MANUFACTURE OF SLIDABLE-CORE PENCILS

Filed July 2, 1956 3 Sheets-Sheet 1

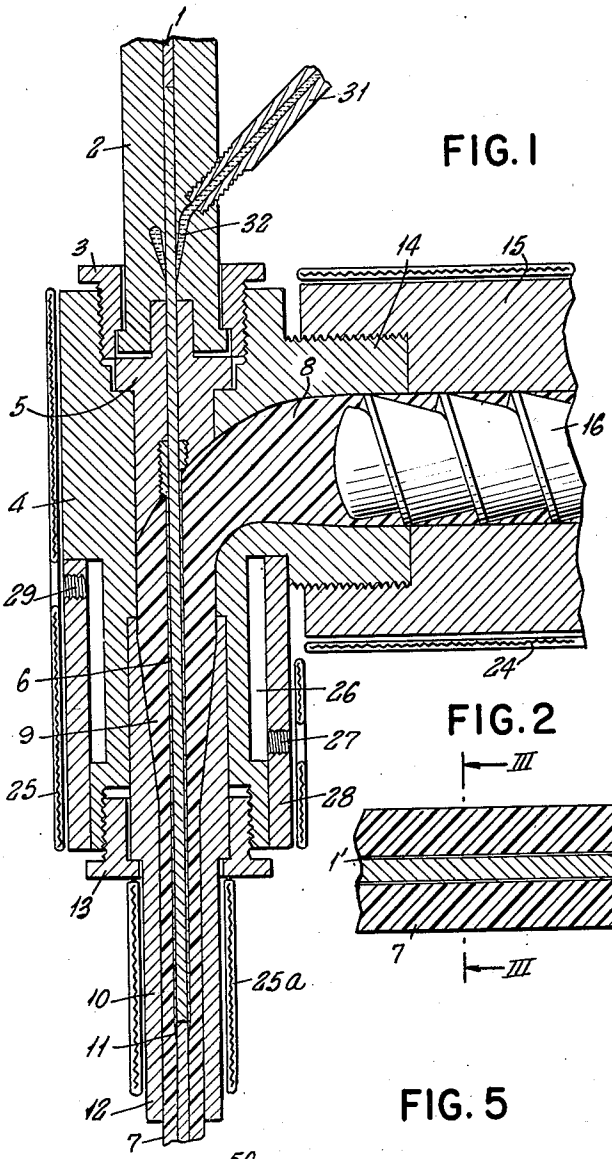

FIG. 1

FIG. 2

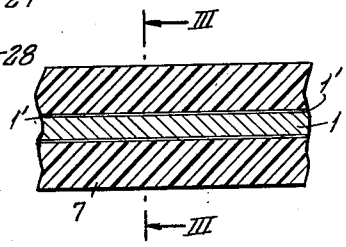

FIG. 3

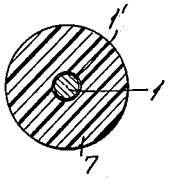

FIG. 5

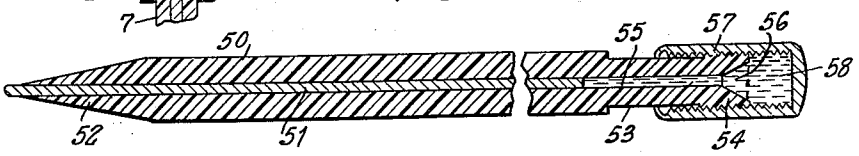

FIG. 6

MANUFACTURE OF SLIDABLE-CORE PENCILS

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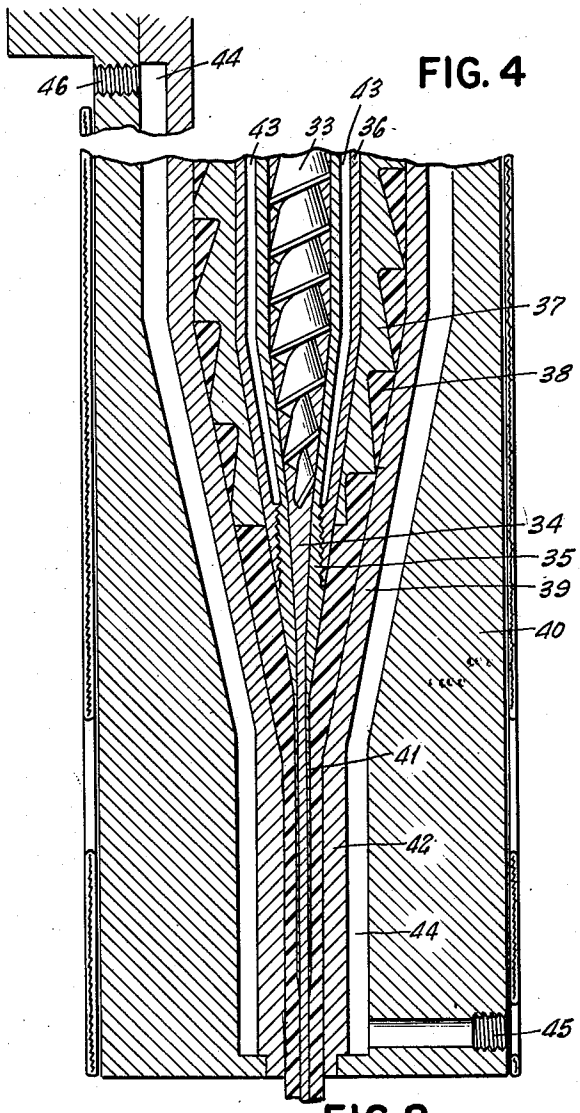

FIG. 4

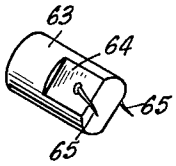

FIG. 7

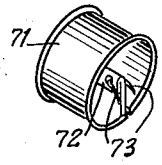

FIG. 11

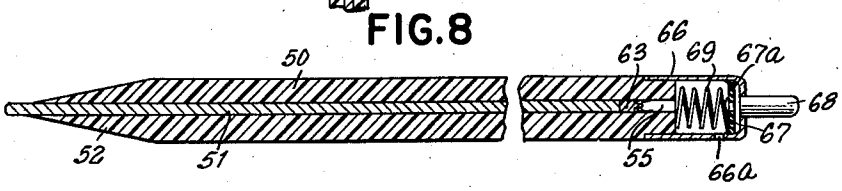

FIG. 8

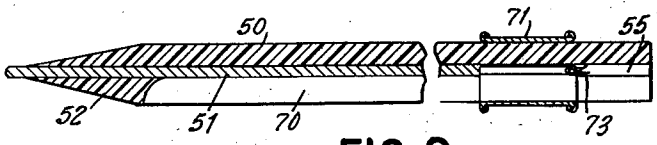

FIG. 9

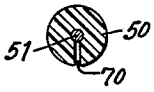

FIG. 10

MANUFACTURE OF SLIDABLE-CORE PENCILS

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FIG. 12

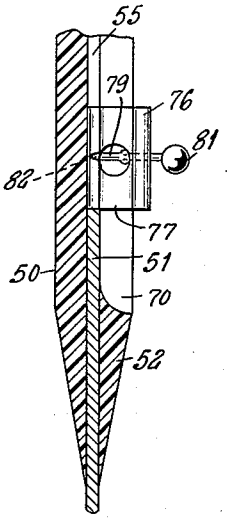


FIG. 13

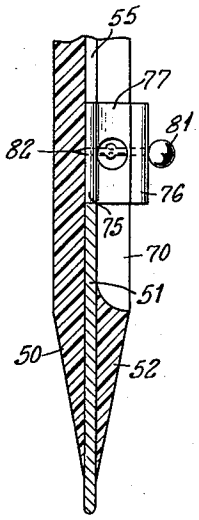


FIG. 14

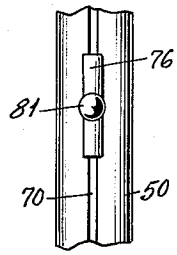


FIG. 15

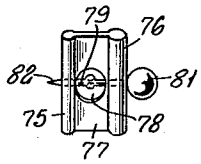


FIG. 16

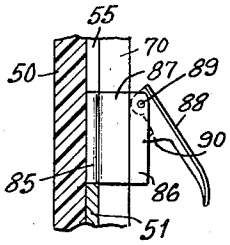


FIG. 17

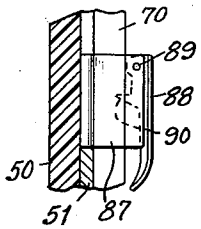


FIG. 19

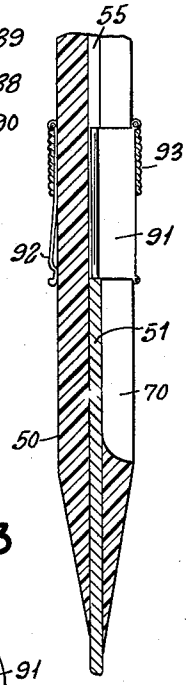


FIG. 20

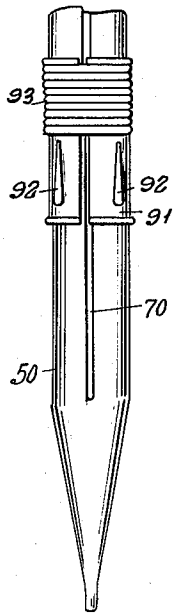


FIG. 21

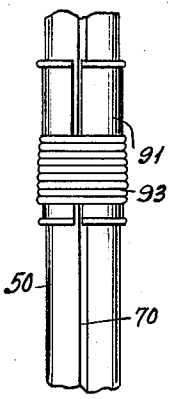


FIG. 18

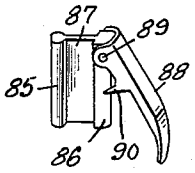


FIG. 22

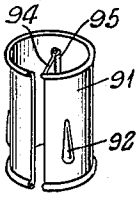
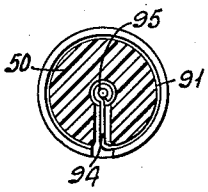


FIG. 23



United States Patent Office

2,902,754

Patented Sept. 8, 1959

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2,902,754

MANUFACTURE OF SLIDABLE-CORE PENCILS

Eugenia Lorenian, Hamburg, Germany

Application July 2, 1956, Serial No. 595,454

Claims priority, application Germany July 7, 1955

11 Claims. (Cl. 29—417)

My invention relates to a method of manufacturing slidable-core pencils by extrusion and to the products made thereby.

It is known to make slidable-core pencils for writing, drafting and other marking purposes in which the lead or other marking core is displaceable in the sheath by mechanical pressure for restoring the worn-off tip of the marking core. In most of these pencils, a rotary screw mechanism is used for advancing and/or retracting the lead. There are also pencils whose sheath has a longitudinal slit through which a mechanical structure penetrates into the lead channel of the sheath for imparting the desired displacement to the core.

The conventional method of producing pencils of this general type is to manufacture the sheath structure separate from the lead or other marking core and to subsequently insert the lead.

It is an object of my invention to devise a method of making slidable-core pencils which greatly simplifies the manufacturing procedure by extruding the sheath and combining it with the core in a single continuous operation, and which also results in products different from, and in some respects superior to, the known pencils of the slidable-core type.

To this end, and in accordance with one of the features of my invention, I extrude a sheath material longitudinally upon and around an advancing marking-core medium but shape the sheath material to final shape before placing it upon the core medium, and I then deposit the shaped sheath material on the core material in a close sliding-fit relation thereto while preventing the exertion of any radial pressure upon the sheath material from a point ahead of the confluence of core and sheath material all the way to the extrusion outlet from which the extruded product continuously emerges as a pencil strand. In the pencil bodies subsequently cut off the strand, the core is practically immovable in the sheath in the transverse direction over the entire length of the core but is longitudinally displaceable if sufficient axial force is applied. I therefore complete each individual pencil by adding thereto a mechanical, hydraulic or pneumatic pressure means which, as will appear from the following, can be done in a very simple manner.

More particularly, when extruding and shaping the sheath material around the travelling marking-core medium in the above-described manner, I keep both separated from each other by a thin-walled elongated nozzle tube as the sheath material, passing through a tapering nozzle bore, is being compressed and shaped to its ultimate cross-sectional size and shape, before I permit the core and sheath materials, both advancing at the same speed, to pass beyond the end of the nozzle tube whence they travel through a cross-sectionally constant outlet portion of the nozzle bore in mutually non-adhering condition and without any radial pressure being exerted upon the sheath material.

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According to a more specific feature of the invention, the method is carried out by using a marking-core medium preferably of such character or composition as to have no welding or adhesion tendency relative to the sheath material under the above-mentioned extrusion conditions. For instance, a lead or other marking material of the ceramic type, such as the mixture of clay and graphite commonly used for pencils, is adhesively incompatible with some thermoplastic sheath materials. The use of such adhesively incompatible materials for core and sheath respectively greatly facilitates attaining the desired longitudinal displaceability of the core in the sheath.

According to another specific feature of the invention, also applicable with incompatible core and sheath materials but of particular advantage with core and sheath materials that tend to adhere or become welded to each other, I coat the core or core medium with a thin film of antiadhesive substance prior to bringing the extrudable sheath material, after shaping it to the size and shape of the desired sheath, into the tight sliding-fit engagement with the core medium. The film coating need not have good lubricating qualities because it should permit axial displacement of the core only by application of axial pressure to the core but should prevent inadvertent core displacement without pressure. The substance of the coating, therefore, may be chosen from a great variety of materials including waxy and fatty substances, resinous and other plastics, as well as viscous or fluid substances or any mixture of such substances with a powdered material such as talc, that is incompatible with the sheath material.

The materials used for the sheath and the core are preferably so chosen as to be practically insensitive to moisture and dryness. The core material may be of the above-mentioned ceramic type and may be hardened prior to applying it to the extrusion method of the invention. However, according to another feature of the invention, the core medium may be applied in deformable and extrudable condition so that the pencil core is extruded under heat and pressure simultaneously with the extrusion of the sheath in a single and continuous manufacturing operation. Both ways of applying the marking-core medium are available for any desired type of marking core, such as a lead core, a coloring or crayon-type core or a copying core.

The sheath material for the method and products according to the invention may consist generally of any extrudable and preferably non-metallic material practically insensitive to moisture, dryness and other atmospheric changes so that it will neither expand nor shrink due to atmospheric conditions. I preferably use as sheath material a resinous plastic, such as thermoplastic synthetic or natural resins or compositions containing such thermoplastic resins. Also suitable are thermosetting synthetic resins or compositions containing such resins. When making the core medium by extrusion, the core material, likewise, should preferably be such as to be free of expansion and shrinking under atmospheric conditions, and the core material may then also contain thermoplastic or thermosetting resins as just mentioned with reference to the sheath material.

The marking core in pencils made according to the invention may have any desired cross-sectional shape and size. It is advantageous to keep the core thin and to give the cross section a non-circular shape such as the shape of an equilateral triangle or square. Such cores, having longitudinal edges, always permit writing a very thin line without necessity for sharpening the protruding point of the core because the edges, when wearing down, always produce new sharp points.

The method according to the invention can be carried out with screw extrusion presses, generally as known, which are provided with heat control means for heating and/or cooling the materials being extruded so as to keep them in the proper condition and convert them to the consistency and degree of rigidity desired in the various stages of extrusion travel. Preferably used are extrusion devices with coaxial nozzles generally as described in the copending application of my husband, Zareh Lorenian, Serial No. 279,496, filed March 31, 1952, now Patent 2,790,202, for Method and Apparatus for Manufacturing Pencils. However, as will be explained, the present invention makes it necessary to modify such extrusion devices so that no radial compression of the sheath material can occur anywhere along its way from a point ahead of the inner-nozzle outlet to the outlet of the sheath-forming outer nozzle. In this respect, the devices used for making pencils according to the present invention are also fundamentally distinct from all previously known proposals of extruding pencils resulting in pencils with bonded and completely immovable marking cores.

The foregoing and more specific objects, advantages and features of my invention will be apparent from, and will be mentioned in, the following description with reference to the embodiments shown by way of example on the accompanying drawings in which:

Fig. 1 is an axial section through an extrusion apparatus for making slidable-core pencils.

Fig. 2 is a partial axial section and Fig. 3 a cross section, along line III—III in Fig. 2, of a pencil made by means of the apparatus, both figures, for the purpose of illustration, showing exaggerated thickness of a coating on the pencil core.

Fig. 4 is an axial section of another extrusion apparatus for simultaneous extrusion of sheath and core according to the invention.

Fig. 5 is an axial section of an embodiment of a pencil with hydraulic pressure means for displacing the core; Fig. 6 is a similar illustration of a pencil modified by means for preventing reverse travel of the core; and Fig. 7 shows the latter means separately in perspective illustration.

Fig. 8 is a sectional view of another pencil made according to the invention and provided with pneumatic core-displacing means.

Fig. 9 shows in section a further embodiment of a pencil with mechanical core-displacing means; Fig. 10 is a cross section of the same pencil; and Fig. 11 shows the displacing means separately and in perspective.

Figs. 12 and 13 are partial and sectional views of still another embodiment showing mechanical core-displacing means in released and latched condition respectively; Fig. 14 is a top view and Fig. 15 a perspective view of the same displacing means.

Figs. 16 and 17 show part of another pencil with mechanical core-displacing means in released and latched condition respectively; and Fig. 18 is a separate perspective view of the same means.

Fig. 19 is a partial, sectional view of a further pencil with mechanical core-displacing means according to the invention; Figs. 20 and 21 are partial side views of the same pencil with the displacing means in released and latched condition respectively; Fig. 22 is a perspective view of the same means; and Fig. 23 is a cross section of the same pencil.

In the apparatus shown in Fig. 1, rigid pre-formed leads **1**, such as ceramic graphite mixtures, are used as the pencil-core medium. The leads are supplied, abutting against each other in a continuous sequence, through a nozzle inlet pipe **2** secured by a nut **3** to the body **4** of an extrusion nozzle of the cross-head type. The pipe **2** is counterbored at its discharge end to receive the inlet part **5** of an inner nozzle which comprises, adjacent to part **5**, a long and thin-walled nozzle tube **6** whose bore has a cross section of circular or non-circular shape corresponding to that of the leads passing through the tube.

The sheath **7** of the pencil is produced from plastic material as described above. The plastic material passes through an outer-nozzle bore and, during manufacture, is in plasticized condition in the more portion denoted by **8**. The outer-nozzle bore has a portion **9** which symmetrically surrounds most of the length of the inner-nozzle tube **6** and tapers toward the inner-nozzle outlet of tube **6** so that the sheath material, being extruded along the core material, is shaped to its final shape while being kept separate from the core **1** by the tube **6**. Any damage to the core medium due to the shaping action is thus prevented as well as any mutual adhesion or coalescence of sheath and marking medium.

The outer-nozzle bore further has an axially elongated end portion **10** of constant cross section corresponding to that of the finished pencil sheath **7**. The outlet **11** of inner tube **6**, where the wall of the tube **6**, tapers down to a line edge of the cross sectional size of the core, is located within the constant width portion **10** of the outer-nozzle bore at a point so far remote from the narrowest cross section of the tapering bore portion **9** that radial pressure is no longer effective in the sheath material. On the other hand, the tube outlet **11** must also be spaced axially from the outer-nozzle outlet to secure satisfactory burnishing of the sheath and secure complete and definite shaping of the sheath to its final size about the slidable core. As a rule, therefore, the inner-tube outlet **11** is preferably spaced from the outer-nozzle outlet a distance larger than the width of the emerging sheath **7** but smaller than the axial spacing of tube outlet **11** from the narrowest cross section of the tapering bore portion **9**. In this respect, the apparatus differs from those disclosed in the above-mentioned copending application Serial No. 279,496, now Patent No. 2,790,202.

The tapering bore portion **9** and the constant-width bore portion **10** of the sheath-forming, outer nozzle form part of a nozzle insert **12** secured to cross-head body **4** by means of a nut **13**. The body **4** has a threaded nipple portion **14** screwed into the discharge end of the cylinder **15** of a conventional screw press whose press screw **16** forwards the sheath material into and through the nozzle. Electric heaters **24**, **25**, **25*a*** surround the press cylinder **15** as well as the nozzle body **4** and the nozzle portion **12** for keeping the sheathing material in proper condition until the pencil is formed. Channels **26** are also provided in the body **4** for coolant or temperature-controlling medium which is introduced through an inlet port **27** in a sleeve **28** welded to body **4** and is discharged through an outlet **29** in the same sleeve. The coolant or temperature-controlling medium serves to properly set the sheathing material so that, as the extruded strand leaves the discharge end of nozzle portion **12**, the sheath **7** is completely shaped and envelopes the lead with the desired close but sliding fit.

In cases where the marking-core medium consists of a material incompatible with the plasticized sheath material so that undesired welding or adhesion of core to sheath does not tend to occur, no further equipment is needed for performing the method of the invention; but if such tendency exists, the core medium is preferably coated with a film of a waxy, fatty or other adhesion-preventing substance. For this purpose, the device of Fig. 1 is shown equipped with an auxiliary nozzle device comprising an inlet pipe **31** through which the coating substance is supplied to a nozzle chamber **32** surrounding the incoming core medium within the inlet pipe **2**. Pipe **31** is threaded into a hole in the side of pipe **2**. A very fine film coating, for instance of stearine or high-boiling mineral grease or silicone grease, is sufficient to make the surface of the core medium incompatible or non-adhesive in the above-mentioned sense.

The pencil strand thus produced, and the individual pencils cut therefrom, are as schematically shown in Figs.

2 and 3 where the coating on core **1** is denoted by **1'** and, as mentioned, is purposely shown with exaggerated thickness. Actually, the film may be made so thin that it does not noticeably increase the diameter of the core.

An apparatus generally as shown in Fig. 1 is also suitable for producing the marking core by extruding a plastic core medium simultaneously with the above-described extrusion of the sheath material. For this purpose it is only necessary to forward and extrude the marking-core medium by means of another extrusion press, for instance also of the screw type, through the core-nozzle inlet pipe **2**. Another apparatus suitable for a similar method is shown in Fig. 4 and described presently.

The apparatus shown in Fig. 4 serves for making a pencil where both the marking material and the sheath are thermoplastics. Two feed screws are arranged concentrically to one another, the inner one **33** serving for feeding the thermoplastic marking material **34** which is formed in the inner nozzle **35** into the lead of the pencil. The nozzle **35** has a sleeve **36** surrounding the screw **33** and welded or screwed to the lower end of nozzle **35**. The outer screw **37** serves for feeding the sheathing material **38** and operates in the nozzle **39** which is mounted in a sleeve **40**. The inner nozzle **35** terminates in a long, thin-walled tube **41** arranged within a constant-width portion **42** of the outer nozzle in accordance with the same principles as explained above with reference to Fig. 1. Located between sleeve **36** and nozzle **35** is a channel **43** for temperature-controlling medium. Between nozzle **39** and sleeve **40** there is also a channel **44** for temperature-controlling medium. Denoted by **45** and **46** are the inlet and outlet, respectively, of channel **44**. The bore of nozzle **35** is shaped to receive the feed screw **33** and tapers gradually to the desired diameter of the finished pencil lead. The bore of the outer nozzle in Fig. 4 is shaped similarly to the outer nozzle shown in Fig. 1 so that the thermoplastic sheathing material flows over the nozzle tube **41** and covers the lead emerging from nozzle tube **41** smoothly in sliding-fit engagement and without any radial pressure.

As mentioned above, the strands made in the described manner, for instance with the aid of machinery as described with reference to Figs. 1 and 4, are subsequently subdivided into individual pencil bodies which are then equipped with pressure means for displacing the core relative to the pencil sheath. This will now be described more in detail with reference to the pencils illustrated in Figs. 5 to 23.

Referring first to Fig. 5, the individual pencil bodies, each comprising a sheath **50** enclosing a marking core **51** which is displaceable only in its longitudinal direction under application of pressure, are first given a conical taper **52** at one end of the body. This can be done, for instance, by means of a pencil sharpener. For that reason, the plastic sheath material is preferably made of such a composition that the finished sheath is scissible.

According to Fig. 5, the opposite end **53** of the pencil sheath is machined to a somewhat smaller diameter and is provided with a screw thread **54**. The core channel **55** of the sheath is preferably widened at **56** to provide together with the interior of an interiorly threaded sleeve **57** a sufficiently large space **58** for the reception of a hydraulic medium. The sleeve **57** is in tight threaded engagement with the end portion **54** of the sheath. The hydraulic medium fills the space **58** as well as the adjacent conical bore **56** of the channel **55**. By turning the sleeve **57**, the core **51** can be made to protrude more or less out of the conical portion **52** of the sheath and, if desired, may also be retracted into the sheath by turning the sleeve in the opposite direction and pressing the core back into the channel.

Fig. 6 shows a similar pencil with hydraulic pressure means corresponding to those shown in Fig. 5 as is apparent from the use of the same reference numerals in both figures for respectively similar elements. However, the pencil according to Fig. 6 is provided with a latching insert **63** adjacent to the core **51** in the channel **55** of the sheath **50**. The insert **63** is separately illustrated in Fig. 7. It consists of a small body of metal or plastic whose cross section corresponds to that of the core channel. The body is squared off at **64** and, at this location, is provided with two barbs which extend to the rear and are curved outwardly. As a result, when the marking core **51** is advanced by turning the pressure sleeve **57**, the barbs **65** slide along the channel **55** and, when back pressure is exerted upon the core **51**, enter into the material of the sheath **50** and thus latch the core in position. As a result, the core cannot be retracted, but the latch body **63** provides a rigid abutment to prevent undesired yielding of the writing tip back into the sheath when using the pencil. The latching body **63** may either be placed loose beside the core **51** or it may be bonded thereto.

When referring herein to "hydraulic pressure means" this term is meant to include any positive displacement means operating with a flowable medium regardless of its particular type. Thus the "hydraulic" medium may consist, for instance, of water, oil, paste, grease, waxy material, and gliding organic or inorganic pulverulent and granular substance which by means of any suitable pressure-applying device acts upon the marking core in a direct or indirect manner.

The pencil illustrated in Fig. 8 is similar to those of Figs. 5 and 6, but is equipped with pressure means of the pneumatic type. Mounted on the top end of the pencil sheath **50** is a cap **66** to serve as a cylinder. A plunger **67** adjacent to a push button **68** has a fitting or seal **67*a*** and is axially displaceable in the cylinder sleeve **66** together with seal **67*a***. Plunger and seal are normally biased by a helical compression spring **69** to the illustrated position. The cylinder sleeve **66** has near its top end a lateral bore **66*a*** through which it communicates with the atmosphere. Each time the button **68** is depressed, an amount of air is compressed and forced into the core channel **55**, thus advancing the core **51** together with a latching insert **63**, the latter being in accordance with Fig. 7. After each such actuation, the plunger **67** and the seal **67*a*** are returned into the illustrated position by the action of spring **69**. During the return movement the air behind the plunger escapes through the bore **66*a*** or also through the gap between sleeve **66** and push button **68**. Thereafter, the push button **68** is again ready for actuation. By virtue of the latching effect caused by the insert **63**, the pencil core **51** is not retracted during the return movement of plunger **67** and seal **67*a***.

The term "pneumatic" as used herein is meant to refer to pressure actuation by any compressible medium, thus, aside from atmospheric air, the pneumatic pressure for displacing the core may also be applied, for instance by means of pre-compressed air, by any other gas under atmospheric or non-atmospheric pressure, a substance that is liquid when compressed and gaseous when in non-compressed condition, which by means of any suitable pressure-applying device acts directly or indirectly upon the marking core.

The pencil illustrated in Figs. 9 to 11, as well as those shown in all subsequent illustrations, is equipped with a purely mechanical device for applying displacing pressure to the pencil core. The pencil sheath **50** is provided with a thin slit **70** which extends over the cylindrical portion of the individual pencil but not over the conical end portion **52** and which penetrates down to the marking core or core channel. The slit **70** may be produced, preferably by means of a thin circular saw, after the individual pencil bodies are cut off the strand emerging from the extrusion apparatus. Preferably, however, the slit is cut into the strand shortly after its extrusion so that the slitting operation forms a step of a continuous fabricating process and is followed by the cutting operation which likewise forms a step of the same process. More specifically, such a continuous operation is performed by slitting

the pencil strand during its travel over a given axial length, then skipping another strand portion so that no slit is produced in the latter portion by the saw or other slitting tool, then repeating the slitting operation over the same given axial length before the slitting tool again skips another portion of the strand length. The strand is then cut into pencils at respective points of severance located in the un-slitted portions which are subsequently machined to the conical tape **52** at the writing end. It will be recognized that in such continuous manufacture the slitting operation and severing operation are intermittently performed on the continuously travelling strand.

According to Figs. 9 and 10 a sleeve **71** is slidably mounted on the pencil sheath **50**. As separately shown in Fig. 11, the sleeve **71** has a thin-walled extension **72** which projects inwardly through the slit **70** into the core channel **55** (Fig. 9) of the pencil sheath. The extension abuts against the marking core **51** so as to advance the core when the sleeve **71** is displaced toward the left in Fig. 9. Mounted on the extension **72** are barbs **73** which pierce into the material of the sheath **50** when back pressure is exerted upon the core and thus prevent the sleeve **71** and the pencil core **51** from moving backward.

The pencil shown in Figs. 12 to 15 is likewise provided with a longitudinal slit **70** extending along the sheath **50** down to the end portion **52**; but is equipped with a different core-displacing mechanism. This mechanism, separately shown in Fig. 15, has an inner portion **75** whose circular or polygonal cross section corresponds to that of the core channel. The portion **71** is connected with an outer portion **76** of the device by means of a thin web **77** which, in the assembled condition of the pencil, extends transversely through the slit **70** in the pencil sheath **50**. The web **77** is preferably provided with a hole at **78**. A pin **79** is slidably mounted in portions **75** and **76** and forms a stop at **80** which limits the displacement of the pin so that the pin cannot inadvertently be pulled entirely out of the device. The pin carries a knob **81** on its outer end and is sharpened to a point at its opposite end **82**. When pin **79** is retracted by pulling knob **81** to the position illustrated in Fig. 12, the slide mechanism is displaceable to shift the pencil core. When the knob **81** is pushed in, as shown in Fig. 13, the point **82** of pin **79** pierces into the material of the sheath **50** and then locks the mechanism as well as the marking core in the proper position.

The modified core displacing mechanism illustrated in Figs. 16 to 18 has an inner portion **85** slidably disposed in the core channel **55** of the sheath **50** and joined with an outer portion **86** by a thin web **87** which extends through the longitudinal narrow slit **70** of the pencil sheath **50**. A lever **88** is pivoted at **89** to the outer portion **86** of the mechanism. The lever **88** preferably consists of a sheet metal structure of a channel-shaped cross section and is provided with one or two pointed projections **90**. When lever **88** is in the releasing position shown in Fig. 16, the mechanism can be displaced along the pencil sheath in order to push the marking core **51** a desired amount out of the tip of the sheath. When the lever **88** is placed into the position shown in Fig. 17, the tooth or teeth **90** pierce into the material of the sheath on both sides of the slit **70** and thus latch the mechanism and the core **51** in position.

The pencil according to Figs. 19 to 23 is provided with a sleeve **91** which is slit longitudinally to act as a spring and is displaceably seated upon the sheath **50**. The sleeve **91** has a number of outwardly and downwardly increasing wedges **92** located in the lower portion of the sleeve. A ring **93** is slidable on the upper portion of the sleeve and can be forced downward over the wedges **92** from the position shown in Figs. 19, 20 to the position shown in Fig. 21. This has the effect of clamping the sleeve **91** against the sheath thus securing the sleeve in fixed position. It will be recognized that, as far as described, the sleeve mechanism is similar to known clamping devices used on conventional pencil holders of sheet metal. However, for the purpose of the present invention the device is modified as follows. Joined with the sleeve **91** is a web portion **94** (Figs. 22, and 23) which passes through the narrow slit **70** of the pencil sheath and carries a dowel portion in the core channel **55** (Fig. 19) of the sheath. Consequently, when the ring **93** is shifted to the releasing position of Fig. 20 and the sleeve **91** is forced downwardly, the pencil core **51** is pushed forward to provide a new writing tip. Thereafter the sleeve **91** is clamped by shifting the ring **93** to the position of Fig. 21 thus locking the pencil core **51** in proper position.

It will be recognized from the various embodiments described in the foregoing, that the invention is applicable for producing a great variety of different pencil designs. As also embodied in the examples described, such pencils can be given largely the appearance of ordinary wood-sheathed writing or drafting pencils to be used in such a manner that the pencil can be discarded when the entire marking core is consumed, the manufacture according to the invention being so much less costly than the conventional methods of making slidable core pencils as to make such use of the pencils economical. That is, such slidable-core pencils can be manufactured at no greater cost than that of conventional wood-sheathed pencils with the added advantage that they require no sharpening and do not become shorter by wear. However, if desired, the method according to the invention is also applicable for the production of more elaborate sliding-core pencils with any desired, more or less fanciful displacing mechanism which then, of course, may affect the cost of the pencil. Furthermore, the invention is not limited to disposable pencils but can also be used for the production of pencils with replaceable marking cores, for instance, of the ordinary ceramic-lead type.

The manufacturing method according to the invention can further be supplemented by an additional method step for the purpose of controlling and, if necessary, correcting the proper engagement of the pencil core with the sheath. For instance, it may happen that the sliding fit engagement between core and sheath after extruding the pencil strand and cutting it into individual pencils is not such as to permit a displacement of the core only under pressure. In order to correct this, the pencils, after being cut from the strand and after having been given a conical writing end, may be inserted under pressure and in heated condition into a conical gauge which may also be heated. As a result, the sheath material is slightly compressed at least along the conical portion **52** (see Fig. 5) of the sheath so that the engagement between core and sheath attains the proper condition in the tip portion of the pencil.

It will be obvious to those skilled in the art, upon a study of this disclosure, that the method of making slidable-core pencils as well as the pencils resulting from the method in accordance with my invention can be modified in various ways and may be incorporated in embodiments other than those specifically illustrated and described, without departing from the essence of the invention and within the scope of the claims annexed hereto.

I claim:

1. The method of making slidable-core pencils which comprises continuously advancing a marking-core medium in a given direction, continuously extruding a sheath material in the same direction along and around the traveling core medium and shaping said material into substantially final shape while maintaining it separated from said core medium, then placing during further travel the shaped sheath material around the core medium with slight but sufficient radial clearance to maintain the shaped sheath material in sliding-fit engagement with said core medium while passing the sheath material

through a nozzle having constant inner cross section from ahead of the first meeting point of said medium and said material to the nozzle outlet point, said core medium being adhesively incompatible with the shaped sheath material, whereby in the finished pencil the core is practically immovable radially in the sheath but is longitudinally displaceable by application of pressure.

2. The method of making slidable-core pencils, which comprises advancing a marking-core medium through an elongated thin-walled tube, extruding a plastic sheath material along the tube and shaping said material symmetrically around the tube to the substantially final shape of the pencil sheath while maintaining core medium and sheath material separated from each other by the thin-walled tube up to a point where said final shape is attained, and then continuing the extrusion of core medium and sheath material through an elongated nozzle outlet bore of constant cross section while maintaining a slight but sufficient radial clearance to maintain the shaped sheath material and the core medium in sliding-fit engagement with each other, said core medium being adhesively incompatible with the shaped sheath material, whereby the pencil strand issuing from the outlet bore has the core practically immovable radially in the sheath and slidingly displaceable in the longitudinal direction only by application of pressure.

3. The method of making slidable-core pencils by extrusion through coaxial nozzles, which comprises continuously forwarding a marking-core medium through an elongated thin-walled tube forming part of the inner nozzle and having an outer cross section corresponding nearly to that of the marking core, extruding a plastic sheath material along and around said tube and shaping it internally and externally to substantially final shape as it passes along said tube, said core medium being adhesively incompatible with the shaped sheath material, maintaining the sheath material confined to a constant cross section from a point along said tube to the outer-nozzle outlet, said outer-nozzle outlet being axially spaced from the tube outlet a distance larger than the sheath diameter but smaller than the axial spacing of said tube outlet from said point so that the sheath material is no longer subjected to radial shaping pressure in the entire zone wherein the core medium travels together with the sheath material, depositing the sheath material in said zone on the core medium while maintaining a slight but sufficient radial clearance to maintain the shaped sheath material and the core medium in sliding-fit engagement with each other, whereby in the pencil strand issuing from the outer-nozzle outlet the core is practically immovable transversely of the sheath but is axially displaceable by application of pressure.

4. The method of making slidable-core pencils by extrusion through coaxial nozzles, which comprises continuously extruding a thermoplastic marking-core medium through an elongated thin-walled tube forming part of the inner nozzle and having an outer cross section corresponding nearly to that of the marking core so that the core medium issuing from said tube has the shape of the final pencil core, extruding a thermoplastic sheath material along and around said tube and shaping it internally and externally to substantially final shape as it passes along said tube, maintaining the sheath material confined to a constant cross section from a point along said tube to the outer-nozzle outlet, said outer-nozzle outlet being axially spaced from the tube outlet a distance larger than the sheath diameter but smaller than the axial spacing of said tube outlet from said point so that the sheath material is no longer subjected to radial shaping pressure in the entire zone wherein the core medium travels together with the sheath material, said core medium being adhesively incompatible with the shaped sheath material, depositing the sheath material in said zone on the core medium while maintaining a slight but sufficient radial clearance to maintain the shaped sheath material and the core medium in sliding-fit engagement with each other, whereby in the pencil strand issuing from the center-nozzle outlet the core is practically immovable transversely of the sheath but is axially displaceable by application of pressure.

5. The method of making slidable-core pencils, which comprises continuously advancing a marking-core medium in a given direction, continuously extruding in the same direction along and around the travelling core medium a non-metallic deformable sheath material practically insensitive to moisture and dryness and shaping said sheath material into final shape while maintaining it separated from said core medium, then depositing during further travel the shaped sheath material upon and around the core medium in sliding-fit engagement therewith and with slight radial clearance while passing the sheath material through a nozzle having constant inner cross section from ahead of the first meeting point of said medium and said material to the nozzle outlet point, said core medium being adhesively incompatible with the shaped sheath material, whereby in the finished pencil the core is practically immovable radially in the sheath and is longitudinally displaceable only by application of pressure.

6. In the method of making slidable-core pencils according to claim 1, said marking-core medium being adhesively incompatible with said sheath material, whereby bonding of core medium to sheath material in the finished pencil is prevented.

7. The method of making slidable-core pencils according to claim 1 wherein the core medium as such is adhesively compatible with the sheath material, comprising the step of coating the core medium with a film of adhesion preventive substance prior to depositing said sheath material onto the coated core medium, whereby bonding of core medium to sheath material is prevented and the core remains displaceable by application of pressure.

8. The method of making slidable-core pencils which comprises continuously forwarding a marking-core medium in a given direction, continuously extruding a sheath material in the same direction along and around the travelling core medium and shaping said material to a pencil sheath, depositing during further travel the shaped sheath material upon the core medium while maintaining a slight but sufficient radial clearance to maintain the shaped sheath material and the core medium in sliding-fit engagement with each other so as to obtain a pencil strand, said core medium being adhesively incompatible with the shaped sheath material, severing individual pencil bodies off the strand, and attaching to each body a means for displacing the core relative to the sheath.

9. The method of making slidable-core pencils according to claim 1, which comprises the steps of slitting the sheath material longitudinally down to the marking core medium over a given axial length as the pencil strand is emerging from the nozzle, interrupting the slitting operation for another given axial length of the strand, cyclically repeating both steps and cutting the strand into individual pencils at respective places each within one of said latter axial lengths, whereby each pencil has a longitudinal slit over most of its length with the exception of an end portion.

10. The method of making slidable-core pencils according to claim 1, which comprises providing the pencil strand, prior to severing the individual pencils from said strand, with thin longitudinal slits down to the core medium, each slit having a given axial length and being axially spaced from the adjacent slit, mounting the displacing means on the sheath of each individual pencil in slidable relation thereto and passing part of said means through the slit into engagement with the pencil core.

11. The method of making slidable-core pencils, which comprises continuously forwarding a marking-core medium in a given direction, continuously extruding a sheath material in the same direction along and around the travelling core medium and shaping said material to a

pencil sheath, depositing during further travel the shaped sheath material upon the core medium while maintaining a slight but sufficient radial clearance to maintain the shaped sheath material and the core medium in sliding-fit engagement with each other so as to obtain a pencil strand, said core medium being adhesively incompatible with the shaped sheath material, severing individual pencil bodies off the strand, and attaching to one of the ends of each individual pencil a fluid pressure means communicating with the interior of the sheath to impose axial pressure upon the core medium for displacing said medium in said sheath.

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