

Dec. 11, 1923.

E. A. WILSON  
MANUFACTURE OF BUTTONS  
Filed Oct. 12, 1921

1,477,094

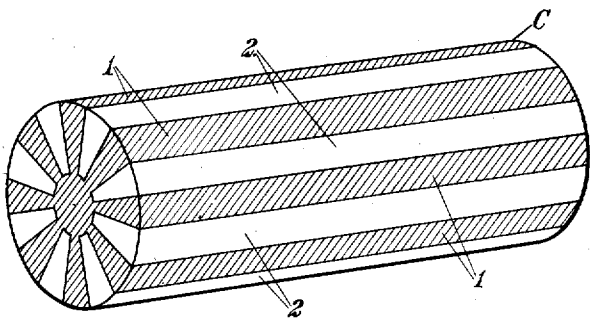


Fig. 1

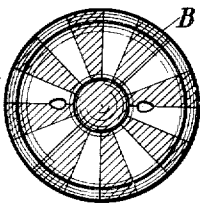


Fig. 7

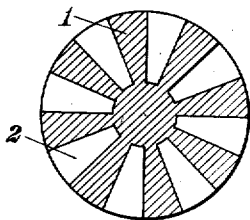


Fig. 2

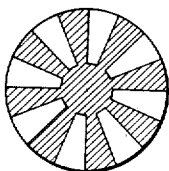


Fig. 3

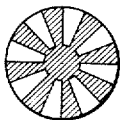


Fig. 4



Fig. 5

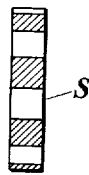


Fig. 6

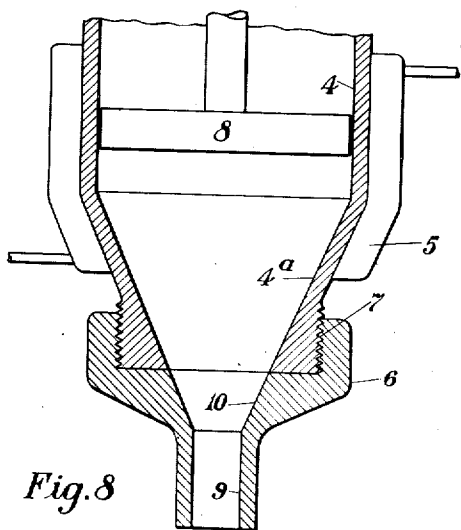


Fig. 8

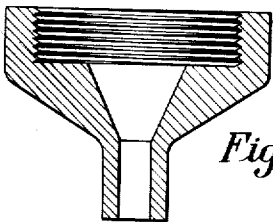


Fig. 9

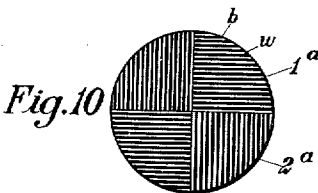


Fig. 10

E. A. Wilson, Inventor

By his attorney J. R. Squair.

Patented Dec. 11, 1923.

1,477,094

# UNITED STATES PATENT OFFICE.

ELBERT A. WILSON, OF ARLINGTON, NEW JERSEY, ASSIGNOR TO E. I. DU PONT DE NEMOURS & COMPANY, OF WILMINGTON, DELAWARE, A CORPORATION OF DELAWARE.

## MANUFACTURE OF BUTTONS.

Application filed October 12, 1921. Serial No. 507,203.

*To all whom it may concern:*

Be it known that I, ELBERT A. WILSON, a citizen of the United States, and a resident of Arlington, in the county of Hudson and State of New Jersey, have invented a certain new and useful Manufacture of Buttons, of which the following is a specification.

This invention relates to the manufacture of buttons, and, more particularly, to the manufacture of pyroxylin plastic buttons having a decorative design incorporated therein.

In equipping a garment with buttons several different sizes are of course generally used; and these various sized buttons should match in design. Usually, for women's wear, four sizes of matching buttons, varying from about one-half inch in diameter to two inches, are required. It is difficult to produce designs which will be acceptable to the trade for all these sizes. The large size (two inch) button has sixteen times the area of the small size (one-half inch) one and, therefore, of a large design which looks well on the large button be used on a small button, small portions only of the large design will appear on the small button and the buttons of the various sizes will run very ununiformly and appear to have been made up from stock of entirely different colors. And, when working in the usual ways, as by means of different sized stencils or the like, it is a matter of no small difficulty, and of considerable expense, to produce on the different sized buttons designs which are identical in all respects except size.

I have devised a process for manufacturing pyroxylin plastic buttons whereby such buttons of varying and desired sizes may be made, all with the same design incorporated therein, the pattern changing in size as a whole, and uniformly as to all its parts, in correspondence with changes from size to size in the buttons, and, except for the matter of size, being identical in all sizes of buttons. Thus, by the present process there can be made perfectly matching buttons of any and all sizes desired. It is the object of the invention to provide a process of the character just indicated, and, in general, to provide a process whereby buttons can be made in a relatively unexpensive, simple and satisfactory manner.

In explaining the process I make reference

to the accompanying drawings illustrating, somewhat conventionally and diagrammatically, certain stages in the manufacture of the buttons, and also a stuffing machine, exemplary of type merely, usable in the manufacture. In the drawings:—

Figure 1 is a perspective view of a completed button-stock cartridge to reduced scale (or of a button-stock rod approximately to size, as regards diameter):

Figures 2, 3, 4 and 5 are end views of various sizes of button-stock rods as formed by extrusion from a button-stock cartridge (or end views to successively reduced scales of the cartridge illustrated in Figure 1):

Figure 6 is an edge view of a button blank as severed from a button-stock rod:

Figure 7 is a face view of a button as made from the blank illustrated in Figure 6:

Figure 8 is a diametrical vertical cross-sectional view of the lower portion of an extruding or stuffing machine:

Figure 9 is a diametrical cross-sectional view of a nozzle of different diameter than that shown in Figure 8, and

Figure 10 is an end view of a button-stock rod showing a grained arrangement.

In brief, the process comprises building up a button-stock cartridge of crude pyroxylin plastic stock to give the desired button design crosswise of its length; extruding or stuffing the cartridge into button-stocks rods of various diameters corresponding to the sizes of button to be produced; cutting the rods into blanks; and forming each blank into a button. In the stuffing operation the design is uniformly reduced so that the rods (and buttons) have all the same design but that design is reproduced in successively smaller sizes in correspondence with the successively smaller sizes of the rods. If desired, and is preferable for economy, separate cartridges all of like pattern may be built up and the different cartridges reduced each to a rod of a size different from that of the others. The cartridges being of relatively large size compared to the buttons permits ready duplication of the design in different cartridges, even though that design be somewhat complicated. Thus I am able to produce various sized buttons having all the same design but with the design uniformly varying from size to size in correspondence with the sizes of the buttons.

To describe the procedure in somewhat greater detail: The desired number of batches of pyroxylin button stock are first made up, each batch being of one of the colors which it is desired to have appear in the button design. The ingredients of the stock may be in any suitable proportions, for example (parts by weight) pyroxylin 65, camphor 23, ethyl alcohol (80%) 12; together with color, pigment, and a small amount of stabilizer. The batches of crude plastic, that is the plastic as it comes, say, from the masticating rolls or the sheeter, and prior to the removal by seasoning of excess solvent therefrom to reduce the solvent to the desired residual amount, are now individually shaped, and assembled to make the button-stock cartridge. The cartridge is built to present the design or pattern diametrically across the cartridge and extending throughout its length, or, to state it somewhat differently, it is built with the pattern extending through the cartridge in a direction substantially at right angles to the spread of the pattern.

The specific build of the cartridge of course depends on the particular design it is desired to reproduce. For illustration, a cartridge C, Figure 1, is shown as comprised of a series of truncated "sectors" 1 of brown plastic extending lengthwise through the cartridge and alternating with the elements of a series of truncated sectors 2 of white plastic, the sectors radiating from a central core 3 of brown plastic. The various portions may be assembled together in any desired manner; conveniently a cartridge such as that illustrated is built up in the cylinder of the stuffing machine. A cartridge is given a diameter substantially equal to the internal diameter of the cylinder. A cartridge of 9 inch diameter is generally satisfactory, and can be extruded to give rods of sizes suitable for buttons of the ordinary sizes, as one-half inch, three-quarters inch, one and one-quarter inches, and two inches.

The cartridge is now drawn in a stuffing or extruding machine, for example of a type conventionally exemplified in Figure 8. The illustrated machine comprises the stock cylinder 4 having a conical bottom 4<sup>a</sup>, surrounded by the jacket 5 for circulating heating medium, and provided with a removable extruding nozzle 6 screwed thereon as indicated at 7. It also comprises a travelling plunger or piston 8 for forcing the plastic from the cylinder. The nozzle is provided with an extruding channel 9 and a conical channel entrance 10 which merges smoothly with and continues the taper of the bottom 4 and the illustrated nozzle 6 is thus representative of a series, another unit of which is shown on Fig. 9. The length of the entrance 10, is, as illustrated, such as to give

the taper a minimum diameter equal to that of the diameter of the channel in the nozzle. The diameter of the channel is of course such as to give the diameter of rod desired in any particular case. Such number of nozzles as is required for the various sized rods to be drawn is provided. In using the machine the cartridge is placed in the cylinder 4 and, upon pressure being applied thereto by the piston 8, the cartridge is forced endwise into the taper 4<sup>a</sup>—10 and the plastic extruded through the channel 9 into a rod of the desired diameter. In the extruding, the plastic is subjected to heat and pressure and, as will be understood by those skilled in the pyroxylin plastic art, the various pattern-forming units are merged and joined into a unitary mass having a substantial degree of rigidity.

As previously indicated, the stock issues from the nozzle in the form of a cylinder or rod in which the pattern or design, incorporated in the original cartridge, is fully preserved but has had all of its features uniformly reduced in dimension, the amount of reduction depending on, and agreeing with, the difference between the diameters of the cartridge and rod. Furthermore, the particular size of nozzle used and, therefore, the particular size of rod, has substantially no effect on the pattern other than the reduction in size of the component parts thereof. Thus, by the use of different sized nozzles there can be produced a series of different sized button-stock rods all having the same pattern, but with the component parts of the pattern of different, and uniformly varying, sizes in accordance with the different diameters of the different units of the series.

As before indicated, a series of like cartridges can be made up and one extruded to a certain diameter, another to a different diameter, and so on, or a single cartridge can be partly extruded to a certain diameter, the nozzle changed and the cartridge partly extruded to a different diameter and so on. That is, when the various portions of pyroxylin plastic stock are assembled to give the pattern, they may be assembled to give the desired pattern in a single cartridge, destined to be drawn into a plurality of different sized rods, or such portions may be assembled to give the pattern in a plurality of cartridges, each destined to be drawn to a rod of a size different from that to be drawn from the others. Such separate cartridges may be obtained, say, by building up each or by building up a cartridge and severing it crosswise into a plurality. Of course if desired certain rods of a series may be extruded from one cartridge, and the remaining rods of the series extruded each from a separate cartridge.

Each button-stock cylinder, produced as

above described, is cut, crosswise of, e. g., at right angles to, its length into individual button blanks or slugs S (Fig. 6), one blank for each button. Then the blanks are pressed, as in a suitable die press, to form the blanks into buttons B (Fig. 7). The die should, of course correspond to, and substantially match, the button blank in diameter.

In order that the buttons formed by the press may have requisite rigidity for use it is of course desirable that the plastic be seasoned to reduce the solvent content, to a suitable residual amount, for example, 2 to 4%.

The seasoning may occur at any time after the extruding; the rods, the blanks or the formed buttons may be seasoned. Desirably it is the rods that are seasoned in order that such shrinking, and so forth, as may occur shall take place in the rods rather than in the formed buttons or blanks. In seasoning, the plastic may desirably be exposed in a drier, heated for example to 100° F., for a suitable period. Should the blanks be cold when it is desired to press them, it is desirable to warm them, to increase plasticity, prior to introduction into the press; conveniently they may be warmed on a steam table.

The elements of the pattern may obviously be built up and arranged in many different ways, the arrangement shown in Figures 1 to 7 being but one example. As another example, in Figure 10 is shown a construction wherein the major pattern units, as sectors 1<sup>a</sup> and 2<sup>a</sup>, are alike in that each is composed of black and white elements *b* and *w* assembled to give a grain; but the sectors are arranged to place the grains of the different sectors in different directions. Thus it will be seen that the distinguishing relationship between elements of the pattern, as sectors 1<sup>a</sup> and 2<sup>a</sup>, may depend upon the arrangement of such like elements with respect to each other, rather than on differences in color between the elements. Or, as in the arrangement shown in Figures 1 to 7, and also as regards elements such as *b* and *w* in Figure 10, the distinguishing relationship may depend on difference in color.

If desired, plastic stock may be extruded into rods, the rods severed into button blanks, and the blanks shaped into buttons, thus utilizing certain advantageous features of the process, even though patterned buttons are not produced. Also, the process is not confined to the production of circular buttons, or to buttons with a circular pattern, for other shaped patterns in cylindrical or other shaped cartridges can be properly reduced and produced in circular or other shaped buttons. For example, a square design in a circular cartridge can be properly produced in various sized cy-

lindrical rods, a square cartridge with any desired shaped pattern can be stuffed into different sized square rods (using of course an extruding machine with a square "cylinder" and extruding channel), and so on.

In making up the cartridges, more particularly the cylindrical ones, the various batches for the elements of the pattern may, if desired, be used in sheet form and the sheets laid one on the other and rolled up together to form a cartridge with the various sheets exposed at the ends of the cartridge to give the pattern, with the pattern extending longitudinally through the cartridge.

I claim:

1. The process of manufacturing different sized patterned pyroxylin plastic buttons with the patterns in all buttons mating but varying in size in correspondence with the differences in size of the buttons, which process comprises assembling various portions of pyroxylin plastic button stock with distinguishing relationship to present the desired pattern, extruding the stock to different sizes in correspondence with the desired different sized buttons, and in a direction longitudinal of the pattern, thereby to produce different sized button stock masses with the patterns in all masses mating but varying in size from mass to mass, and forming each said mass into buttons.

2. The process of making incorporated-pattern pyroxylin plastic buttons of like pattern and different sizes which comprises, assembling various portions of pyroxylin plastic button stock with distinguishing relationship to give the desired pattern, extruding the so-assembled plastic in a direction longitudinally through the pattern and into button stock masses of different sizes corresponding to the sizes of like-patterned buttons to be produced, and forming each said mass into a set of buttons.

3. The process of making incorporated-pattern pyroxylin plastic buttons of different sizes and like pattern, with the pattern varying in size in substantial accordance with differences in size of the buttons, which process comprises making up a plurality of pyroxylin button stock cartridges, equal in number to a plurality of the sizes of buttons to be produced, from masses of plastic with distinguishing relationship to give each cartridge the same desired pattern crosswise of the cartridge, extruding the respective cartridges each to a rod of a diameter corresponding to a respective button size, to give a series of rods corresponding in diameter to the different button sizes, and forming each said rod into a set of button blanks, and forming said blanks into buttons.

4. The process of making incorporated-pattern pyroxylin plastic buttons of dif-

ferent sizes and like pattern, with the pattern varying in size in substantial accordance with differences in sizes of the button, which process comprises making up a pyroxylin plastic button stock cartridge from masses of plastic with distinguishing relationship to give the desired pattern cross-wise of the cartridge, extending the cartridge into rods corresponding in size and number to a plurality of the sizes of buttons to be produced, and forming each said rod into a set of buttons. 10

In testimony whereof I affix my signature.

ELBERT A. WILSON.

### Certificate of Correction.

It is hereby certified that in Letters Patent No. 1,477,094, granted December 11, 1923, upon the application of Elbert A. Wilson, of Arlington, New Jersey, for an improvement in "Manufacture of Buttons," errors appear in the printed specification requiring correction as follows: Page 2, line 111, for the misspelled word "cartrdige" read *cartridge*; page 3, lines 127 and 128, claim 3, strike out the words "button blanks, and forming said blanks into"; page 4, line 8, claim 4, for the word "extending" read *extruding*; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 22d day of January, A. D., 1924.

[SEAL.]

KARL FENNING,  
*Acting Commissioner of Patents.*