

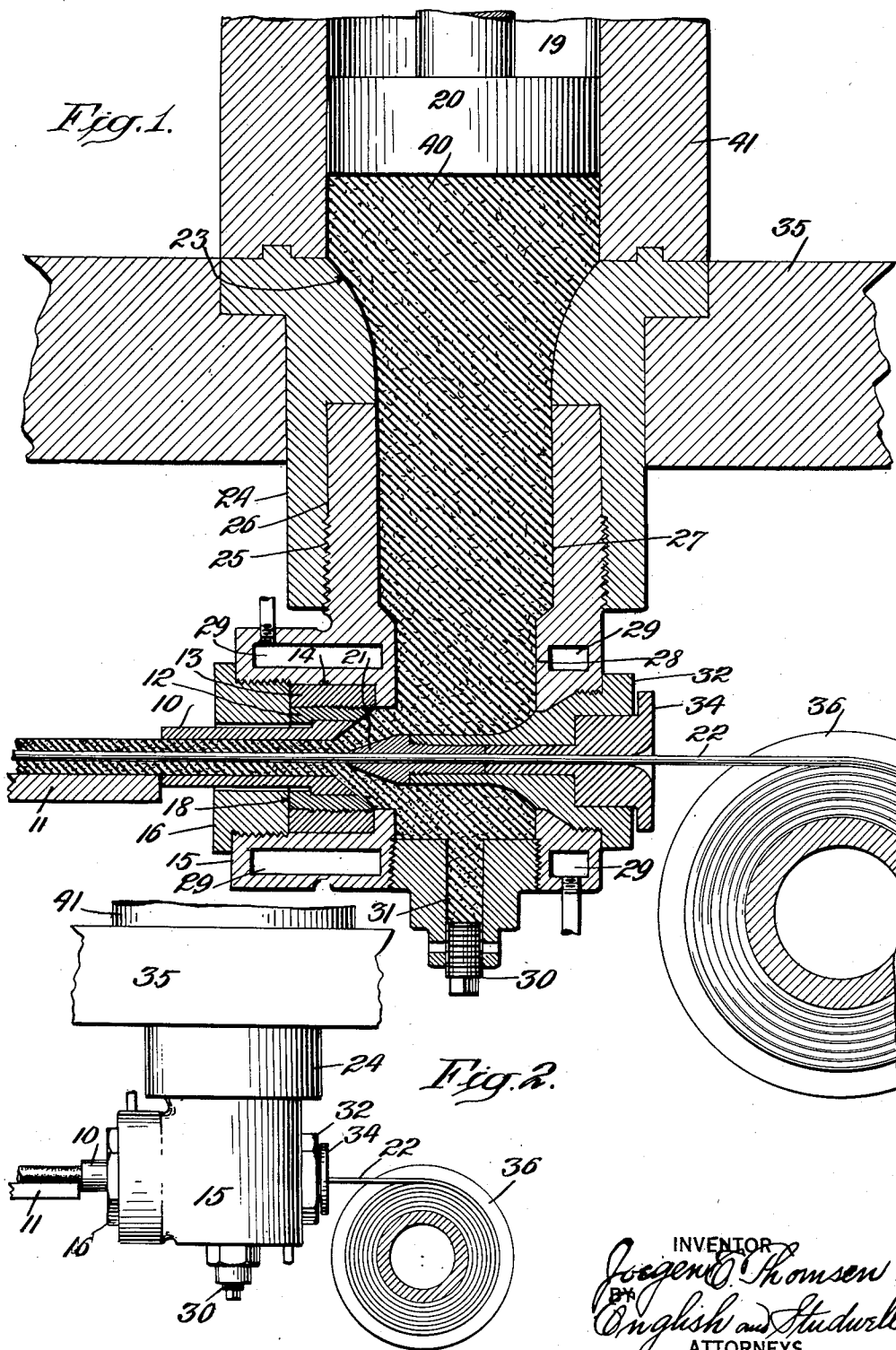
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METHOD OF MAKING PENCILS

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## UNITED STATES PATENT OFFICE

1,937,104

## METHOD OF MAKING PENCILS

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5 Claims. (Cl. 18—55)

This invention relates to a method for making composition sheath pencils economically and expeditiously.

One of the objects of the invention is to produce a pencil having a self-hardening lead and a self-hardening composition sheath or covering for the lead. Another object of the invention is to provide a method whereby such a pencil may be easily made. Through the use of several novel combinations of ingredients I have been enabled to successfully produce pencils of this character so constructed as to meet all requirements. For example, the sheath in such a pencil must be initially so constituted that it can be extruded from an extruding machine such as herein described while it is in a plastic condition; it must be capable of surrounding, and upon drying, of contracting and firmly gripping the "lead" or other marking material; it must be capable of being easily and smoothly cut by a knife or pencil sharpener; it must be non-warping; it must have a substantially smooth exterior for the application of a coating of finishing material such as japan or varnish, should one be required; and in general must resemble the natural wood sheath in all its qualities as nearly as possible. Not only must the composition sheath meet these practical requirements, but it must also meet the commercial requirement of being manufactured at a price permitting it to compete with wood sheaths.

In addition to the requirements needed in a composition sheath, a self-hardening lead is also necessary to enable pencils to be made according to the process of this invention. The invention therefore contemplates the manufacture of pencils having both a composition sheath and a self-hardening lead, the use of these two essentials enabling the pencils to be rapidly and successfully made.

In carrying out the manufacture of pencils according to this invention, I prefer to use a self-hardening sheath composition composed primarily of wood flour, a non-absorbent cellulose material such as comminuted rice hulls, maize products, fibres, such as those obtained from cocoanut hulls, corn stalks or the like and a water soluble binder such as casein or the like. This composition forms the subject-matter of my copending application, Serial No. 580,739, and is preferred, although it is entirely possible that some other plastic sheath composition of similar characteristics may be used with success.

For a self-hardening lead, either that now used in the so-called "indelible" pencils, or those

leads used in the water and oil-soluble color pencils can be employed. In cases where a graphite self-hardening lead is desired, I prefer to use that which forms the subject-matter of my copending application for patent Serial No. 597,813, filed March 9, 1932, wherein a successful self-hardening lead primarily composed of wax-impregnated graphite, a cellulose binder such as an alkyl derivative of cellulose and a plasticizing agent such as bentonite is described.

In the drawing, Fig. 1 is a vertical sectional view through an extruding device or press used in carrying out this invention, and Fig. 2 is a side view of the device on a smaller scale.

The plastic sheath material and a self-hardening lead are formed into pencils by expelling or extruding them together through a nozzle 10 so that they are received on a table or other like supporting surface 11. The nozzle 10 is mounted in a bushing 12 located within a plug 13, which fits in an opening 14 provided in a bottom member 15 of the press. The plug 13 as well as the bushing 12 is held in place by a gland nut 16 threaded into the lower member 15, so that the bushing 12 and the plug 13 rests against its inner face 18.

The plastic sheath-forming material 40 is placed into a cylindrical interior 19 of the chamber 41 at the top of the press. A plunger 20 presses upon the plastic material 40 and urges it downwardly around an internal nozzle 21, through which is fed the self-hardening lead 22. The lead when so fed through the nozzle is in relatively soft or pliant condition, so that it may be in the form of a lengthy rod conveniently wound in roll form and coiled upon a reel 36 from whence it is fed. As the plunger 20 exerts a downward pressure causing the plastic sheath material 40 to be extruded from the nozzle 10, the plastic material 40 encloses the lead 22 and draws it with it, the lead being drawn through the internal nozzle 21, and the sheath composition 40 and lead 22 being forced through the nozzle 10 together to form the pencil which is fed out on to the table 11 and then severed into proper lengths.

Between the cylindrical portion 19 of the chamber 41 and the nozzle 10, is a slightly funnel-shaped passage 23 in a member 24, which is held fast to the chamber 41, said member 24 being held by threads 25 on an upper extension 26 of the lower member 15. From the lower part of the funnel-shaped passage 23, the plastic sheath material 40 flows into the cylindrical bore 27 of the extension 26 and then into a constricted portion 28 of said bore which contains the in-

ternal nozzle 21 at its lower portion so that the plastic sheath material moving downwardly under the pressure of the plunger 20 may flow entirely around the internal nozzle 21.

5 To keep the plastic material cool, passages 29 may be provided for receiving cool water or some other cooling medium, these passages surrounding the nozzle 21, and located within the lower member 15. For cleaning purposes there may be provided a screw plug 30, which is threaded into a lower opening 31 below the cylindrical portion 28 of the nozzle casing. The internal nozzle 21 is shown as screwed into a mount 32 which is threaded into an opening in the nozzle casing 15 located directly opposite the nozzle 10, and the mount 32 is provided with a guide member 34 for guiding the lead 22 through the nozzle. The press may be mounted on a bench 35 or other support, and the lead 22 in its relatively soft condition is drawn from the rotating reel 36, suitably mounted to rotate as the lead is drawn from it.

It will be seen that the piston 20 presses the plastic material out through the nozzle 10 with a minimum of friction, there being no moving parts in contact with the plastic material.

Since the lead 22 is in a quite lengthy or continuous form and since it is self-hardening and in a soft or pliant condition, enabling it to be contained on and fed from a roll, a great number of pencils can be made from a single length of lead, this greatly increasing the speed of production.

When a self-hardening sheath composition as herein described is used in combination with a self-hardening lead, the resultant pencil is one which is in all ways equal to the ordinary wood sheath pencils using a pre-hardened lead.

The sheath composition used is preferably one which shrinks to a greater degree than the lead, so that the sheath, upon hardening, firmly grips the lead and holds it securely in place.

What I claim is:—

1. The process of producing a pencil from a plastic sheath-forming material and a self-hard-

ening marking material, consisting of preforming and reeling the marking material, and then expelling the plastic sheath forming material and the marking material together from an extruding nozzle with the marking material at the center while the sheath forming material is in a plastic condition and while the preformed marking material is soft.

2. The process of producing a pencil from a plastic sheath-forming material and a preformed self-hardening marking material, consisting in first forming and reeling a rod of marking material, and then feeding the rod while in a relatively soft condition and expelling it together with the sheath-forming material from an extruding nozzle with the rod at the center thereof.

3. The process of producing a pencil which consists of first forming and reeling a self-hardening rod of marking material, then feeding the rod centrally through an extruding nozzle and extruding a self-hardening sheath material around the preformed marking rod.

4. The process of producing a pencil from a plastic sheath-forming material and a self-sustaining rod of preformed self-hardening marking material, consisting of preforming and winding a predetermined length of the marking material, then moving the marking material into position for passage of the rod through an extrusion machine, then feeding the rod centrally through an extruding nozzle and extruding a self-hardening sheath material around the preformed marking rod without distorting the marking rod.

5. The process of producing a pencil from a plastic sheath-forming material and a rod of preformed self-hardening marking material, consisting of preforming and reeling the marking material into ring-like form and transferring the same for passage of the rod through an extrusion machine while in a relatively soft condition, then passing the preformed rod centrally through an extrusion nozzle and extruding a plastic sheath-forming material around the self-hardening marking rod.

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