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MANUFACTURE OF A MULTICOLOR LEAD

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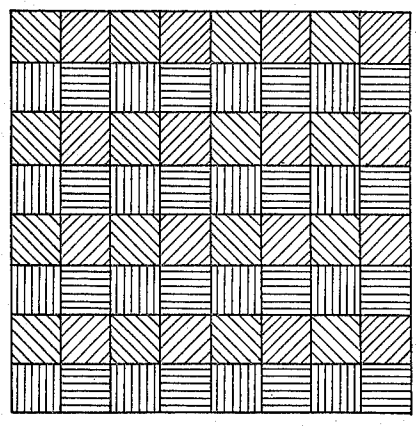


*Fig. 1*

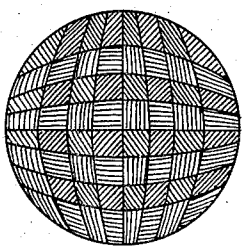


*Fig. 2*

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## MANUFACTURE OF A MULTICOLOR LEAD

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1 Claim. (Cl. 18—61)

The invention relates to the manufacture of a lead for pencils by means whereof it is possible to write in a plurality of colors, so that the written stroke or mark as a rule exhibits at least two colors adjacent one another, and said colors change rapidly.

Processes are already known for the manufacture of two-colored or multi-colored leads, either by simultaneous extrusion from a nozzle having a plurality of color channels uniting in the said nozzle, or by gluing together a plurality of single-colored leads, or by assembling pieces of the color compositions, which in cross-section have the shape of circular segments, so as to form a cylinder. This cylinder of color composition is then handled in the ordinary lead pencil extrusion press having ordinary cylindrical containers for extruding the composition.

The fundamental disadvantages of these known processes is that when using the leads manufactured by them, the color changes much too infrequently, so that it is necessary to write much too long with the same color. The reason for this is that in all the processes, the possible number of color components in the lead is too small. In the last-mentioned known process, however, even with a large number of color components (in the factory it will scarcely be possible to join together properly more than six segments to form a cylinder), the boundary faces between two colors in the cylinder of color composition, and later in the lead, lie relatively close together only at the centre of the shaft, while they diverge rapidly towards the periphery. A pointed lead is used, the writing point moves outwardly more and more from the centre of the shaft towards the periphery of the shaft, and the change in color will be more infrequent, so that the pencil marking is of the same color for a longer period.

A further disadvantage of the last-mentioned segment process resides in the fact that the separation of a cylindrical core into segments and the re-assembling of differently colored segments to form a new shaft or core, cannot be effected (on account of the blade-like shape of the segments in the case of a large number of components) so accurately as to leave no air between the individual segments. In extruding the composition from an extrusion nozzle, this air prevents an intimate union between the individual segments. A lead produced in this way exhibits radially extending fissures which considerably impair its strength.

All these disadvantages are obviated with the present invention. According to the invention, a composition body, likewise composed of a plurality of axially-directed components, each single-colored in itself, is extruded through a single orifice, but the individual single-colored components of the composition body have a square, rectangular or other cross-section without acute angles, which makes it possible to assemble and press the single-color components together during the extrusion process without any gaps, and to form a composition body which in cross-section has a checkered pattern in different colors.

A simple and therefore advantageous form of carrying out this process comprises extruding by the normal manufacturing process used for making the shaft of a lead pencil, a quadrangular rod having a square cross-section and assembling a number of these rods into a composite body or block having a cross-section which is sub-divided into many colors in a checkered pattern, then introducing this composite body into a composition container of square cross-section, and extruding said composite body from the container through a preferably cylindrical extrusion nozzle, in order to form a cylindrical lead or shaft.

The process according to the invention has first of all, the advantage that by means thereof, it is possible to combine any desired large number of components in the composite body, since the de-centralisation in the cross-sectional distribution of the components renders the process independent of the number of such components. There is, furthermore, the further advantage that the individual components are very easy to manufacture, due to the fact that their cross-section is of simple shape, and their air-free assembly may also be carried out without any difficulty for the same reason. It is also possible to remove the air from the assembled composition body by tapping and pressing it (as by tapping its outer surface), so as to free it from the last residue of air which may still be present, without the fear of thereby weakening the cohesion of the components.

Fig. 1 is an end view of a composite slug or cartridge which may be formed and extruded, according to the invention.

Fig. 2 is a cross-section of a cylindrical pencil shaft which has been made by extruding the body illustrated in Fig. 1. Fig. 2 is drawn to enlarged scale.

To provide a numerical example, it is, for example, easily possible, according to the invention, to use a composition container of square cross-section, the length of a side of this cross-

section being 80 mm. This container can be used with an extrusion nozzle, to press and to combine into a block, 64 lead rods, of four different colors for example each rod having a square cross-section, the length of a side of such cross-section being 10 mm. This is shown in Fig. 1. If this block is formed by extrusion into a cylindrical lead of 2.6 mm. diameter, the length of side of the squares of the checker pattern will be reduced to about 0.3 mm. Since the width of a written line is about 0.3 to 0.6 mm., the probability of the stroke being in two colors is very great even with this dimension. With these dimensions, 49 points of intersection of color boundaries are distributed over the interior of the cross-section of the lead, while the lead, if subdivided in segment form only contains one such point of intersection. The length of side of the color composition components of square cross-section may be reduced still further without any difficulty, and the number of rods of different colors in one lead or shaft may be increased, thereby providing with certainty the probability that each stroke will consist of at least two colors. The four different colors in Fig. 1 are indicated by different kinds of shading.

As shown in Fig. 2, the completed shaft has a checkered pattern in cross-section, although the straight boundary lines in the original composite body have been distorted.

For the purpose of defining the invention in the claim, it is noted that I extrude a slug or cartridge having elements of different colors so that the transverse cross-section of said slug or cartridge has a checkered pattern in which the elements of said composite slug or cartridge are free from acute angles. Likewise the elements of said composite slug or cartridge have longitudinal surfaces which substantially abut each other so that air spaces are eliminated when said composite slug or cartridge is extruded to make the shaft.

I claim:

The method of forming a cylindrical multicolored pencil shaft which comprises assembling a plurality of shaft elements of plastic material and of different colors with their faces in contact with each other, each of said shaft elements being in the form of a rod of substantially square cross-section, said elements being assembled into the form of a block having square cross-section, and extruding said block through a circular orifice in a direction longitudinally of said block.

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