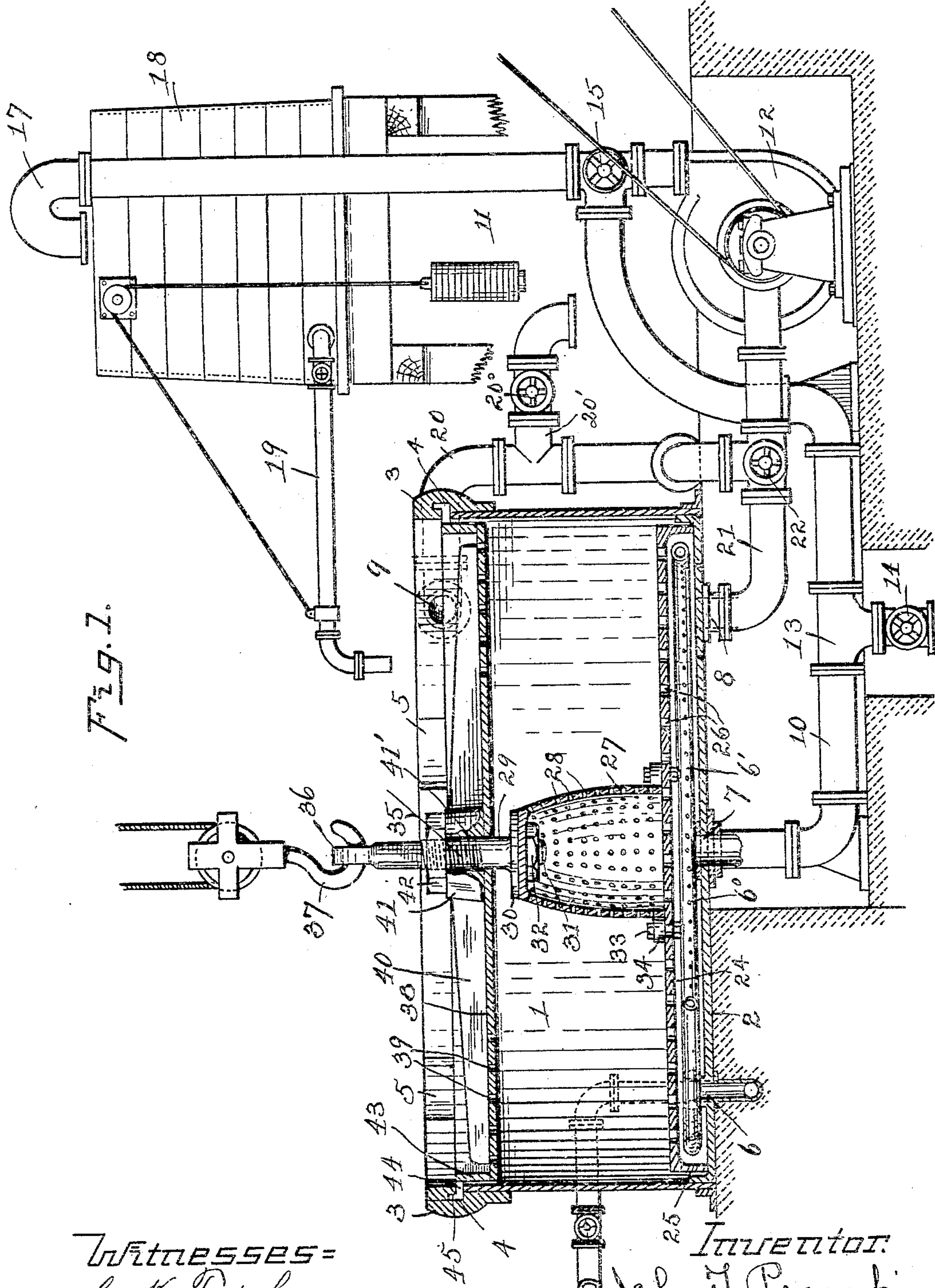


J. T. PSARSKI.
DYEING MACHINE.
APPLICATION FILED MAR. 23, 1909.

955,993.

Patented Apr. 26, 1910.

3 SHEETS—SHEET 1.



Witnesses=
C. H. Tresch.
B. E. Reynolds.

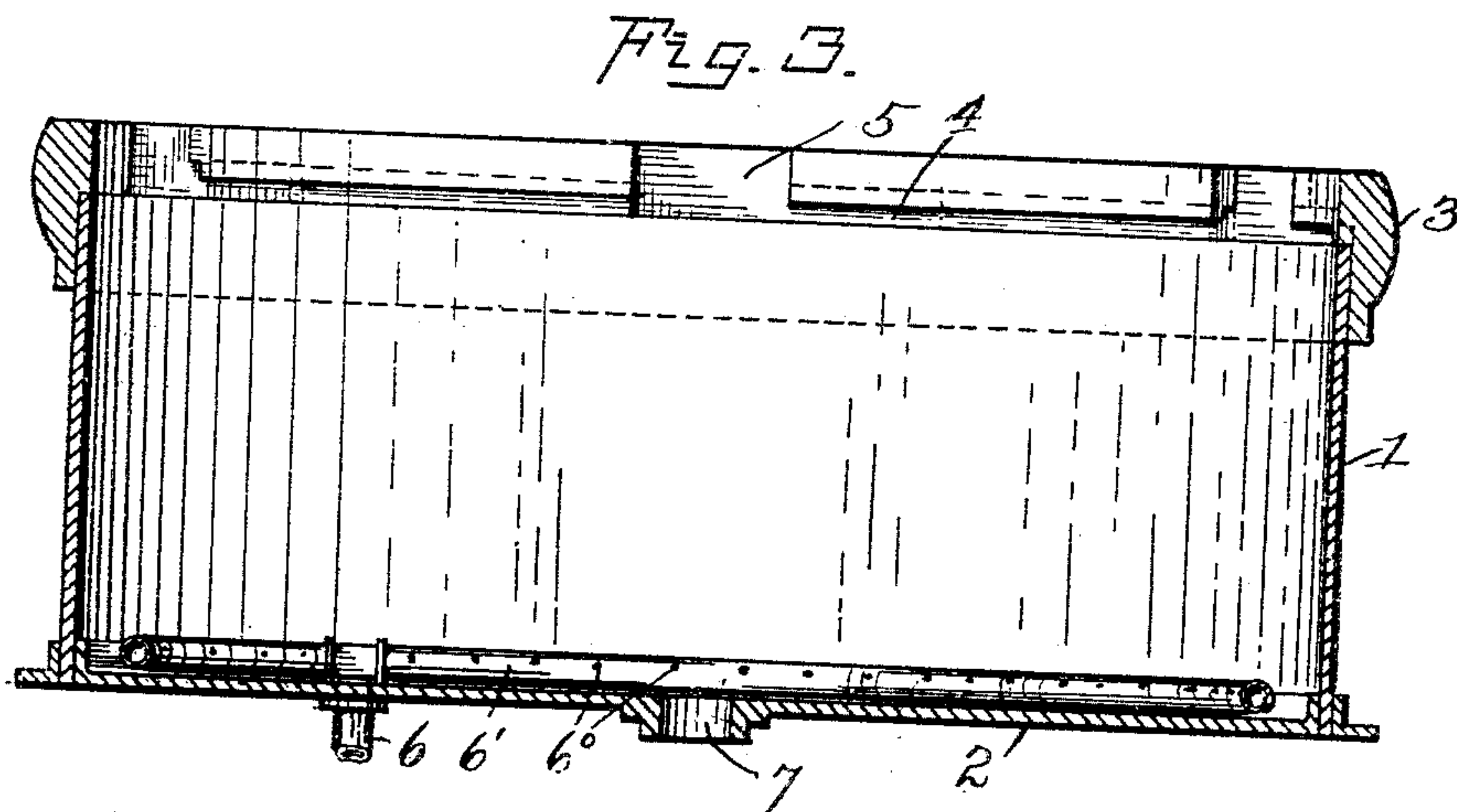
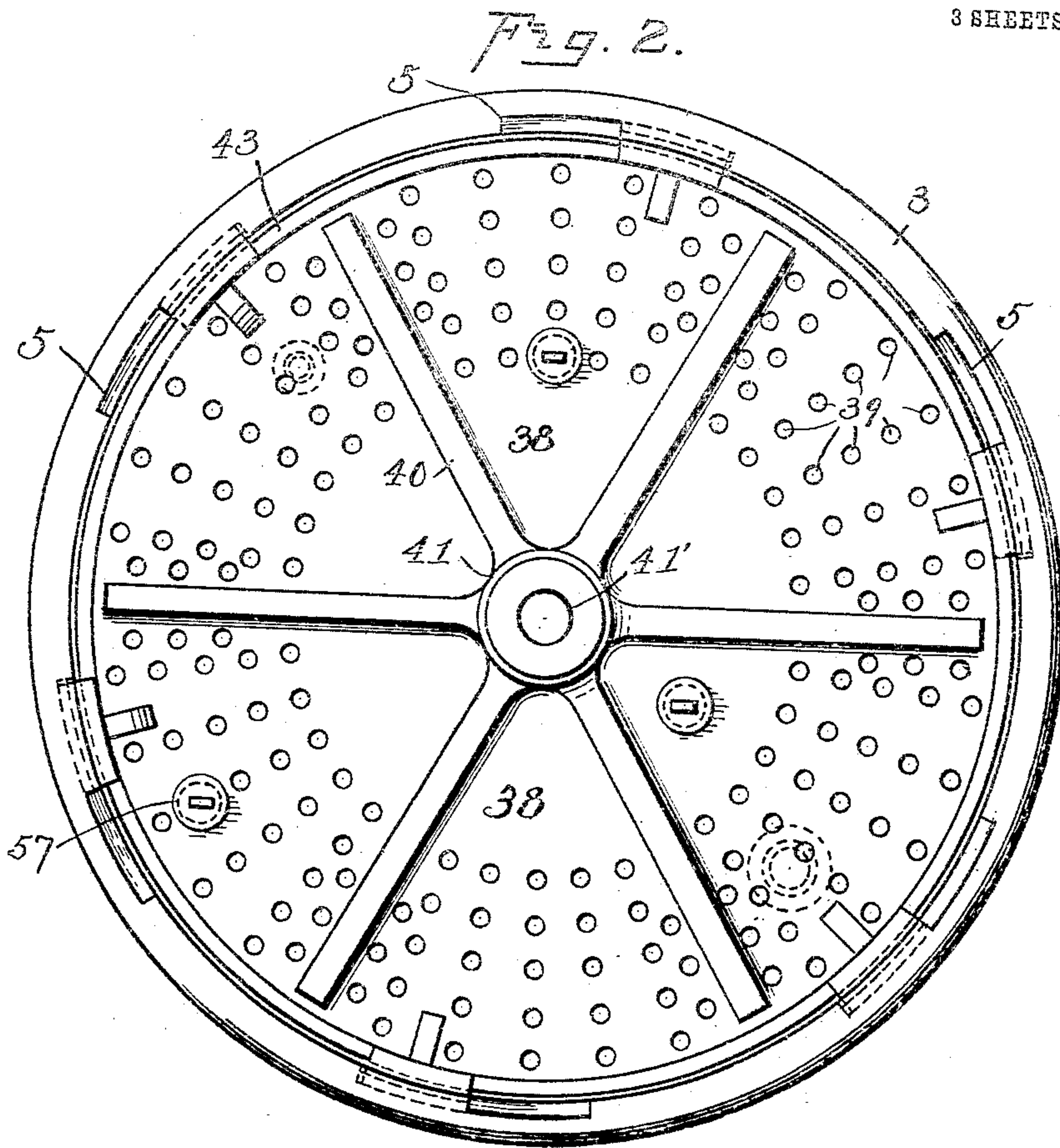
Inventor:
John T. Psarski,
by Crockett & Kivis
Attorneys.

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3 SHEETS—SHEET 2.



Witnesses:
C. H. Dresch
B. E. Reynolds.

Inventor:
John T. Psarski,
by
Brockett & Kivis
Attorneys.

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3 SHEETS—SHEET 3.

Fig. 4.

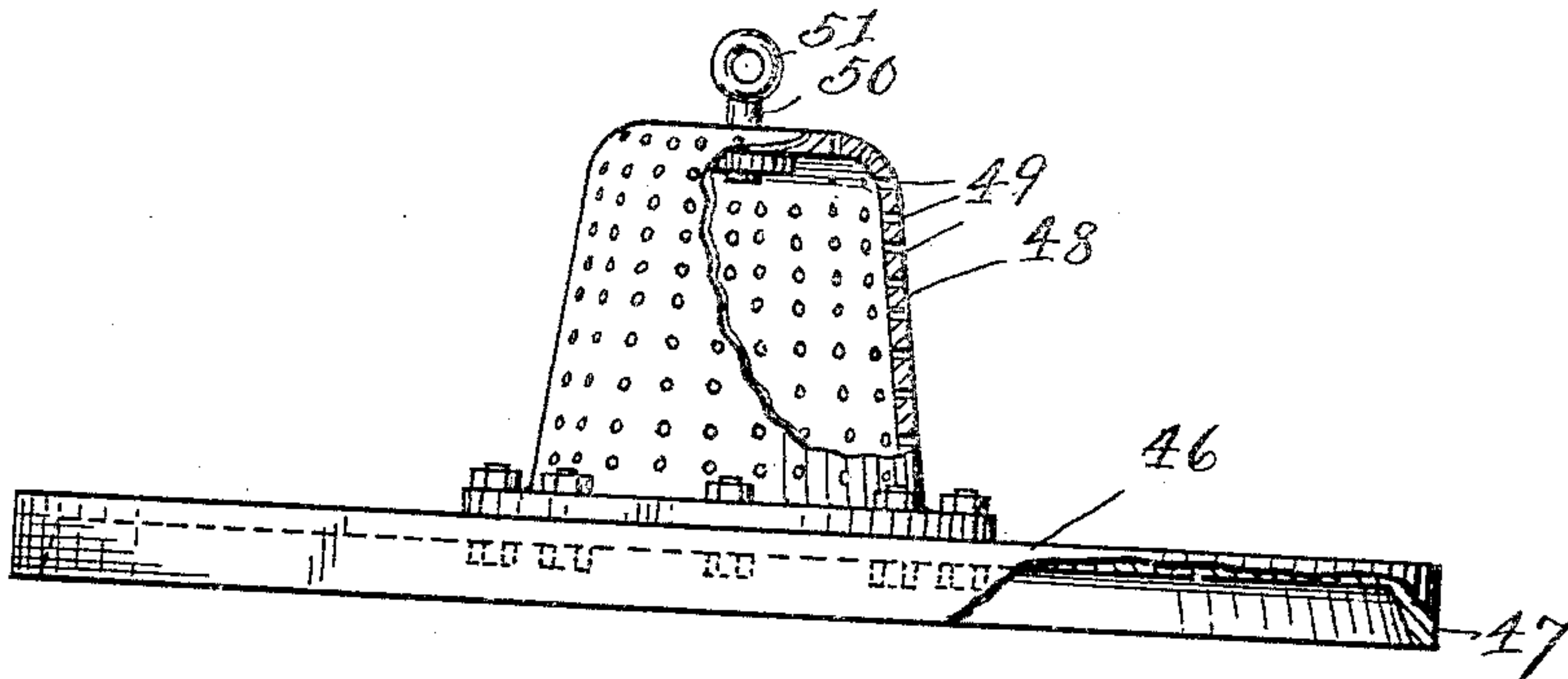
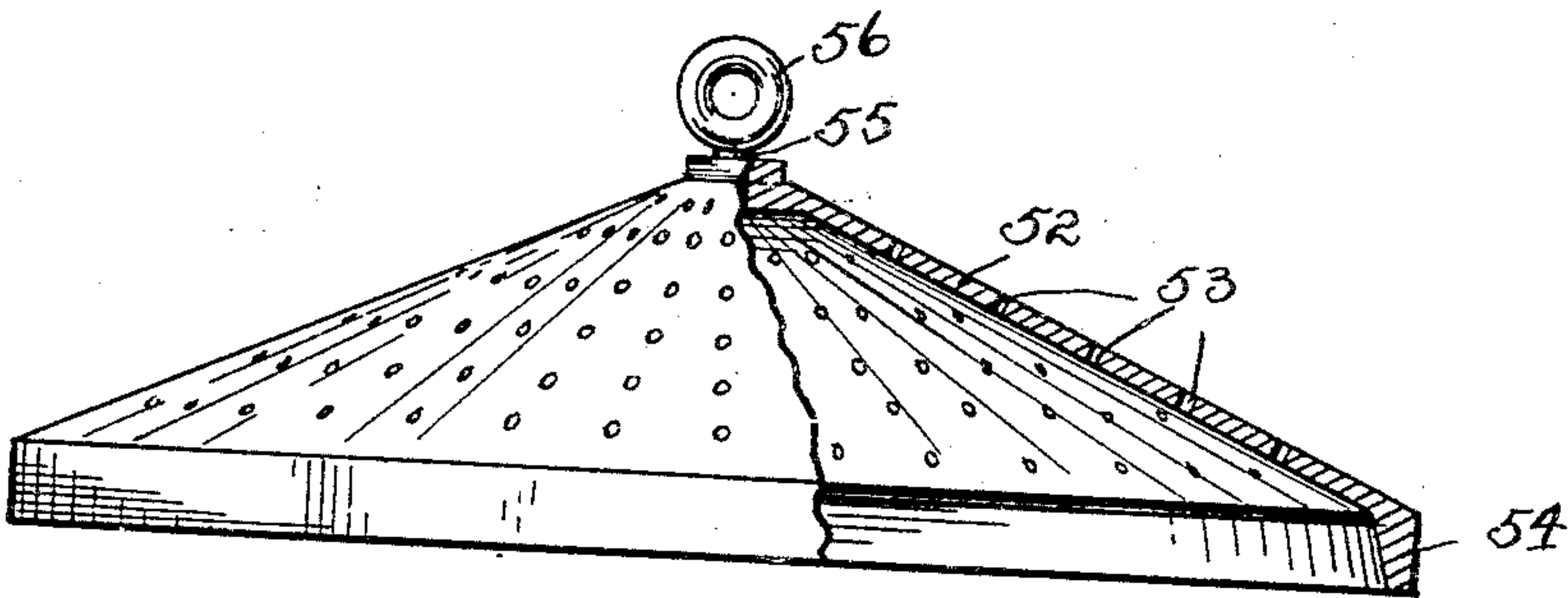


Fig. 5.



Witnesses:
C. H. Tesch
B. E. Reynolds.

Inventor.
John T. Psarski,
by
Brockett & Kwis,
Attorneys.

UNITED STATES PATENT OFFICE.

JOHN T. PSARSKI, OF CLEVELAND, OHIO.

DYEING-MACHINE.

955,993.

Specification of Letters Patent.

Patented Apr. 26, 1910.

Application filed March 23, 1909. Serial No. 485,222.

To all whom it may concern:

Be it known that I, JOHN T. PSARSKI, a subject of the Czar of Russia, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Dyeing-Machines, of which the following is a specification.

In the art of dyeing cotton and wool and other substances numerous difficulties are encountered in the endeavor to obtain a uniform coloring of the mass by reason of the fact that the dye liquor is not evenly distributed through the mass, by reason of its forming channels, thus causing some portions to be more thoroughly colored than others. These channels form through the mass but they appear more easily and more frequently between the mass and the metal tank or cover. In fact it is a well established fact among colorists that great skill is required in the packing of any ordinary dye tank to prevent the formation of these channels and even then if the dye liquor is forced through with any considerable pressure it will form channels in spite of the care taken in the packing or filling process. In fact in using some fast dyes the distribution of the dye in the apparatus now in use, is so poor that practically all of such dyeing is done by hand, as it were, in order to produce an even color.

In coloring wool the acid colors distribute through the mass, with the apparatus of the present day, fairly well and with reasonable success except that there is a slight variation in the color as pointed out. The fast dyes for wool or the alizarin colors, however, are very heavy and do not permeate the mass readily with the present form of apparatus, so that the work is usually done by hand. This is also true of the dyes for cotton, namely the substantive colors and sulfur colors, for while the substantive colors permeate the mass with fair results, the sulfur colors are more stubborn and act in a manner similar to the fast colors for wool. All of these difficulties are substantially eliminated by the applicant's apparatus and he is able to produce an even grade of color throughout the entire mass by reason of the fact that he is able to force the dye liquor through the mass with more pressure and much more quickly on account of the lack of formation of channels.

The object of the present invention, therefore, is to so confine the material to be dyed in a portion of the apparatus, by a particular circulation of the dye liquor, that channels around and through the mass are substantially prevented, and an even color is produced, so that the dye liquor may be circulated more rapidly and with greater pressure, thus decreasing the time consumed in the dyeing operation.

More specifically the invention relates to a suitable tank provided with a cover having perforations, preferably near the periphery only, together with a distributing member adapted to distribute the dye liquor in a manner such that the mass is forced upward by and outwardly from the center and toward the outlet opening so that the formation of channels is prevented. It is also a feature of the invention to have the capacity of the outlet openings less than the inlet openings and to circulate the dye liquor under pressure so that the mass is forced in the direction and to the point indicated with great pressure, thereby making it necessary for the liquor to go through the mass rather than forming channels around it.

The invention further relates to certain details of construction hereinafter set forth in the following description, drawings and claims.

Referring to the drawings, Figure 1 is a side elevation of a tank constructed in accordance with my invention showing the dyeing tank in section; Fig. 2 is a top plan view of the dyeing tank showing the construction of the lid or cover; Fig. 3 is a sectional view of the tank with the cover and the false bottom and other mechanism removed; Fig. 4 is a side elevation of a modified form of bottom; and Fig. 5 is a side elevation partly in section of still another modified form of bottom.

In carrying out my invention any preferred form and construction of parts may be employed so long as they possess the necessary features, but I have shown one construction in the drawings which is highly effective in operation and in such embodiment 1 represents a suitable tank having a suitable bottom plate 2 and a reinforcing rim 3 provided with an annular groove 4, and at points around said rim provided with cut-away portions 5 for a purpose to be described. The tank is further provided with a steam inlet 6 and a dye liquor inlet 7 lo-

cated at substantially the center of the bottom plate, a dye liquor outlet 8 also in the bottom, but preferably to one side of the center, and another dye liquor outlet 9 near the upper edge thereof as shown clearly in Fig. 1. The liquor inlet 7 is connected by a pipe 10 with a pipe 11 leading to a suitable pump 12 which is preferably of the centrifugal type. The pipe 10 is provided with a tee 13 having a valve 14 in the branch thereof which controls the outlet of any liquor from the pipe 10 to the sewer or other discharge. The pipe 10 is connected to the pipe 11 and at the juncture of these pipes is a three-way valve 15 for a purpose to be described. The pipe 11 is extended up and is provided with a return bend 17 which may empty into a suitable dye liquor tank 18 having a discharge pipe 19 extending over the tank 1. The upper outlet 9 is connected by a pipe 20 with a pipe 21 leading to the lower dye outlet 8 and passing to the inlet of the centrifugal pump 12. A three-way valve 22 is arranged at the juncture of the pipe 20 and the pipe 21 for a purpose to be described.

By the arrangement of pipes and valves already described, it will be seen that as the dye liquor is supplied from the tank 18 to the tank 1, it is drawn by the pump 12 from the upper part of the tank through the outlet 9, the valve 22 being set for such operation. As the pump forces the liquor into the pipe 11 it passes through the pipe 10 to the bottom part of the tank, thence through the mass of cotton or wool, in a manner to be described, to the top of the tank 1 where it passes out in the same manner through the outlet 9, the valve 15 being set to permit the flow through the pipe 10 and to prevent any flow back to the dye tank 18. If the operator should desire to return the liquor to the tank 18, the valves 22 and 15 are set so that the liquor will be drawn from the bottom of the tank 1 by the pump 12 and forced up through the pipe 11 back into the dye tank 18 for further use if desired. If the operator should desire to discharge the liquor into the sewer, this may be accomplished by opening the valve 14, which will permit the exit from the tank 1 through the pipe 10.

The tank 1 is provided with a false bottom 24 spaced away from the bottom plate 2 by means of a flange 25 and provided with perforations 26 which permit the dye liquor supplied through the opening 7 in the bottom plate, to pass up through the mass above the false bottom 24. This false bottom has at substantially the center, a distributing member 27 of more or less cylindrical form but having slightly sloping sides provided with perforations 28. This member 27 has secured to it a shank 29 having a shoulder 30 bearing against the top of the member, and a threaded portion 31 extending through

an opening in the same and provided with a nut 32. The member 27 is secured to the false bottom by means of bolts 33 passing through a flange 34 forming part of the member. The shank 29 is threaded at 35 and extends above the edge of the tank where it is provided with an eye 36 through which the hook 37 of a suitable hoist may be engaged.

A suitable cover 38 is provided for the tank 1 and it is provided with a plurality of perforations 39 to permit the liquor to pass therethrough, and with strengthening ribs 40 which meet at a boss 41 at the center having an opening 41' therethrough for the reception of the shank 29. A nut 42 may be supplied to the threaded portion 35 of the shank 29 for engagement with the boss 41 to force the cover downward into the tank as will later be more fully disclosed.

The cover is normally held within the tank by means of a ring 43 which is provided with lugs 44 having up-turned end portions 45 and these lugs and end portions are adapted to engage in the groove 4 after they have been let down through the recesses 5 so that they may aline or register with such groove 4. The perforations in the cover are of less capacity than those in the distributing member so that the entire pressure of the circulation will accumulate under the mass, as it were, to force it into the outer upper corner around the tank and tightly against the outlet openings in the cover and against the side of the tank so that the formation of channels is substantially avoided.

In charging the dyeing tank 1 the false bottom 24 is arranged in place and the cotton or wool or other material is supplied above this bottom and around the distributing member 27 to the proper height in the tank. After this has been accomplished, the cover 38 is then let down upon the mass with the lugs 44 and end portions 45 passing down through the recesses 5 until they are at a point to register with the groove 4. If they should not register due to the density of the cotton or wool, they may be brought into such position by setting up the nut 42 upon the threaded portion 35 of the shank 29 when a slight additional pressure is had upon the cotton or wool by means of this nut. The cover in place upon the material, the next operation is to admit the dye liquor through the pipe 19 from the tank 18 until it is higher in the dyeing tank 1 than the opening 9. The pump 12 is then set in motion with the valves 22 and 15 set to permit the dye liquor above the cover 40 to be drawn through the pipe 20 and a part of the pipe 21 to the pump and thence forced through the pipe 10 above the bottom plate 2 through the perforations in the false bottom 24 and through the perforations in the

central distributing member 27 and radially upwardly against the mass forcing it against the top and against the side of the tank toward the upper outer corner whereby the formation of channels between the mass and the side or top of the tank is prevented. It will also be seen that since channels are not formed, the dye liquor must pass through the mass before it can get out through the perforations near the periphery of the cover, and in view of the fact, as noted that channels are not formed, the pressure of the dye liquor may be increased so that it will flow with considerable rapidity through the machine, thus decreasing the length of time consumed in dyeing very materially. This operation is continued for a sufficient length of time to properly set the color in the material, and after this is accomplished the dye may be returned to the tank in a manner already described, or may be discharged into the sewer.

In the modification shown in Fig. 4 the perforated false bottom 46, similar in all respects to the false bottom 24, is provided with a flange 47 and a central distributing member 48 provided with perforations 49 and with a centrally located shank 50 provided with an eye 51. This device is used where it is not necessary to have a central bearing on the top of the cover.

In the modification shown in Fig. 5 the false bottom 52 is made conical and is provided with perforations 53 and a supporting flange 54 as well as a centrally located shank 55 provided with an eye 56. This bottom is used on materials which color very readily and which require less circulation or distribution of the dye than others. I prefer to supply the steam inlet 6 with a distributing pipe 6' which is preferably arranged circularly around the inside of the tank, as shown clearly in Figs. 1 and 3, and this pipe is provided on the inside of the circle with perforations 60 whereby the steam is distributed evenly through the dye liquor under the false bottom. If for any reason it should be necessary to drain from the top of the tank the dye liquor or water this may be accomplished by means of an outlet 20' in the pipe 20. This outlet 20' is provided with a valve 20°. In order to obtain access to the dye tank after the cover is in place suitable tri-holes 57 are provided at various points in the cover and at various distances from the center so that samples may be taken from within to ascertain the grade of coloring of the different portions of the material.

Having described my invention, I claim:—

1. In an apparatus for dyeing permeable material by forcing dye-carrying liquor through the same, a receptacle forming a chamber for receiving the material and having means for distributing the entering

liquor over one face of the mass of material in the chamber, also having independent imperforate portions for confining the material and arranged in opposition to the liquor entrance, and further provided with a discharge arranged between the imperforate portions, the material being forced toward said imperforate portions and the discharge by the circulation of the dye liquor through the mass whereby channeling is prevented.

2. In an apparatus for dyeing permeable material by forcing dye-carrying liquor through the same, a receptacle provided with a foraminous portion for supplying the liquor to one surface of the mass of material in the receptacle, with independent imperforate material-confining portions arranged in opposition to said supply and against which the material is compacted, and with a discharge arranged between said imperforate material-confining portions.

3. In an apparatus for dyeing fibrous material by forcing dye-carrying liquor through the same, a receptacle forming a dyeing chamber and having means for distributing the liquor on one side of the mass of fibrous material contained in the receptacle, a foraminous portion through which the liquor escapes on the opposite side of the mass of material, and central and peripheral imperforate fiber-confining portions arranged at an angle to each other on opposite sides of said foraminous portion and forming surfaces against which the material is compacted to prevent channeling, one of said imperforate portions extending in substantially the plane of the foraminous portion.

4. In an apparatus for dyeing permeable fibrous material by repeatedly forcing dye-carrying liquor through the same, a receptacle forming a dyeing chamber having a foraminous bottom extending upwardly at the center for distributing the liquid to the under side and center of the mass of fibrous material, independent imperforate portions arranged at an angle to each other and located respectively opposite said bottom and the upwardly extending portion of the bottom, and a foraminous portion intermediate said imperforate portions through which the liquid may escape.

5. In an apparatus for dyeing permeable fibrous material by repeatedly forcing dye-carrying liquor through the same, a tank having imperforate sides, a foraminous bottom extending upwardly at the center for distributing the liquid to the under side and center of the mass of fibrous material and a cover having a central imperforate portion against which the material will compact to prevent channeling, and a foraminous part through which the liquor may escape located between the central imperforate part of the cover and side wall of the tank.

6. In a dyeing machine, in combination, a

tank, a single unitary cover for said tank having outlet openings near the periphery thereof only, a distributing member extending over the bottom and having a portion
5 projecting up into the center of the mass of the material, said member being provided with perforations, the aggregate capacity of which is greater than that of the outlet openings, and said distributing member serving
10 to cause an upward and outward distribution of liquor whereby the mass is forced against the side and the top near the periphery thereby preventing the formation of channels at these points, and means for
15 circulating the liquor under pressure.

7. In a dyeing machine, in combination, a tank, a single, unitary cover therefor having outlet openings near the periphery

thereof only, a perforated horizontal false bottom for distributing the dye liquor upwardly through the mass to be dyed, said
20 false bottom having a perforated member extending up into the center of the tank from said bottom and serving to cause a radial circulation of the dye liquor, the aggregate capacity of the perforations in the
25 false bottom and upwardly extending member being greater than the capacity of the outlet openings in the cover, and means for
30 circulating the dye liquor.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN T. PSARSKI.

Witnesses:

ALTON H. BEMIS,
C. H. TRESCH.