

June 20, 1944.

R. L. DETJEN

2,352,083

MOLD

Filed May 1, 1941

2 Sheets-Sheet 1

FIG. 2.

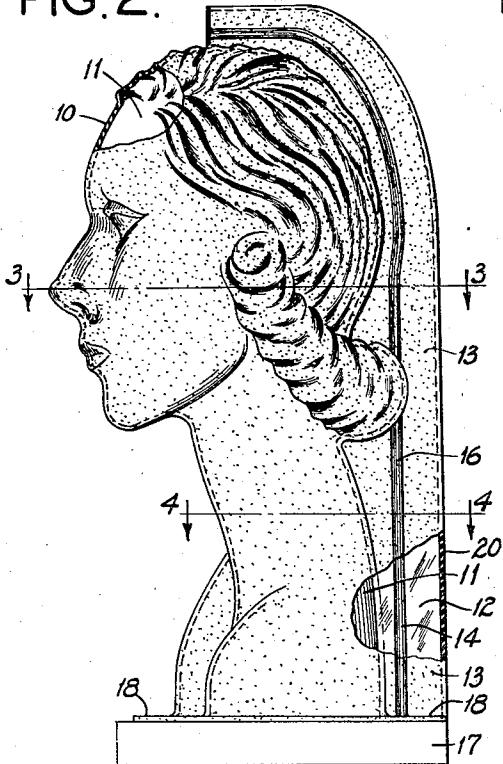


FIG. 1.

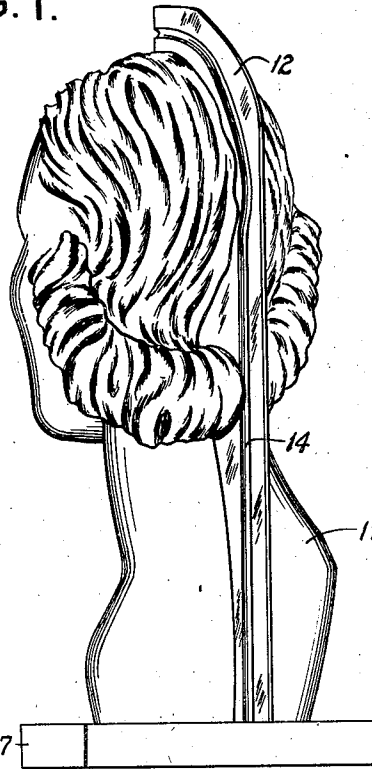


FIG. 3.

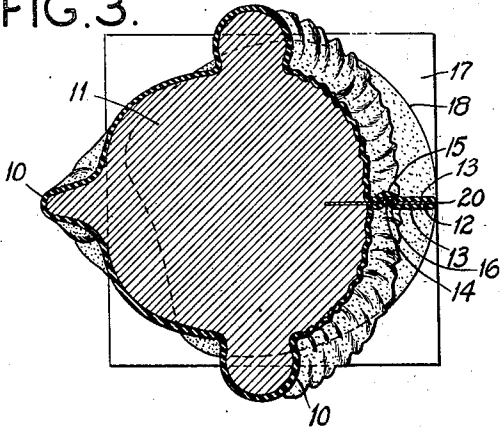
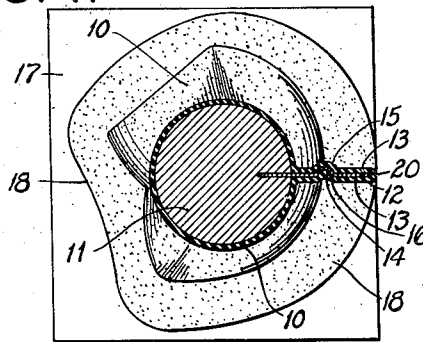


FIG. 4.



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2 Sheets-Sheet 2

FIG. 5.

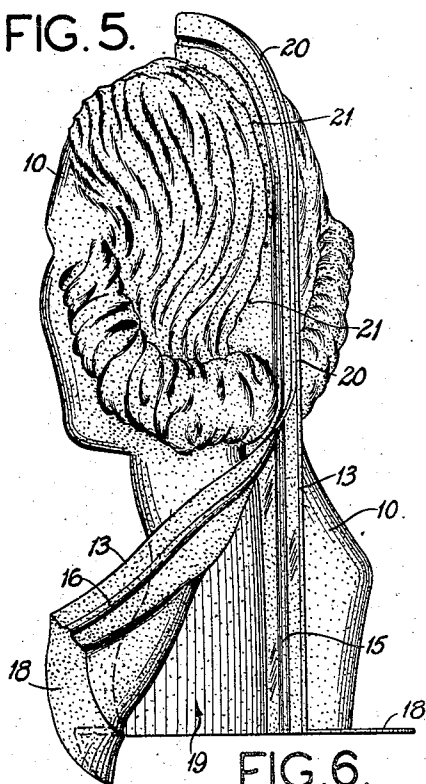


FIG. 8.

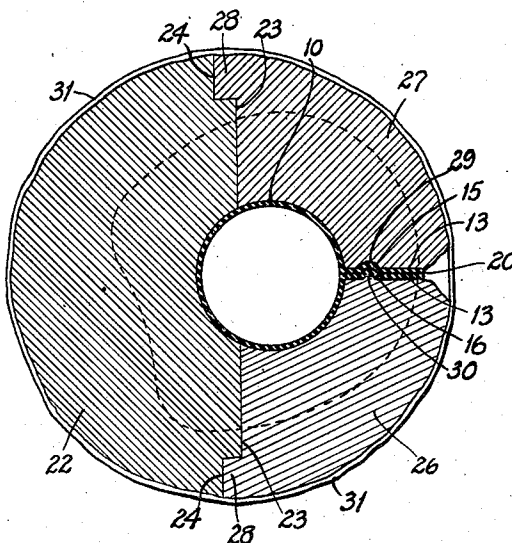


FIG. 6.

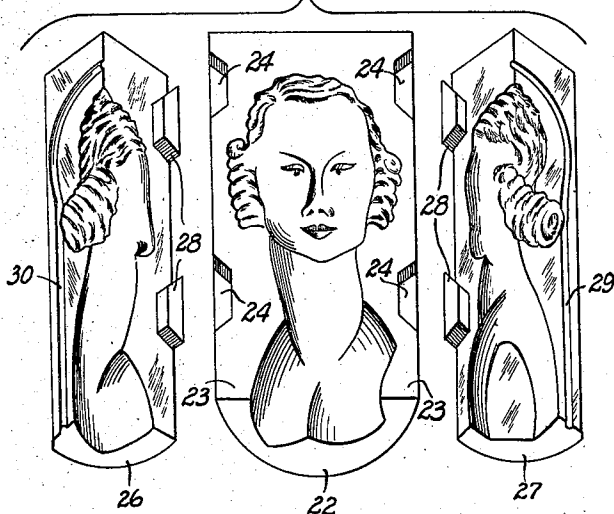
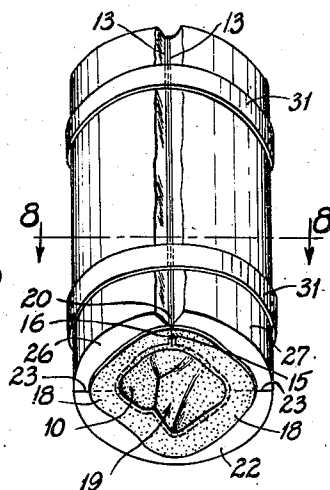


FIG. 7.



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MOLD

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Application May 1, 1941, Serial No. 391,239

3 Claims. (Cl. 18—39)

My invention relates to the art of molding, and more particularly to improvements in molds for casting objects in plaster or other materials having similar molding properties.

The principal object of my invention is to eliminate many of the undesirable conditions and disadvantages attending the use of molds of heretofore prevailing type by the provision of an improved mold which is very durable, being adapted to produce a great number of identical castings without appreciable wear; which is capable of reproducing delicate details of a pattern in the castings, and which retains such details in spite of frequent use.

Other objects are attained in an improved mold which leaves substantially no seam lines or other blemishes on the castings, thereby avoiding the necessity for repairing or "touching up" the castings after they are removed from the mold.

Another advantage of my improved mold is that the split or parting line is not required to be located at any particular wall area—a customary requirement in molds of former type which sometimes results in the formation of a seam in a prominent surface portion of the casting—but may be located so as to subtend a relatively inconspicuous surface portion of the cast object.

Yet another advantage is that the mold of my invention is not adversely affected by heat such as is normally chemically produced in plaster during the hardening process. A plaster casting may be allowed to remain in the mold of my invention until it hardens sufficiently to permit its safe removal.

These and other objects and advantages will appear and be more fully explained in the following description wherein reference is made to the accompanying drawings. In these drawings:

Fig. 1 is a rear elevational view of a pattern or model having certain provisions useful in the formation of a matrix;

Fig. 2 is a side elevational view of the pattern of Fig. 1 with the matrix member of my improved mold thereon;

Figs. 3 and 4 are transverse sectional views taken at lines 3—3 and 4—4 of Fig. 2;

Fig. 5 illustrates the matrix member removed from the pattern;

Fig. 6 is a composite view showing the complementary members of a shell structure used to reinforce the matrix member of Fig. 5 during a molding operation;

Fig. 7 shows the shell and matrix members in assembled relation, and

Fig. 8 is a transverse sectional view taken at line 8—8 of Fig. 7.

Referring now to the drawings by characters of reference, my improved mold comprises a relatively thin-walled, flexible rubber envelope, constituting the matrix, and a rigid, sectionalized shell which is adapted to fit about said matrix to reinforce and hold it in proper shape during a molding operation.

The rubber matrix, shown in Fig. 5 and designated 10, is made on a pattern or model characterized by a thin flange that extends longitudinally of the pattern body and projects a distance of three-fourths of an inch or more therefrom.

In the present example the pattern 11 selected for illustration is a bust such as is employed for millinery display purposes. The flange 12 aforesaid, comprises a strip of sheet metal and extends substantially the full height, at the back of the pattern. It is desirable to install the flange 12 without unduly altering the normal surface contour of the pattern body, and this may be accomplished by producing a saw-cut in the pattern, inserting the flange member to the desired depth, and cementing the flange in place. In most instances it will be advantageous to locate the flange at the least conspicuous side or surface portion of the pattern. As will hereinafter more fully appear, flange 12 provides for the formation of an opening slit in the rubber matrix, and the formation of rubber flanges or lips 13 integral with the matrix, by which the mating edges of the slit are held together, and the opening sealed during a molding operation. A groove 14 or the like in flange 12 produces complementary tongue and groove portions 15 and 16 in the opposed lips 13, which facilitates proper registration and fitting together of the lips.

The body of the pattern is mounted on a base member 17 to give it stability and to provide a surface for the formation of a rubber base flange 18 that skirts the opening 19 through which the mold is adapted to be charged, as will hereinafter more fully appear. The entire pattern, including the flange 12 and the base member 17, is coated with a suitable paint or lacquer to render it substantially impervious to moisture and provide for a uniform surface texture.

The rubber matrix 10 is molded about the pattern by applying successive layers of rubber, in a liquid state, over the entire surface of the pattern body 11, the flange 12 and the upper surface of base member 17, each layer being allowed to set before a subsequent layer is applied. The pattern thusly covered is illustrated in Fig. 2.

The rubber may be applied by brushing or spraying, the latter method being preferred, and a sufficient number of coats is applied to build up a layer or wall thickness of approximately three-sixteenths of an inch. After the last coat has set sufficiently to permit the matrix to be handled, the rubber on the upper surface of the base member 17 is appropriately trimmed to form a base flange of the desired width. Next, a knife cut, indicated at 20, is made in the rubber at the outer edge of flange 12 and extended the full length thereof. This cut permits the rubber lip portion 13 on the opposite sides of flange 12 to be separated, and the layer of rubber to be stripped, or peeled from the pattern. It has been found desirable to remove the matrix from the pattern in this manner before the rubber has completely dried or set, and since the rubber may still be in a somewhat plastic condition great care must be exercised to avoid wrinkling, creasing or otherwise impairing the matrix. After its removal as aforesaid the matrix is placed in a suitable curing or drying atmosphere, wherein it is supported in a suitable manner to prevent it from losing its shape before it has thoroughly cured. Thus, by suspending the matrix by a cord attached to the upper portion of the lips 13, and allowing the base flange 18 to rest on a support, the weight of the matrix will be distributed, avoiding stresses that tend to distort the matrix during the drying process.

The matrix produced by the foregoing method is very pliable, yet has sufficient body that it will retain its proper shape and form when supported as aforesaid. It is quite possible to produce a rubber matrix of such thickness and body that extraneous means to hold it in proper shape are not required. For example, merely by applying a sufficient number of coats of the liquid rubber onto the pattern, a matrix having a wall thickness of one-half inch or more may be produced. Such relatively thick-walled rubber molds are known in the art but have never been satisfactory except, perhaps, for the molding of simple shapes. The chief reason for this resides in the difficulty ordinarily experienced in removing the molded object, without damage thereto, from the rubber mold, such difficulty being increased where a one-piece mold is employed. I have determined that the most satisfactory method of separating the mold from the object cast therein is to "peel" the mold from the object. This, of course, cannot readily and satisfactorily be accomplished unless the rubber mold is relatively thin and highly flexible. Accordingly the rubber matrix of my invention has these characteristics, the wall being readily adapted to be doubled back upon itself as would normally occur when peeling the matrix from a casting.

It will be understood that a rubber matrix having the physical characteristics above described will not, of itself, have sufficient "body" or stiffness to maintain its proper or normal shape, and to impart the same to a mass of plastic material introduced therein. Therefore reinforcing means in the form of rigid shell sections are used in conjunction with the described matrix.

To form these shell sections the rubber matrix is used as a pattern and the material from which the shell is to be formed, plaster being suitable, is cast in place about the matrix. To facilitate holding the matrix in proper shape during its use as a pattern, as aforesaid, the edges along the seam at the base of the lips 13 are secured

together by stitching, indicated at 21 (Fig. 5). It should be understood that such stitching is merely a temporary expedient, the stitches being removed after the matrix has served its purpose as a pattern during the formation of the backing shell. The matrix is supported in a manner most conducive to maintaining it in proper shape and form, as by supporting it from above and below, and then plaster in a thin, watery state is applied, as by splashing the same on the matrix, to cover the surface thereof. The plaster is allowed to dry, producing a thin initial coat. Several additional coats of thin plaster are applied and allowed to harden, whereafter a layer of thick plaster may be applied. Suitable reinforcing means, such as sheets of burlap, are introduced between layers of thick plaster.

In this manner a thick-walled section 22 of hard plaster is formed on the frontal surface of the matrix. The opposite side edges 43 of the shell section are suitably trimmed to render them smooth and regular. Key recesses 24 are cut into edge surfaces of the front section, and the entire edge surfaces are coated with a thin film of grease. The shell sections 26 and 27 are prepared in the manner above described, by first splashing watery plaster on the exposed matrix surfaces to produce a thin shell, then increasing the thickness of the shell sections by subsequent layers of plaster and burlap. The thin film of grease on the edge surfaces 23 of section 22 prevent coalescence thereof with the subsequently formed sections 26 and 27 which are formed with projections or keys 28 that fit the recesses 24 of section 22 formed thereon.

The sections 26 and 27 are separated from each other by the rubber flange formed by the matrix lips 13. Complementary groove and ridge formations 29 and 30 are produced on the opposite edge surfaces of the sections 26 and 27 by the corresponding formations 15 and 16 on the lips 13 of the matrix, and these formations, together with the key projections 28 and recesses 24 assure a proper fitting together of the shell sections 45 and proper positioning of the matrix in the shell assembly.

In using the mold of my invention the rubber matrix is immersed in water and then installed in the outer shell, the assembly being illustrated in Fig. 7. The shell sections are held in assembled relation about the matrix by means of rubber bands 31, or other suitable binding means. It will be observed that the matrix lips 13 are tightly compressed together between the opposite surfaces of the sections 26 and 27 so that only the merest outline of the seam will be manifest on the casting. The matrix base flange 18 at the open end of the mold prevents plaster or other material from entering the crevice between the matrix and shell sections when the mold is being charged. As is customary in the casting of plaster objects, plaster in a thin, semi-liquid state is first introduced into the mold cavity and suitably distributed so that the entire inner surface of the matrix is coated. After this initial layer has set sufficiently, additional plaster is introduced to produce either a solid casting, or a hollow one of desired wall thickness. After a suitable interval to allow the plaster to harden, the rubber bands 31 are removed and the shell sections 22, 26 and 27 are lifted away from the casting and matrix member which envelops it. As has been previously mentioned, removal of the matrix is accomplished by opening the seam at the lip portions 13, then literally

peeling the matrix from the casting, starting at the seam line. In this manner the casting may be easily removed from the mold in perfect condition. The matrix is immersed in water to remove all traces of plaster and then is ready to be installed in the shells for subsequent use.

An important advantage of the mold of my invention over the glue and gelatine molds currently in widespread use is that with molds of the latter type it is desirable, and in some cases imperative, that the plaster castings be removed before they have hardened sufficiently to permit them to be handled without danger of breakage. Thus, the heat produced by the plaster, which is exothermic during the setting process, is likely to impair a glue or gelatine mold. Such however is not the case with the rubber matrix, or mold lining of my invention. The cast object may and desirably is left in the said matrix until it has hardened beyond the stage of fragility.

What I claim and desire to secure by Letters Patent is:

1. In a molding device, a matrix comprising a uniformly thin-walled, hollow, elastic body having an opening slit in a wall portion thereof, a rigid casing for said matrix, said casing having

portions adapted to grip the matrix at the edges of said slit to maintain said slit in sealed condition during a molding operation.

2. In a molding device, a matrix comprising a relatively thin-walled, hollow, pliable body formed of elastic material, said matrix having a slit in a wall portion thereof, outwardly projecting lips formed integrally of said body at opposite sides of said slit, a casing having a cavity adapted snugly to receive said matrix and hold the same in a rigid state during a molding process, said casing having opposed surface portions between which said lips are adapted to be clamped together to seal said slit.

3. In a mold, a matrix comprising a hollow, integral thin-walled elastic body having a slit therein, outwardly projecting lips formed on said matrix, along the opposite edges of said slit, a rigid, sectionalized shell structure adapted snugly to receive said matrix to prevent flexion of the matrix during a molding operation, and means for holding said shell sections in assembled relation about said matrix, and with said matrix lips tightly clamped together between opposite edges of adjacent shell sections.

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