(No Model.)

A. & S. DE PONT.

MOLD FOR THE MANUFACTURE OF SOLID BALLS OF ARTIFICIAL IVORY.

No. 502,013. Patented July 25, 1893.

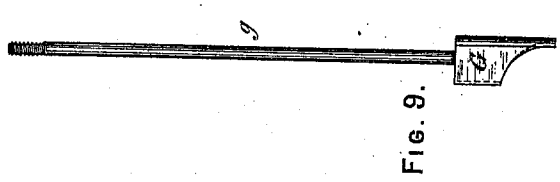

FIG. 9.

FIG. 10.

FIG. 8.

FIG. 6.

FIG. 7.

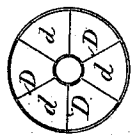

FIG. 4.

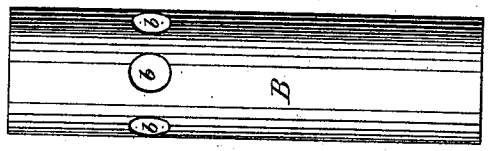

FIG. 3.

FIG. 5.

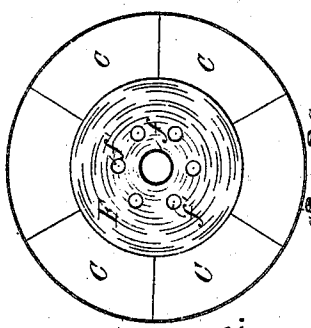

FIG. 2.

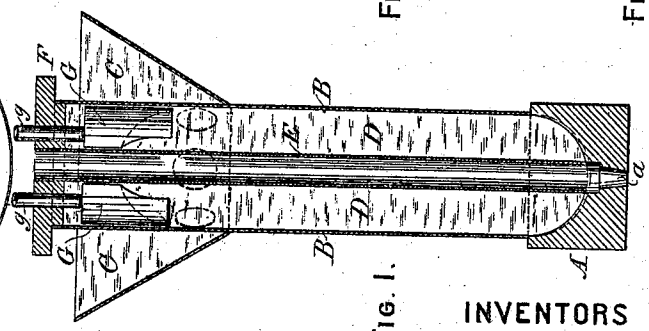

FIG. 1.

WITNESSES

Chas. Ovendale.

Josh. Bates

INVENTORS

Alexandre de Pont

Silvain de Pont

By Wm. P. Thompson Esq

attys.

UNITED STATES PATENT OFFICE.

ALEXANDRE DE PONT AND SILVIUS DE PONT, OF LANCASTER, ENGLAND.

MOLD FOR THE MANUFACTURE OF SOLID BALLS OF ARTIFICIAL IVORY.

SPECIFICATION forming part of Letters Patent No. 502,013, dated July 25, 1893.

Application filed July 22, 1892. Serial No. 440,939. (No model.)

To all whom it may concern:

Be it known that we, ALEXANDRE DE PONT and SILVIUS DE PONT, citizens of Switzerland, residing at Lancaster, in the county of Lancaster, England, have invented certain new and useful Improvements in Molds for the Manufacture of Solid Balls, Blocks, or Slabs of Artificial Ivory or Ivory Substitute in Variegated Colors, of which the following is a specification.

This invention relates particularly to artificial ivory or ivory substitutes from which billiard balls and similar articles are made which are required to be variegated or colored in a variety of manners with the object of assuring that the color shall be permanent and not liable to wear or chip off or require to be renewed. It is primarily designed to be applied to balls produced from artificial ivory synthetically prepared but it may also be applied to other material or compositions of material such as celluloid or the like intended to be used as ivory substitutes or for the making of balls or similar articles. Hitherto on billiard balls or other solid articles made of such compositions the required colors have been merely produced upon the surface by dyeing or staining in one of the usual and well known processes or the required colors have been painted or enameled upon the surface. These surface colors are always liable to fade or wear off and require frequent renewing. By this invention we dispense with all processes of dyeing, staining, painting or other surface coloring of the balls or other articles after they are finished and construct the ball or other article so that the colors required to appear on the surface shall penetrate to the center or to a considerable distance below the surface.

It consists essentially in forming the solid block, slab or ball—from which the billiard ball or other article is to be made—of two or more sections of the composition prepared in different colors and the whole compressed or solidified together, the several sections corresponding in shape to the coloring required on the surface, or in other words in forming the solid blocks or balls by compressing or solidifying together separate colored sections the sections having been previously molded or formed into the required shape.

The invention will be more particularly described with reference to the production of variegated balls of artificial ivory synthetically prepared (as described in the specification of Letters Patent No. 444,775, dated January 13, 1891) and in the accompanying drawings an appliance or mold is shown as an example suitable therefor but it is to be understood that the appliance may be varied to suit the requirements of other shapes and to the preparation of other compositions either in a powdered, plastic or other condition.

Referring to the drawings:—Figure 1. is a sectional elevation; Fig. 2. a plan; Fig. 3. an elevation of external tubular casing B; Fig. 4. a plan of same with inner tube or compartment E and plates or leaves D forming outer compartments in position; Fig. 5. a plan with inner tube and plates removed; Fig. 6. an elevation of inner tube E; Fig. 7. a plan of same; Fig. 8. an elevation of thin plate or leaf D; Fig. 9. an elevation of plunger G; Fig. 10. a sectional plan of same.

In carrying out the invention we take the composition in its primary powdered or pulpy condition and dye or color portions varying colors as may be required for the finished ball or article before being placed in the shaping or compressing mold in which the article is formed and these are then grouped together in any section or shape to give the required markings and the whole are then compressed, molded or finished in the usual way.

When forming balls from artificial ivory synthetically prepared we prefer to take the composition in a powdered form and fill it into molds by means of an appliance such as shown in the drawings by which radial sections of the composition of different colors are grouped together in the mold or cup A.

The appliance is constructed with an external tubular casing B, with a number of holes or openings *b* at or near the top the number of holes corresponding with the number of internal chambers into which it is divided. In the drawings six are shown.

Outside the casing B, surrounding the holes *b*, there are fitted a corresponding number of small hoppers or chutes C through which the different colored powders are filled or poured into the interior. The interior is divided into

a number of chambers by six very thin steel plates or leaves D radiating from a small inner tube E to the internal surface of the casing B. The lower ends of the plates D extend below the casing B and are shaped to fit into the mold A. At the upper end the casing B is fitted with a cap F to which the upper ends of the thin plates D and the inner tube E are soldered or otherwise secured.

In each of the divisions or chambers *d* formed by the plates D, a plunger G is fitted preferably of the shape shown whereby when the chambers are filled with the composition it may be pressed down into the mold A.

The cap F is provided with a central hole *f* to fit the tube E, and holes *f'* through which the rods *g* of the plungers G slide. The upper ends of the plunger rods *g* may be screwed or otherwise attached to a disk or other similar contrivance for forcing them down together. The lower ends of the plates D are rounded to fit into grooves in the hemispherical cup or mold A. A movable steel plug *a* is fitted into the bottom of the mold A, to assist the removal of the ball therefrom when compressed.

The tubular casing B shown is designed to produce balls with radial sections of different or alternating colors but other shapes may be employed as required the internal compartments being constructed to correspond with the designs to be produced.

The powdered material is introduced into the chambers of the tubular casing B and pressed down into the mold A by the plungers G. Said casing is then removed leaving the composition undisturbed in the mold A. Such composition is then compressed and solidified in the usual way in the case of the artificial ivory already referred to by subjecting it to a high pressure say one to two tons per square inch at a temperature of from 220° to 270° Fahrenheit and then allowed to cool and mature. We are thus able to produce balls or other articles perfectly homogeneous throughout in which the color penetrates into the material below the surface and cannot be worn or faded therefrom and when taken from the molds they may be turned and finished in the usual way.

What we claim, and desire to protect by Letters Patent, is—

1. A mold for use in the art of manufacturing variegated composition balls which consists of a tubular casing B divided internally into a number of chambers or sections *d* by thin plates D substantially as described.

2. A mold for use in the art of manufacturing solid articles of ivory substitutes or artificial ivory in variegated colors which consists of the mold A, the tubular casing B provided with holes *b* and divided internally into chambers by the thin plates D and tube E and the small hoppers or chutes C placed outside the casing B substantially as described.

3. In a mold for use in the art of manufacturing solid articles of artificial ivory or ivory substitutes the combination with the mold A of the external casing B provided with holes *b* and divided internally into chambers into which the material is placed, the hopper C by which the material is filled, the cap or cover F provided with holes *f'*, and the plungers G by which the material is pressed down into the mold A while the casing B is removed.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

ALEXANDRE DE PONT.
SILVIUS DE PONT.

Witnesses:
W. O. ROPER,
WILLIAM HENRY LORD.