

No. 808,481.

PATENTED DEC. 26, 1905.

F. M. SCHAFFER.
DRYING APPARATUS.
APPLICATION FILED JUNE 21, 1905.

2 SHEETS—SHEET 1.

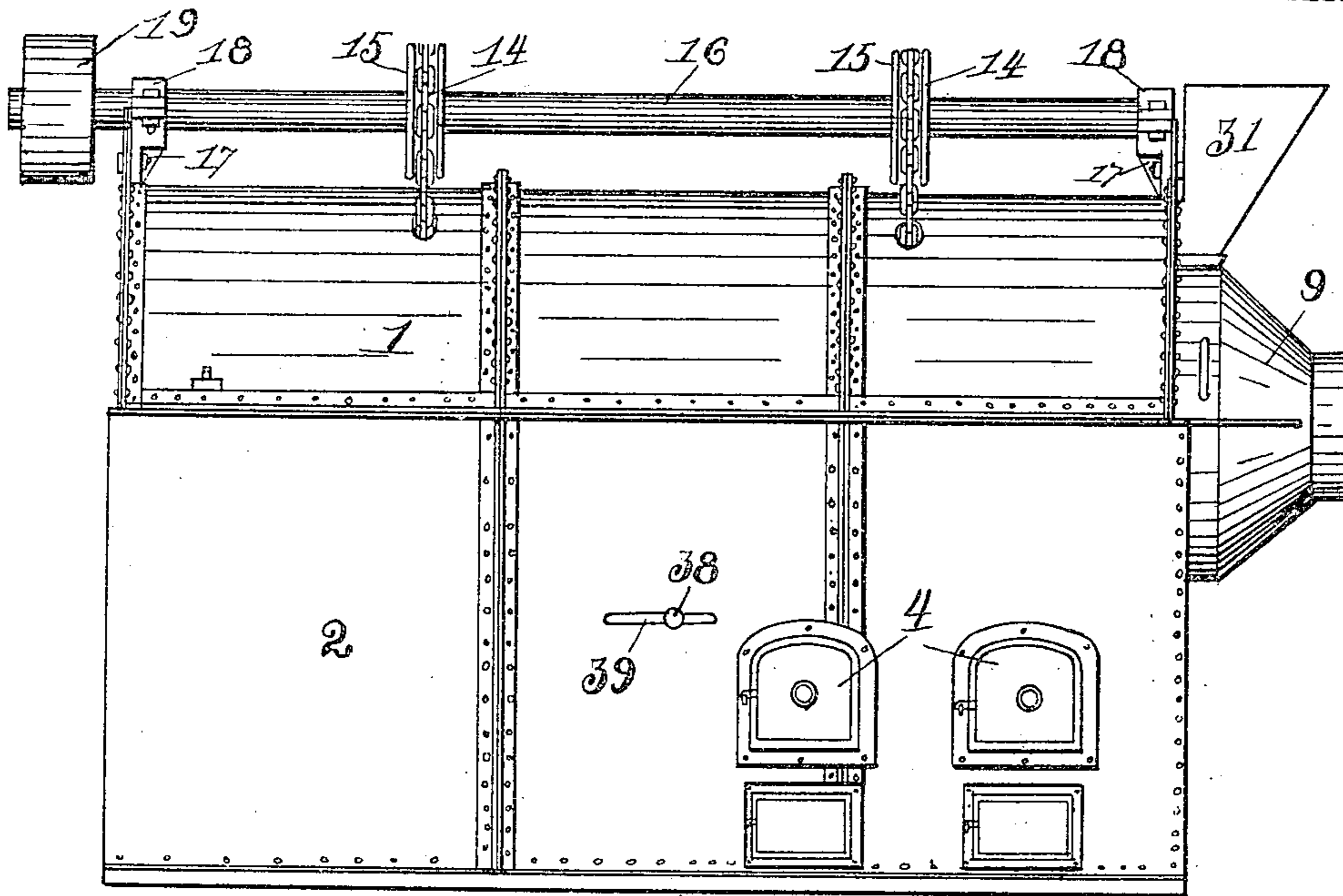


Fig. 1

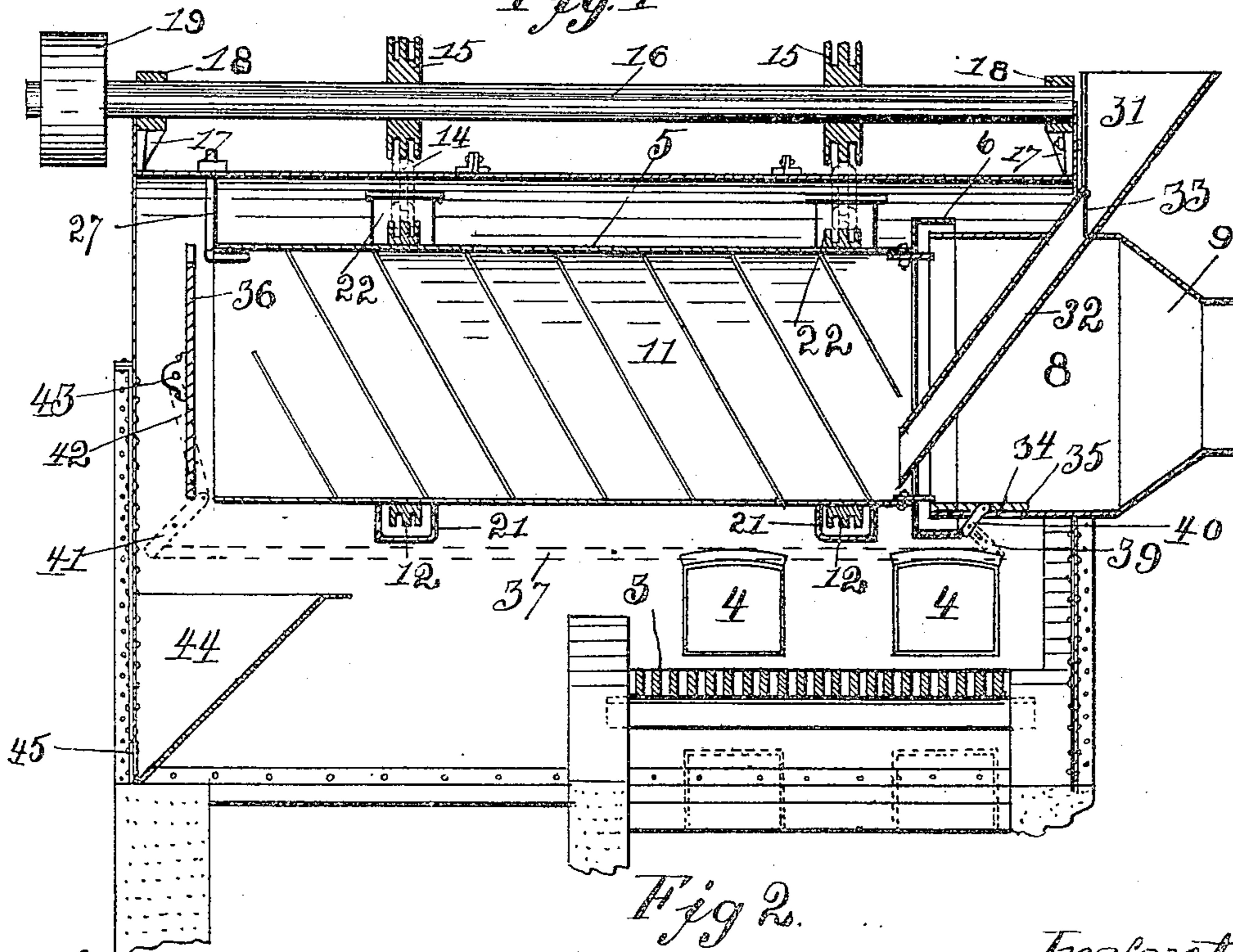


Fig. 2.

Witnesses.
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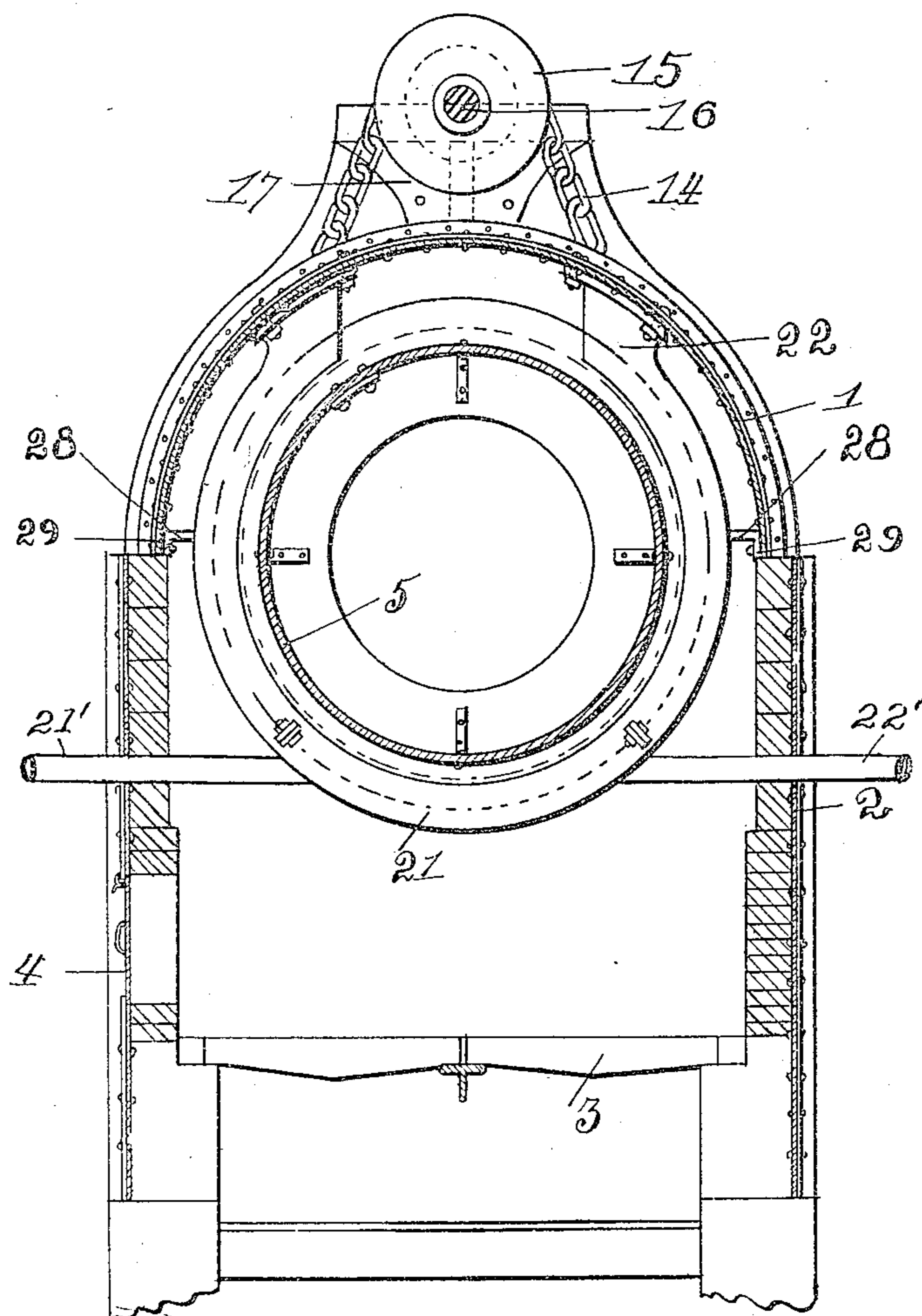


Fig. 3.

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UNITED STATES PATENT OFFICE.

FRANK M. SCHAFFER, OF INDIANAPOLIS, INDIANA.

DRYING APPARATUS.

No. 808,481.

Specification of Letters Patent.

Patented Dec. 26, 1905.

Application filed June 21, 1905. Serial No. 266,286.

To all whom it may concern:

Be it known that I, FRANK M. SCHAFFER, a citizen of the United States of America, residing at Indianapolis, in the county of Marion and State of Indiana, have invented certain new and useful Improvements in Drying Apparatus, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention relates to certain new and useful improvements in drying apparatus, and is particularly adapted for use in connection with the drying of sand, concrete, or other like mineral substances, one of the main
15 objects of my invention being to provide a drier which will effectually dry the material without the aid of a forced draft, as is generally employed in connection with driers employed for the drying of this class of material.
20

It is a further object of the present invention to provide a drier in which the rotatable drying-drum is suspended without the aid of castings at the end thereof, as is the general
25 practice, whereby to materially decrease the cost of manufacture and at the same time materially increase the longevity of the drier, owing to there being no exposed journals or bearings for the sand or other mineral substance to cut and wear out.
30

Briefly described, the invention comprises a drying-drum rotatably mounted in an inclosing shell or casing and to which drying-drum the material to be treated is fed and
35 carried therethrough as the drum revolves by means of a spiral conveyer in the interior of the drum. This drum is suspended on chains, which are driven whereby to revolve the drum, means being provided to prevent injury to the chains from the action of the heat from the furnace underneath the drying-drum. A damper is provided for controlling the volume of draft, and, if desired, a dust-collector may be connected to the one
40 end of the drum. Means is also provided to prevent the draft passing up the feed spout or chute or the blowing of the material back through said spout or chute.

Other details of construction enter into
45 my invention, and the same, together with the construction noted above, will be herein-after more specifically described and then more particularly claimed, and in describing the invention in detail reference will be had
50 to the accompanying drawings, forming a part of this application, and wherein like nu-

merals of reference will be applied to like parts throughout the different views of the drawings, in which—

Figure 1 is a side elevation of my improved
60 drier. Fig. 2 is a central longitudinal sectional view thereof. Fig. 3 is a transverse vertical sectional view.

In the present illustration of my invention I have shown the same as applied to a single-
65 drum drier; but the same principle of construction may be adapted equally as well to driers having two or more drums, and consequently I do not confine myself to a single-drum construction, but will describe this particular construction in detail.
70

The type of drier herein shown may be described as a transportable one, the walls of the furnace being constructed of sheet metal, though it will be apparent that where the
75 drier is built to remain stationary at one point the furnace-walls may be built of brick or other masonry. The hood or cover 1, which incloses the drying-drum, is mounted on the rectangular box-like casing 2, forming the
80 furnace and in which the fire grate or grates 3 are placed, the said casing being provided in one or both sides, as may be desired, with one or more doors 4 to permit the placing of the fuel onto the grate-bars. The drying-
85 drum comprises a cylindrical body 5, provided at its one end with an annular flange 6, that receives the inner end of a breeching 8, mounted stationary in one end wall of the hood and casing. This breeching is in open
90 communication at all times with the drying-drum, its outer end being preferably contracted so as to form a neck 9, with which a stack connection (not shown) may be made or a dust-collector (not shown) may be con-
95 nected, and the stack connection then made with the dust-collector. The drying-drum is provided on its interior wall with a spiral conveyer 11, of any desirable or approved form, whereby to carry the material fed into
100 the drum at the receiving end to the discharge end as the drum revolves. This drying-drum is supported by the chains which drive the same, and to accomplish this the drum is provided with sprocket-wheels 12, spaced a suit-
105 able distance apart, so as to give the desired balance in suspension, and these sprocket-wheels 12 are engaged by sprocket-chains 14, which operate thereover and over sprocket-wheels 15, mounted on the drive-shaft 16,
110 which is suspended above the hood or cover 1. A convenient means for affixing the drive-

shaft in position is that of extending the end walls of the hood or cover 1, as shown at 17, and providing thereon suitable bearings 18 to receive the drive-shaft 16, the same being provided with the usual drive-pulley 19. In order to prevent the action of the fire underneath the drum damaging the chains, I provide segmental troughs 21, supported from brackets 22, attached to the inner faces of the hood or cover 1 and to which water is fed through a suitable supply-pipe 21', the water being discharged through pipe 22.' It is only necessary to have water at the "basin portion" or lower part of the troughs, where the flame from the fire strikes same. These segmental troughs inclose the chains underneath the drum and prevent the fire coming in contact therewith. The openings made in the hood or cover 1 for the chains to travel through are covered up on the inside of the cover 1 by the brackets 22, through which the chains 14 pass, the opening in the brackets being simply sufficient to permit the ready passage of the chain. As stated, the drum is suspended by the chains which impart rotary movement thereto; but in order to prevent the drum dropping at its discharge end in case either of the drive and suspension chains should break I provide a bracket 27, the angular lower end of which projects into the drum, but is normally free from frictional engagement therewith. In order to prevent lateral or swinging movement of the drum at its discharge end, I provide means, such as a bracket 28, the angular ends 29 of which are bolted to the inner face of the hood or cover 1 and the horizontal flanges of which engage the respective opposite sides of the drum.

The material to be dried is fed into a hopper 31, having a spout or chute 32, extending down into the breeching 8 and discharging into the receiving end of the drying-drum. The end wall of the hood or cover 1 carries a flap-valve 33, projecting into the spout or chute 32 and which opens inwardly under pressure of the material to permit the ready passage of the latter, but closes under back pressure, so as to prevent any draft up through the hopper, and consequently preventing any of the material being blown back through the delivery-spout and hopper.

In the drying of different materials it frequently happens that certain elements or constituent parts of a material will melt at a much less heat or temperature than other elements contained in or constituent parts of the material, and consequently it is necessary and imperative in this class of devices to provide means whereby the draft may be direct from the furnace to the stack or uptake. To accomplish this in connection with my device, I provide the breeching 8 with a port or opening 34, normally closed by a damper or valve 35 of the hinged or flap-valve form. I

also provide a damper or valve 36 to close the discharge end of the drying-drum when the port or opening 34 is opened and provide means for operating these two valves simultaneously, whereby when one is opened the other will be closed, and vice versa. This may be done in various ways, but a practical method practiced by me is the provision of an operating-lever 37, approximately to the center of which is attached a handle 38, projecting out through a slot 39 in the casing 2 in position to be readily actuated by the operator. One end of this lever 37 is pivotally connected to a link 39, that is fulcrumed or pivotally supported intermediate its ends and has its other end pivotally attached to the lower end of a link 40, which has its upper end connected to the pin- tle of the damper or valve 35. The other end of the lever 37 is pivotally connected to the lower end of a link 41, fulcrumed or pivotally supported intermediate its ends with its upper end pivotally connected to a link 42, also fulcrumed or pivotally supported intermediate its ends and having its upper end pivotally connected to a rod 43, which carries the damper or valve 36. This damper or valve 36 is provided with cut-away portion whereby it will not engage with the precautionary bracket 27, as the damper or valve is moved into closed position.

Within the casing 2 is provided a receiving-bin 44 to catch the dried material as it is discharged from the drying-drum, from whence the material is taken through opening 45 in the casing.

It is believed that to those skilled in the art the construction and operation of the device will be readily apparent from the foregoing description, taken in connection with the accompanying drawings, and that further detail description is unnecessary. I desire, however, to call attention to the fact that the drier is operated without the aid of a forced draft, now generally employed and which has a tendency to remove certain lighter elements or constituent parts of the substance or material being dried, and thus delivering a dried material which has deteriorated in the drying process, and hence is of inferior quality.

By the employment of the chain-drive I dispense with all castings or other journals for the drum which have heretofore been a source of great annoyance and expense owing to the sandy material coming in contact therewith and damaging the journals to such an extent as to in a short time render the same worthless, as well as detracting from the perfect working of the device during operation. The dispensing with these castings which form the journals for the drum also materially cheapens the cost of manufacture of the drier.

The drier above described is fed by gravity-pressure, thus dispensing with spiral conveyers as used heretofore.

By the damper arrangement described the temperature may be readily controlled as may be required according to the nature of the material being dried.

Although I have herein shown and described in detail a practical embodiment of my invention as it is practiced by me, yet I do not wish to confine myself to the construction in detail as shown and described, as it will be evident that various changes may be made in the details without departing from the general spirit of the invention.

Having fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a drying apparatus, a drying-drum, means for heating said drum, sprocket-wheels carried by said drum, sprocket-chains meshing with the sprocket-wheels on the drum and supporting said drum and also acting as the drive-chains to rotate the drum, a drive-shaft with sprocket-wheels thereon over which said chains are passed, and temperature-controlling means whereby the draft from the furnace to the uptake is through the drum or direct to the uptake, substantially as described.

2. In a drying apparatus, a drying-drum, drive-chains for rotating said drum and also acting as the suspension means therefor, a conveyer within the drum, means for heating said drum, and means for protecting the chains from the action of the heat, substantially as described.

3. In a drying apparatus, a drying-drum rotatable within an inclosing hood or cover, a drive-shaft supported above the drum,

sprocket-wheels on the drive-shaft, and sprocket-wheels on said drum, drive-chains operating over said sprocket-wheels to drive the drum and also acting as the suspension means therefor, a conveyer within the drum, a furnace underneath the drum, and temperature-controlling means whereby the draft from the furnace may be established through the drum or may be shut off and established partially around the drum and thence direct to an uptake, substantially as described.

4. In a drying apparatus, a drying-drum, an inclosing hood or cover, means for heating said drum within said hood or cover, a breeching extending into one end of said drum and through the end wall of said inclosing hood, and provided with an opening, a delivery-chute extending through said breeching into the drum, a damper carried by said breeching and adapted to close the opening therein, and a damper arranged to close the end of said drum.

5. In a drying apparatus, a rotatable drying-drum, drive-chains for rotating said drum and also acting as the suspension means therefor, means for heating said drum and means for protecting the chains from the action of the heat.

6. In a drying apparatus, a drying-drum, an inclosing hood under which said drum is mounted, drive-chains in which said drum is suspended, means for heating the drum, troughs partially surrounding the drum and inclosing said drive-chains.

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

FRANK M. SCHAFFER.

Witnesses:

WM. W. CARTER,
C. A. KEPNER.