

A. C. RICE.
TANK FOR TREATING GLUTINOUS MATERIAL.
APPLICATION FILED MAR. 6, 1907.

903,775.

Patented Nov. 10, 1908.

3 SHEETS—SHEET 1.

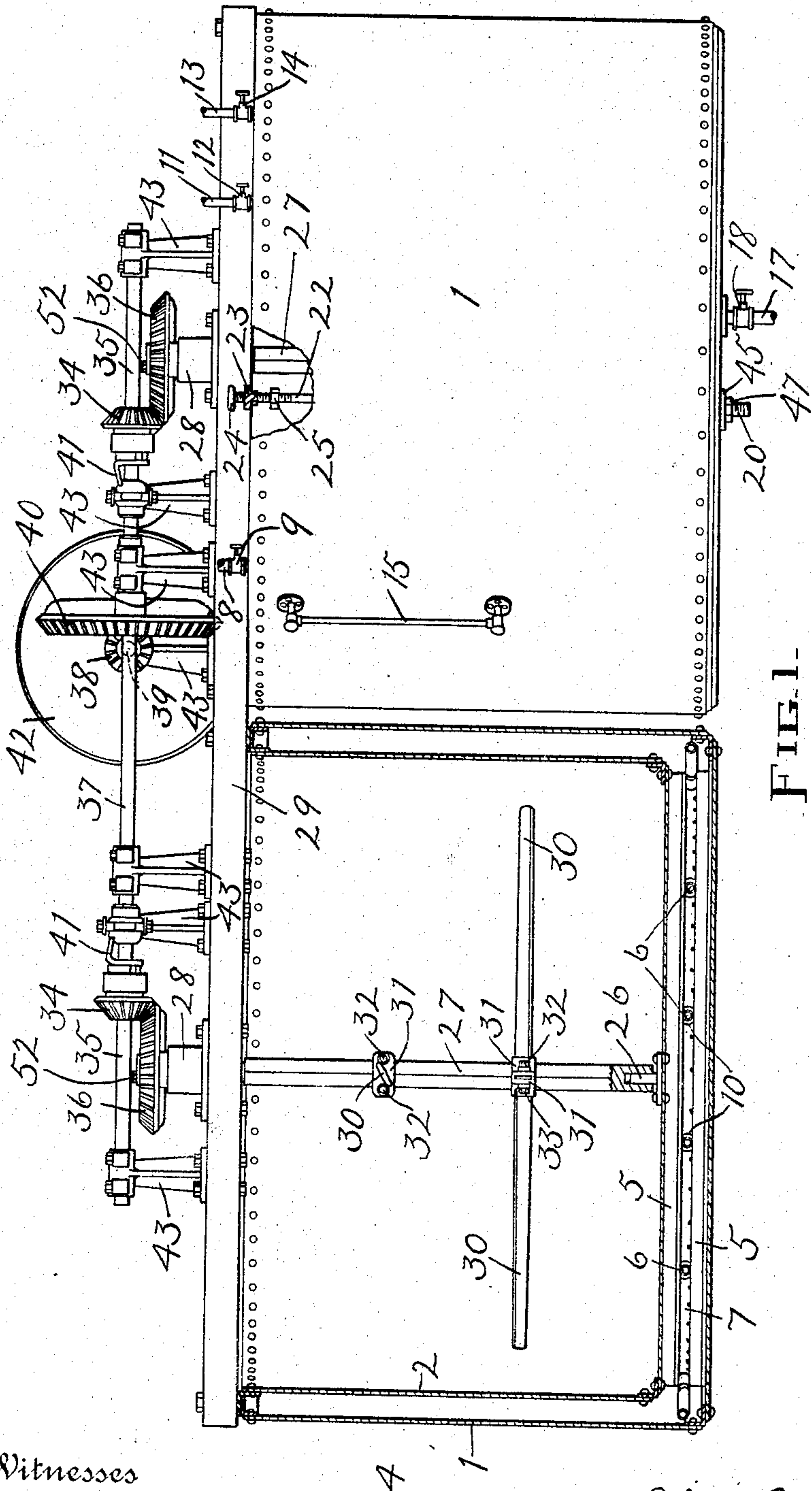


FIG. 1.

Witnesses
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at St. Pointe.

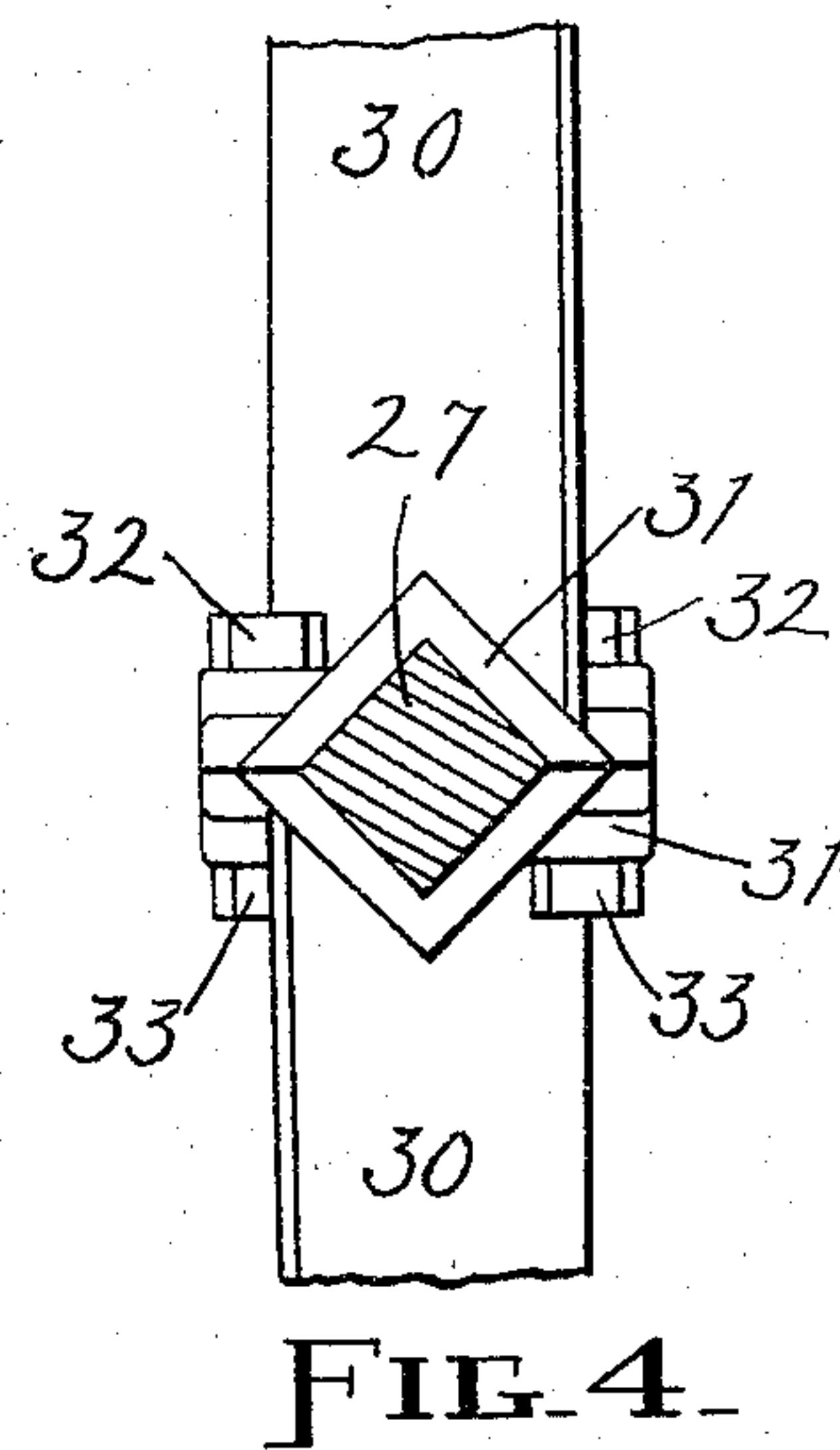
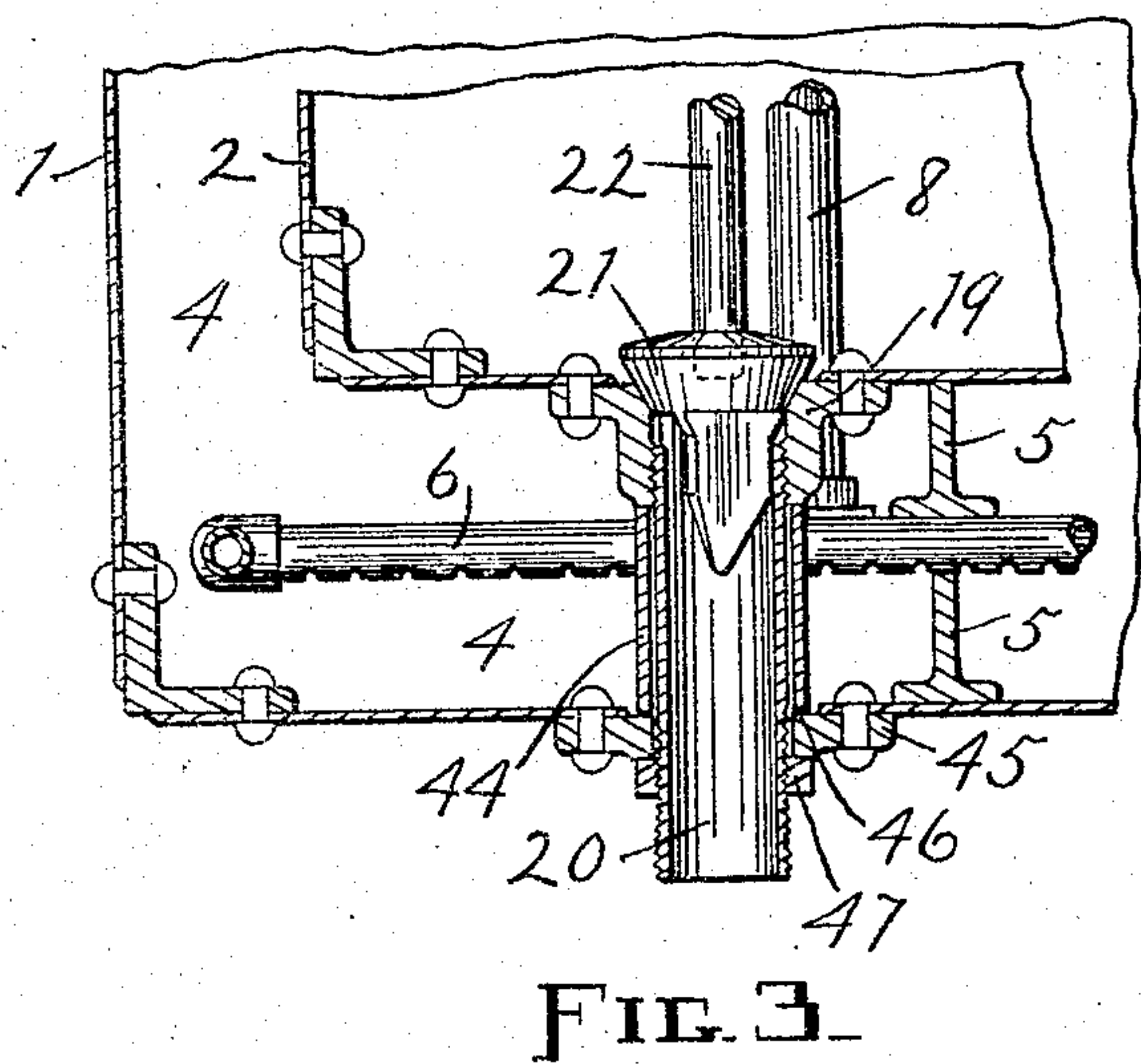
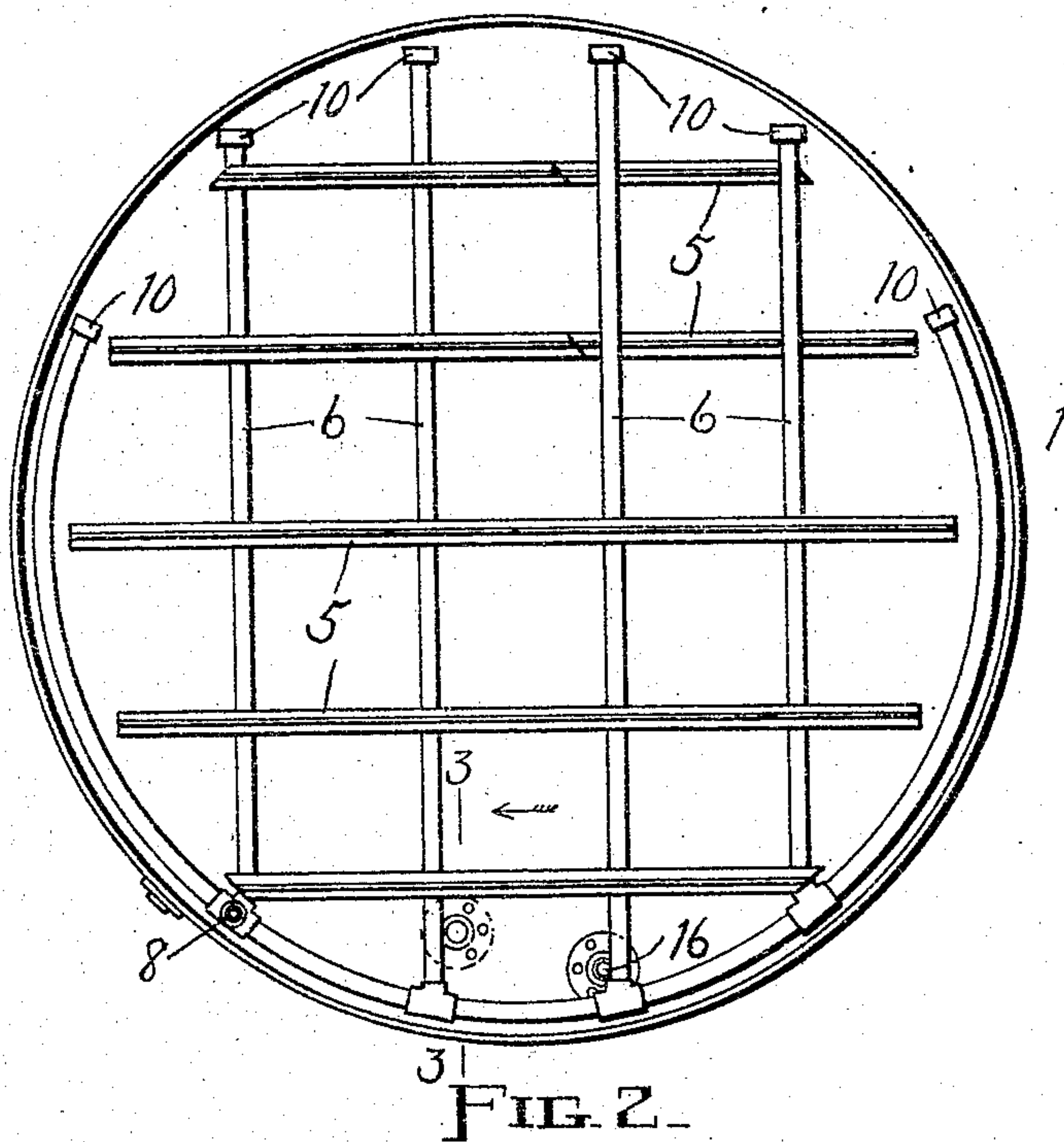
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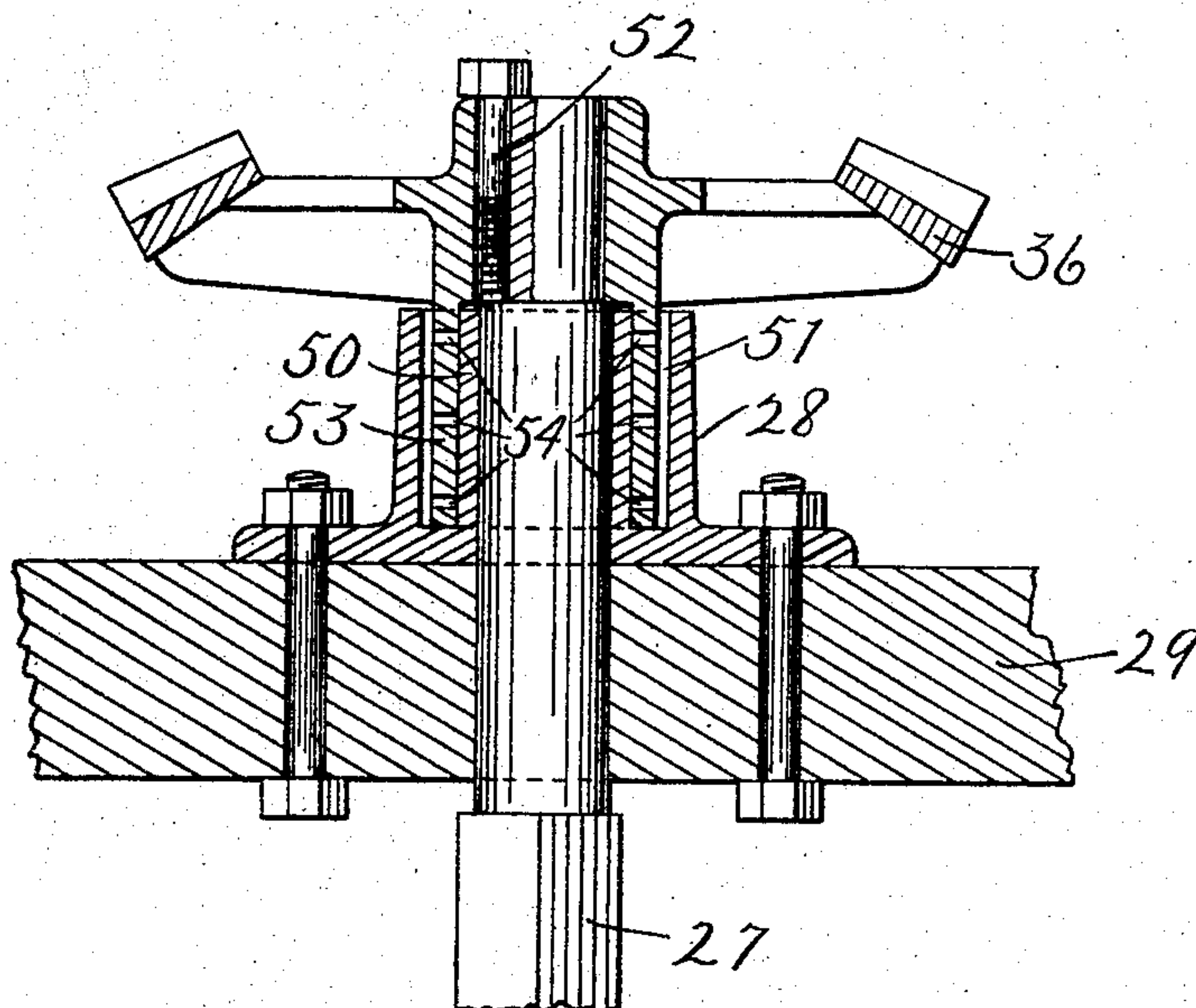


FIG. 5.

WITNESSES
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UNITED STATES PATENT OFFICE.

ALVA C. RICE, OF WORCESTER, MASSACHUSETTS, ASSIGNOR TO VELLUMOID PAPER COMPANY, OF WORCESTER, MASSACHUSETTS, A CORPORATION OF WEST VIRGINIA.

TANK FOR TREATING GLUTINOUS MATERIAL.

No. 903,775.

Specification of Letters Patent.

Patented Nov. 10, 1908.

Application filed March 6, 1907. Serial No. 360,831.

To all whom it may concern:

Be it known that I, ALVA C. RICE, a citizen of the United States of America, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Tank for Treating Glutinous Material, of which the following is a specification.

My invention relates to improvements in tanks employed in the preparation of glutinous material, as ordinary glue, for certain purpose, in which a peculiarly constructed tank is provided, together with power-driven agitators of special construction, and auxiliary and subsidiary parts and members, all as hereinafter set forth.

The object of my invention is to provide a tank suitable for cooking and otherwise preparing to the best advantage the glue used in treating paper to strengthen the same and to render it water-proof, grease-proof and acid-proof, or for other uses to which such tank may be adapted. This tank is particularly useful in the manufacture of what is known as Vellumoid paper or paper covered by United States Letters Patent No. 804,808, issued to the Vellumoid Paper Company November 14th, 1905.

Other objects and advantages of my improvement will appear in the course of the following description.

I attain these objects by the means illustrated in the accompanying drawings, in which—

Figure 1 is a view of two tanks and their appurtenances embodying my invention, the first of these tanks being shown in section and the second in elevation; Fig. 2, a plan view of the outer jacket of one of the tanks; Fig. 3, an enlarged sectional view of a portion of the bottom of one of the tanks, showing the construction of the same and the outlet from the interior with the valve therefor, said view being taken on lines 3—3 looking in the direction of the arrow in Fig. 2; Fig. 4, an enlarged detail of the agitator, the shaft being in section and the major portions of the arms being broken off, and, Fig. 5, an enlarged detail of the agitator shaft bearing.

Similar figures refer to similar parts throughout the several views.

Although each tank is complete in itself and each is the duplicate of the other, I have shown two because in practice I prefer to employ two and even three or more, according

to the size of the plant or the size and number of the treating tanks for the paper which receive their supply from this source.

The driving mechanism for the agitators is adaptable to any number of tanks after the first by merely lengthening the shaft and duplicating the supports therefor and the gears thereon, as will be readily seen.

Each tank consists of an outer jacket 1 and an inner jacket 2 suitably constructed and so arranged one within the other as to provide a chamber 4 at the sides and bottom, such chamber being closed at the top. On the bottom or floor of the jacket 1 are two series of inverted T-irons 5 with a series of perforated steam pipes 6 between. The aforesaid T-irons and pipes lie horizontally between the floors of the two jackets, and the bottom of the jacket 2 rests on the upper T-irons.

At one end the steam pipes 6 open into a perforated steam pipe 7 which extends part way around the chamber 4 and receives steam from a suitable source of supply through a stand pipe 8. The stand pipe 8 opens at the bottom into the pipe 7 and rises above the top of the chamber 4 where it is provided with a valve 9 to control the entrance of the steam. The ends of the pipe 7 and the ends of the pipes 6 opposite the junction points with said pipe 7 are closed with caps 10. The pipes 6 extend crosswise of the T-irons.

Water is admitted to the chamber 4, from any suitable source of supply, through a pipe 11 located at the top and provided with a valve 12; and water, both hot and cold at different times during the preparation of the solution, is admitted to the interior of the tank, that is, to the jacket 2, from any suitable sources of supply, through a pipe also located at the top and provided with a valve 14.

15 is a gage-glass to show the height of water in the jacket 4.

In the floor of the jacket 1 is a clean-out opening 16 through which the waste water in the chamber 4 can be removed, a pipe 17 and valve 18 being provided below said floor for this purpose.

The outlet from the tank for the solution is through a valve-seat 19, riveted to the underside of the floor of the jacket 2, and a pipe 20 passing from said valve-seat downward through the floor of the jacket 1. The lower end of the pipe 20 is usually connect-

ed by a pipe with a pump (not shown) through the medium of which the solution is transferred from the preparing tank to the treating tank for the paper.

5 A valve 21 is provided for the valve-seat 19, which has a stem 22 extending upward through and above a bracket 23 at the top of the tank. The upper terminal of the valve-stem 22 is in threaded engagement
10 with the bracket 23, and such stem has a hand-wheel 24 mounted thereon to facilitate rotating the parts so as to open or close the valve 21 according to the direction of such rotation and whether said stem be screwed
15 up or down in said bracket. A check-nut 25 on the valve-stem 22 below the bracket 23 serves to limit the upward travel of said stem by reason of its coming into contact with said bracket when the stem is screwed
20 upward or outward, and thus limits the upward movement of the valve 21 or determines the extent to which the same can be opened. This limit of movement of the valve in opening can be changed, of course,
25 by readjusting the check-nut 25. A portion of one side of the second or right-hand tank in Fig. 1 is broken out to show the connection between the valve-stem and its bracket.

Rising from the center of the floor of the
30 jacket 2 of the tank is a pin or stud 26 which enters an opening in the base of a vertical agitator shaft 27 and prevents such base from swaying. The upper terminal of the shaft 27 is journaled in the manner ex-
35 plained below in a bearing 28 bolted to the top of a support or platform 29, after passing through the same. The platform 29 supports the agitator mechanism on top of the tanks. The shaft 27 below the platform
40 29 is square in cross-section and to this portion of the shaft is secured a number of horizontal agitator paddles or arms 30, there being four such arms in the present case arranged in pairs standing at right-angles to
45 each other.

Each arm 30 has at its inner end a collar section 31 adapted to fit onto two adjacent sides of the angular part of the shaft 27, so that when two arms have their collar sections brought into proper position they can
50 be bolted together, as shown, to form a complete collar about said shaft. The collars formed in the manner noted above firmly grip the shaft and hold the arms securely in
55 place, owing to the fact that the adjacent edges of each pair of collar sections do not come quite together thus enabling such sections to be drawn into close and binding contact with the shaft by bolts 32 and nuts
60 33. Each arm 30 is oblique cross-wise. The inclinations of the two arms which constitute a pair are in opposite directions. In Fig. 1 the lower part of the shaft 27 shown in the first or left-hand tank is broken away
65 to disclose the stud 26.

The bearing 28 has an inner hub 50 for the larger cylindrical part of the vertical shaft 27 at the upper terminal, and surrounding this hub is an annular oil chamber 51. The smaller top portion of the shaft 27 is received into a gear 36 and the two members
70 are rigidly fastened together by means of a bolt 52 tapped into such members along a line of junction parallel with their axis. The gear 36 has a depending sleeve 53 which
75 is adapted to enter the chamber 51 and fit around the hub 50. Radial holes 54 in the sleeve 53 admit oil from the chamber 51 to the bearing surfaces between said sleeve and hub 50. This construction enables the shaft
80 27 to be rotatably suspended at the top and to revolve with very little friction, since the base of the sleeve 53 in the oil chamber 51 is the movable part that sustains the downward stress, there being no contact between
85 the upper end of the bearing 28 or its hub 50 and the gear 36, and guards against the possibility of any oil getting into the tank below. The shaft is really supported by the gear and both are supported by the floor of
90 the oil chamber.

The agitator made up of the shaft 27 and the arms 30 is revolved directly through the medium of a bevel pinion 34 carried by a horizontal shaft 35 and meshing with the
95 bevel gear 36 on the upper end of said shaft 27. In line with the shaft 35 is a shaft 37 driven by a bevel pinion 38 carried by a shaft 39 and meshing with a bevel gear 40 on said shaft 37, and the shaft 35 is en-
100 gaged with and disengaged from the shaft 37 by means of a clutch 41. A pulley 42 on the shaft 39 when revolved in the usual manner drives said shaft and the shaft 37, also the shaft 35 and the agitators when the
105 clutch 41 is actuated to engage the two last-mentioned shafts. The shafts 37 and 39 are situated at right-angles to each other and these with the shaft 35 are suitably journaled in bearings at the upper ends of
110 standards 43 bolted to the top of the platform 29. As before intimated the driving mechanism may be duplicated for each additional agitator.

A short inclosing pipe 44 may be provided
115 for the pipe 20 where it runs through the chamber 4, such pipe 44 extending between the base of the valve-seat 19 and a flange 45 riveted to the underside of the floor of the jacket 1, as shown in Fig. 3. A pack-
120 ing-ring 46 is inserted between the flange 45 and the adjacent end of the pipe 44. The lower terminal of the pipe 44 is screw-threaded and a lock-nut 47 is screwed onto such terminal and forced against the bottom
125 of the flange 45.

In practice a solution of glue and water is made in the tank, the water being run in through the pipe 13 and valve 14, and such solution is raised to the proper temperature
130

and maintained at that temperature by the surrounding water jacket in the chamber 4 formed by water admitted to said chamber through the pipe 11 and valve 12 and heated by live steam injected into the same through the pipe 8, valve 9 and perforated pipes 6 and 7. The solution is not maintained at a high temperature throughout the entire period of the treatment, but is allowed to cool several times and at such times the steam must be shut off from the chamber 4. In the process of preparing the solution it is agitated to thoroughly mix and commingle the ingredients thereof by means of the arms 30 which are revolved in the manner hereinbefore fully described. After being fully prepared the valve 21 may be opened and the solution pumped out of the tank through the pipe 20 in whatever quantities are required; meanwhile the preparation of a similar solution can be going on in the other tank. The water in the chamber 4 can be drawn off through the pipe 17 and valve 18 at the bottom. The interior walls and floor of the jacket 2 and the walls and floor of the chamber 4 can be flushed and cleansed whenever desired by turning hot water into said jacket and either steam or water and steam into said chamber and permitting the same to escape through the valve seat 19 and pipe 20 from the jacket and through the pipe 17 and valve 18 from the chamber.

It will be clearly understood from the foregoing description that with this tank I am enabled to thoroughly treat and prepare glutinous material, so far as the heating or cooking of the same goes, by means of the water jacket surrounding the solution receptacle without subjecting such material or solution to the direct action of or actual contact with either steam or hot water, which is a very important advantage and one of the primary objects of my invention because in no other way have I been able to produce as good results or properly prepare the glue even.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination of a treating tank, for glutinous material, comprising double walls and floors forming a closed chamber around and below the receptacle for the material to be treated, means in the bottom of such chamber to heat the same, means also in the bottom of such chamber to support the re-

ceptacle on the floor of the chamber, and agitators in said receptacle adapted to keep the solution therein in motion.

2. The combination with a treating tank, for glutinous material, comprising double walls and floors forming a chamber around and below the receptacle for the material to be treated, of perforated steam pipes in the bottom of said chamber, and supporting members above and below such pipes.

3. The combination with a treating tank, for glutinous material, comprising two jackets spaced apart and forming a solution receptacle with a chamber around and below the same for water, of perforated steam pipes in the bottom of said chamber, and supporting members also in the bottom of the chamber, said members and certain of said steam pipes affording a support for the inner jacket on the floor of the outer jacket.

4. A treating tank, for glutinous material, comprising two jackets spaced apart to form an outer closed chamber and an inner receptacle, said chamber having a water inlet and outlet and said receptacle having a solution outlet with a valve therefor, a stem rising from said valve, a support for the upper terminal of said stem, the latter being in threaded engagement with said support, and steam pipes in the outer chamber having a connection leading to the outside of the tank.

5. The combination with a treating tank, for glutinous material, comprising two jackets spaced apart to form an outer closed chamber around and below an inner receptacle, of a series of steam pipes and a feed pipe therefor in the bottom of said outer chamber, said pipes being perforated and having their free ends capped, and two series of supports arranged above and below said steam pipes and crosswise of the same.

6. The combination with a treating tank for glutinous material, and a support on top of said tank, of a vertical agitator shaft centered in such tank and suspended from said support and provided with laterally-extending arms, means to revolve such shaft and means to prevent the lubricant from the upper shaft bearing from passing below the support into said tank.

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Witnesses:

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