

No. 882,256.

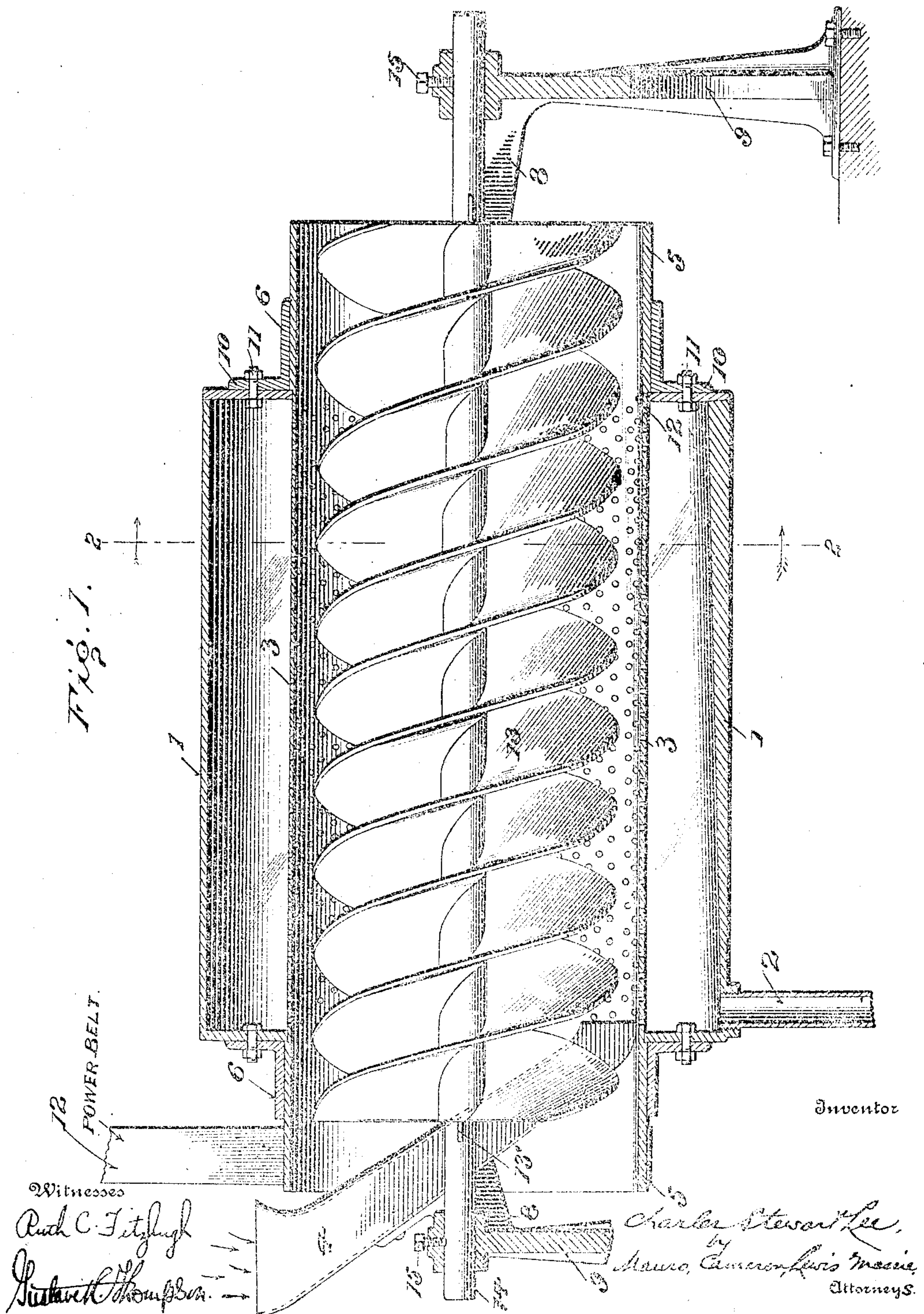
PATENTED MAR. 17, 1908.

C. S. LEE.

CENTRIFUGAL SAND DRIER.

APPLICATION FILED JULY 11, 1907.

3 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.

Fig. 2.

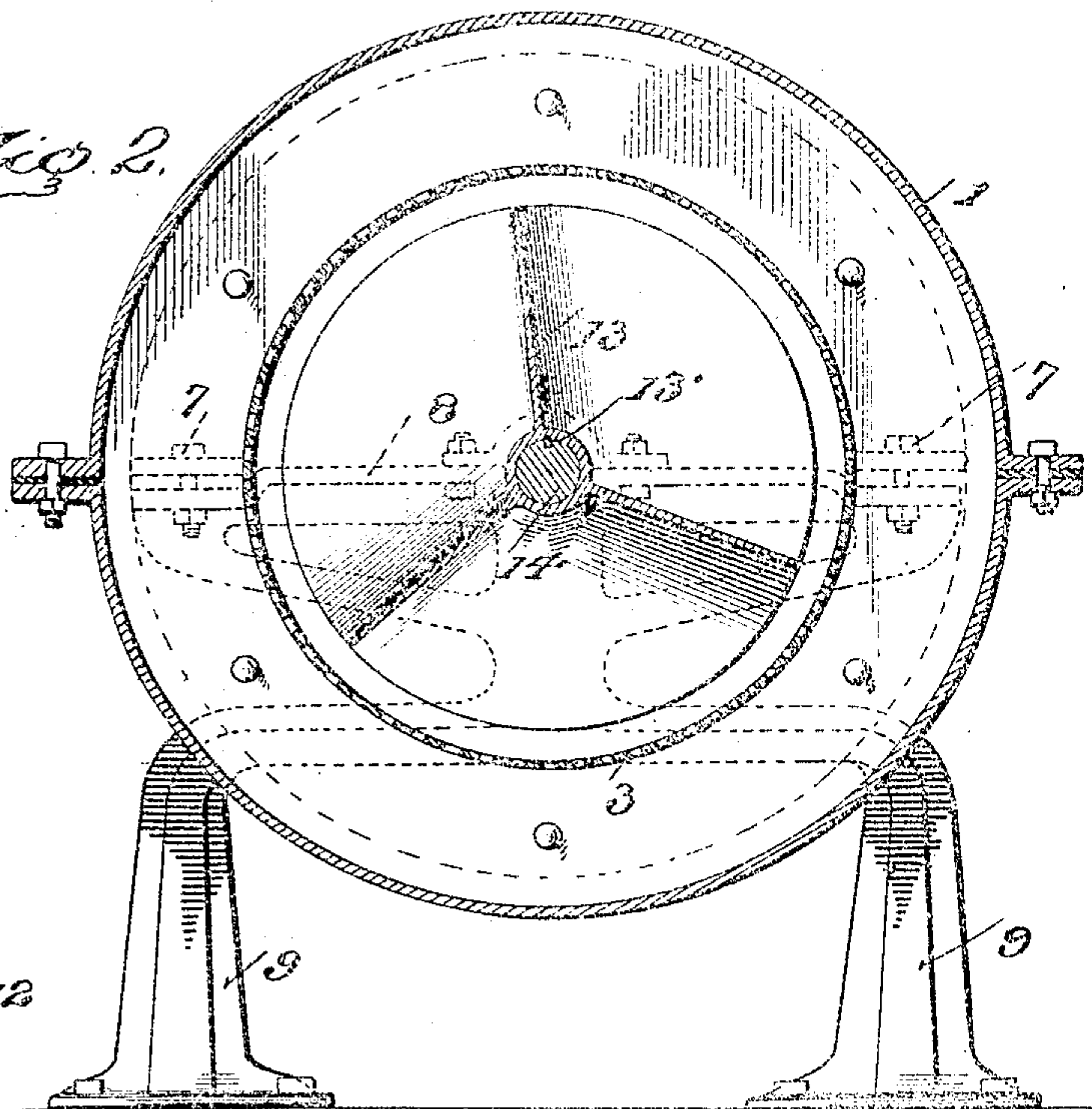
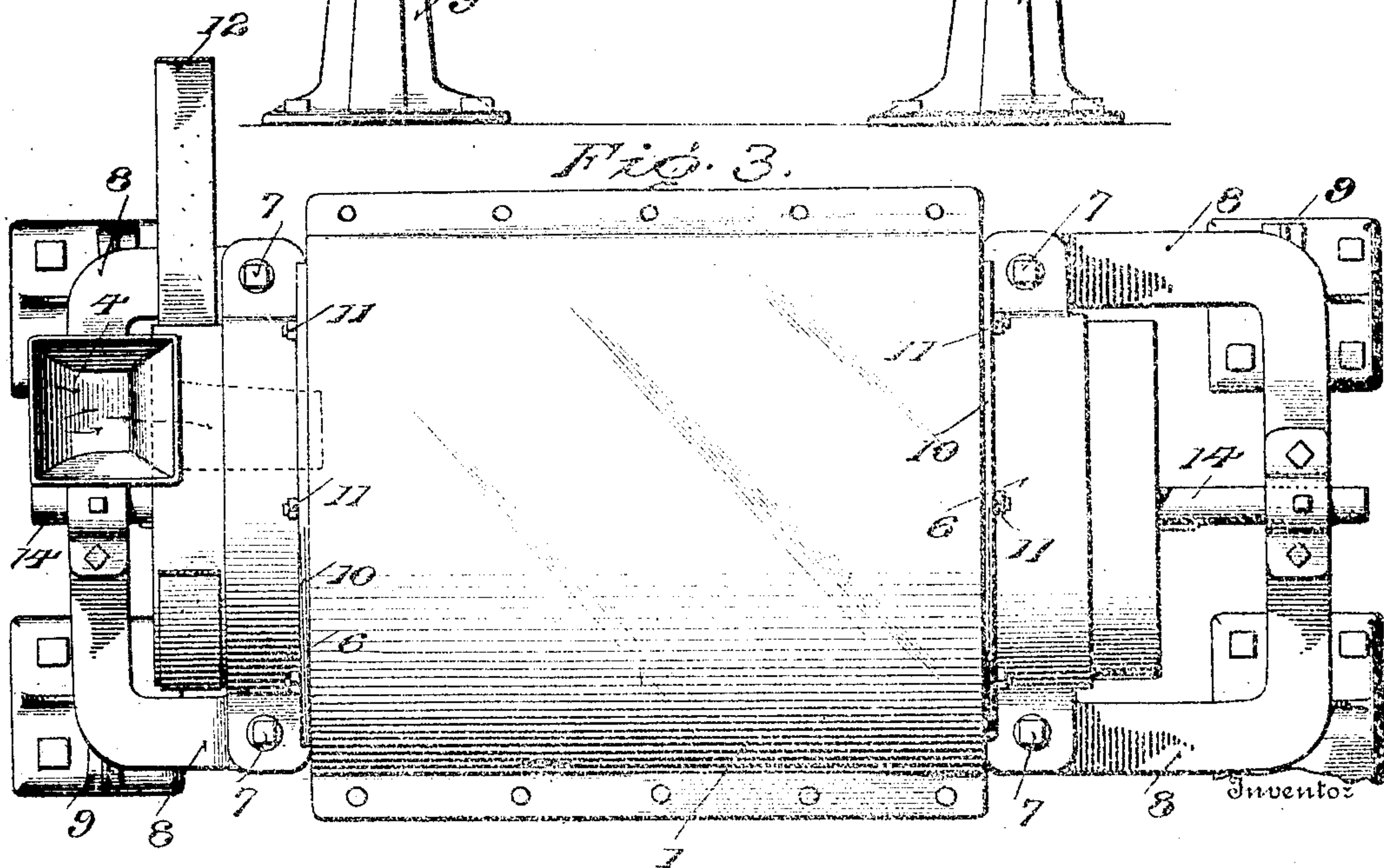


Fig. 3.



Witnesses

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UNITED STATES PATENT OFFICE.

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CENTRIFUGAL SAND-DRIER.

No. 882,256.

Specification of Letters Patent.

Patented March 17, 1908.

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To all whom it may concern:

Be it known that I, CHARLES STEWART LEE, a resident of Baltimore, Maryland, have invented a new and useful Improvement in Sand-Driers, which invention is fully set forth in the following specification.

The present invention relates to sand driers, and more particularly is a device of this character in which the water is expelled by centrifugal force at the same time that the sand is continuously fed therefrom.

Heretofore in the treatment of sand, and particularly that used in the fabrication of glass, it has been customary after the sand is subjected to the necessary washing, to store the same in a large receptacle or bin for the purpose of permitting the sand to drain until sufficient of the water has passed therefrom to permit the sand to be passed into the heat drier from which it must be expelled in a perfectly dry state. This draining receptacle or bin, in establishments of this character, occupies at least half the floor space of the building, and the sand must remain therein at least twenty-four hours before it is at all in condition to be passed into the drier. The usual way of transporting the sand from the draining receptacle to the drier is through the medium of an endless belt onto which the sand is shoveled by the attendants, this shoveling involving considerable time and expense.

The sand in the draining receptacles after standing for twenty-four hours is of varying degrees of wetness, increasing towards the bottom of the pile, and therefore an amount of heat under the drier sufficient to thoroughly dry the sand coming from the top layer, which is the driest of the pile, will be insufficient to so dry the sand from the lower layers, and accordingly it is necessary to fire up more and more as the bottom of the pile is reached and the sand becomes wetter and wetter, until finally the temperature under the drier is so high as to have the metal thereof at a white heat. Such a condition of things results in the consumption of large quantities of fuel, requires the presence at the drier of skilled attendants and renders short the life of the expensive driers used; and it is the object of the present invention to entirely dispense with the draining receptacle and all its attendant incidents and expenses and to so treat the sand as to present it to the drier at a uniform degree of dryness.

whereby the temperature under said drier may be maintained at a lower, certain, constant amount with a consequent large saving of fuel, a prolongation of the life of the drier, an increased and more satisfactory output and the need for less skilled labor. Briefly stated, these objects are effected by providing an improved drier consisting of a perforated cylinder entirely open at both ends and of uniform bore throughout, into which the sand is passed directly from the washers, and which is arranged to be driven at a high rate of speed to expel the water from the sand by the action of centrifugal force; a stationary conveyer of the screw type mounted therein, which acts in conjunction with the revolving cylinder to feed the sand forward; the whole being arranged within an imperforate outer casing. The said perforated cylinder is supported by bearings engaging the periphery thereof and is driven by means likewise engaging the periphery thereof—this in order that the ingress and egress of the sand may be unobstructed, the bearing and driving surfaces protected from the sand and water, the device so simplified as to eliminate the danger of clogging by the wet sand, and so that the sand may be treated in quantities sufficiently large as to render the device commercially successful. This drier discharges the sand onto the conveyer belt heretofore used for transporting the sand from the draining receptacle to the heat drier.

The invention will be better understood by reference to the accompanying drawings, wherein,

Figure 1 is a longitudinal section, the screw conveyer being shown in elevation; Fig. 2 is a section on line 2—2, Fig. 1; and Fig. 3 is a top plan view.

Referring to the drawings, 1 is an imperforate metal casing of any suitable construction, and here shown as formed in two sections, provided with a drain 2 for carrying off the water expelled from the sand. Projecting through said cylinder 1 is a cylinder 3 perforated where surrounded by cylinder 1 and of uniform bore throughout, into one end of which the sand is fed from the washer (not shown) in any suitable manner, as through chute 4. The ends of said cylinder 3 are provided with imperforate bearing strips 5 of a thickness greater than that of said cylinder, said strips being either formed integrally

with said cylinder or formed separately and secured thereto. These strips engage in suitable bearings 6, preferably metallic, and here shown as of the two-part strap type, this arrangement of bearings leaving the ends of the cylinder entirely open and unobstructed and the bearings and driving surface out of the way. The parts of said bearings are held together by suitable connecting means, such as bolts 7, and are supported by arms 8 of standards 9, said bearings being provided with flanges 10 arranged, if desired, to be secured to cylinder 1 by bolts 11, whereby said cylinder is fixedly held in position. The cylinder 1 engages at these points in cut-away portions 12 of said bearing strips 5 to prevent any water or sand getting between the bearings and the rotating cylinder.

Cylinder 3 which in operation revolves at a high rate of speed—900 revolutions to the minute have been found to give excellent results—is driven by means engaging the periphery of one of the projecting ends thereof—preferably a belt 12, connected to any suitable source of power, engaging one of the bearing strips 5 adjacent to one of the bearings 6. Within said cylinder 3 is mounted a suitable conveyer 13 of the screw type, and here shown as of the triple-flight variety, said conveyer being fixedly secured (as by spline 13') to shaft 14 which projects at either end from cylinder 3 and is supported on standards 9 in a manner to prevent rotation, as by bolts 15 engaging in recesses in said shaft. The edges of the blades of the conveyer do not contact with the cylinder 3 but an appreciable space is provided therebetween.

The operation of the device is as follows: Cylinder 3 having been started to rotate at about 900 revolutions to the minute, sand from the washers, heavy with water, is fed into one end thereof through chute 4. As soon as the sand touches the rapidly revolving cylinder the water begins to be expelled therefrom through the perforations in said cylinder, by the action of centrifugal force, and the layer of sand on the inner surface of the cylinder rapidly deepens until the space between said cylinder and the edge of the first conveyer blade is filled. The continued rotation of the cylinder then results in the sand being fed forward through the drier along the blades of the conveyer, until the sand is finally expelled through the discharge end of the cylinder in a comparatively dry state—much drier than the topmost layer of a pile which has stood in the draining receptacle for twenty-four hours.

The provision of a triple-flight conveyer which is maintained stationary, in association with a cylinder revolving at a rate of about 900 revolutions to the minute, results in a very rapid and satisfactory feed of the sand through the cylinder, so that a device of

this character, entirely open at both ends so that the feed of sand to and from the cylinder is unobstructed by bearings and driving means, can successfully handle ninety tons of sand a day—the output of the usual installation.

It will be appreciated that by employing the present device the sand is dried in a small fraction of the time heretofore consumed and in a much more satisfactory manner; an installation to handle the same output as heretofore will require a building only about half as large, inasmuch as the need for the huge draining receptacle is eliminated; the time, trouble and large expense which was heretofore involved in shoveling sand from the draining receptacle onto the conveyer belt which carries the sand to the heat drier is obviated; the sand issues from the rotating cylinder of this device always at the same degree of dryness—which is very much drier than the driest sand of a pile which has drained for twenty-four hours—and accordingly the degree of heat to be maintained under the drier, besides being lower than heretofore, may be fixed and constant, resulting in a large saving of fuel, prolongation of the life of the drier and the necessity for less skilled labor and less attention.

While the apparatus has been herein described particularly with relation to the drying or draining of sand, for which it has been especially designed, it may obviously be used for the drying or draining of other materials.

What is claimed is:

1. A combined drying and conveying device comprising a fixed imperforate casing, a rotatable perforated cylinder contained therein and a stationary screw conveyer supported in said perforated cylinder.

2. A combined drying and conveying device comprising a fixed imperforate casing, a perforated cylinder passing therethrough and entirely open at the discharge end thereof, bearings for said cylinder engaging the periphery thereof, means for rotating said cylinder also engaging the periphery thereof, and a stationary screw conveyer contained in said perforated cylinder.

3. A combined drying and conveying device comprising a fixed imperforate casing, a perforated cylinder of uniform bore throughout and entirely open at its discharge end passing therethrough, bearings for said cylinder engaging the periphery thereof, means for rotating said cylinder also engaging the periphery thereof, and a stationary screw conveyer contained in said perforated cylinder.

4. A combined drying and conveying device comprising a fixed imperforate casing, a perforated cylinder contained therein and entirely open at both ends, bearings for said cylinder engaging the periphery thereof, means for rotating said cylinder also engag-

ing the periphery thereof, and a stationary screw conveyer supported in said perforated cylinder.

5 5. A combined drying and conveying device comprising a fixed imperforate casing, a perforated cylinder of uniform bore throughout and open at both ends passing there-
through and provided at each end with a thickened bearing surface, bearings for said
10 cylinder engaging said bearing surfaces, means for rotating said cylinder also engaging one of said bearing surfaces, and a stationary screw conveyer supported in said
perforated cylinder.

15 6. A combined drying and conveying device comprising a fixed imperforate casing, a perforated cylinder of uniform bore through-

out and provided at each end with a thick-
ened bearing surface, bearings for said cyl-
inder engaging said bearing surfaces and 20
provided with flanges, means securing said
flanges to said imperforate casing, means for
rotating said cylinder also engaging one of
said bearing surfaces, and a stationary
triple-flight screw conveyer supported in 25
said perforated cylinder.

In testimony whereof I have signed this specification in the presence of two subscrib-
ing witnesses.

CHARLES STEWART LEE.

Witnesses:

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