

W. D. KILBOURN.
METHOD OF HANDLING MATTE.
APPLICATION FILED OCT. 14, 1909.

964,275.

Patented July 12, 1910.

4 SHEETS—SHEET 1.

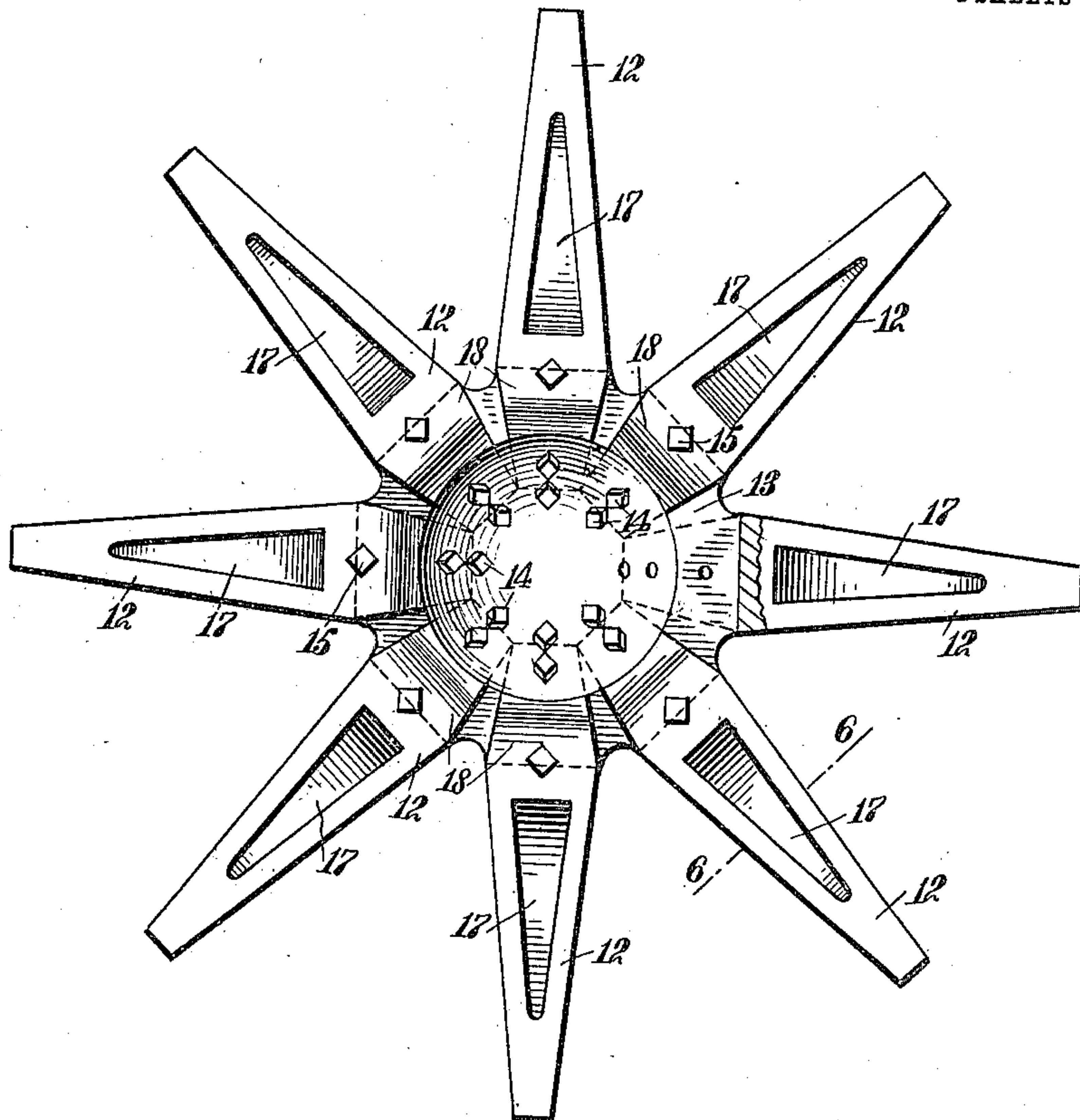


Fig. 1

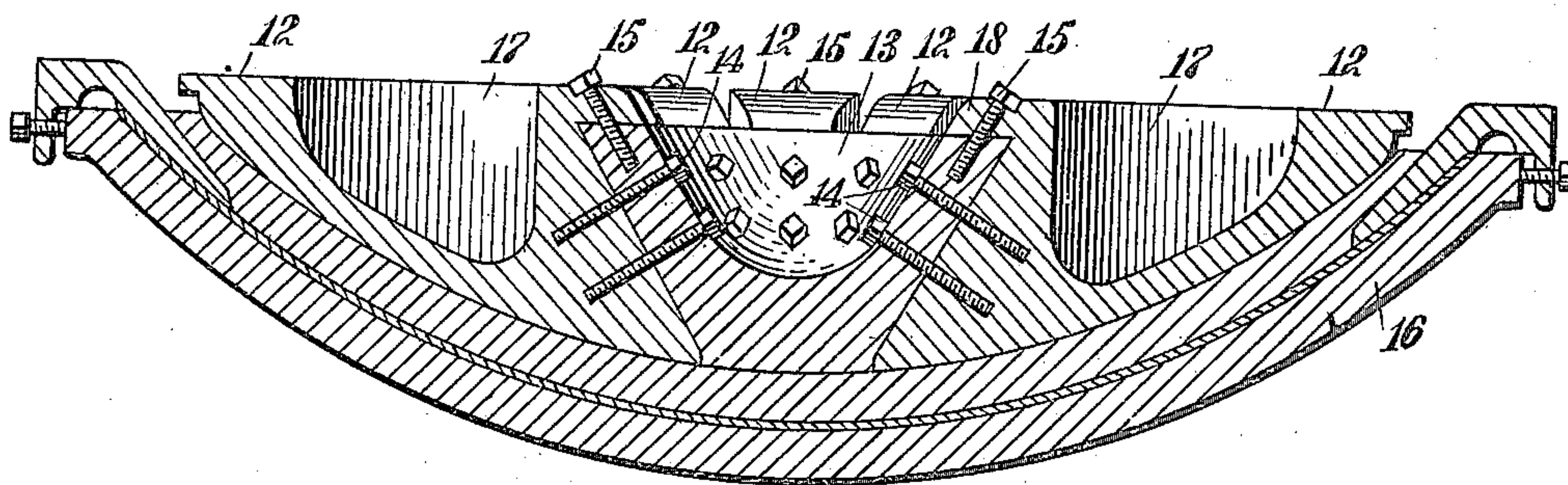


Fig. 2

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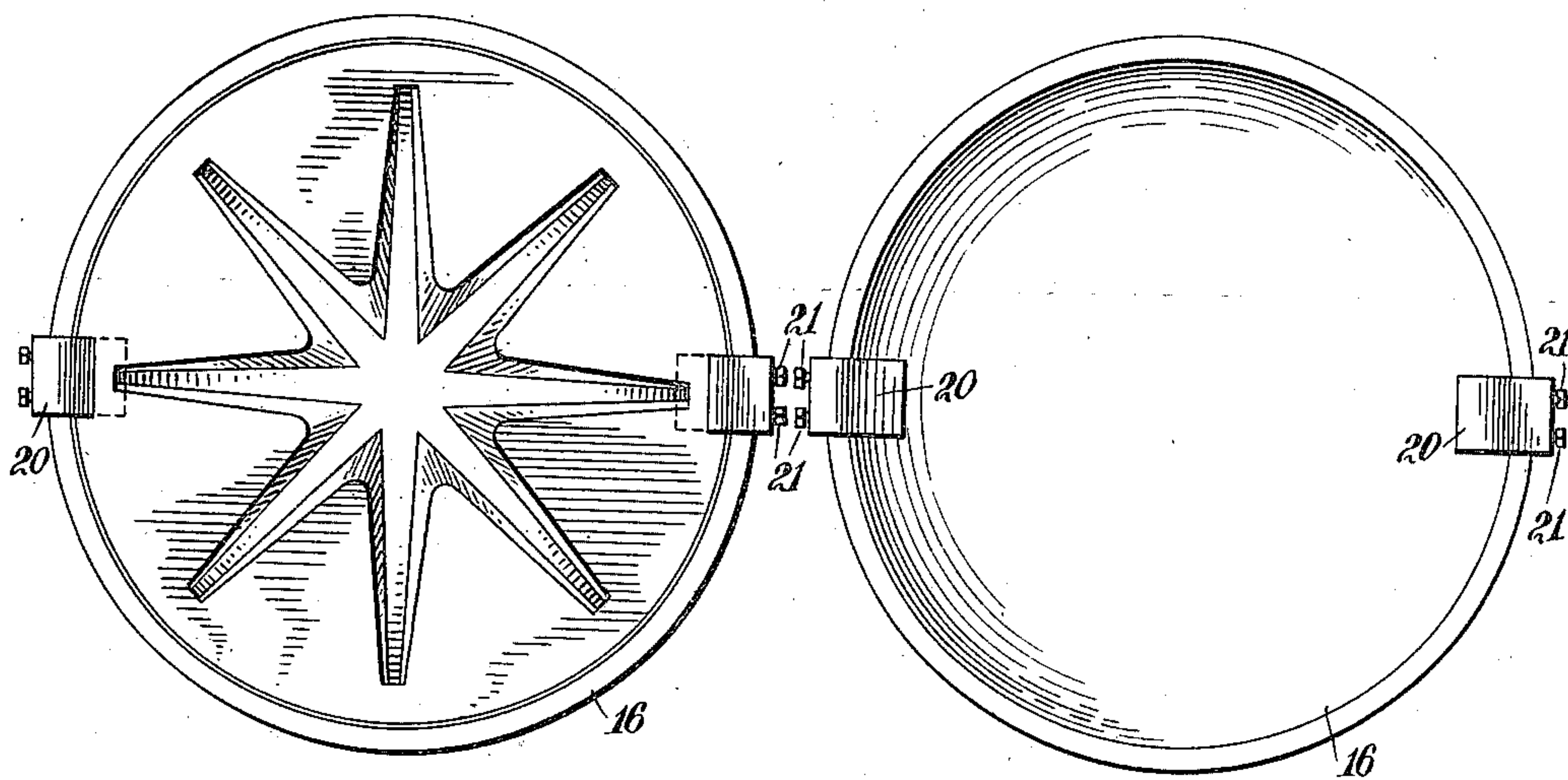


Fig. 3

Fig. 4

Fig. 5

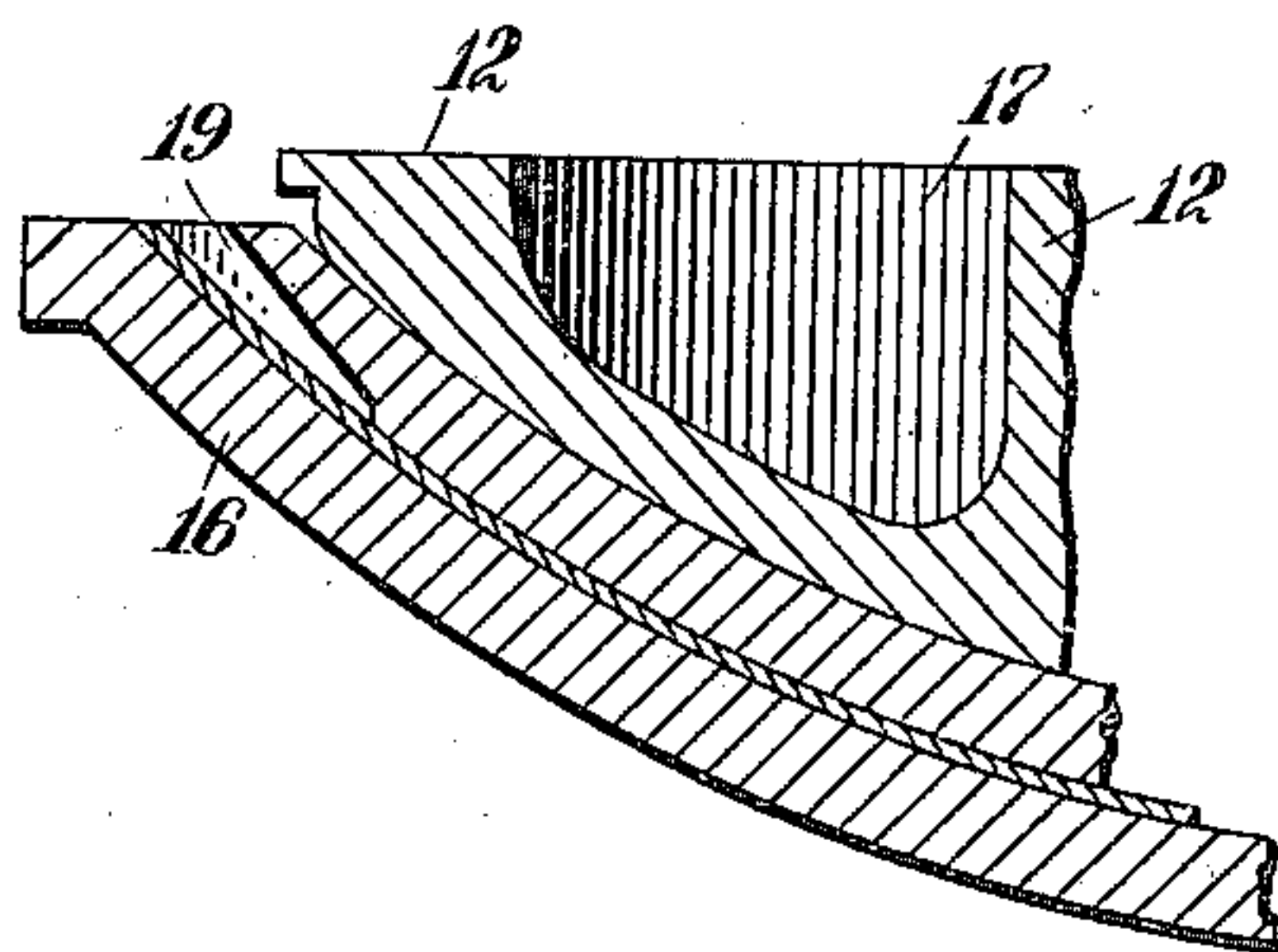
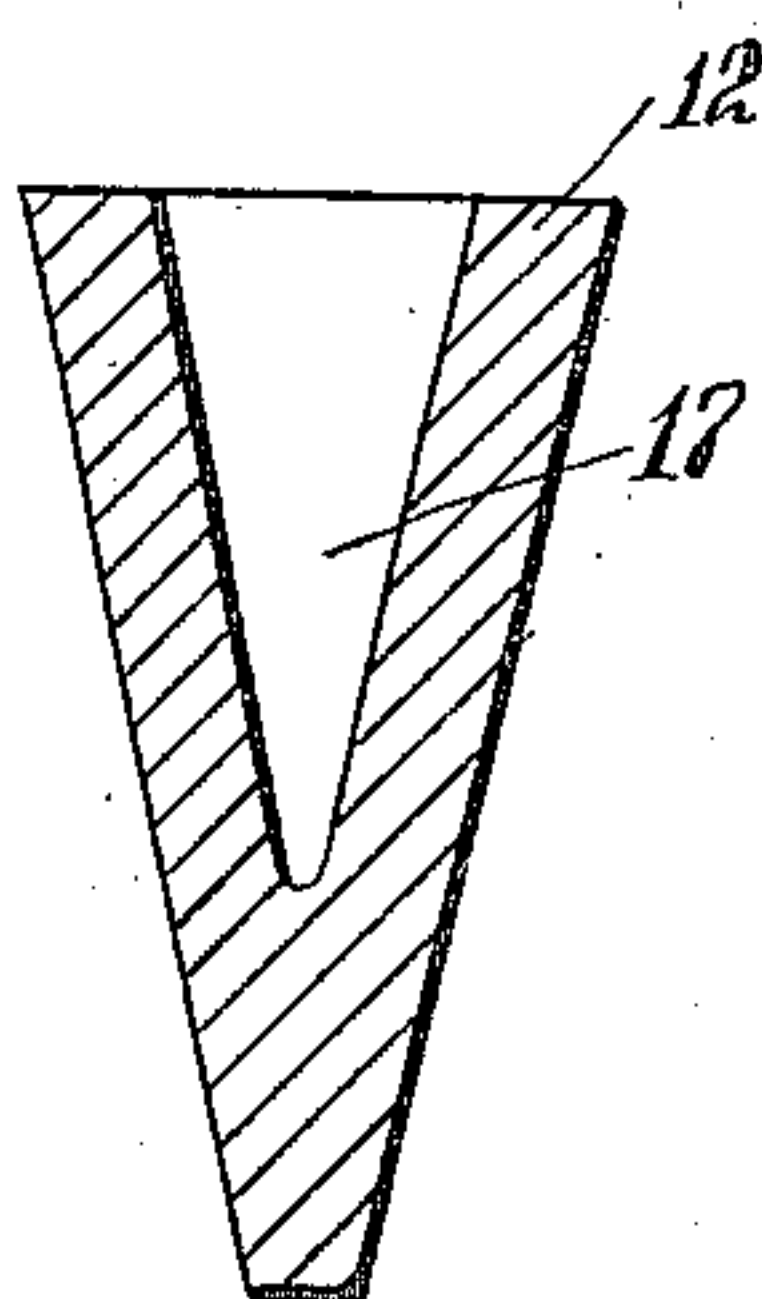


Fig. 6



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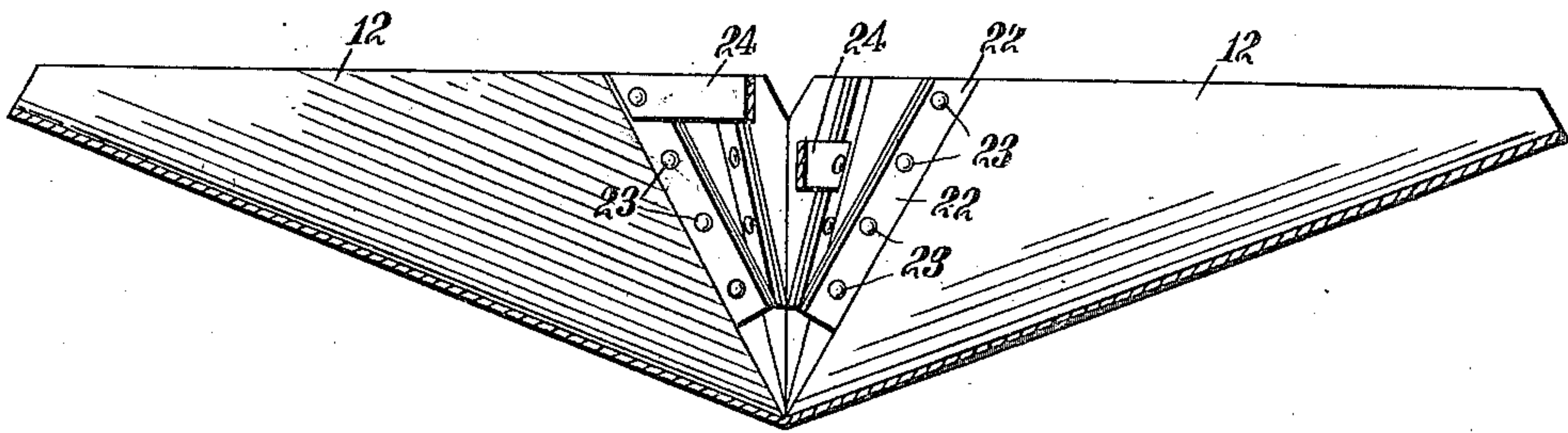
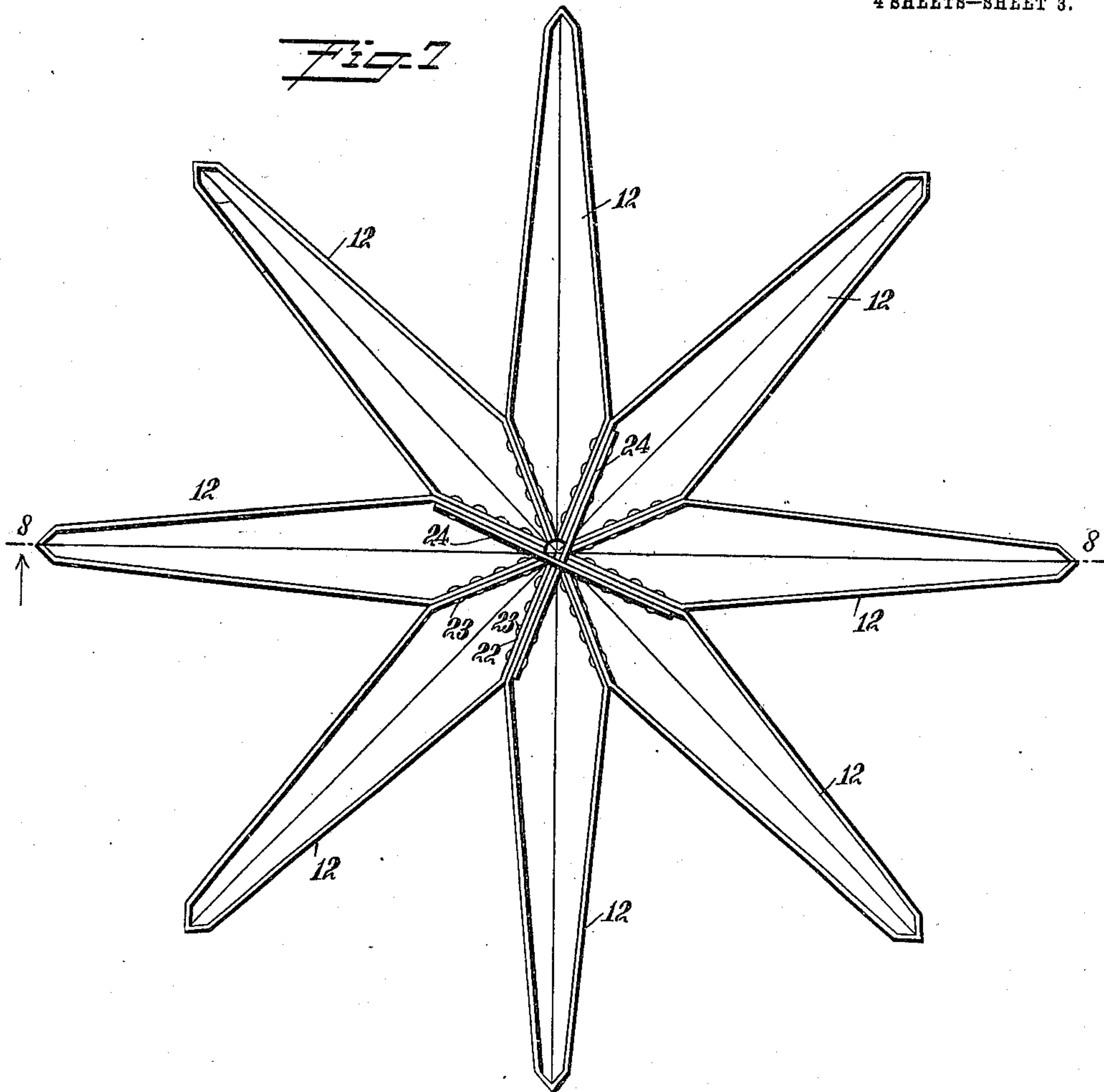
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4 SHEETS—SHEET 3.



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Fig. 8

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4 SHEETS—SHEET 4.

Fig. 9.

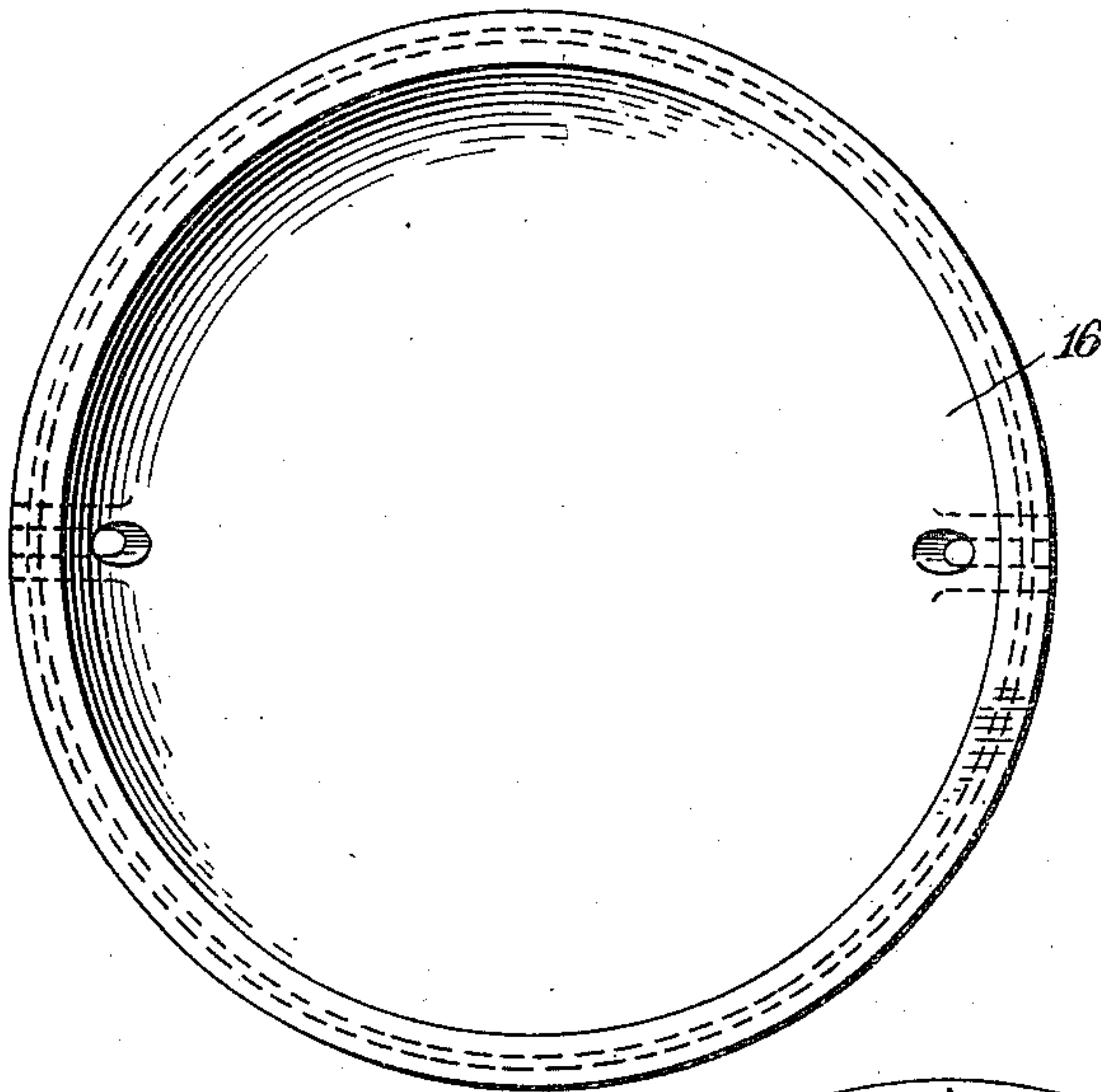
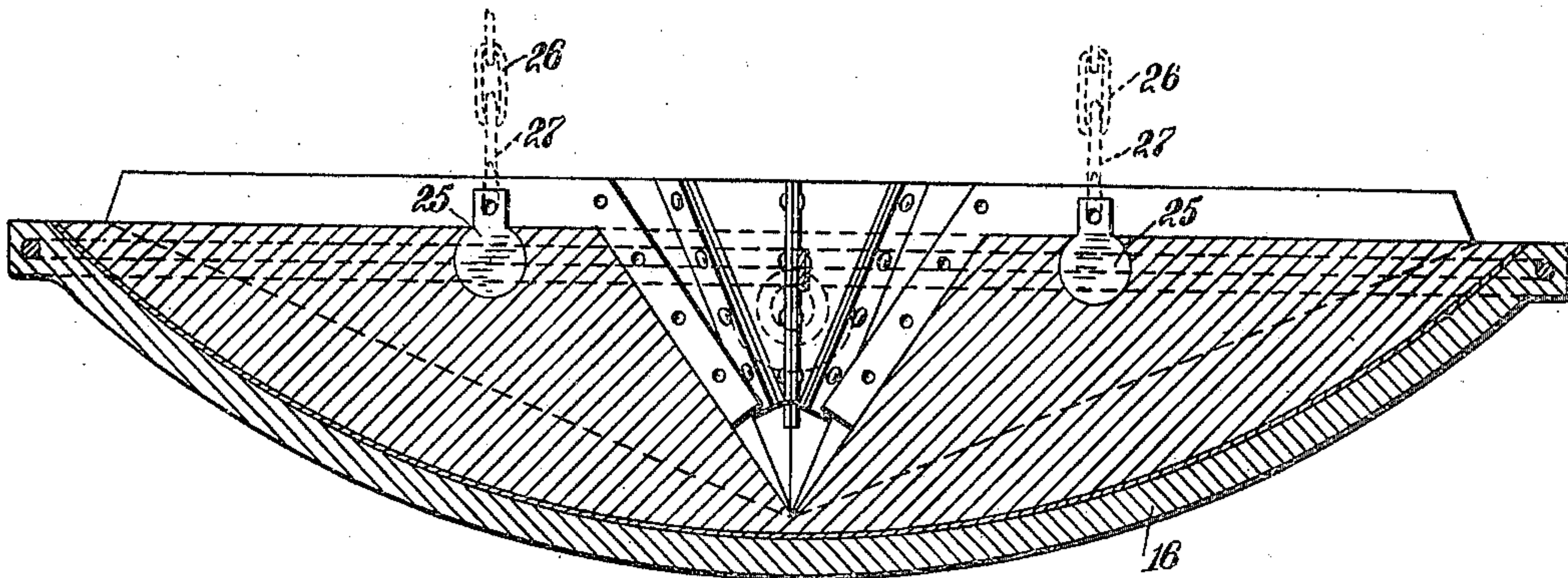
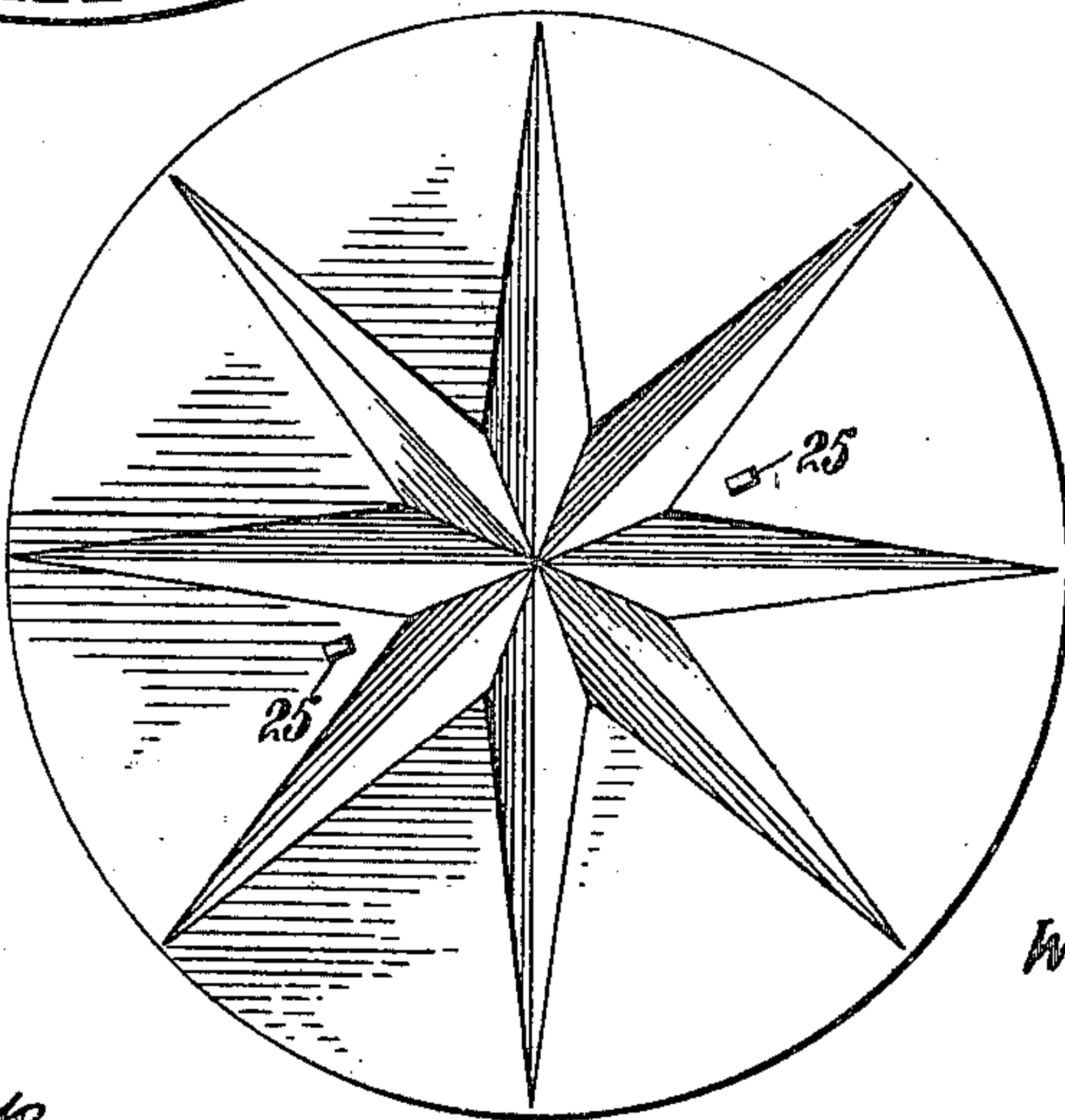


Fig. 10.

Fig. 11.



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UNITED STATES PATENT OFFICE.

WILLIAM D. KILBOURN, OF MURRAY, UTAH.

METHOD OF HANDLING MATTE.

964,275.

Specification of Letters Patent.

Patented July 12, 1910.

Application filed October 14, 1909. Serial No. 522,508.

To all whom it may concern:

Be it known that I, WILLIAM D. KILBOURN, a citizen of the United States, and a resident of Murray, in the county of Salt Lake and State of Utah, have invented a new and Improved Method of Handling Matte, of which the following is a full, clear, and exact description.

Among the principal objects which the present invention has in view are: to so handle the matte that the same will, in cooling, separate into fragments which may be delivered to the crusher without being manually broken; to prevent the bursting of large bodies of matte; and to provide an apparatus for so shaping the matte as will cause the same to separate into predetermined sizes and shapes upon cooling.

One embodiment of the apparatus, and a modification thereof, employed by me in the following of the method employed by me and hereinafter set forth, is illustrated in the accompanying drawings, wherein—

Figure 1 is a plan view of the shaper constructed and arranged in accordance with the present invention; Fig. 2 is a cross section through the center of a matte pan, containing the matte and shaper embedded therein; Fig. 3 is a top plan view of the matte pan, having a mass of matte contained therein, and shown as having been impressed by the shaper, which has been removed. In this view are shown the anchor molds. Fig. 4 is a top view of the matte pan, having the anchor molds attached thereto prior to receiving the molten matte; Fig. 5 is a fragmentary detail view of the edge of the matte pan, showing in section the edge of the shaper employed by me; Fig. 6 is a cross section of one of the extensions taken on the line 6—6 in Fig. 1; Fig. 7 is a top view of a modified form of a shaper constructed in accordance with the present invention; Fig. 8 is a sectional view taken on the line 8—8 in Fig. 7, of the shaper; Fig. 9 is a sectional view of the usual matte pan, similar to that shown in Fig. 2, showing the modified shaper, the same being shown as in its loaded condition, having secured therein the usual anchors; Fig. 10 is a top view of a form of the usual matte pan; and Fig. 11 is a top view of a mass of matte as formed by me when using the modified shaper, and prior to cooling.

Heretofore matte has been handled by being dipped, drawn off from the melt, and

run into matte pans of a construction similar to that illustrated in Fig. 10 of the present drawings. After being thus drawn, suitable steel hook-like anchors have been let into the molten matte, having suitable eyelets or grab hooks extended above the molten mass whereby the grab hooks or chains of a suitable crane engage the said anchors after the matte has cooled, to lift the matte as a mass from the pans to place the same upon a carrier, for cartage to the crushing dump. Many well known objections have attended this method of handling matte, among which it is sufficient to mention those which it is particularly designed this invention shall obviate. One prominent objection has been that the large mass in which the matte is handled requires that the same shall be broken into comparatively small fragments before being delivered to a crusher to be put into condition for the roaster. A second prominent objection has existed in that not infrequently the large mass of partially cooled matte bursts while being handled by the crane, scattering the partly molten interior of the mass, oftentimes among the mechanics employed in handling the same, thereby causing painful and often fatal injuries.

I have found that by impressing a shape upon the matte mass, I may take advantage of its rapid and unequal cooling qualities, causing it to automatically fracture along the lines of the angular impression. To impress the shape upon the mass which causes it to fracture, I employ metal forms of various sizes and shapes. Two of these forms are illustrated in the accompanying drawings, shown particularly in Figs. 1 and 6. The shape shown is an octagonal pointed star, the extensions 12, 12 of which are elongated, narrow and deep at the center.

The shaper I preferably construct from cast iron, the extensions 12, 12 being formed separately from a center body 13, and secured thereto by bolts 14, 14 and 15. The body 13 I form with octagonal sides adapted to receive the squared inner ends of the extensions 12. The center of the body 13 is formed in the shape of a bowl. (See Figs. 1 and 2.) The depth of the body is sufficient to extend above the rim of the pan 16 when pressed in the molten matte contained therein.

In the operation I utilize the upper edge of the body 13 to measure the depth of the

insertion of the shaper. When the molten mass of the matte is near the upper edge of the body 13, I know the thickness of the matte extending between the bottom of the body 13 and the bottom of the pan 16 at the center thereof.

The extensions 12, 12 are provided with spaces 17 in the center thereof, provided for the purpose of lightening the construction. The extensions are further provided with the overhanging portion 18 through which is driven a perforation to pass the screw bolt 15. Similar screw threaded perforations are provided in the body 13 to receive the bolt 15. The perforations provided in the same body to receive the bolts 14 are smooth bored. Perforations are provided in the extensions to align therewith being adapted to engage the screw threads of the said bolts 14.

When assembled for use, the shaper is in the form shown in Fig. 1 of the drawings. The purpose in forming the extensions in the manner described is to provide for the rapid and ready replacement of a broken extension. The extensions 12 are provided with overhangs 12^a, under which suitable grab hooks of a hoisting crane may be located, whereby the assembled shaper may be handled when inserted into and withdrawn from the molten matte mass. When the shaper is assembled, as shown in Figs. 1 and 2 of the drawings it is handled as a unit, and in such handling the grab hooks of the hoisting crane are inserted under the overhangs 12^a, 12^a.

When the matte has cooled it is lifted from the pans as a solid mass, and for this purpose I have provided the grooves 19, 19 on opposite sides of the mass of matte. These grooves are formed by clips 20, 20, which are secured on the pan prior to the molten matte being poured, by the set screws 21, 21. When the matte has sufficiently cooled to withdraw the clips 20, 20, the screws 21, 21 are loosened and the clips withdrawn. When the matte has sufficiently cooled to raise the mass from the pan the grapples of the hoist are inserted in the grooves 19, 19 and the cake is raised from the pan.

In the drawings, Figs. 7 to 10 inclusive, I have shown a modified form of the shaper, together with a pan of the present shape, and anchoring lugs as now employed in the handling of matte. This modified form of shaper I construct from sheet or plate metal, upturning the sides of the extensions 12, 12 to form troughs, and at the center upturning the edges 22, 22 to form securing flanges which are riveted together by rivets 23, 23. To further strengthen the construction I extend cross braces 24, 24 between two of the joined edges 22, 22. These braces 24, 24 not only serve to strengthen the construc-

tion, but also afford anchorage for attachment of the fall of the crane or other implement used for raising and lowering the shaper upon the molten mass.

In constructing the shaper it is designed that the common center of the extensions 12, 12 should reach to nearly the bottom of the pan 16. In this way there is formed in the mass of matte a series of depressions extending from the periphery of the mass on the upper surface to the center, and at a gradually increasing depth from the periphery to the center.

The method of handling matte employed by me is as follows: The matte is drawn off into the pan 16 in the usual manner. The shaper is dipped into a clay wash and as the matte is cooling the shaper is depressed into the upper surface and there permitted to remain a few seconds. It is then lifted and permitted to cool, when it will be found that there has adhered a thin coating of the matte. When this has cooled the shaper may be returned and embedded in the surface of the matte for a period of from twelve to eighteen minutes, in which time the mass of matte has cooled sufficiently to solidify, at least upon the upper surface. The shaper is then removed by lifting the same. There is left an impression in the matte mass, substantially as shown in Figs. 3 and 11 of the drawings. The further cooling of the matte mass is facilitated by the increase of the cooling surface formed by the impression, thereby retaining the matte mass for a shorter period in contact with the cast iron pan 16.

To lift the mass from the pan 16 the clips 20, 20 are removed, leaving the grooves 19, 19. Within these grooves 19, 19 are inserted the grapple irons of the hoist. When the grapple irons are firmly seated, the hoist raises the mass away from the pan and deposits the same in a convenient place for more rapid cooling.

When using the modified form of shaper, there have been inserted in the molten matte the anchors 25, 25, to which chains 26, 26 are connected by means of hooks 27, 27. When the mass has cooled sufficiently to retain its mass form, the hooks 27, 27 are inserted in the eyelets of the anchors 25, 25, and by a suitable crane connected with the chains 26, 26, the mass is lifted from the pan 16 and placed in some convenient position for final cooling. It is in the final cooling that the fractures due to the extreme contraction of the mass occur. These fractures are along the lines of most constricted areas, which is from the bottom of the grooves formed by the extensions 12, 12 and the pan 16.

It will be found, after the mass has been fractured in the number of pieces as above described, that the fragments may be de-

livered into the crusher without further handling.

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

1. The method of handling matte, consisting in impressing upon the upper surface of the matte mass while cooling, a series of indentations.
2. The method of handling matte, consisting in impressing upon the matte mass while cooling, a series of indentations disposed in the line of desired division of the mass.
3. The method of handling matte, consisting in impressing upon the upper surface of the matte mass while cooling, a series of elongated grooves.
4. The method of handling matte, consisting in impressing upon the matte mass while cooling, a series of elongated grooves disposed in the line of desired division of the mass.

5. The method of handling matte, consisting of impressing upon the matte mass while cooling, a series of elongated grooves radially disposed.

6. The method of handling matte, consisting in impressing upon the matte mass while cooling, a series of grooves adapted to cause the mass to fracture along the line of said grooves when contracting.

7. The method of handling matte, consisting in drawing off the matte into a shallow pan; and embedding in the upper surface of said matte until the same is sufficiently cooled to retain its form, a metallic shape adapted to produce a series of elongated grooves in said matte mass.

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

WILLIAM D. KILBOURN.

Witnesses:

J. W. HOUSTON,
F. O. HORN.