

A. DEVILLE.
MANUFACTURE OF PATTERNS AND MOLDS.
APPLICATION FILED AUG. 28, 1905.

965,878.

Patented Aug. 2, 1910.

3 SHEETS—SHEET 1.

Fig. 1.

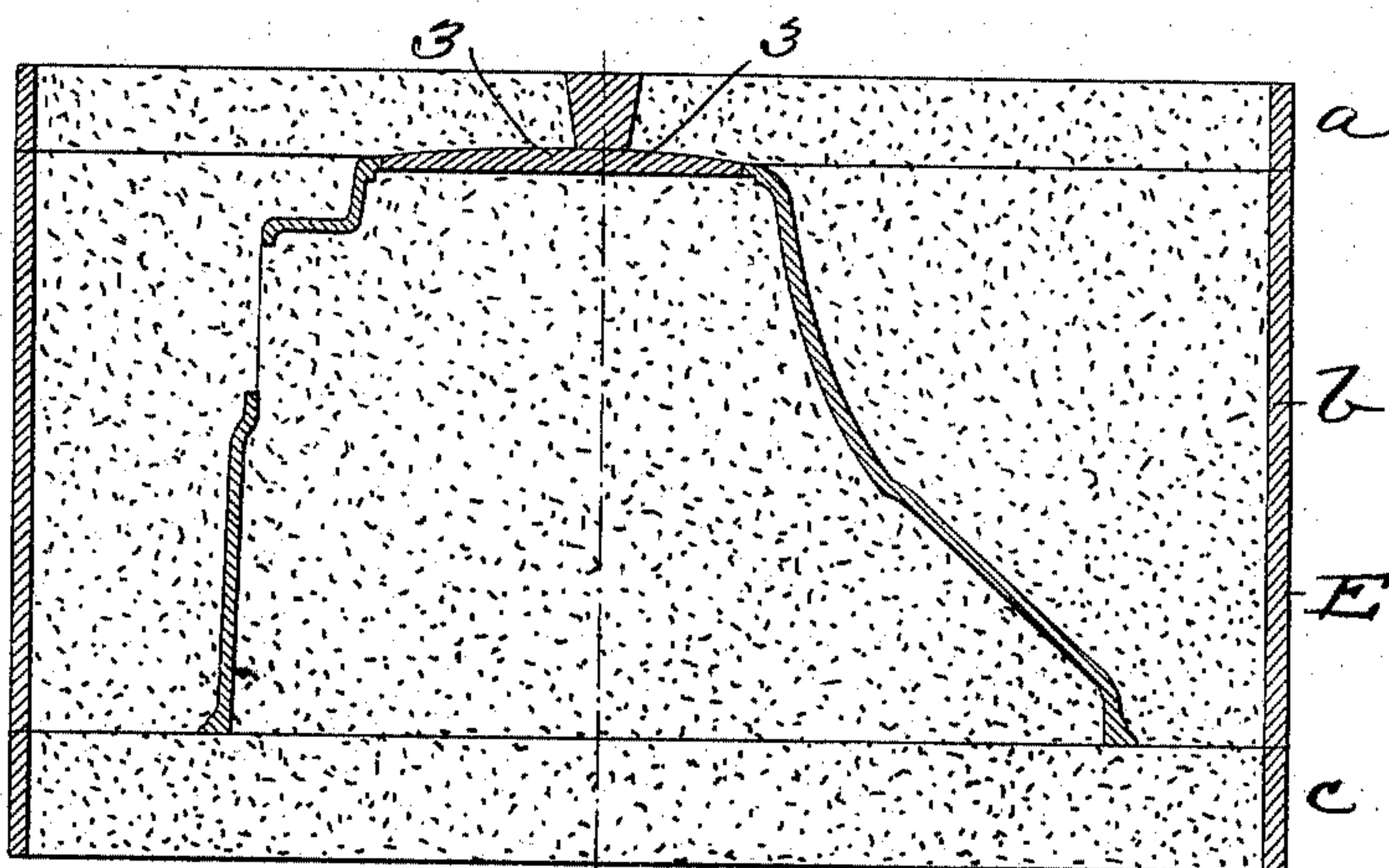


Fig. 2.

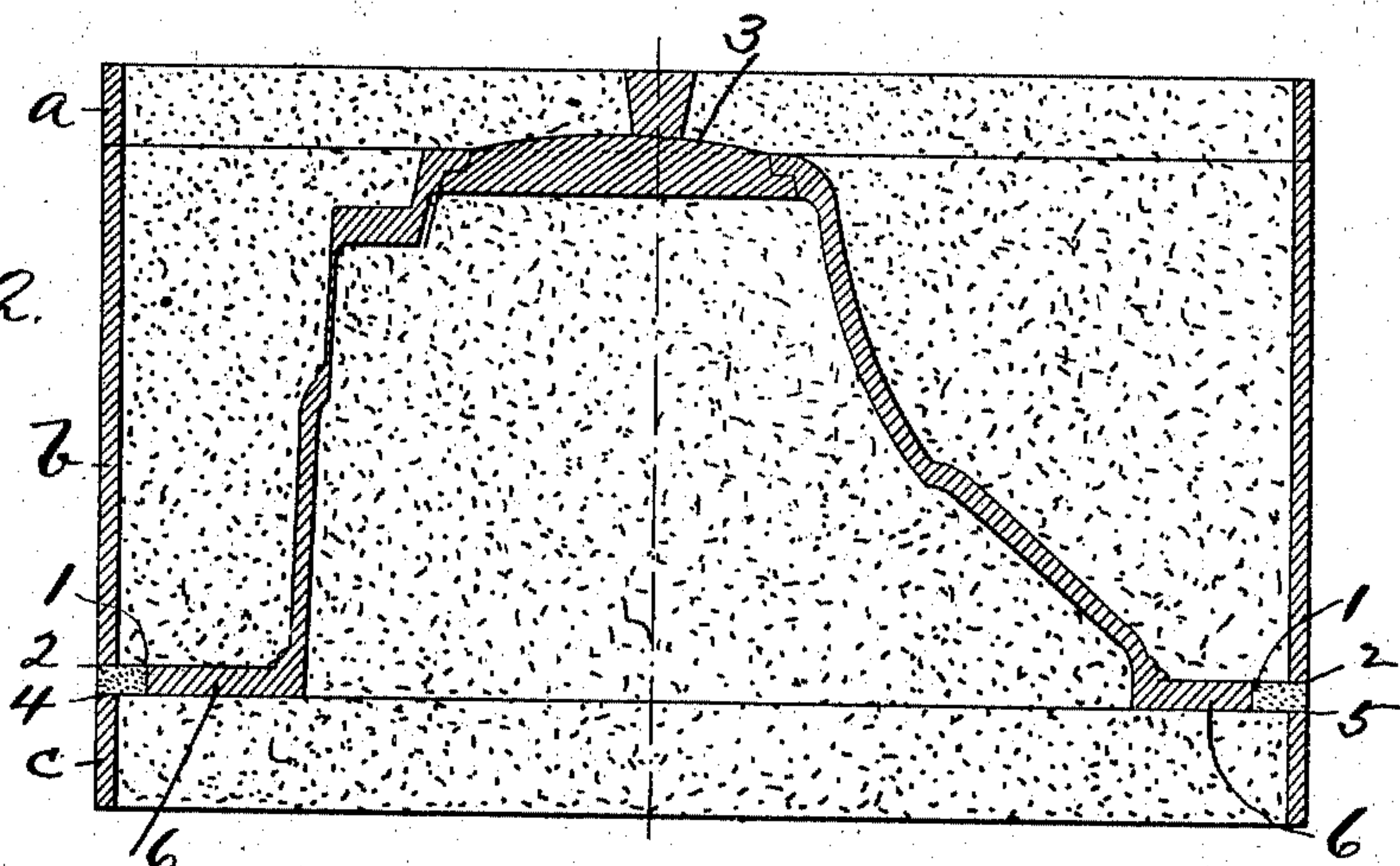
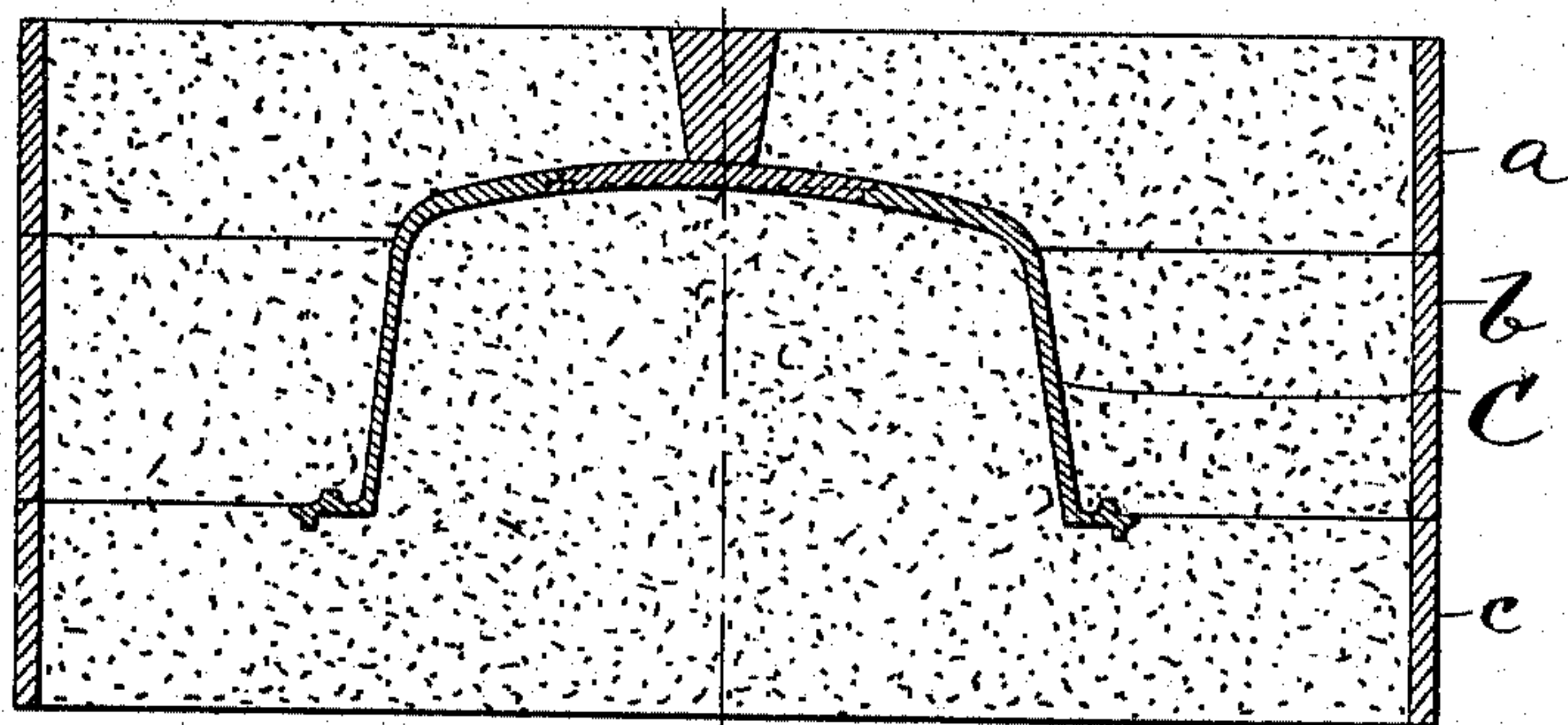


Fig. 3.



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3 SHEETS—SHEET 2.

Fig. 4.

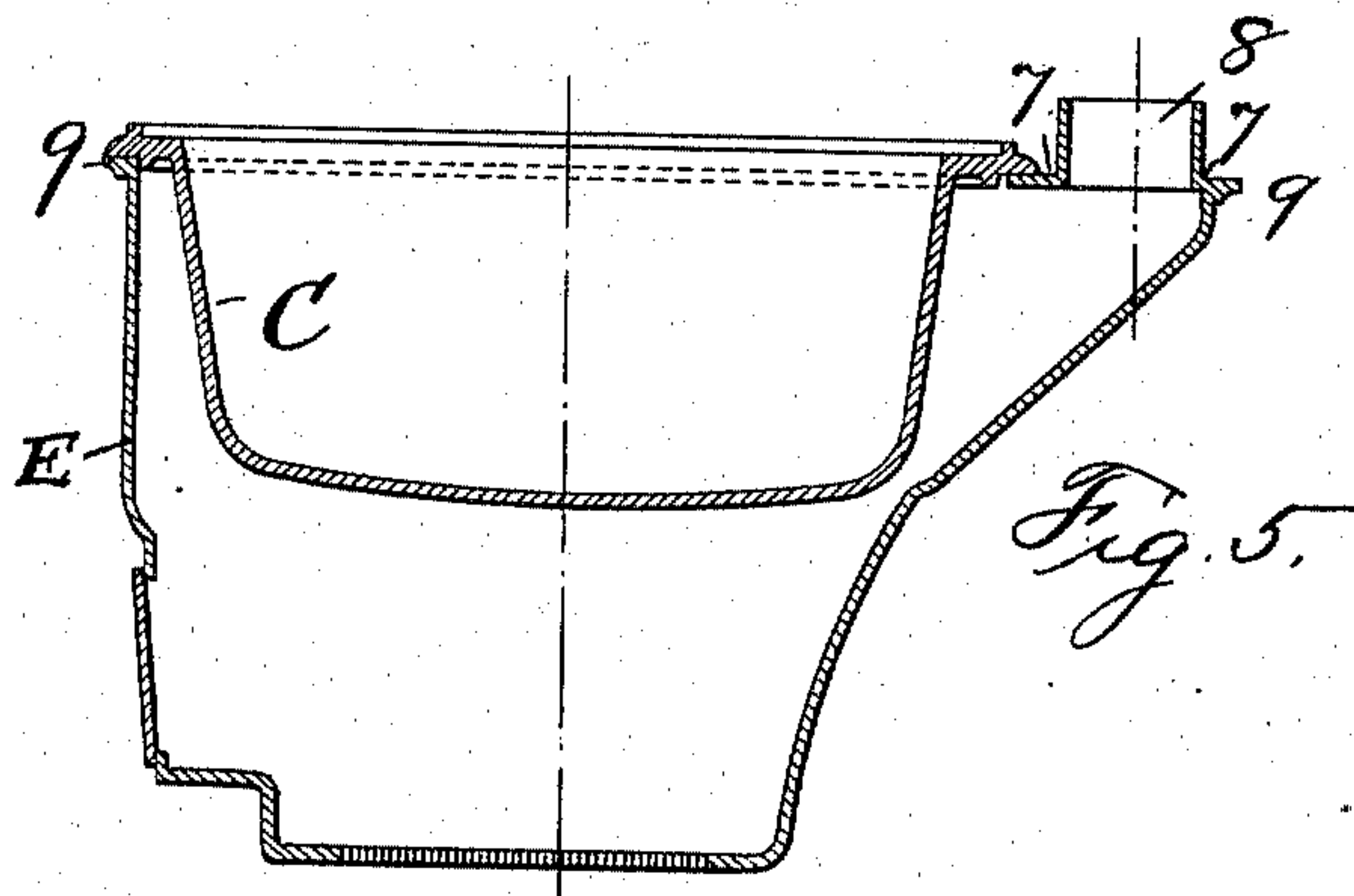
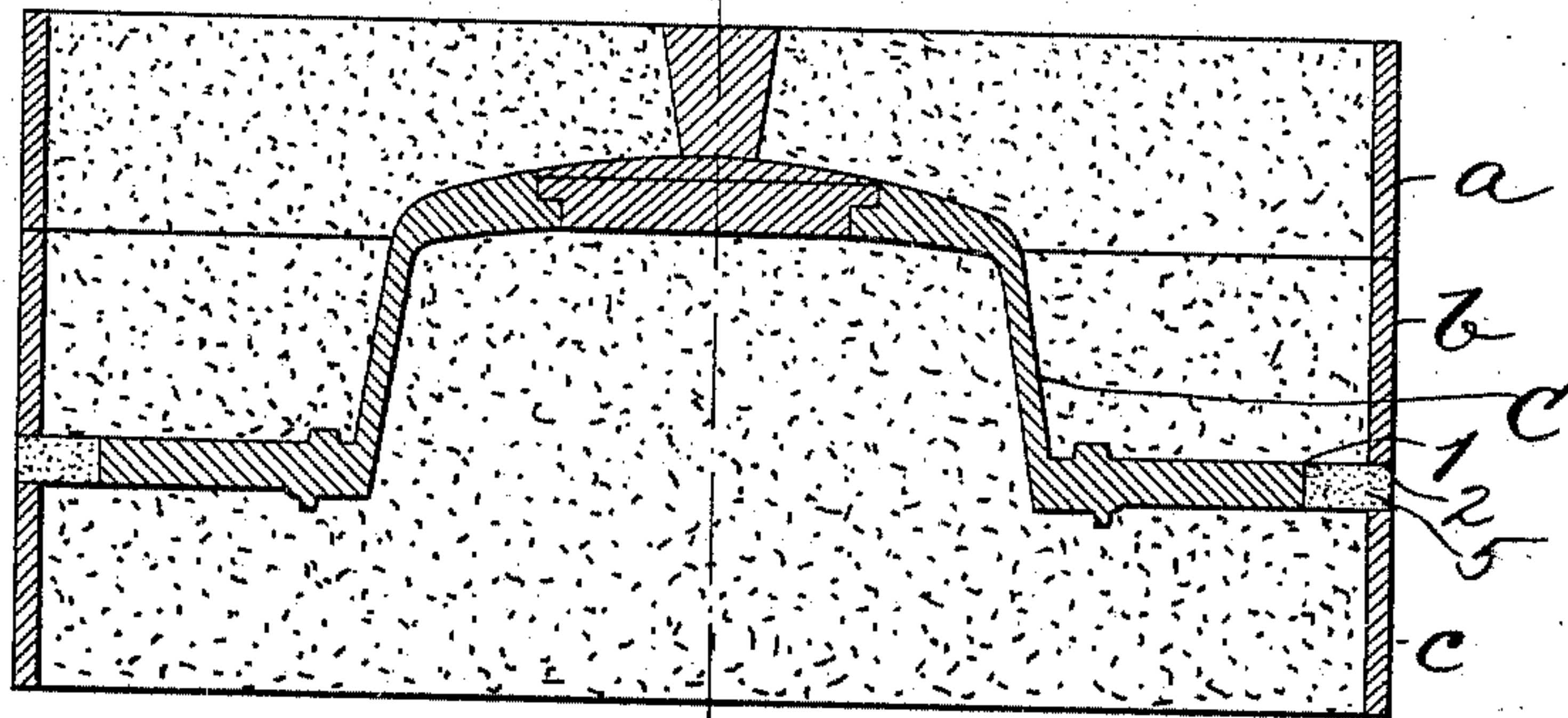


Fig. 5.

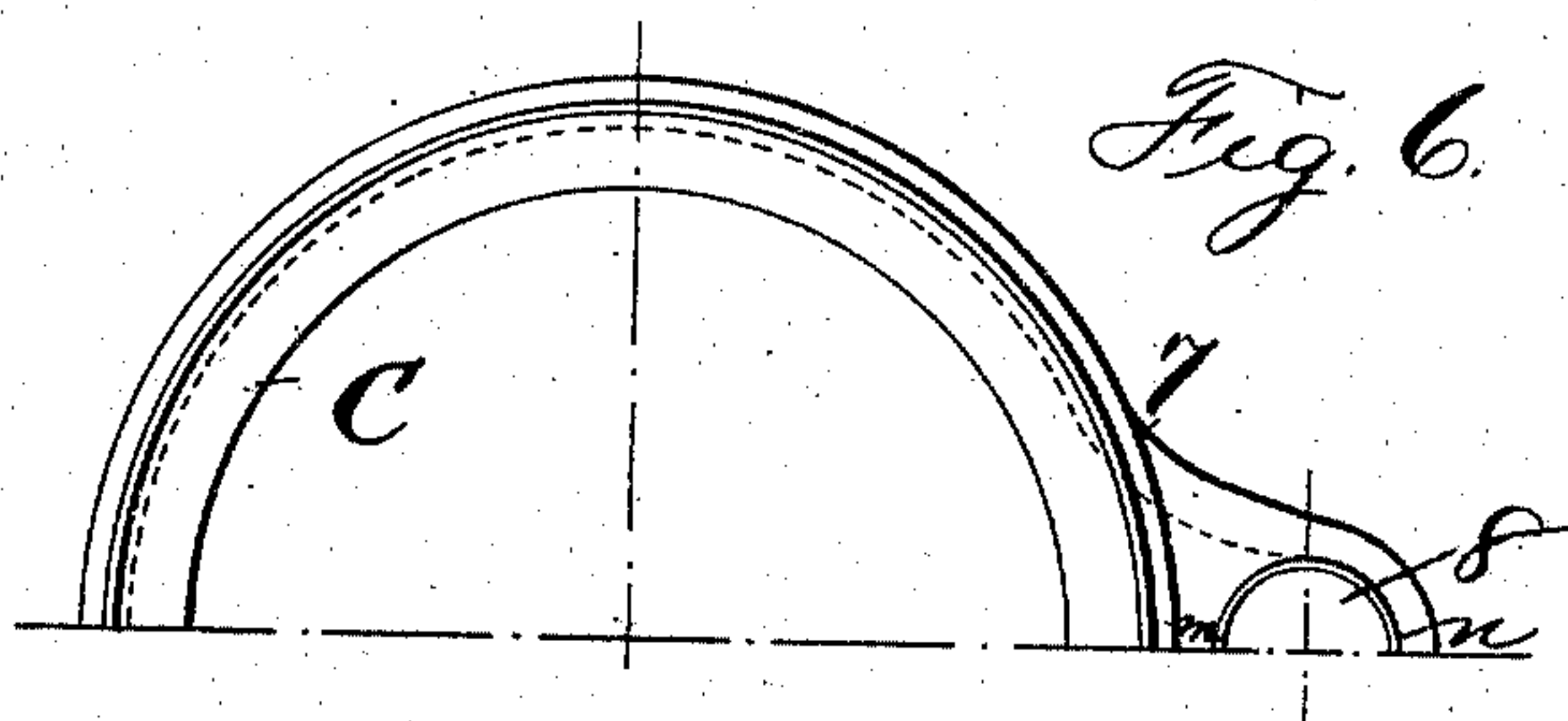


Fig. 6.

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3 SHEETS—SHEET 3.

Fig. 7

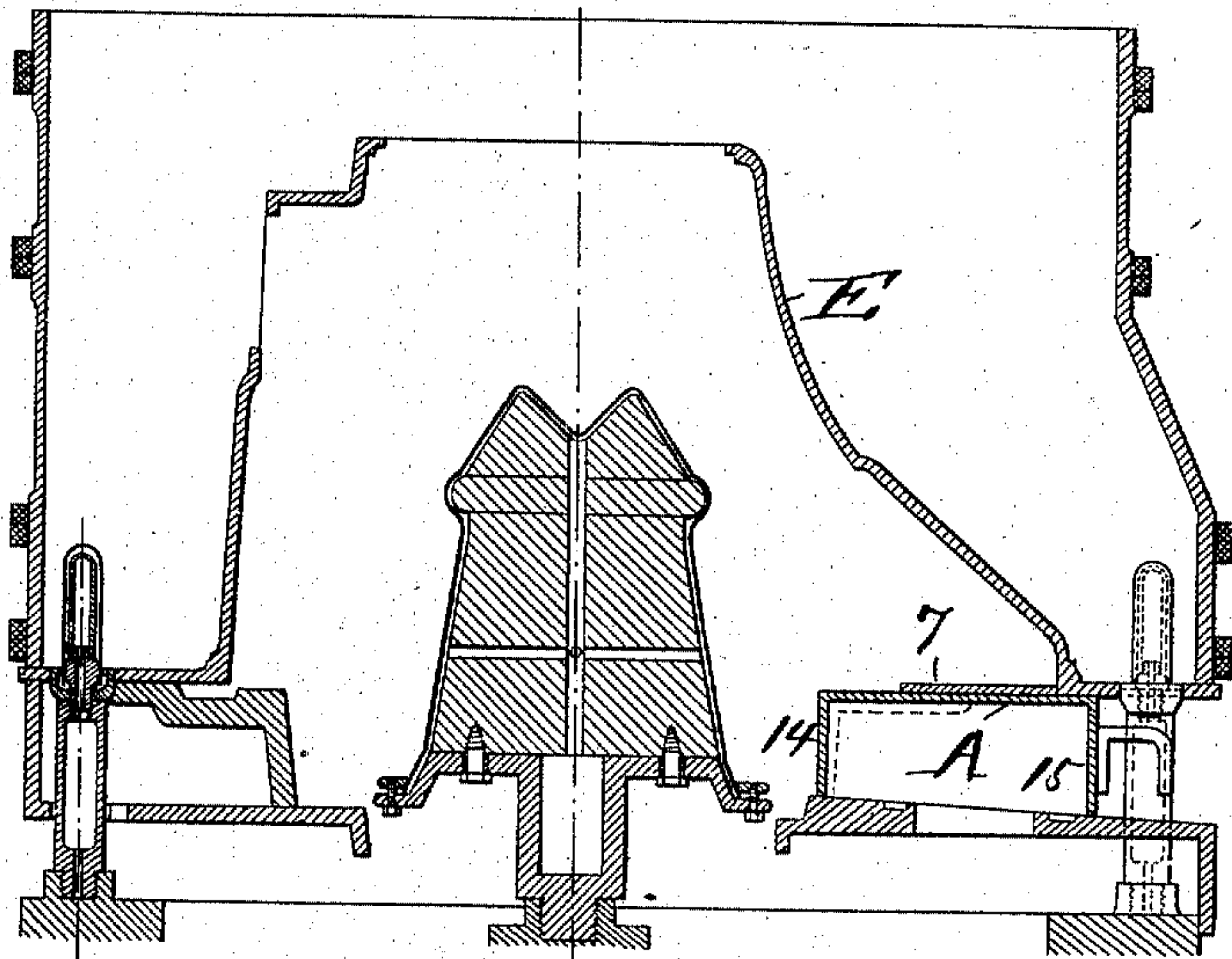


Fig. 11

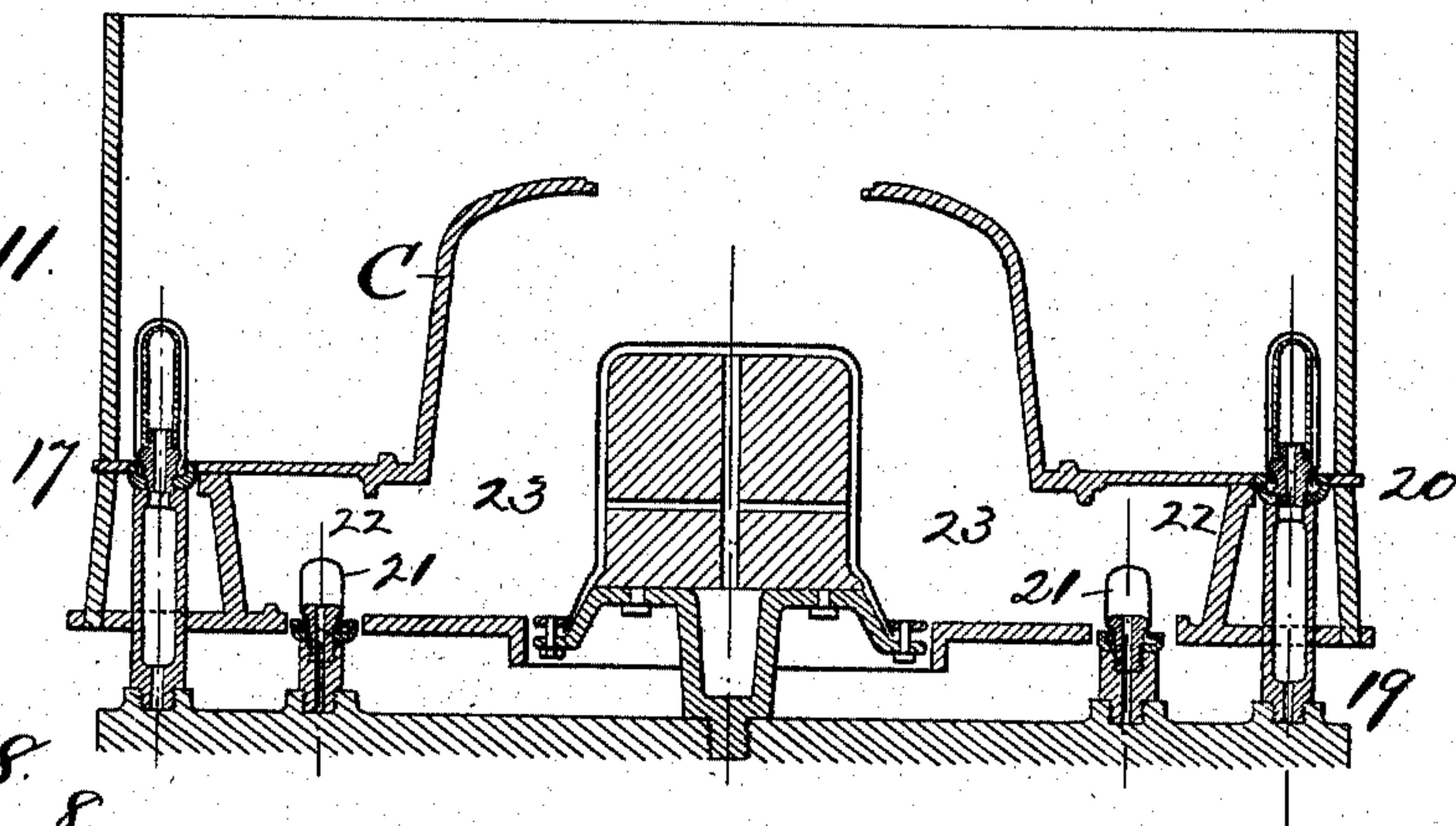


Fig. 8

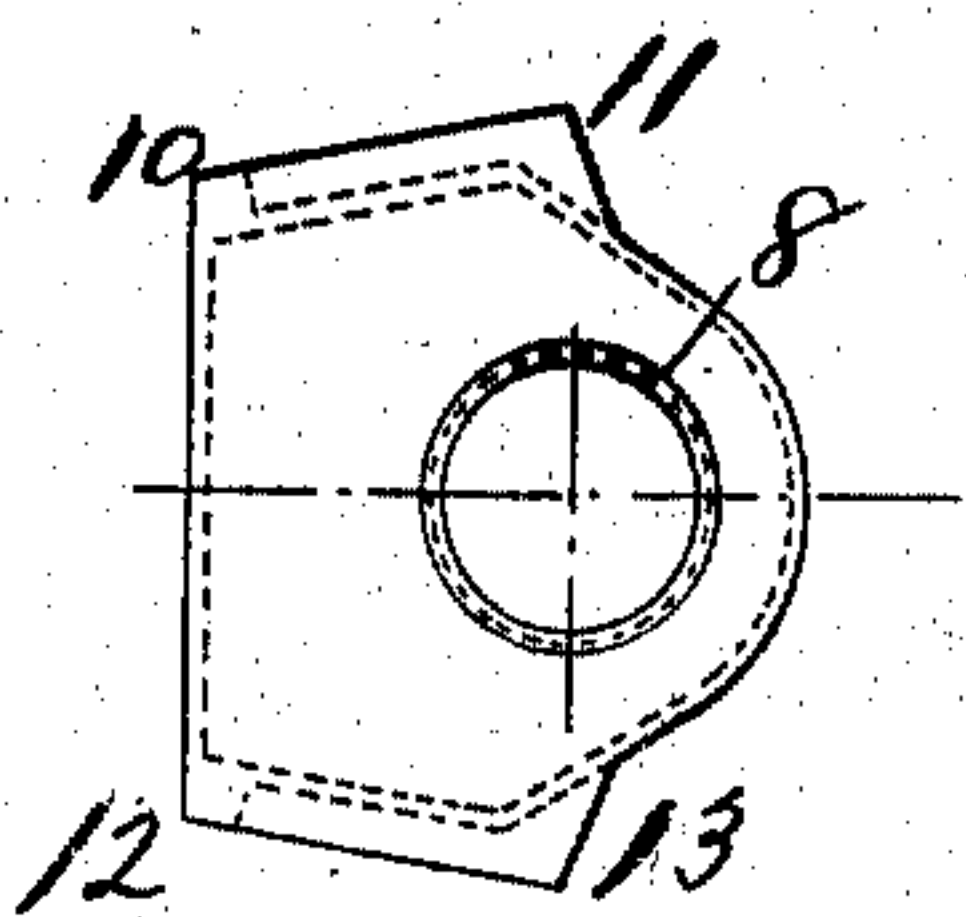
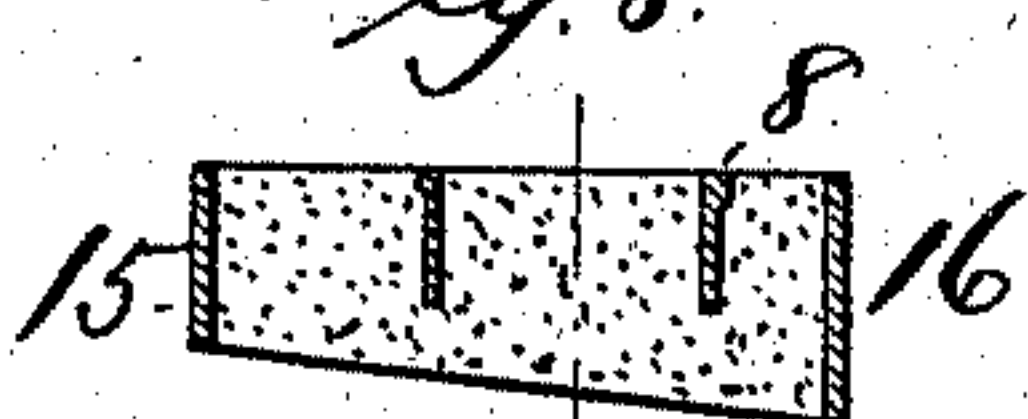


Fig. 9

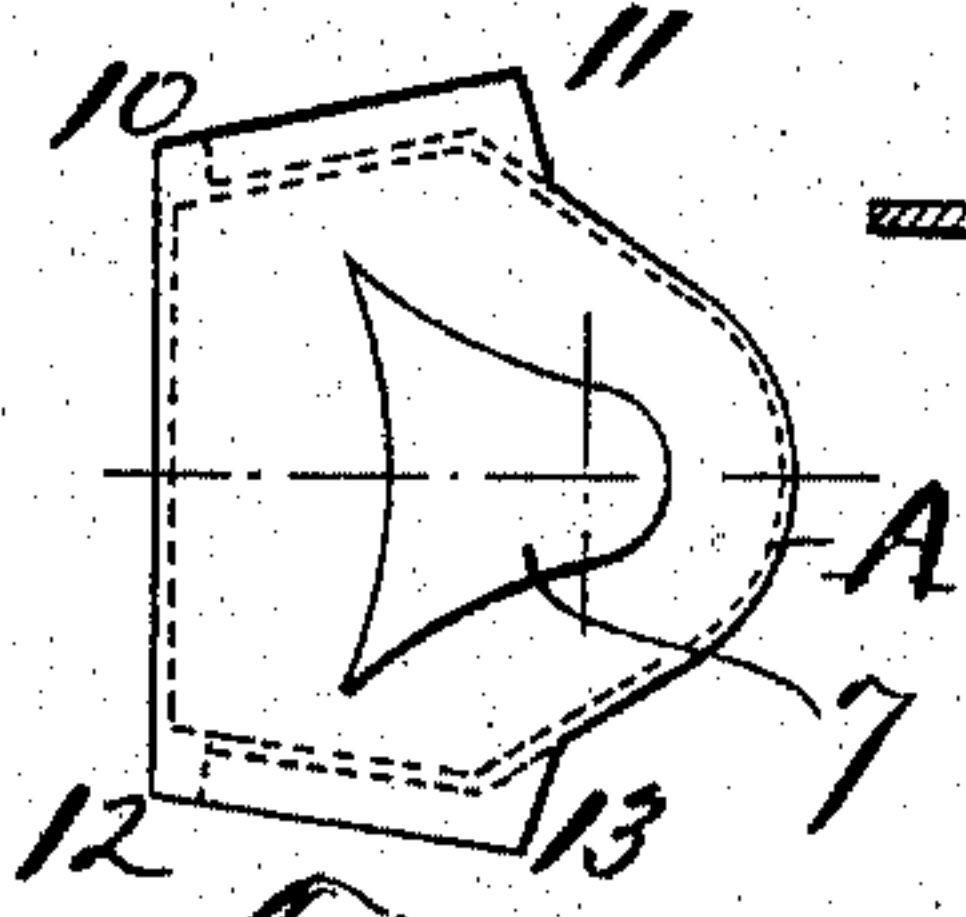
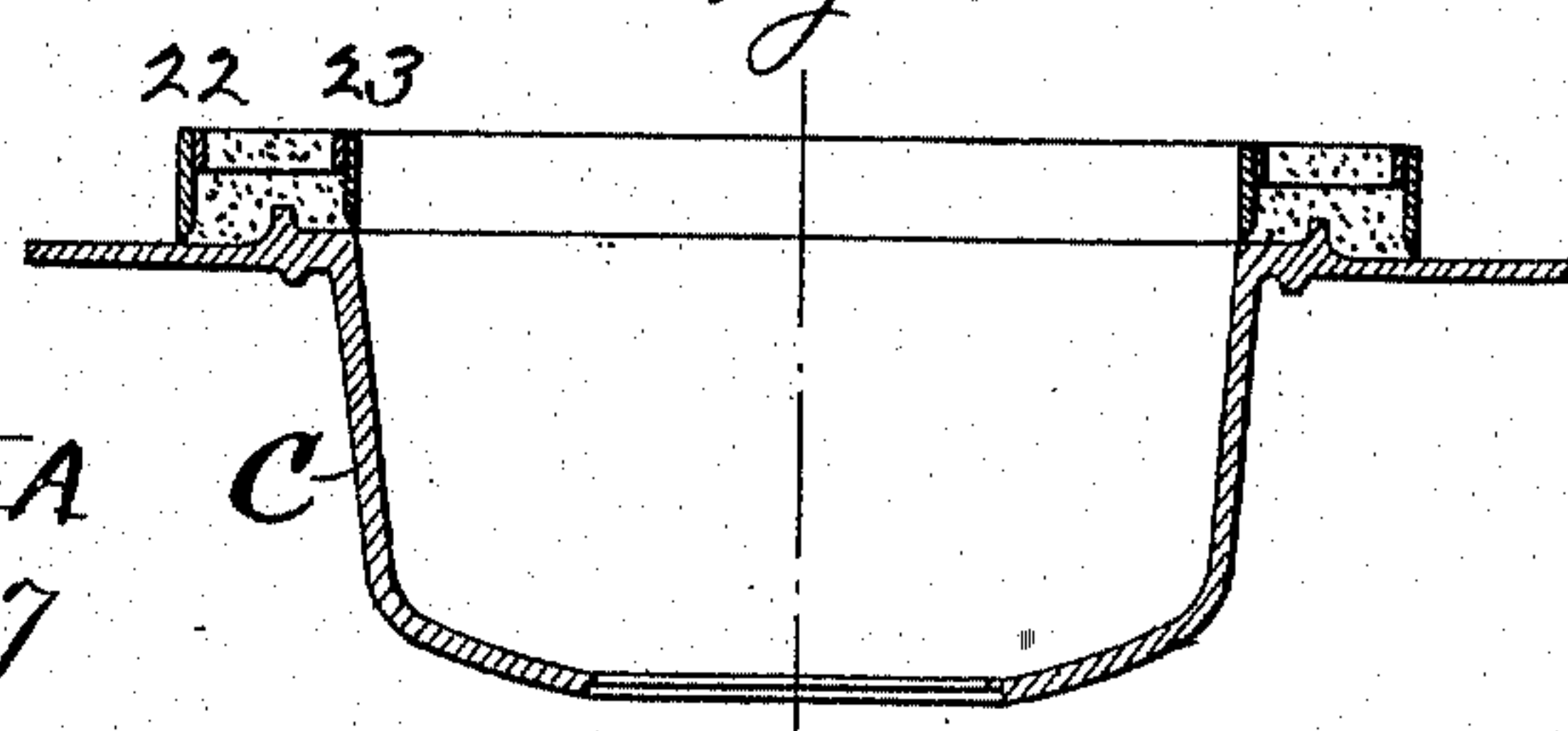


Fig. 10

Fig. 12



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UNITED STATES PATENT OFFICE.

ALBERT DEVILLE, OF CHARLEVILLE, FRANCE.

MANUFACTURE OF PATTERNS AND MOLDS.

965,878.

Specification of Letters Patent.

Patented Aug. 2, 1910.

Application filed August 28, 1905. Serial No. 276,126.

To all whom it may concern:

Be it known that I, ALBERT DEVILLE, a citizen of the Republic of France, residing at Charleville, Ardennes, in France, have invented certain new and useful Improvements in the Manufacture of Patterns and Molds, of which the following is a specification.

Mechanical molding by simultaneous inside and outside compression necessitates a pattern of special strength which is not found in thin articles such, for instance, as a boiler or pan. For giving it the necessary strength the mold casing is, according to this invention, formed in parts so that the mold parts prepared as for an ordinary pattern can be afterward displaced parallel to each other in order to obtain a thickened pattern.

In the accompanying drawing, Figure 1 is a section of a first construction, in which a furnace E—as shown in Fig. 7—is taken as the original type-pattern, and is shown packed in sand. Fig. 2 shows this construction with the final pattern completed and cast after the parts of the mold have been moved apart ready, after trimming and corrections, to serve for mechanical molding. Figs. 3 and 4 show another construction, representing the boiler or vessel C of the apparatus shown in Fig. 5, with molded flange. Fig. 5 shows in action a boiler or kettle set in a furnace E, the reproduction of which can be obtained by mechanical molding by utilizing the two patterns in question. Fig. 6 is a plan of one-half of the apparatus shown in Fig. 5. Fig. 7 shows the furnace pattern alone mounted in a frame-mold, showing the arrangement of the box A used for the formation of the smoke-outlet with the plate forming the inner flange. Figs. 8, 9 and 10 show details illustrating the way of molding the smoke pipe of the boiler furnace. Fig. 11 shows a flanged boiler arranged in the frame-mold, for the purpose of illustrating the method of obtaining the bottom of the molded flange and of sinking iron handles in sand contained in the movable crown. Fig. 12 is a section of the same in reversed position.

In Figs. 1, 2, 3, and 4, the frame for building the pattern consists of three distinct superposed parts *a b* and *c*. In the upper part *a*, filled with rammed sand, is formed an opening for the casting or introduction of molten metal, while the central part *b* is in-

tended for forming an envelop or outer part of a sand mold, and the bottom part *c* serves as the support for the sand core of the mold. This is the way in which this mold is used, for instance, for making a pattern having the shape of a boiler (Figs. 1 and 2): A first or type-pattern is taken, such as used in ordinary foundries, similar to, but larger than the article to be produced, on account of successive shrinkings (Fig. 1). The outside of this first pattern and then the inside are packed with sand. The casting head 3 is placed in position in the usual manner, and a mold is obtained by means of two sand bodies formed around, and in the interior of, the said first pattern, as in ordinary foundries. Then, before casting metal into this mold, the parts of the mold *b* and *c* are separated after the uniform extent of a few millimeters (in practice 6 to 12 millimeters) by raising the two parts *a b* of the frame in a uniform manner, that is to say, so that they remain parallel to each other. If casting were effected in that state, the metal would escape from the frame. In order to avoid this, the space formed between the parts *b c*, is charged with an annular filling of sand 1 2 4 5 (Fig. 2). This having been done, some metal that admits of subsequent modification or treatment, for instance cast iron, copper bronze or even aluminium bronze is cast, and thus a pattern of a boiler with a wide flange 6 is obtained. This wide flange constitutes a strengthening band or loop and together with the general increase of the thickness of the pattern, renders the latter undeformable, whatever be the pressure to which it might be subsequently submitted. The pattern thus cast is afterward corrected on the milling machine, by suitable tools or by file or chisel, in order to correct the imperfections of a rough casting, and is then ready for machine molding.

Simultaneous filling of the core and of the outer casing with prepared sand, constitutes a characteristic feature of the simultaneous mechanical molding of the interior and of the exterior of the mold, and is a sort of corollary of the same. In order to enable this simultaneous filling to be effected, the upper cap forming the lowest portion of the bottom of the boiler, is cut off by means of a saw and readjusted on its seat by forming on it a groove. It would be more practical to make the said cap separately and to fit it, on the lathe, to the body of the boiler. When

the pattern thus constructed is used in the machine, a hollow identical to it is produced, with the peculiarity that the separation of the sand of the casing and of the core, for forming the outside and inside moved parts, is effected by the existence of the metal flange 6. The mold in intaglio thus having been obtained, and the pattern removed, there will be no obstacle to the reverse raising movement being effected in the machine itself, as had been made when making the pattern, and if these two movements are exactly of the same extent, it will be found that the new mold is well closed and that its hollow corresponds to the exact article which it is desired to obtain, and not to the impression of the pattern which had been used to produce it. Thus it is merely necessary to cast the metal. But all articles to be molded are not as a rule as simple as has been assumed above. This process is applicable to a larger number of ingenious combinations, of which the following are two examples.

The pattern which it is intended to use in this process must have such general shape that it should be possible to withdraw them from the mold without tearing, by simple upward movements.

A very common article, a boiler furnace, is one of that type, but the smoke pipe opening must be covered up to the place which the boiler will occupy, by a solid part 7 (Fig. 5), to which is secured a branch 8 for securing a cylindrical sheet metal pipe. Let us assume that the boiler has been removed from the furnace.

The mold is obtained in the following manner:—A strengthened or thickened pattern is obtained in the way described for the boiler, but after having removed the whole of the part constituting the smoke-outlet branch 8 and its seat plate 7. This pattern is placed on a support-cup of the machine with the face 9 (Fig. 5) as if there were no smoke-outlet.

A recess is made in the cup C, below the enlarged portion *m n* Fig. 6, forming the beginning of the smoke pipe, so as to receive a box or part 10, 11, 12, 13 (Figs. 9 and 10), which is fitted therein with a slight amount of friction and then takes up the right position, the faces 10, 11, 12, 13, and 14 15, (Figs. 7 to 10) being flat and machined with a slight taper.

The box A is arranged at the upper general level of the cup and consequently just below the pattern E when the latter is in place (Fig. 7), but a raised portion 7, which is seen outlined in plan in Fig. 10, of the desired thickness and which is exactly inserted in the smoke pipe recess, is formed by an applied plate 7. This raised portion will be impressed in the mold and after the withdrawal of the box A will form a per-

manent hollow or recess. This box is, in fact, removed after compression, at the same time as the pattern, and is replaced by another of identical outer shape (Fig. 8), but flush with the cup, without any raised portion. In that part, which is hollow, sand has been previously compressed and the pattern of the smoke outlet pipe 8 (Figs. 5, 6, 8 and 9) has been impressed at a suitable place in a reverse position. At the moment when casting takes place this part will present therefore a circular groove corresponding to the smoke-outlet which it is desired to obtain (section 14, 15, Fig. 8). The mold thus prepared being cast, the article desired will be produced with its smoke pipe, cast in one piece. The boilers, on the other hand, generally have a molded flange and are provided with two handles. These flanges can be very well made by means of a suitable apparatus such as described in my application filed August 28, 1905, Ser. No. 276127. But when these flanges present special molding difficulties, for instance when provided with inscriptions in relief or ribs of considerable size, the process is as follows: In an annular crown 22 23 (Fig. 11) constituted by two rings of light sheet metal connected by stays and charged with sand, is impressed the top of the flange of the boiler, which will then be the bottom of the molding. This impression is done by press or by hand as a preliminary operation, and the two handles *d* are inserted in the sand. The part *c* is arranged so as to receive this prepared crown (Fig. 12) which completes it, and the molding is proceeded with as described in my application No. 276127, or in accordance with the usual practice of hand molding. When the sand is removed after having removed the casting, the crown 22, 23 is withdrawn and can be used indefinitely.

What I claim is:

The hereindescribed process of preparing patterns and molds for casting flanged or hollow articles which consists in first making an ordinary mold of the article to be reproduced, then vertically separating the parts of the casing containing the mold parts to increase the thickness or width of the space between the inner and outer mold parts, then filling the outer part of the intervening space with sand, and then casting metal within the space between the mold parts.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ALBERT DEVILLE.

Witnesses:

GEORGE FANGIE,
MAURICE FAVEY.