

J. H. DANVER & W. H. LOSE.  
METHOD OF FORMING PATTERNS FOR HOLLOW CAST WARE.  
APPLICATION FILED DEC. 24, 1908.

925,306.

Patented June 15, 1909.

Fig. 1.

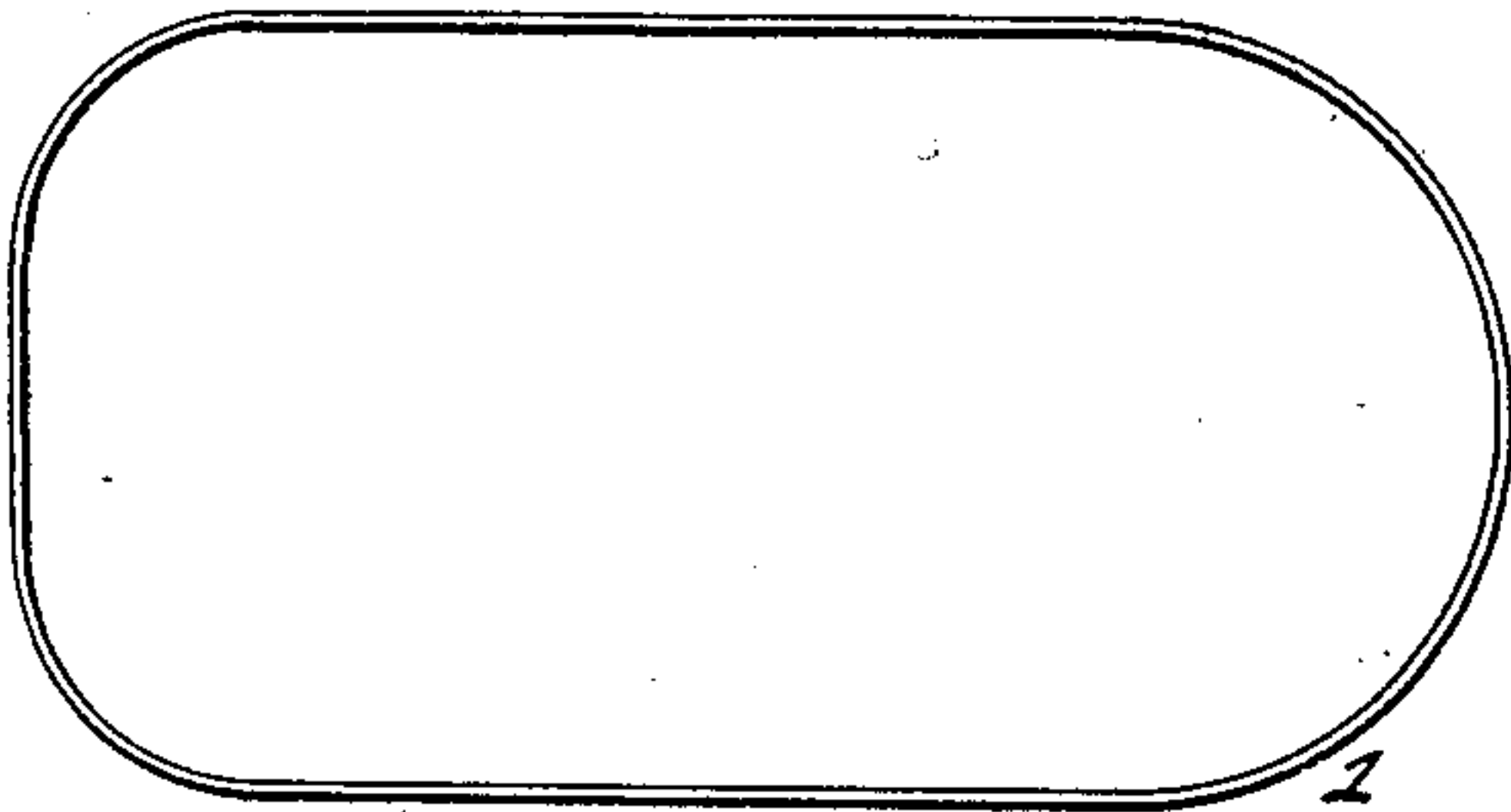


Fig. 1<sup>a</sup>.

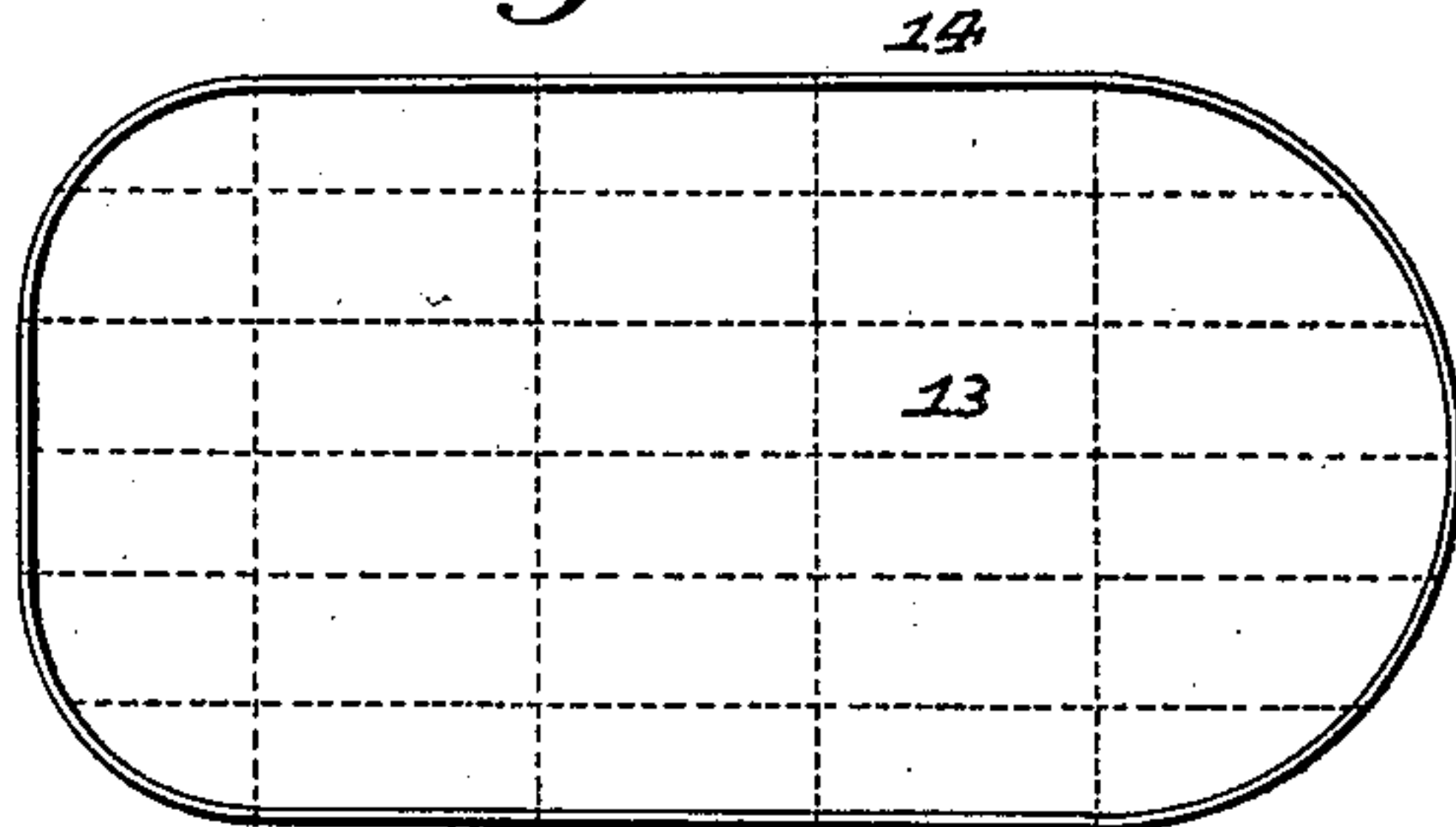


Fig. 2.

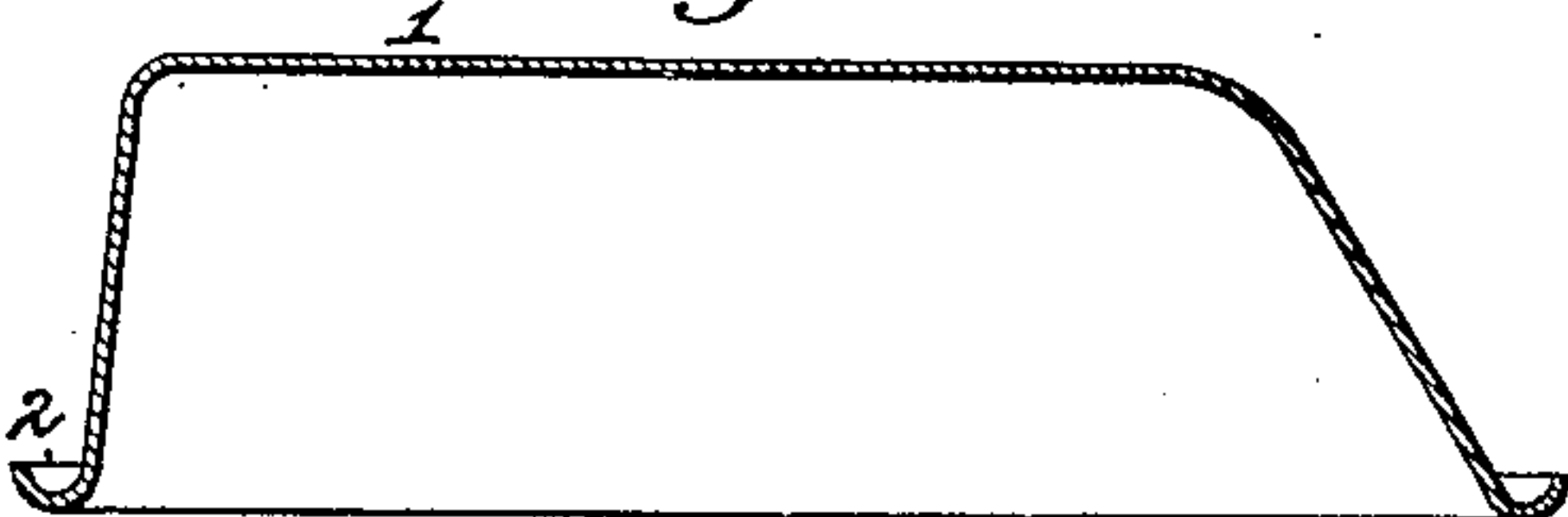


Fig. 2<sup>a</sup>.

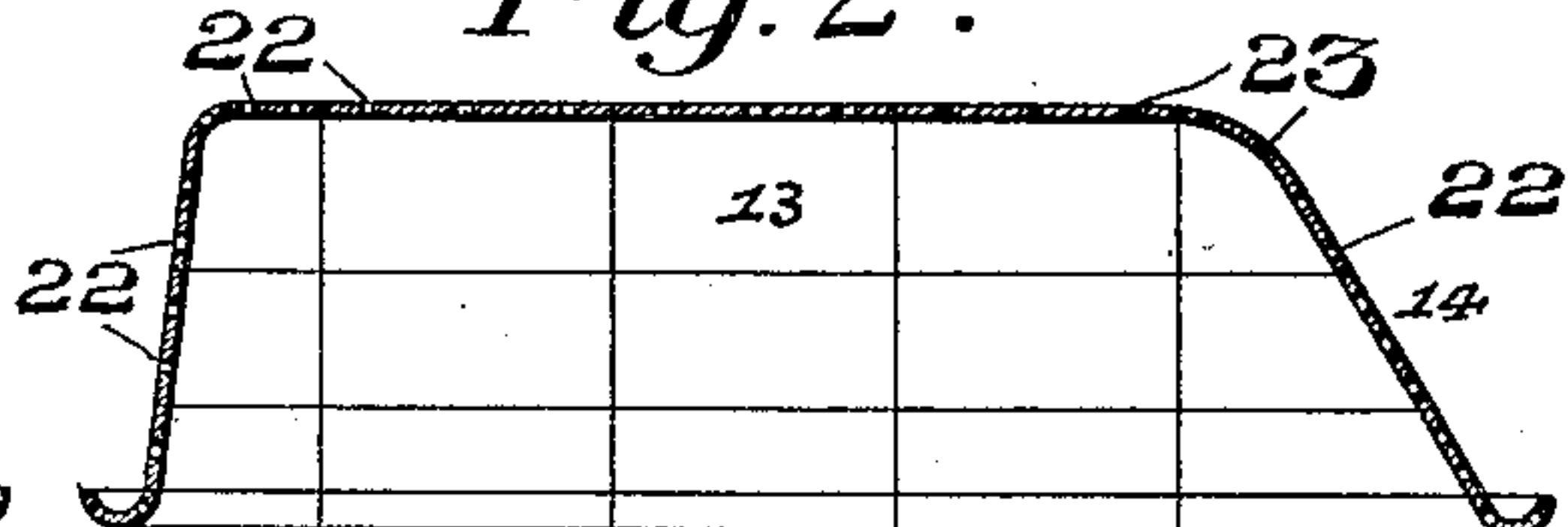


Fig. 3.

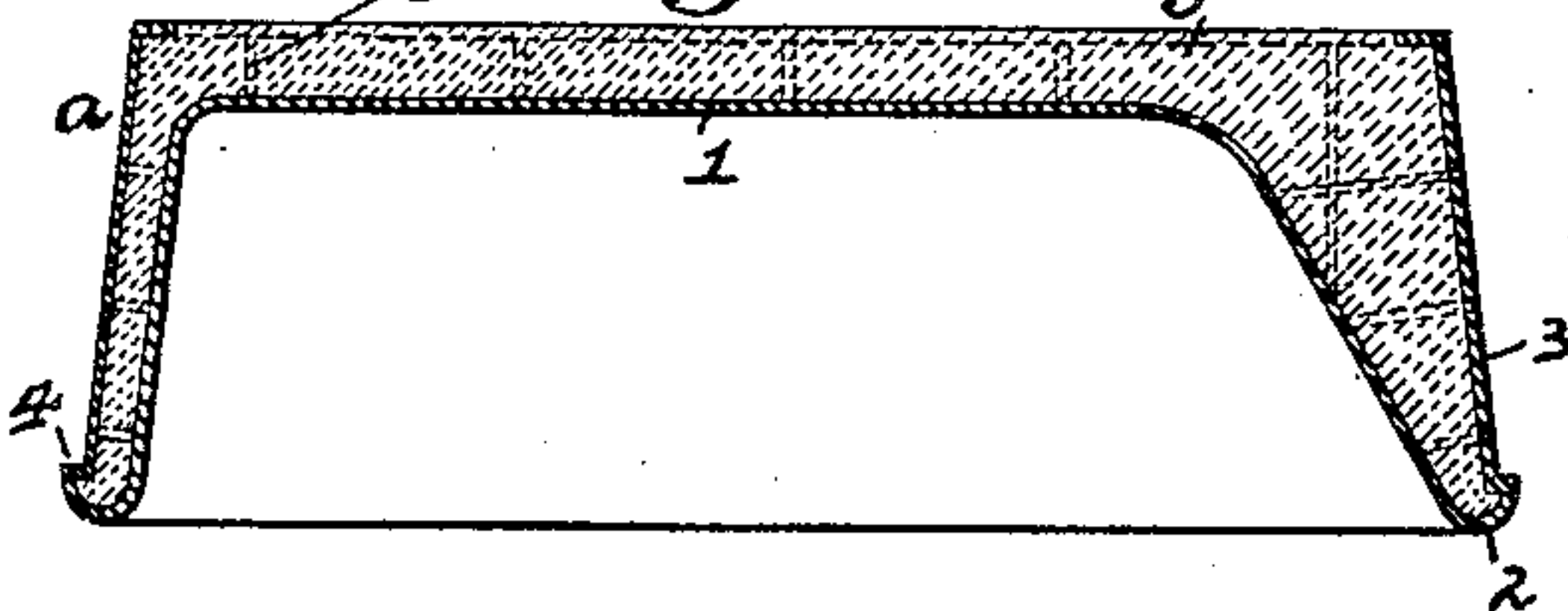


Fig. 3<sup>a</sup>.

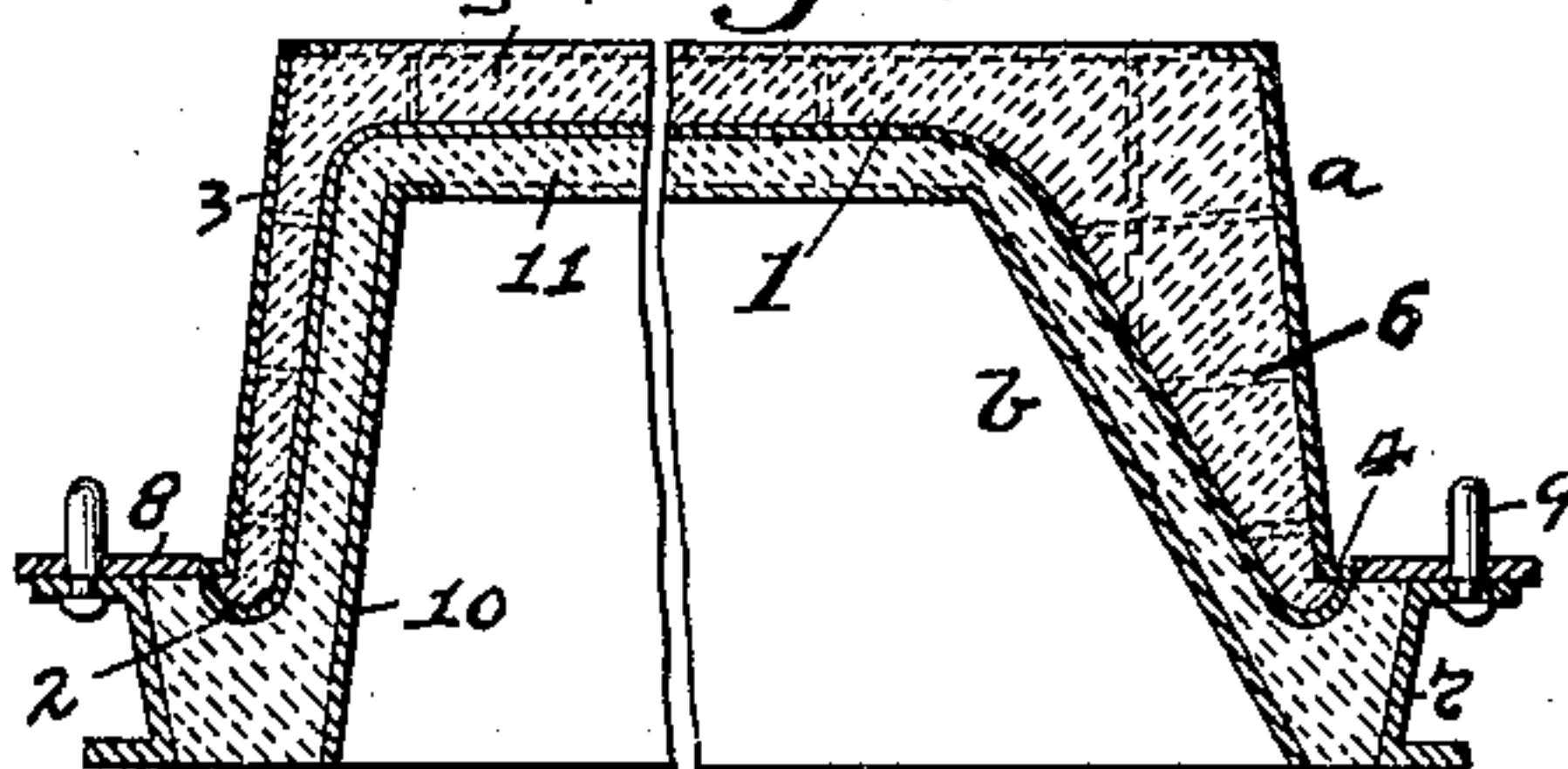


Fig. 4.

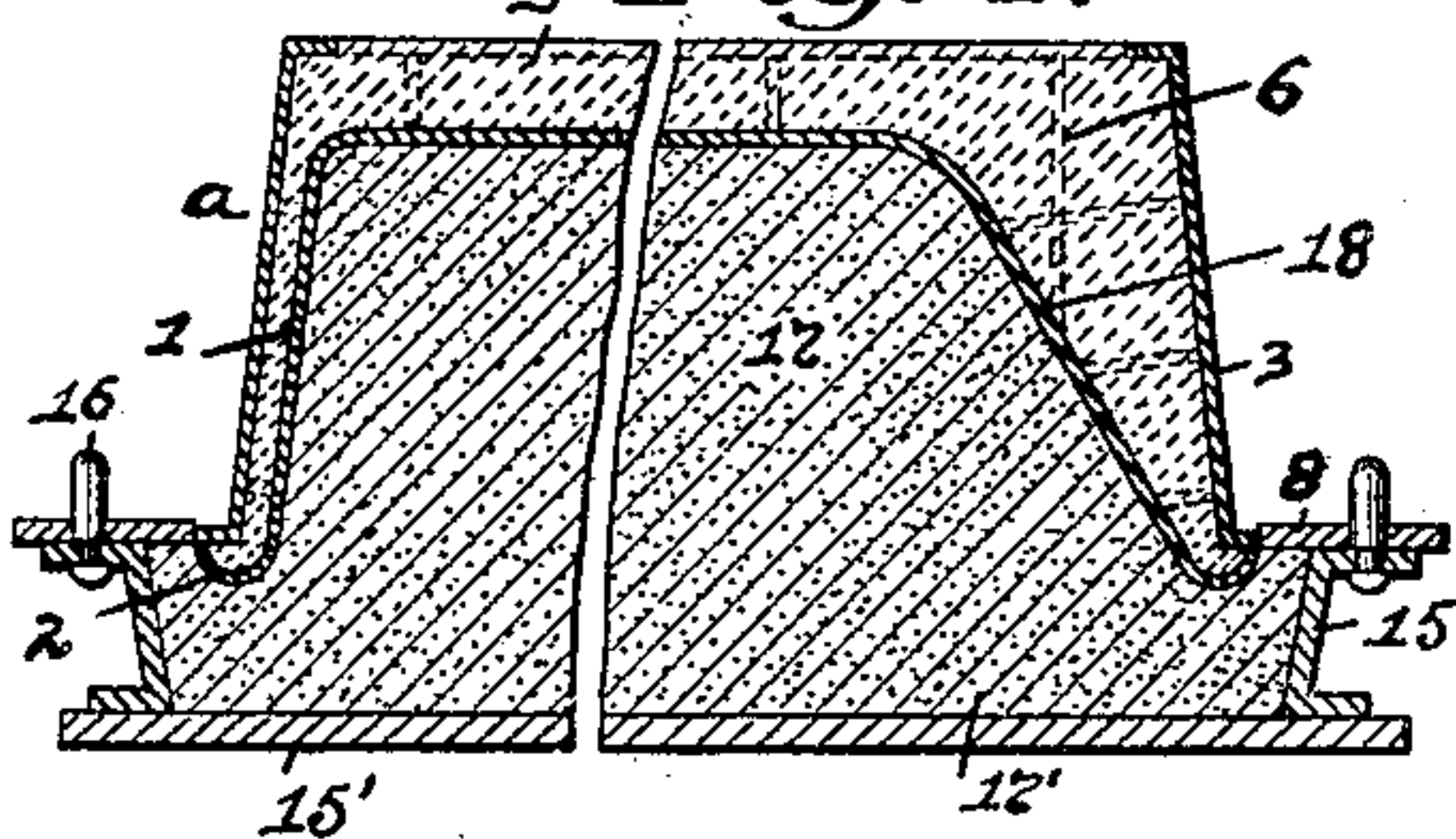


Fig. 3<sup>b</sup>.

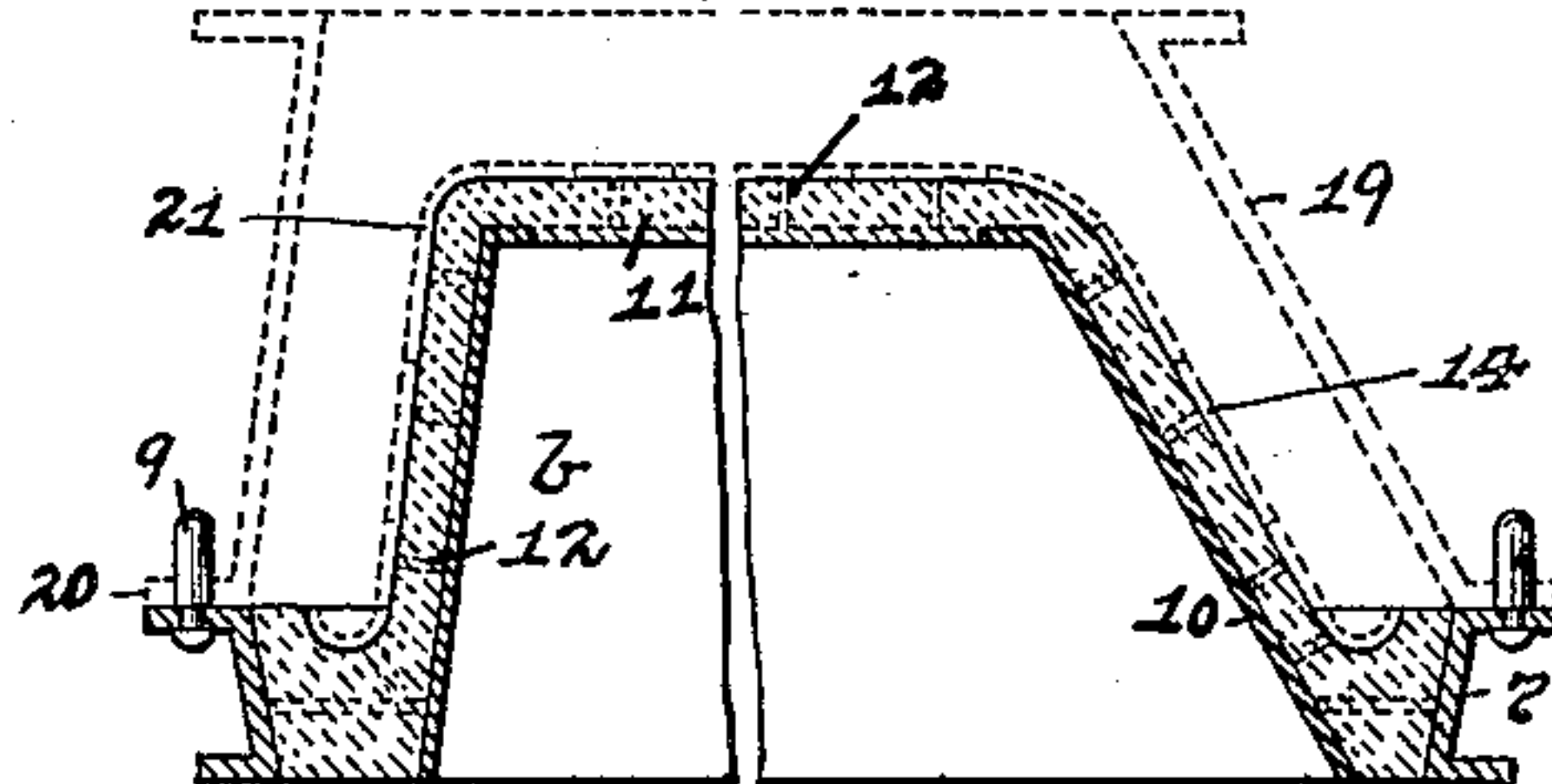


Fig. 6.

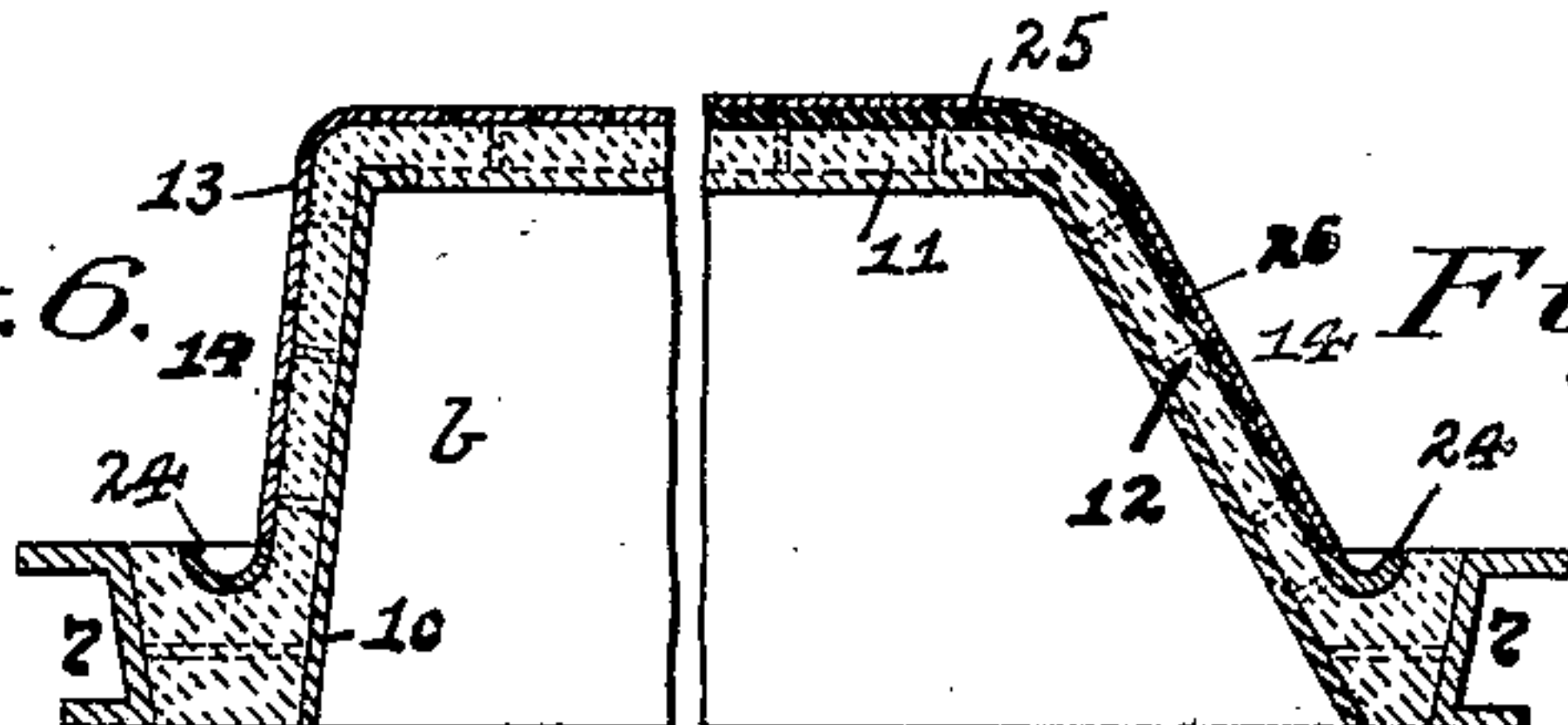
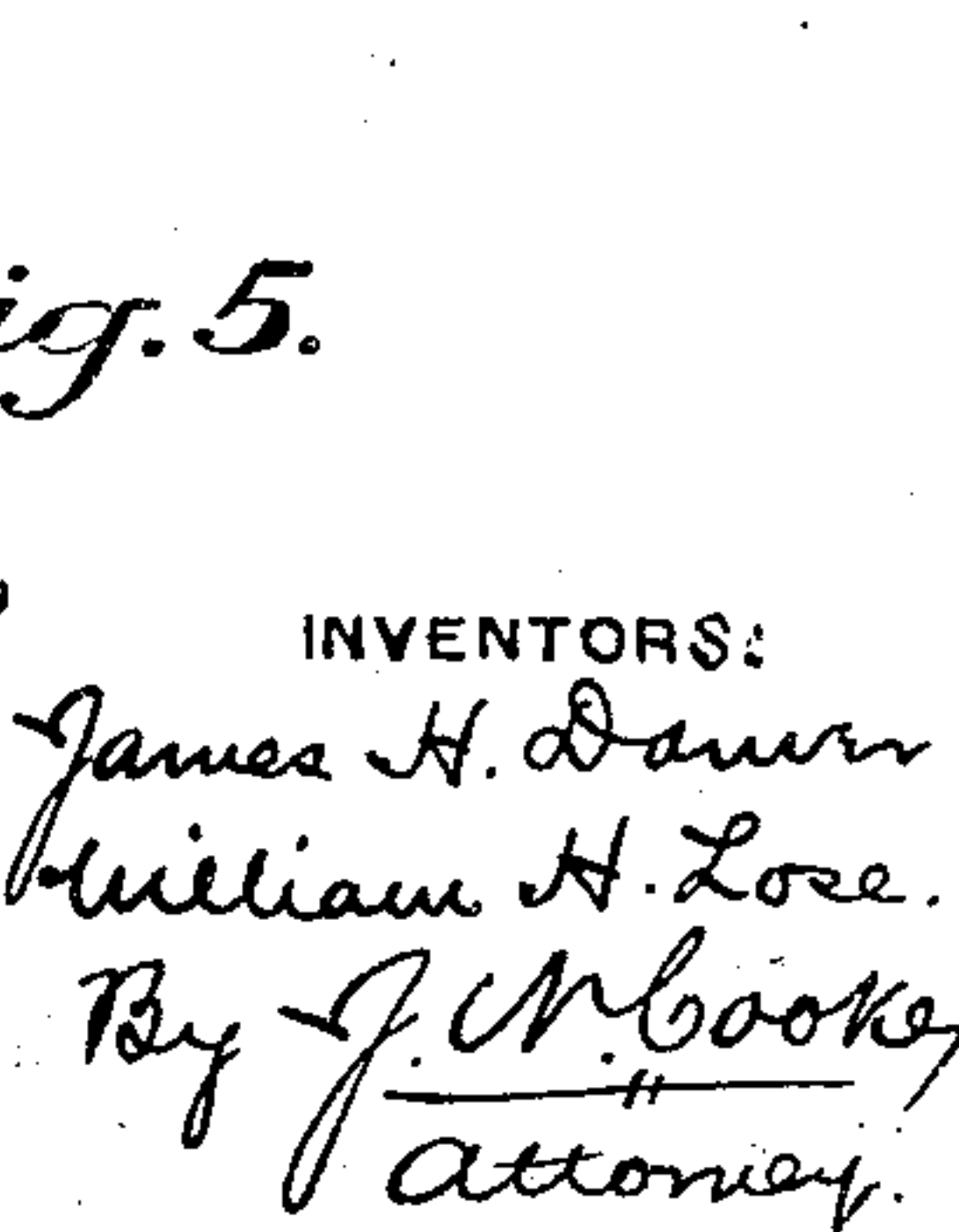


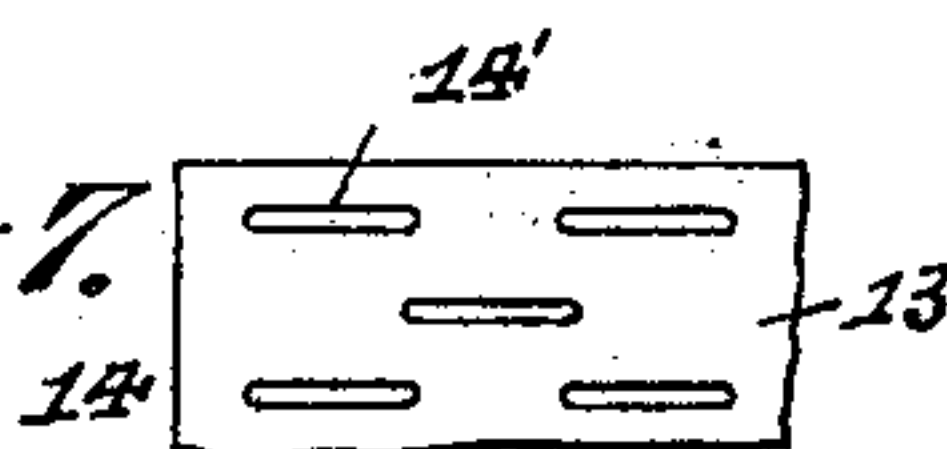
Fig. 5.



WITNESSES

Walter Farniss

O. L. Thompson, Fig. 7.



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# UNITED STATES PATENT OFFICE.

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## METHOD OF FORMING PATTERNS FOR HOLLOW CAST WARE.

No. 925,306.

Specification of Letters Patent.

Patented June 15, 1909.

Application filed December 24, 1908. Serial No. 469,157.

*To all whom it may concern:*

Be it known that we, JAMES H. DANVER and WILLIAM H. LOSE, residents of Beaver and Zelenople, respectively, in the counties of Beaver and Butler, respectively, and State of Pennsylvania, have invented a new and useful Improvement in Methods of Forming Patterns for Hollow Cast Ware; and we do hereby declare the following to be a full, clear, and exact description thereof.

Our invention relates to a method of forming patterns, and has special reference to the formation of patterns for molds in the casting of hollow ware such as bath-tubs, sinks, etc. Heretofore in the casting of hollow ware such as bath-tubs it has been customary to form a sand mold for this casting in the following manner. The pattern for the casting is laid upon a flat board with the outside of said pattern exposed, then one-half of the flask, which we will call the cope flask is laid over the pattern and the space between said pattern and flask is filled and rammed with sand, so that said flask and sand will form the cope half of the mold. This cope half and pattern are then turned over and the other half of the flask called the drag is placed on top of the cope half of the flask and kept in position by pins attached to it, and a corresponding eye-bolt fastens the other half of the flask. The inner or hollow part of the pattern and drag flask is then filled and rammed with sand and then a bottom board is placed upon and clamped to said flask, after which this completed mold is turned over, which leaves the bottom board securely on the floor. The cope flask is then lifted off the pattern and the pattern is then drawn off the sand contained in the hollow part of the pattern, so that by then placing the cope half of the flask back onto the drag half of the mold we have the completed mold ready for pouring and with a mold cavity in the sand and between the two of the exact shape and thickness of the pattern. This is the oldest method and most extensively used in the manufacture of all castings of this thickness to such an extent that about 90 per cent. of all such castings are made by this process at the present time. In order to improve the making of these castings there have been used what is known as pattern blocks, and the general principle of these blocks with their apparatus for drawing them is to have two blocks or patterns, one upon

which they form the drag half of the sand mold and the other the cope half. In these two blocks it is necessary to have one larger than the other in exactly the proportion of the thickness required in the castings made from them and the method of making these two pattern blocks by those employing this system of molding is as follows:

An ordinary pattern is taken which is of the same thickness as the casting required from it and about 1" to 1½" in thickness is added to the outside of said pattern, and then a casting is made from this pattern which gives a pattern block of about 1½" to 1¾" in thickness all over, thereby forming the drag pattern block. To make the cope pattern block about 1¼" to 1½" thickness is added to the same ordinary pattern on the inside or hollow part and then a casting is made from this, so that these two pattern blocks are ground and filed the same as an ordinary pattern, with the exception that the drag block is only finished on the inside and the cope block only on the outside. It will thus be seen that in order to get these two blocks to correspond in shape and size with only a difference of thickness of ⅜" all over for the thickness of the casting to be formed means that it will require the best of mechanics and constant use of calipers, templets and gages to bring these blocks to finished state. The making of the cope block which is finished and filed on the outside is a very simple matter, but when it comes to getting the drag block to correspond in thickness to said cope block, trouble is encountered on account of the finishing being on the inside of the same, so that as all such castings are very thin in comparison with the size, it will be seen that the getting of these blocks to make an exact thickness is the most important of the work.

The object of our invention is to overcome the objections and difficulties found heretofore in making these patterns, to do away with the great expense, time and skill in the proper and accurate finishing of the same, and to provide a method for performing this work which will be cheap, simple and efficient in its practice, will overcome the making of varying thickness of this ware through the shrinkage in the casting of the patterns, and will enable the casting of hollow ware, such as bath-tubs having the same even thickness of walls throughout and of the size desired.



Our invention consists, in the novel method of forming patterns as hereinafter more specifically set forth and described and particularly pointed out in the claims.

5 To enable others skilled in the art to which our invention appertains to use and practice our improved method of forming patterns, we will describe the same more fully, referring to the accompanying drawing, in  
10 which—

Figure 1 is a plan view of the hollow member for forming part of the drag pattern block. Fig. 1<sup>a</sup> is a like view of the hollow pattern member for forming the outer wall of  
15 the cope pattern block. Fig. 2 is a longitudinal section of the drag member shown in Fig. 1. Fig. 2<sup>a</sup> is a like view of the pattern member shown in Fig. 1<sup>a</sup>. Fig. 3 is a longitudinal section of the drag pattern block. Fig. 3<sup>a</sup> is a like view showing the drag pat-  
20 tern block in position for forming the cope pattern block. Fig. 3<sup>b</sup> is a like view showing the pattern in position on the cope pattern block for forming the outer wall of the  
25 mold. Fig. 4 is a longitudinal section of the drag pattern block in position for forming the core or inner mold wall. Figs. 5 and 6 are sectional views showing other forms of the pattern. Fig. 7 is a detail view of a por-  
30 tion of one of the sections shown in Fig. 6. Like symbols of reference herein indicate like parts in each of the figures of the drawing.

As illustrated in the drawing, 1 represents the hollow member, which is preferably  
35 formed of cast metal and finished on its interior surface by filing or in any suitable manner so that it is even and smooth. This member 1 conforms to the exact shape and size of the finished article to be formed and  
40 it forms part of the drag pattern block *a* shown in Fig. 3, by being provided with a frame or casing 3 extending around the same and supported by its flange 4 on the rim 2 of  
45 said member, so that any suitable composition 5 can be placed within the space formed between said member and casing and such member and casing be tied together by the stay rods 6 therein. After the drag pattern  
50 block *a* has been so formed, it is placed upon a cope machine for forming the cope pattern block *b* shown in Fig. 3<sup>a</sup> and Fig. 3<sup>b</sup>, such block *a* being suitably centered by means of a stripping plate 8 set upon the dowel pins 9  
55 on the flask 7 and within which has been previously placed a frame or casing 10. A suitable composition 11 is then placed within the space formed between the pattern block *a*, flask 7 and casing 10, and such composition supported by the stay rods 12. After  
60 this is done the drag pattern block *a* and stripping plate 8 are removed, which leaves a molded form whose surfaces conforms exactly to the contour of the molding face on the member 1 of the drag pattern block *a*.  
65 The molded face of this form is then covered

with the sections 13 formed from a hollow pattern member 14, such as is shown in Figs. 1<sup>a</sup> and 2<sup>a</sup>, which can be formed of cast or sheet metal and finished to the thickness  
70 required in the article to be cast, and then such sections are placed upon and built up around the composition 11 of the molded form, as shown in Fig. 3<sup>b</sup>, where they are finally and firmly secured to said form and  
75 together in any suitable manner at their joints by any suitable filling material to complete the cope pattern *b*.

The drag pattern block *a* and plate 8 are placed upon a drag flask 15 on a mold board 15' such as is shown in Fig. 4 where they are  
80 held in their proper positions by the dowel pins 16 on said flask passing through the said plate, so that the lower portion 17' and core portion 17 of the drag mold 18 can be formed by sand placed within the space between said  
85 block, slate, flask and board, and after this is done the block *a* can be removed from the said drag mold so formed on said flask.

The cope flask 19, shown in dotted lines Fig. 3<sup>b</sup> is placed on the flask 7 and around  
90 the cope pattern block *b* and such flask held in place and in proper position by the dowel pins 9 on the flask 7 passing through the flange 20 on the flask 19, so that sand can be placed in the space formed between the  
95 block *b* and flask 19 and the cope mold 21 shown in dotted lines in said figure formed thereby.

After the drag mold 18 and cope mold 21 have been thus formed they are connected  
100 together in the usual manner for the casting of the article and the pouring operation performed to form such article.

In order to insure the forming of the mold cavity of the exact thickness throughout for  
105 the even thickness of the tub metal throughout, a series of holes 22 can be drilled in the sections 13 of the cope member 14, as shown in Figs. 1<sup>a</sup> and 2<sup>a</sup> for the purpose of testing the thickness of the said member, and then  
110 such holes can be afterwards filled up with Babbitt metal or other suitable material, as shown at 23 in Fig. 2<sup>a</sup> in order to form the completed solid member when in use, or these holes may be used in fastening the said  
115 sections upon the molded form to complete the pattern *b* shown in Fig. 3<sup>b</sup>.

As shown in Fig. 5, the hollow built-up pattern member 14 can be formed by using a rim portion 24 preferably of cast metal,  
120 such as brass, and of the proper shape and thickness for the rim of said pattern on the cope pattern block *b*, which portion is joined to a soft metal portion 25, such as lead, extending around the composition 11 on said  
125 block and of the proper thickness, and such portion is provided with a sectional sheet metal portion 26, such as brass, for fitting over the same and joined to said rim portion 24 to form the finished or completed pattern  
130



block *b*. As shown in Fig. 6 the pattern member 14 can be formed by joining the sheet metal sections 13 together and to the cast rim portion 24 in any suitable manner, and such sections can be provided with holes or slots 14' therein for being connected to the composition 11 of the cope pattern block *b* by any suitable filling material, such as cement placed therein.

Various other modifications and changes in our improved method of forming patterns may be resorted to without departing from the spirit of the invention or sacrificing any of its advantages.

It will thus be seen that our improved method of forming patterns will enable such patterns to be formed in a rapid and convenient manner and the castings produced thereby will be free from any imperfections or unevenness, while the cope pattern being similar in size and shape to the drag pattern and finished to the required thickness of casting and then made into sections for being built upon the cope block so as to conform to the shape of the cope pattern, will overcome the difference in shrinkage that would occur in a pattern cast in one piece. The cope pattern block being also formed from the drag pattern block will enable the cope block to conform to said drag block, so that when the sectional cope member is placed on the cope block the exact and even thickness of casting will be formed when the drag and cope molds formed from the drag and cope pattern blocks respectively are placed together for the casting operation.

What we claim as our invention and desire to secure by Letters Patent, is—

1. The herein described method of forming pattern blocks for hollow cast ware, consisting in forming a drag pattern block, then forming a form for the cope pattern block therefrom, and then applying a sectional cope pattern to said form.

2. The herein described method of forming pattern blocks for hollow cast ware, consisting in forming a drag pattern block, then forming a molded form for the cope pattern block therefrom, and then applying a sectional cope pattern to said molded form.

3. The herein described method of forming pattern blocks for hollow cast ware, consisting in forming a drag pattern block, then forming a form for the cope pattern block

therefrom, and then applying a sectional built-up cope pattern to said form.

4. The herein described method of forming pattern blocks for hollow cast ware, consisting in forming a drag pattern block, then forming a molded form for the cope pattern block therefrom, and then applying a sectional built-up cope pattern to said molded form.

5. The herein described method of forming pattern blocks for hollow cast ware, consisting in forming a drag pattern block, then forming a form for the cope pattern block therefrom, and then applying a sectional cope pattern of a thickness for the mold cavity to said form.

6. The herein described method of forming pattern blocks for hollow cast ware, consisting in forming a drag pattern block, then forming a molded form for the cope pattern block therefrom, and then applying a sectional cope pattern of a thickness for the mold cavity to said molded form.

7. The herein described method of forming pattern blocks for hollow cast ware, consisting in forming a drag pattern block, then forming a form for the cope pattern block therefrom, and then applying a sectional built-up cope pattern of a thickness for mold cavity to said form.

8. The herein described method of forming pattern blocks for hollow cast ware, consisting in forming a drag pattern block, then forming a molded form for the cope pattern block therefrom, and then applying a sectional built-up cope pattern of the thickness for the mold cavity to said molded form.

9. The herein described method of forming a drag pattern block for hollow cast ware, consisting in forming a hollow pattern member, and then securing a backing to the same.

10. The herein described method of forming a drag pattern block for hollow cast ware, consisting in forming a hollow pattern member, and then securing a molded backing around the same.

In testimony whereof, we the said JAMES H. DANVER and WILLIAM H. LOSE, have hereunto set our hands.

JAMES H. DANVER.  
WILLIAM H. LOSE.

Witnesses:

J. L. TREFALLER, Jr.,  
J. N. COOKE.