S. BECKER.

ART OF MOLDING.

APPLICATION FILED JULY 29, 1921.

1,401,577. Patented Dec. 27, 1921.

2 SHEETS—SHEET 1.

Fig. 1.

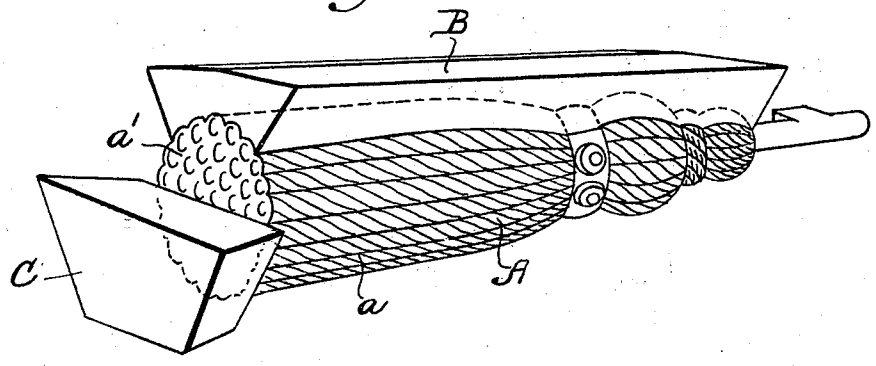


Fig. 2.

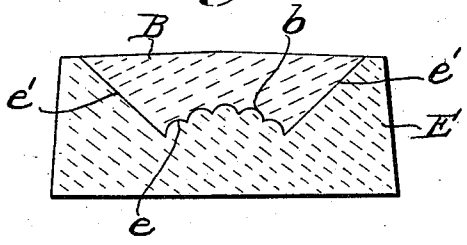


Fig. 3.

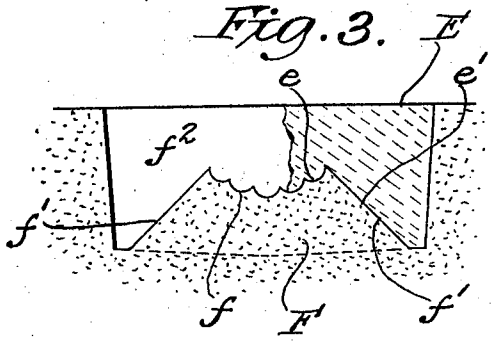


Fig. 4.

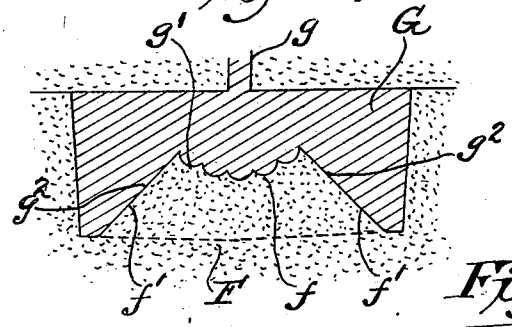


Fig. 5.

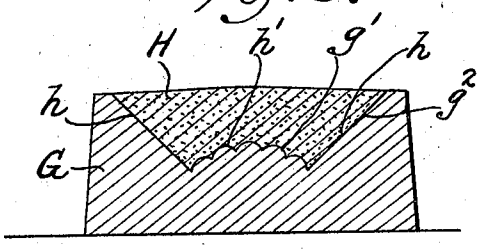
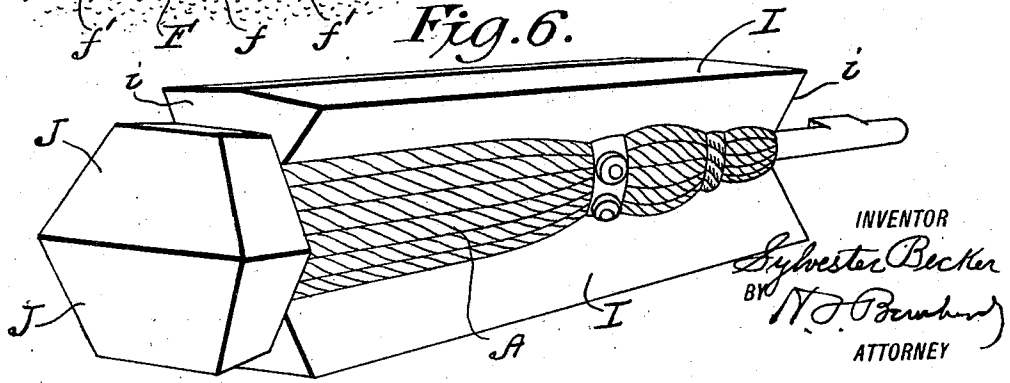


Fig. 6.



INVENTOR

Sylvester Becker

BY

ATTORNEY

S. BECKER.

ART OF MOLDING.

APPLICATION FILED JULY 29, 1921.

1,401,577. Patented Dec. 27, 1921.

2 SHEETS—SHEET 2.

Fig. 6a.

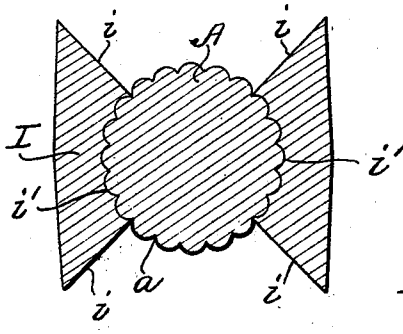


Fig. 7.

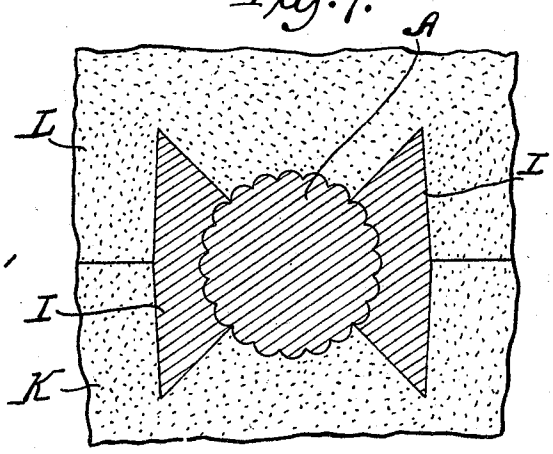


Fig. 9.

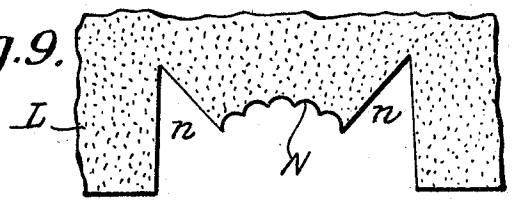
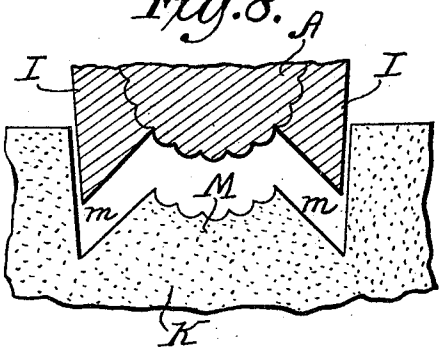
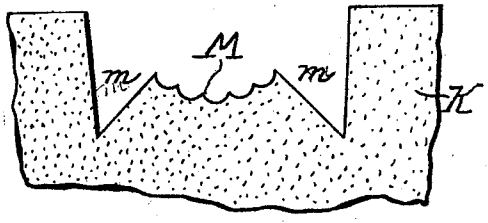


Fig. 8.





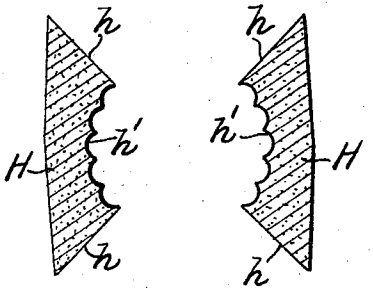


Fig. 10.

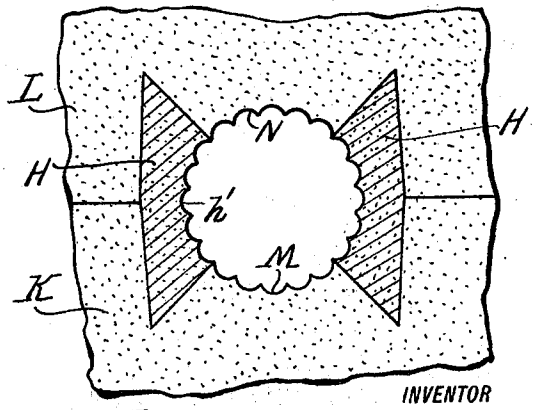


Fig. 11.

INVENTOR

Sylvester Becker

BY

N. J. Bernberg

ATTORNEY

UNITED STATES PATENT OFFICE.

SYLVESTER BECKER, OF RUTHERFORD, NEW JERSEY, ASSIGNOR TO STERLING BRONZE COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

ART OF MOLDING.

1,401,577. Specification of Letters Patent. Patented Dec. 27, 1921.

Application filed July 29, 1921. Serial No. 488,284.

To all whom it may concern:

Be it known that I, SYLVESTER BECKER, a citizen of the United States, residing at Rutherford, county of Bergen, State of New Jersey, have invented a certain new and useful Art of Molding, of which the following is a specification.

This invention pertains to the art of molding preparatory to casting, the same being directed, more particularly, to the formation of the molding material, such as sand, for casting articles the surfaces of which are recessed or set in.

In the formation of the molding sand within the drag and cope of a flask, a pattern of the object to be cast is usually pressed into the sand; but owing to the recessed or set in formation of the surface of the pattern, said surface being more or less in intaglio, it is difficult, if not impossible, to withdraw the pattern from the sand without breaking down the walls of the molded sand. This difficulty has heretofore been overcome by the use of false cores, requiring the services of a skilled workman, known as false core workers, but molders have not been able to utilize to good advantage the false cores in molding the sand, the result being the production of false molds involving the loss of time and labor and greatly decreased production.

The object of my invention is the formation of molds rapidly, economically and accurately without resorting to skilled labor, such molds being especially adapted for the production of cast objects with the surfaces more or less in intaglio. By my procedure, the production of false molds is done away with, and castings are made rapidly and accurately from molds the sand of which is formed in accordance with my invention.

Briefly stated, the invention consists in stopping out certain selected areas of a pattern the surface of which is more or less in intaglio by attaching to said pattern at the selected areas false members the external form or contour of which is such that the pattern and the attached false pieces are withdrawable easily from the molded sand without breaking down the walls of the sand; thereafter molding the pattern with the attached members in sand present in the cope and drag of a flask, and subsequently withdrawing the pattern and its attached parts from the sand, the effect of which is to impart the desired formation to the sand in contact with the exposed areas of the pattern in the cope and drag and, also, to produce spaces or recesses in the sand of the cope and drag next to the formed up walls of the mold; producing core prints conforming to the stopped out areas of the pattern, and thereafter assembling said core prints within the recesses or spaces molded in the sand by the stopping out members attached to the pattern, said inserted core prints being in register with the previously molded areas of the sand and the whole producing a mold cavity of the desired formation whereby the casting may be produced.

The invention includes, also, a novel procedure for producing the false pattern member and the core print, either or both, comprising the making of a cast in plastic material from each stopped out area or section of the pattern, thereafter producing from said cast a core box in plastic material such as plaster of Paris, molding in sand a matrix from the core box, producing a metal core box from the sand mold, utilizing the metal core box for molding in sand a matrix from which the false pattern member is cast so that the same will register with the area or section of the pattern to be stopped out, and molding from the metal core box a core print in sand, the molded sand core print being treated as by baking the same so as to render it available for use as a part or parts of the mold cavity from which the object is to be cast.

Other functions and advantages of the invention will appear from the following description taken in connection with the drawings, wherein—

Figure 1 is a perspective view of a pattern of any desired form with a surface in intaglio, more or less, and illustrating casts in plastic material from two definite areas or sections of the surface thereof.

Fig. 2 is a vertical cross section of the plaster cast for molding in plastic material a plaster core box.

Fig. 3 is a vertical cross section through a portion of the plastic core box illustrating the operation of molding in sand a matrix for casting the metal core box.

Fig. 4 is a vertical cross section of the procedure for casting a metal core box from the matrix of Fig. 3.

Fig. 5 is a vertical cross section through

the metal core box and showing a core print molded therein.

Fig. 6 is a perspective view of a pattern with four false members attached thereto for stopping out definite areas or surfaces of said pattern, leaving other areas or sections exposed for molding sand in the cope and drag of the flask according to said exposed pattern areas.

Fig. 6ª is a cross section through the pattern of Fig. 6 with two false members attached to the respective side surfaces thereof.

Fig. 7 is a vertical cross section of the pattern incased by sand in the cope and drag of the flask.

Fig. 8 is a vertical section through a part of the pattern and a part of the molded sand in the drag, showing the pattern partially withdrawn from the sand.

Fig. 9 is a vertical cross section through the sand in the drag and cope, the latter being separated.

Fig. 10 are vertical cross sections through the core prints produced from metal core boxes of the character shown in Fig. 5, and

Fig. 11 is a vertical cross section through the sand in the drag and cope with the core prints assembled in register with the molded sand for completing the mold cavity.

A is the pattern prior to the attachment of the false members (one or more) for molding the sand. As shown in Fig. 1, the pattern is provided with recesses or is undercut at *a* in its longitudinal surface and at *a'* in one of its end faces, said surface or surfaces of the pattern being more or less in intaglio and the character of which surfaces makes it impracticable to produce a matrix or mold cavity in sand for the reason that said pattern after the molding operation cannot be withdrawn from the sand without breaking down or distorting the surfaces of the matrix or mold cavity. The pattern selected for illustrating is a curtain-cord tassel supposed to be composed of cord strands assembled in contacting order and producing a multiplicity of recesses *a a'*; but, obviously, any other kind of pattern may be employed with a recessed or intaglio surface, the contour of which may be of such intricate design as to render it impossible to mold in sand without resorting to the common practice of utilizing false core prints.

As a step preliminary to the operation of stopping out definite areas or sections of the surface of the pattern and the attachment to said pattern of the false members so that the pattern used for molding presents the appearance of the composite pattern of Fig. 6, I proceed to obtain a cast in plastic material from each area or section of the pattern to be stopped out, Fig. 1 showing the procedure for making a plaster cast from a definite side part of the pattern and another plaster cast from a definite end part of the pattern, although it is proper to explain that in the form of pattern shown at A there are produced from plaster casts two from opposite side surfaces of the pattern and two from one end face thereof. To make the plaster cast, a definite section or area of the pattern is covered to a desired thickness with plastic material, such as plaster of Paris, as indicated at B C, applied to a part of the side surface at B and a part of the end surface at C. The material of each plaster cast while in a plastic condition conforms accurately to the surface of the pattern, and when hardened such material produces a plaster cast of a desired form both longitudinally and in cross section, it being usual to impart a tapering or wedge shaped cross section to the plaster cast. Of course, it is apparent that I may use any plastic self-hardening material in lieu of plaster of Paris.

The desired number of plaster casts having been obtained from the areas or sections (two or more) to be stopped out in the pattern, it is next in order to obtain from each cast B or C a plaster core box as at E in Fig. 2. This step involves the placing of the matrix face *b* of the plaster cast face downward in plastic material E, such as plaster of Paris, shown in Fig. 2, the result being the production of the plaster core box E and with a mold cavity the bottom of which is a matrix surface *e* and the side walls of which mold cavity are inclined at *e'* in upwardly diverging relation. The plaster core box E is employed for molding a matrix in sand at F, see Fig. 3, said matrix having a surface *f* reversed to the surface of the pattern and the plaster core box E and the sides *f'* of the molded matrix being inclined. Said plaster core box E when pressed into the sand produces a molding cavity f^2 the bottom surface of which is bounded by matrix F and inclined walls *f'*, and into said cavity molten metal is introduced through the gate *g* so as to cast a metal core box G, see Fig. 4. This core box has parallel sides and a flat top the under surface of said core box producing a matrix *g'* conforming to the pattern and bounded by inclined sides g^2 so related to the matrix surface as to produce a mold cavity of a desired depth, width and length, the side walls of said cavity converging toward the matrix surface. Said core box G is employed for producing a core print H of sand, to which end the proper molding sand is deposited in the box, compacted and leveled, the resulting product being a sand core print the sides of which are beveled at *h* and one surface *h'* of which is a matrix corresponding to the stopped out

area of the pattern but reversed thereto. It will, of course, be understood that the proper number of core prints are made in accordance with the stopped out areas or sections of the pattern, and that said core prints are assembled as hereinafter described in the required relation to the molded sand in the flask.

The areas or sections on the surface of pattern A are covered, concealed, or stopped out by parts which for convenience in designating them are referred to as false members or parts, four of which are shown at I J in Fig. 6. These false parts are composed of any material suitable for the purpose, but for stability in handling the pattern, Fig. 6, it is preferred to cast the false members in order that they may conform accurately to the stopped out areas and be attached fixedly to the pattern, said false parts being usually wedge shaped in cross section in order that said parts with the pattern may be withdrawn easily from the sand after molding the mold cavity therein. Each false part is produced usually by making a plaster cast as B or C, from which is ultimately produced a mold cavity similar to the mold cavity g' g^2 of the metal core box G so that the false member I or J may be cast in the required form and dimensions; *i. e.* the part I is formed with inclined sides *i* converging toward a matrix surface *i'*, see Figs. 6, 6ª, 7 and 8, whereas part I has inclined sides *j* and a matrix surface (not shown) conforming to the end surface of the pattern, see Fig. 1. The false parts I J having been cast or otherwise formed, they are placed into contact with the pattern at the sections or areas to be covered, concealed or stopped out, leaving other sections or areas of the pattern exposed, as shown in Figs. 6, 6ª, 7 and 8. Said false parts are suitably attached to the pattern, and constitute parts thereof for molding recesses in the sand, which recesses are occupied by the core prints for completing the mold cavity.

The core prints, such as H, having been prepared from the metal core boxes G, and other core prints having been prepared in the manner described so as to produce core prints of the end face of the pattern covered by parts J, and false parts I J having been prepared and cast and attached to the pattern so as to cover certain areas and leave other areas of the pattern exposed, I now proceed to mold in sand as follows:—The cope and drag of a flask is charged with sand as usual, and the pattern A with false members I J attached thereto is positioned in the sand crosswise of the meeting line of the masses K L in the drag and cope, respectively, see Fig. 7. The sand is thus molded to conform to the exposed surfaces of the pattern and to the external contour of the false pieces, and upon opening the flask, or separating the sand L in the cope from the sand K in the drag, the resulting mold space is characterized by molded surfaces or matrices M N in the drag and cope, respectively, which matrices conform to the exposed surfaces of pattern A, and the sand in cope and drag, furthermore, is molded to produce recesses *m*, *n*, adjacent matrices M N, respectively, which recesses *m*, *n*, conform to the external contour of the false pieces I, it being apparent that false pieces J of pattern A in Fig. 6 produce other recesses (not shown) in the sand of cope and drag. The tapering form of the recesses *m*, *n*, produced in the sand by the false pieces attached to the pattern enables the cope to be separated from the drag, and the pattern to be withdrawn from the sand without disturbing the molded surfaces; *i. e.* breaking down the walls of the mold cavity, a most important function in molding for intricate castings. The flask having been opened and the pattern withdrawn, the operator proceeds to assemble the core prints H by placing them in the recesses *m* so that they will extend, upon reassembling the cope with the drag, into the recesses *n* of the cope, said core prints being in matching relation to or in register with the matrices M N so as to produce a complete mold cavity for casting the object in the desired form. It is obvious that the metal is poured as usual in casting the object.

The means and procedure employed in carrying out my invention enables the formation of molds in sand to be performed rapidly and economically and by utilizing the services of unskilled labor, the resulting molds conforming accurately to the pattern. Workmen of ordinary intelligence can perform the operations required, and the procedure is so easily followed as to minimize the formation of the so-called "false molds," the mold being so rapidly and accurately produced from the use of the pattern A with false members that the process of casting can be carried on rapidly, particularly in the production of objects the surfaces of which are most irregular or of intricate design.

Having thus fully described the invention, what I claim as new and desire to secure by Letters Patent is:

1. In the art of molding, the process which consists in stopping out a definite area of a pattern provided with a recessed surface by attaching to said pattern a member which covers the selected area, preparing a core print of the stopped out area on the pattern, producing in sand a matrix conforming to the exposed area of the pattern and a recess or space following the external contour of the attached member, and assembling the core print with the molded sand by depositing said core print in the recess or

space so that the matrix surface of the core print is in register with the matrix produced in the molded sand.

2. In the art of molding, the process which consists in making a core print with a matrix the surface of which conforms to the contour of a definite area of a pattern, stopping out the selected definite area of the pattern by covering the same with a member, leaving the remaining surface of said pattern exposed, molding in sand a matrix with recesses adjacent thereto by compacting the sand into contact with the exposed surfaces of the pattern and the attached member; withdrawing the pattern and its attached member from the molded sand, and placing core prints in the recesses of the molded sand for the matrices of said core prints to be in register with the matrix in the molded sand to complete the mold cavity.

3. In the art of molding, the process which consists in preparing a core print with a matrix conforming to the contour of a definite area of a pattern, stopping out the definite selected area of the pattern by covering the same with a member the external contour of which is such as to facilitate the withdrawal of the pattern from molded sand, placing the pattern with its partial covering member in sand, molding in sand a matrix the surfaces of which conform partly to the exposed surfaces of the pattern and partly to the contour of the stopping out member attached to said pattern, withdrawing the pattern and its attached member from the sand, and assembling the core print by depositing the same in the spaces formed by the stopping out member so that the matrix of the core print is in register with the matrix produced in sand by the exposed surfaces of the pattern.

4. In the art of molding, the process which consists in preparing a plurality of core prints with matrices conforming to definite selected areas of a pattern, stopping out the selected areas of a pattern by covering the same with members attached to said pattern so as to leave other areas of said pattern exposed, molding in sand and from the pattern a matrix the surfaces of which conform partly to the exposed areas of the pattern and partly to the contour of the stopping out members, withdrawing the pattern and the attached members from the molded sand, and assembling the core prints for the matrices thereof to register with the matrices following the exposed surfaces of the pattern.

5. In the art of molding, the process which consists in preparing a core print with a matrix conforming to a definite area of a pattern, stopping out the selected area of the pattern by attaching to the pattern a member which covers the selected area, said attached member being of tapering form in cross section, molding in sand and from the pattern a matrix which conforms partly to the exposed surface of the pattern and partly to the tapering cross section of the member attached to the pattern, and assembling the core print to occupy that section of the matrix in sand following the contour of the stopping out member and for the matrix of the core print to register with that part of the sand matrix conforming to the exposed surface of the pattern.

6. In the art of molding, the process which consists in obtaining a cast in plastic material from a definite selected area of a pattern, producing a core box with a matrix conforming to the contour of the selected area of the pattern, making a core print from said core box, molding in sand from the pattern a matrix, and assembling the core print into register with said matrix.

7. In the art of molding, the process which consists in obtaining a cast in plastic material from a definite selected area of a pattern, producing a core box with a matrix conforming to the contour of the selected area of the pattern, making from the core box a core print provided with a matrix the surface of which conforms to the selected definite area of the pattern, stopping out the definite selected area of the pattern by covering the same with an attached member, placing the pattern with its attached member in sand and molding therein a matrix conforming partly to the exposed surface of the pattern, withdrawing the pattern and its attached member from the molded sand, and assembling the core print within the molded sand for the matrix of said core print to register with the sand matrix which conforms to the exposed area of the pattern.

In testimony whereof I have hereto signed my name this 23 day of June, 1921.

SYLVESTER BECKER.