

No. 822,022.

PATENTED MAY 29, 1906.

F. M. SCHAEFFER.
SAND DRIER.

APPLICATION FILED JAN. 13, 1906.

2 SHEETS—SHEET 1.

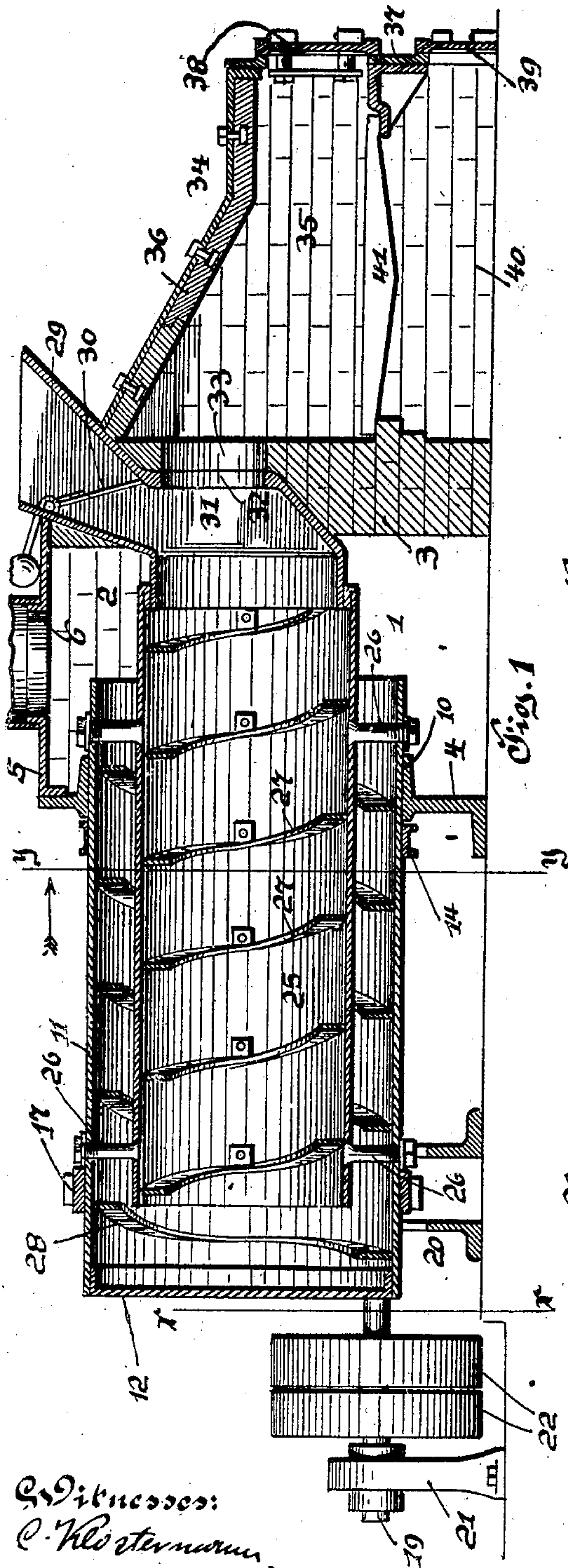


Fig. 1

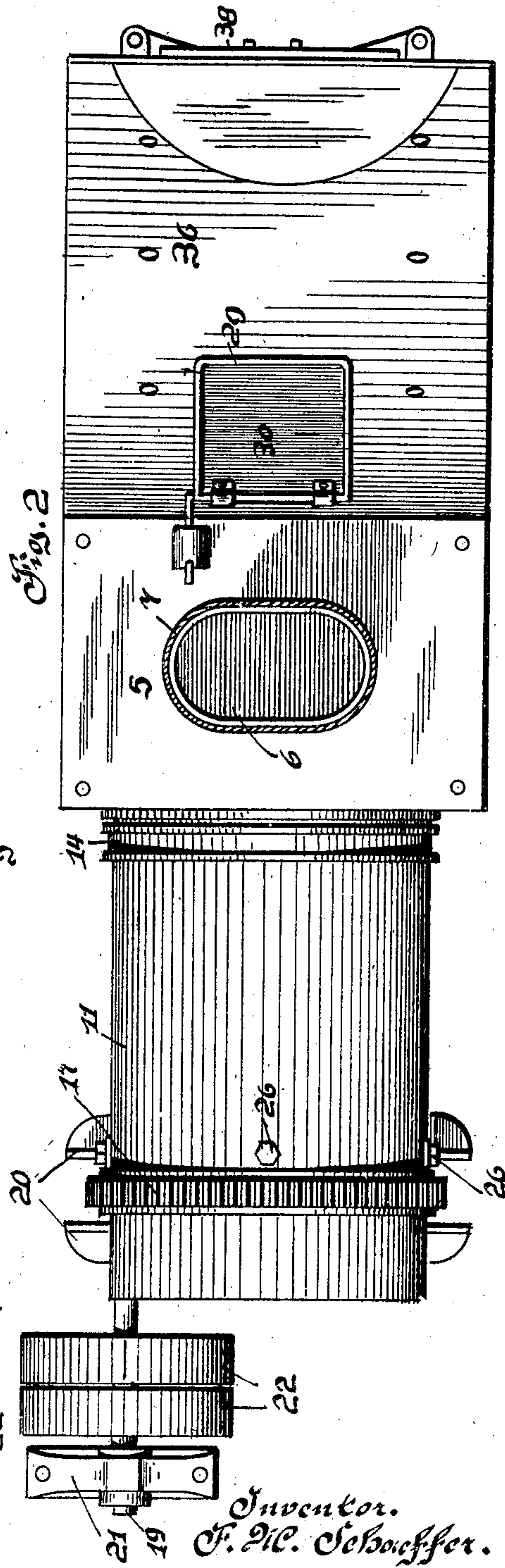


Fig. 2

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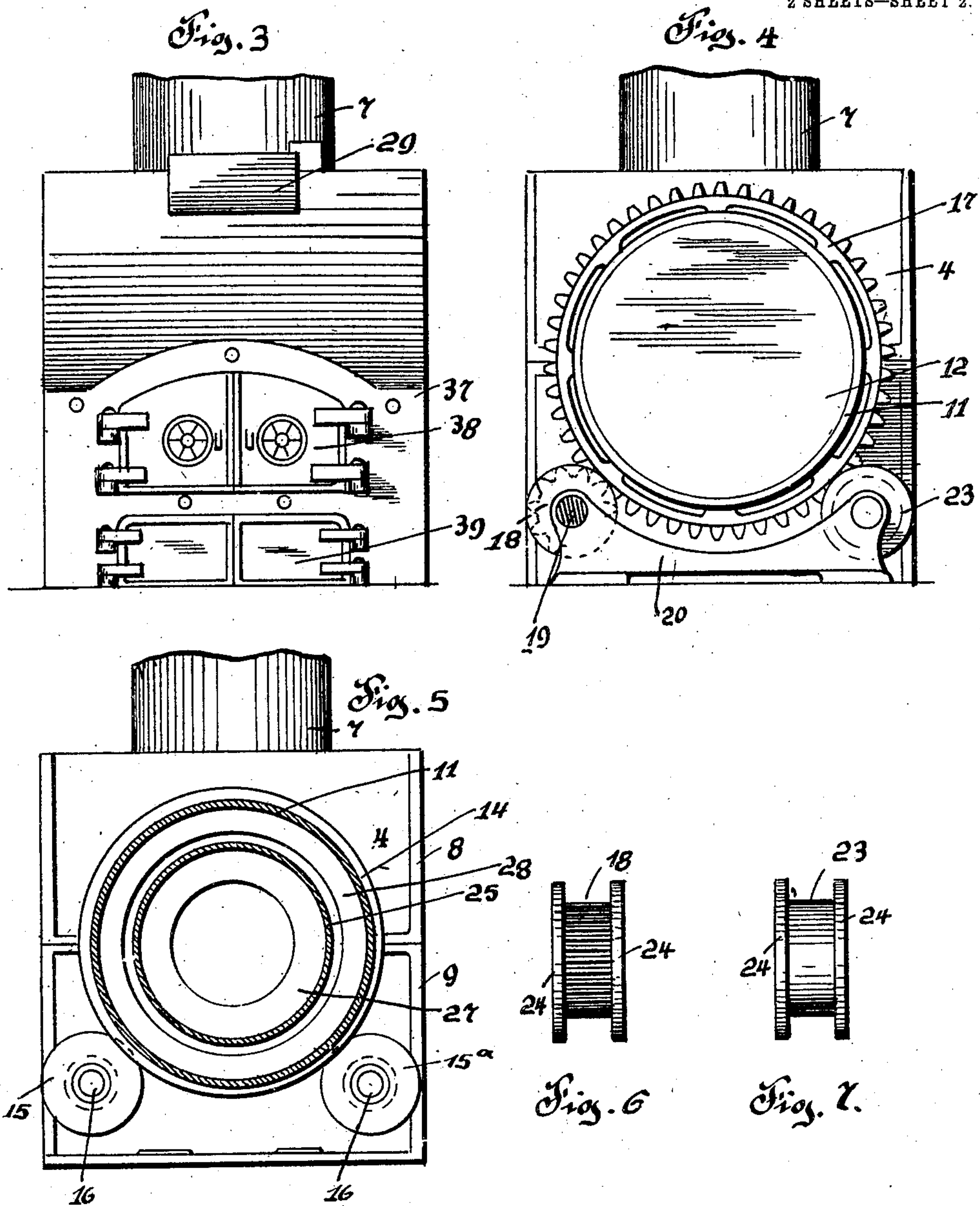
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

FRANK M. SCHAEFFER, OF INDIANAPOLIS, INDIANA, ASSIGNOR OF ONE-HALF TO STOUGHTON A. FLETCHER, OF INDIANAPOLIS, INDIANA.

SAND-DRIER.

No. 822,022.

Specification of Letters Patent.

Patented May 29, 1906.

Application filed January 13, 1906. Serial No. 295,911.

To all whom it may concern:

Be it known that I, FRANK M. SCHAEFFER, 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 Sand-Driers, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to certain new and useful improvements in sand and gravel driers; and the invention relates more particularly to a drying apparatus adapted to be used by railroad companies, contracting companies, plasterers, and like artisans for drying sand and gravel.

My invention aims to provide positive and reliable means for speedily and effectually drying sand and gravel, and in this connection I have devised a novel form of apparatus into which the sand or gravel is fed, quickly dried, and delivered in a dried state to a point adjacent to the apparatus.

To this end the apparatus involves two revolving drums or cylinders into which the sand or gravel is fed. The drums or cylinders are subjected to heat from a flame which passes into one of the drums or cylinders, causing the sand or gravel to become thoroughly heated and dried before its delivery from the apparatus. In order that the sand or gravel may be thoroughly dried, I have devised novel means for revolving the drums and thoroughly mixing and agitating the sand or gravel while being subjected to the heat of the flame entering one of the drums or cylinders. The agitating or mixing means also serves functionally for propelling or feeding the sand or gravel through the apparatus.

The detail construction of my improved sand and gravel drier will be hereinafter more fully described and then specifically pointed out in the claims, and, referring to the drawings accompanying this application, like numerals of reference designate corresponding parts throughout the several views, in which—

Figure 1 is a longitudinal sectional view of my improved apparatus. Fig. 2 is a plan thereof. Fig. 3 is a front view of the apparatus. Fig. 4 is a rear end view taken on the line *x x* of Fig. 1. Fig. 5 is a cross-sectional view taken on the line *y y* of Fig. 1 looking in the direction of the arrow of said figure. Fig.

6 is a detail view of a pinion used in connection with the apparatus. Fig. 7 is a detail view of a roller associated with said pinion.

The apparatus illustrated in the accompanying drawings is adapted to be constructed in the vicinity of the work in connection with which sand or gravel is used, the sand or gravel being fed direct to the apparatus from the river-bed or ground from which it is obtained, in the majority of instances the sand and gravel being obtained from a river-bed and fed to the apparatus in its wet and damp state. In constructing the apparatus I have aimed to provide as reliable a structure as possible in order to reduce the labor used in connection with such an apparatus, and the few parts used in connection with the apparatus permits of it being easily and quickly disassembled for shipment when it is to be used upon another site to dry sand or gravel.

In practice I construct a housing or compartment 1, which consists of side walls 2 2, a fire wall or bridge 3, and a drum or cylinder supporting plate 4. The compartment 1 is closed by a top plate 5, having an oval flanged opening 6 formed therein, over which is mounted a stack or chimney 7.

The drum or cylinder supporting plate 4 is substantially rectangular in elevation and is preferably made in two parts 8 and 9, each part being provided with a semicylindrical opening 10, formed by flanging the plate 4, as clearly illustrated in Figs. 1 and 5 of the drawings. The semicylindrical opening of the plate 4 forms a bearing for an outer drum or cylinder 11, having its rear end closed by an end plate 12. The drum or cylinder 11 adjacent to the plate 4 has its periphery provided with a channel-track 14, in which engages rollers 15 15^a, journaled upon studs 16 16, carried by the plate 4, said rollers being arranged at each side of the plate 4, thereby forming a bearing upon which the drum or cylinder may revolve.

Adjacent to the rear end of the drum or cylinder I provide a peripheral rack 17, and meshing with said rack is a pinion 18, which is mounted upon a shaft 19, journaled in a bearing or housing 20. The shaft 19 is also journaled in a bearing or housing 21, and upon said shaft are mounted belt and pulley wheels 22 22, whereby the shaft 19 may be rotated to revolve the drum or cylinder 11.

The pinion 18 is preferably arranged in

longitudinal alinement with the roller 15, while another roller 23 is journaled in the bearing or housing 20 in longitudinal alinement with the roller 15^a. In Figs. 6 and 7 of the drawings I have illustrated in detail the pinion 18 and the roller 23, and by referring to said figures it will be observed that the pinion and roller are provided with peripheral flanges 24 24, these flanges being adapted to bear against the peripheral rack 17 and sustain the weight of the rear end of the drum or cylinder, thereby reducing the friction that otherwise would exist between the pinion 18 and the teeth of the peripheral rack.

Within the drum or cylinder 11 is mounted an inner auxiliary or supplementary drum or cylinder 25, said cylinder being sustained by screw-bolts 26, which extend inwardly from the drum or cylinder 11 and engage the walls of the auxiliary drum or cylinder 25. The inner walls of the drum or cylinder 25 are provided with a spirally-arranged conveyer and agitator 27, which is adapted to convey sand or gravel from the forward end of the drum or cylinder to the rear end thereof, thereby depositing the sand or gravel in the outer drum or cylinder 11. The inner walls of the drum or cylinder 11 are provided with a similar spiral conveyer 28, which is arranged to convey the sand or gravel forwardly to the compartment 1, where it is deposited and may be removed through one of the side walls 2 thereof or may be precipitated into a suitable hopper. (Not shown.)

In the fire or bridge wall 3 is mounted a chute or hopper 29, the opening of which is controlled by a weighted door or gate 30. The chute or hopper 29 terminates in a cylindrical end 31, which protrudes into the forward end of the cylinder or drum 25. The rear wall of the chute or hopper 29 is provided with an opening 32, which registers with an opening 33, formed in the fire or bridge wall 3.

Upon the forward side of the fire or bridge wall is constructed a conventional form of furnace 34, consisting of side walls 35 35, a top 36, and a front wall 37. In the front wall are arranged fire-doors 38 and a door 39, which permits of access being had to the ash-pit 40, located beneath the grates 41 41 of the furnace.

In operation the wet and damp sand or gravel is delivered into the chute or hopper 29, from where it descends to the auxiliary drum or cylinder 25. The sand or gravel in passing through the chute or hopper 29 opens the door 30 until the load or prescribed quantity has passed into the drum or cylinder 25, at which time the door or gate 30 is closed. As the sand or gravel is carried from the forward to the rear end of the drum or cylinder 25 the heat generated by the fire within the furnace 35 passes through the

openings 32 and 33 and through the inner or auxiliary drum or cylinder, where the heated air and flames of the fire are baffled by the end plate 12 of the drum or cylinder 11 and projected forwardly between the inner drum 25 and the outer drum 11 to the compartment 1, the forward movement of the heated air and flames being facilitated by the draft established by the compartment 1 and the chimney or stack 7. While the sand or gravel is traversing the drum or cylinder 25 it is subjected to the heated air and the products of combustion from the furnace 35, and by the time it has been carried forwardly within the outer drum or cylinder 11 the sand or gravel has been thoroughly dried and heated. The revolving of the drums or cylinders 11 and 25 thoroughly agitates and mixes the sand, whereby all the particles will at one time or another contact with the heated surface of the drums or cylinders 11 and 25, besides being subjected to the flames and heated air that pass through said drums or cylinders.

By the construction and arrangement of the various parts of my improved apparatus it will be seen that the apparatus can be readily operated and controlled by unskilled labor, the apparatus when in operation requiring very little attention. The apparatus in its entirety is particularly adapted for use in connection with railroad construction, where it is desired that sand or gravel being used be expeditiously dried in large quantities, and it can be seen by the construction of the apparatus that a continuous drying of the sand and gravel in large quantities can be easily and quickly accomplished.

I do not care to confine the use of my improved apparatus to sand and gravel, as phosphates and the like minerals may be readily dried and treated therein.

I preferably construct the apparatus of strong and durable metal and non-fusible brick or material, and I desire it to be understood that such changes as are permissible by the appended claims may be resorted to without departing from the spirit and scope of the invention.

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

1. In a drying apparatus, the combination with a furnace, of a compartment arranged at the rear of said furnace, a chimney carried by said compartment, an outer drum protruding into said compartment, a supplementary drum mounted within said outer drum and extending into said compartment, the inner walls of said drums having spirally-arranged conveyers mounted therein, a chute mounted in said compartment and protruding within said supplementary drum, a peripheral rack carried by said outer drum, a weighted gate arranged within said chute,

means to revolubly support said drums, and means engaging said peripheral rack to revolve said drums, substantially as described.

2. In a drying apparatus, the combination 5 with a furnace, of a compartment arranged at the rear end of said furnace, drums extending into said compartment, spirally-arranged conveyers carried by the inner walls of said compartment, a chute mounted in said com- 10 partment and extending into one of said drums, means to revolubly support said drums, and means to revolve said drums, substantially as described.

3. In a drying apparatus, the combination 15 with a furnace, of a compartment arranged at the rear of said furnace and communicating therewith, said compartment having an outlet, drums revolubly mounted adjacent to said compartment and protruding therein, a 20 chute mounted in said compartment and extending into one of said drums, spirally-arranged conveyers mounted in said drums, and means to revolve said drums, substantially as described.

25 4. In a drying apparatus, a drum-supporting plate made in two sections secured together, rollers carried by one of said sections, an outer drum revolubly mounted in said supporting-plate and having a circular track 30 resting on said rollers, a plate closing one end of said drum, a spiral conveyer carried by the inner wall of the drum and arranged to carry material toward the open end of the drum, an inner drum mounted within the outer 35 drum open at both ends, said inner drum being rigidly connected to the outer drum and of considerably less diameter than the outer drum to form a space between the two drums, a spiral conveyer carried by the inner drum 40 and arranged oppositely to that of the outer drum, and means for revolving said drums.

5. In a drying apparatus, an inner and an outer drum, the outer drum closed at one end and open at the other end, and the inner 45 drum open at both ends and having one end extending beyond the open end of the outer drum, a spiral conveyer carried by the inner

drum arranged to convey material toward the closed end of the outer drum, a spiral conveyer carried by the outer drum arranged 50 to convey material toward the open end of said outer drum, and a hopper having a circular discharge end receiving the extending end of the inner drum which revolves thereon.

6. In a drying apparatus, two drums ar- 55 ranged one within the other, and rigidly connected to be revolved in unison, spiral conveyers carried by the drums and arranged in opposite directions, a pair of rollers arranged near one end of the drums on which the outer 60 drum revolves, and a roller and a pinion arranged near the other end of the drums on which the outer drum revolves, a rack carried by the outer drum meshing with said pinion, and means for rotating said pinion to revolve 65 the drums.

7. In a drying apparatus, an inner and an outer drum connected together to revolve in unison, the inner drum being spaced away from the outer drum and having its receiving 70 end projecting beyond the adjacent end of the outer drum, a plate closing the one end of the outer drum, a spiral conveyer within the inner drum arranged to convey material toward the closed end of the outer drum, and a 75 reversely-arranged spiral conveyer within the outer drum to convey the material to the open end of said outer drum.

8. In a drying apparatus, a feeding chute or hopper terminating in an open cylindrical 80 discharge end, and a furnace having an outlet-opening in alinement with said discharge end, combined with an inner drum open at both ends with one end received on the discharge end of the chute or hopper, an outer 85 drum closed at one end and rigidly connected to the inner drum, conveyers in said drums, and means for rotating the drums.

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

FRANK M. SCHAEFFER.

Witnesses:

E. E. POTTER,
M. E. WHITE.