze remains as such in the finished glaze.

The term "zinc sulphide" as employed in the specification and appended claims is understood to apply to ordinary zinc sulphide and does not embrace the so called "luminescent" sulphides of zinc which have undergone a special treatment and contain excitants which render the substance self-luminous.

Having thus fully described the nature of my said invention and the best means I know of carrying the same into practical effect, I declare that what I claim is:

1. The improvement in the production of glazes, enamels or the like which contain ordinary zinc sulphide as an opacifier, which consists in introducing zinc oxide into the glaze at some stage of its manufacture or application.

2. A manufacture of an opaque glaze or enamel for application to ceramic ware or metal-ware, wherein zinc oxide is used to improve the whiteness of the opacity in the finished glaze due to ordinary zinc sulphide.

3. A batch which is to be used for producing a glaze that has opacity due to ordinary zinc sulphide, characterised by containing zinc oxide or a product which will yield zinc oxide during the smelting of the batch or the firing of the glaze.

4. A frit for producing on ceramic ware or metal ware a glaze which has opacity due to ordinary zinc sulphide, characterised by containing zinc oxide or a product which will yield zinc oxide during the firing of the glaze.

5. Articles glazed with a glaze made from the batch defined in claim 3.

6. Articles glazed with a glaze made from the frit defined in claim 4.