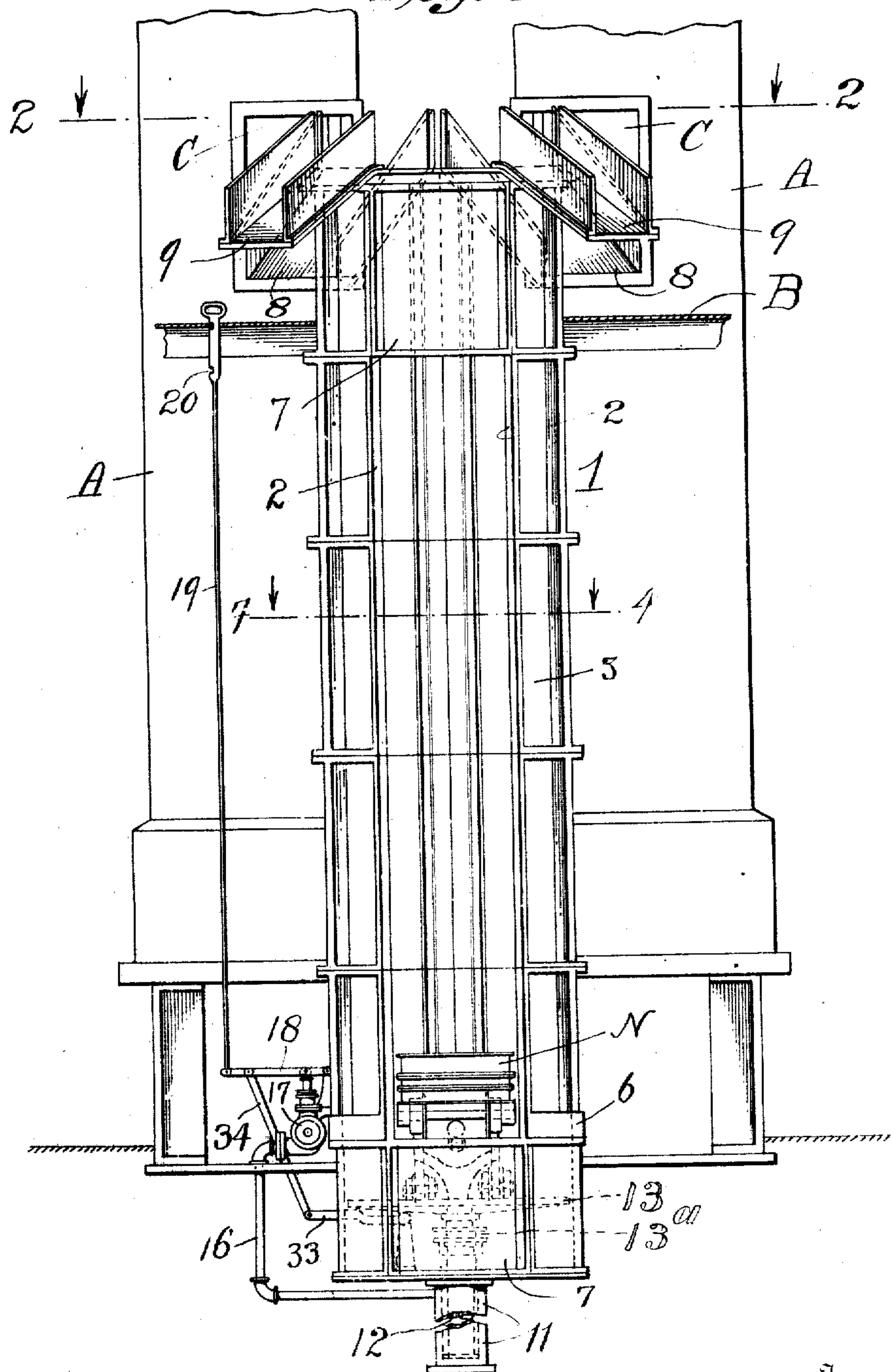


D. GILES.
FURNACE CHARGING APPARATUS.
APPLICATION FILED SEPT. 5, 1908.

933,031.

Patented Aug. 31, 1909.
3 SHEETS—SHEET 1.

Fig. 1.



Witnesses:
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S. T. Wier

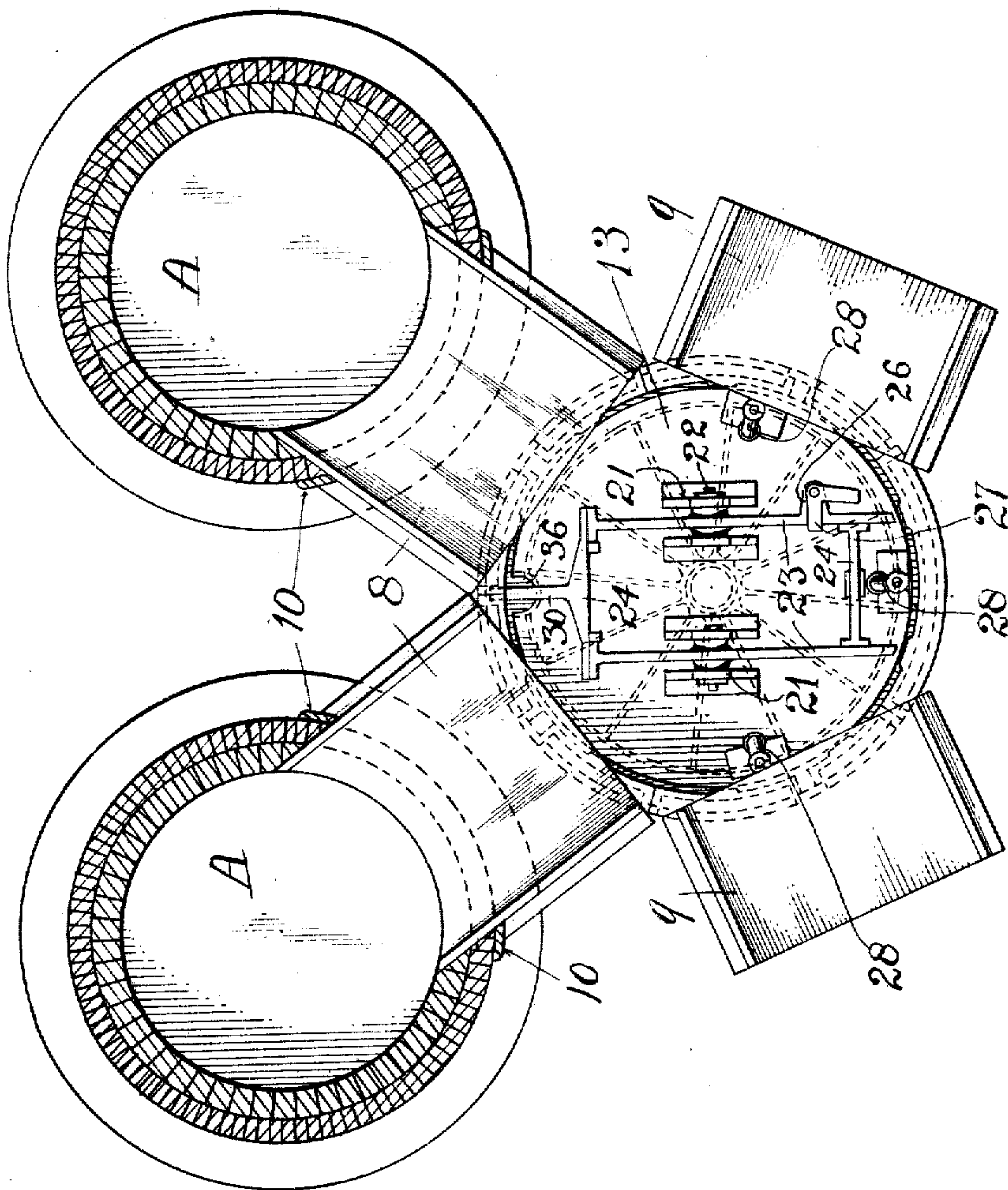
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By *Attorney R. W. Barkley.*

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Fig. 2.



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Fig. 3.

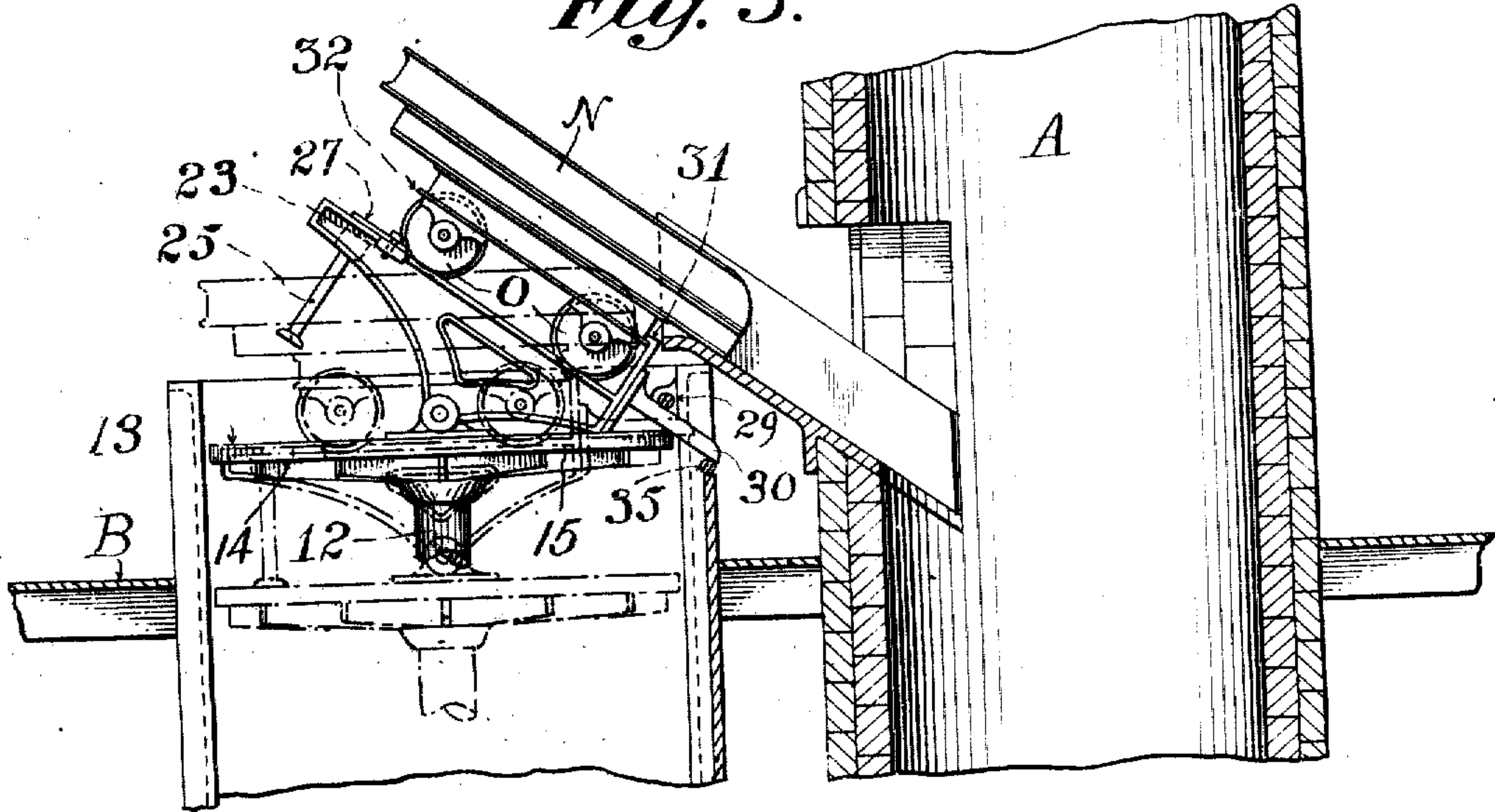


Fig. 4.

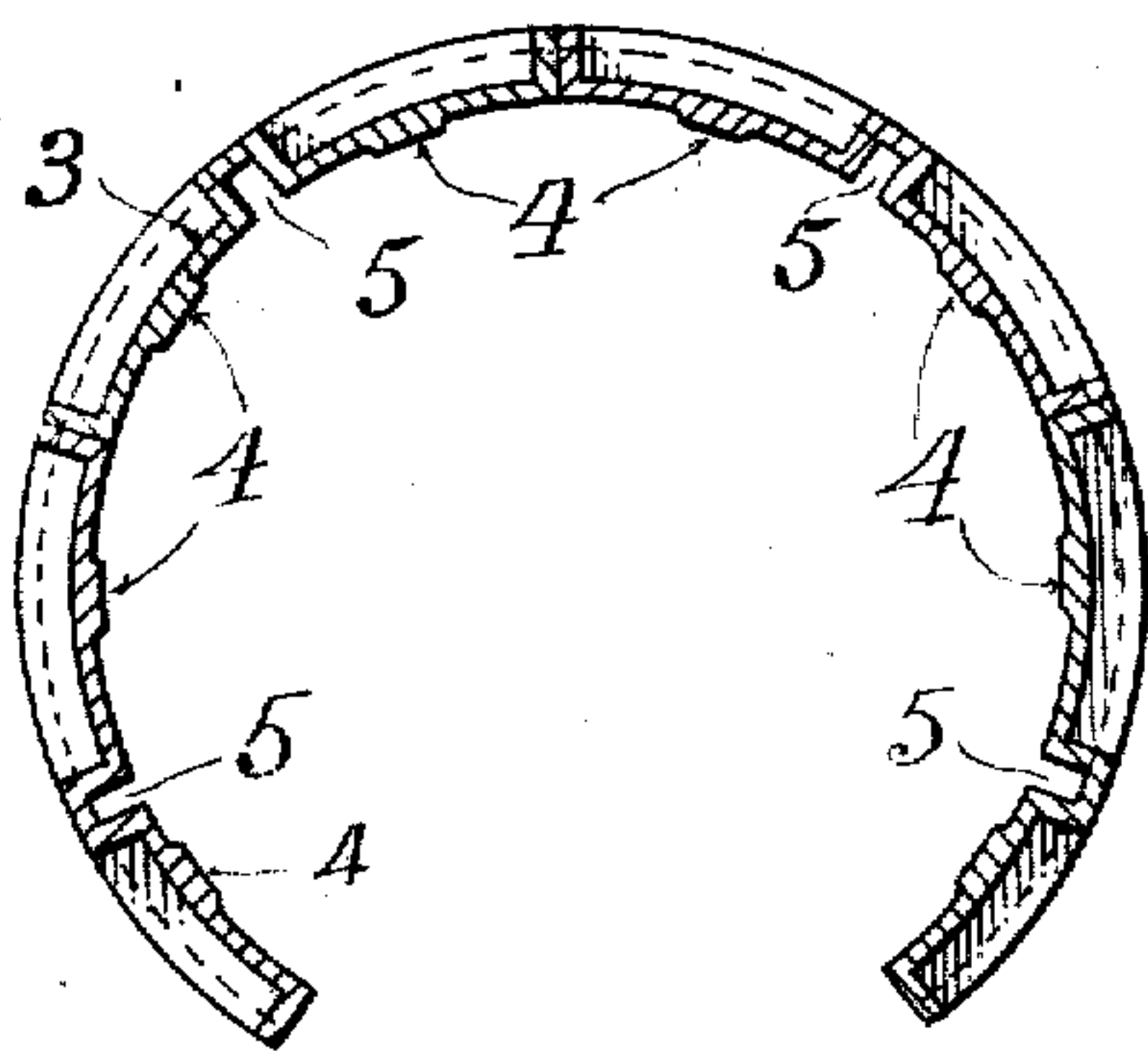
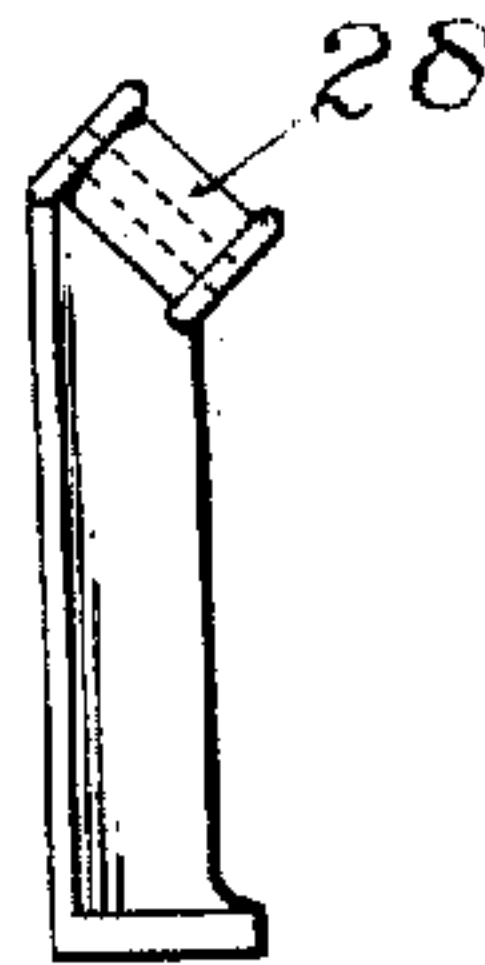


Fig. 5.



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UNITED STATES PATENT OFFICE.

DAVID GILES, OF CHATTANOOGA, TENNESSEE, ASSIGNOR TO UNITED STATES CAST IRON PIPE & FOUNDRY COMPANY, A CORPORATION OF NEW JERSEY.

FURNACE-CHARGING APPARATUS.

933,031.

Specification of Letters Patent.

Patented Aug. 31, 1909.

Application filed September 8, 1908. Serial No. 451,777.

To all whom it may concern:

Be it known that I, DAVID GILES, a citizen of the United States, and a resident of Chattanooga, in the county of Hamilton and State of Tennessee, have invented a certain new and useful Improvement in Furnace-Charging Apparatus, of which the following is a specification.

One object of this invention is to elevate coke and iron to the level of the charging door of a furnace and there to discharge the same.

Another object is to do as much of the work as possible on the ground level and as little as possible on the level of the charging floor.

Another object is to serve more than one furnace by one and the same elevating apparatus.

Other objects will appear hereinafter.

The invention consists of features of construction, arrangements and combinations of devices hereinafter described and more particularly pointed out in the appended claims.

The invention is embodied in the apparatus illustrated in the accompanying drawing, forming part hereof, in which—

Figure 1 is a front elevation, partly broken away; Fig. 2 is a plan view, partly in section on the plane 2—2 of Fig. 1, and with parts omitted; Fig. 3 is a sectional view of the upper part of a furnace and the charging apparatus; Fig. 4 is a section on the plane 4—4 of Fig. 1 showing only the cylinder; and Fig. 5 is a detail view.

In the drawings, the reference symbol A marks a cupola furnace, which may be of any form or type. By preference, two such furnaces are located adjacent to each other, and the charging apparatus forming the subject-matter of this invention is located at a convenient distance from them and is arranged to serve both.

The reference B designates the "charging floor," which is located at a suitable level below the charging doors C of the furnaces A.

The reference 1 marks a hollow cylinder located equidistantly from the two furnaces A. The front of this cylinder is omitted (see reference 2) from the ground level to near the top of the cylinder. Preferably, the cylinder 1 is built of cast-iron flanged plates bolted or otherwise secured together to form the cylinder. The sections 3 are provided internally with bearing, or guide,

faces 4 for coaction with the periphery of the table, hereinafter mentioned, and with internal grooves 5, forming continuous guides. Just about the ground level, the cylinder 1 is formed with a ring 6, the internal diameter of which is at least as great as a diameter internally of the cylinder 1 through two grooves 5, all for a purpose to appear hereinafter. Special plates 7 form sill and lintel for the door 2 of the cylinder 1.

At the top of the cylinder 1 are fixed chutes 8 9 for delivering charges into the furnaces A or on to the charging floor B, respectively. The chutes 8 set into the charging doors C of the furnaces A, being provided with external flanges at 10 which fit against the outer surfaces of the furnaces. The chutes 9 are attached in any suitable manner to the cylinder 1.

Placed centrally of and in axial line with the cylinder 1 is a closed casing 11, which is sunk in the ground and at its top is provided with a stuffing box. This casing houses a plunger piston 12 which passes through the said stuffing box and which is adapted to be raised by water-pressure and to be lowered by the release of said pressure. To the upper end of the plunger 12 is fast a circular table 13 whose periphery is adapted to coact with the bearers 4 as the table rises and falls in the cylinder 1. Under the table 13 is a flange 14 which is provided at suitable distances apart with notches or recesses 15 for a purpose to appear hereinafter.

A water pipe 16 connects the casing 11 with a hydraulic valve 17 and with a source of supply of water under pressure or head. The valve 17 is operated by a lever 18 and a hand rod 19 to admit water to the casing and to discharge it therefrom. The rod 19 has two notches 20 therein, which are adapted to engage with the edge of a hole in the charging floor B to lock the valve 17 in each of its two positions for admitting and discharging water to and from the casing 11, and thereby to elevate and lower the table 13. The rod 19 has a suitable hand-piece whereby it may be grasped.

On the table 13 are two pairs of bearings 21 for shafts 22. Two tipping or tilting tracks or rails 23 are hinged upon the shafts or rods 22, and these rails are united rigidly together by means of the cross-bars 24. These rails 23 are so placed or weighted that, normally, they are horizontal, a stop

or leg 25 thereon resting at such time on the table 13 to retain them in such position. At the outside of one of the rails 23 is a lug 26, on which is pivoted an angle lever latch 27, said latch being adapted to "chock" the wheel of a car N on said rail.

The table 13 may be turned, as by rotating the plunger 12 in the casing. This is done conveniently by means of sockets 28 which are attached to the table at convenient points, and in which a suitable lever (not shown) may be inserted. In this way, the turntable 13 may be turned to cause the rails to point toward any one of the said chutes 8, 9.

It is preferred to have the tipping of the rails automatic in its action, and, in order to secure this end, transverse stops 29 are fixed in bearings at the upper ends of the guides 5 in position such that they will contact with and arrest the arm 30, which, preferably, is rigid with the rails 23, the arrangement being such that, once the arm 30 engages with a stop 29, the continued rise of the turntable 13 will cause the rails 23 to tip as indicated in full lines in Fig. 3, thus causing the car N to discharge its contents down the corresponding chute. The car N has wheels O which run on the rails 23, and it is open at its front and top. The car is prevented from running off the rails when these are tipped, by means of a catch 31 rigidly connected with the rails and which engages over a flange 32 on the car N, as shown in Fig. 3, while the pivoted latch 27 is used to chock a rear wheel of the car. The arm 30 is of a length such that it fully enters a guide 5 and also the ring 6, but without touching by its end; thus, this arm acts to prevent the turntable from turning, once this arm has entered a groove 5, until said arm is again at the level of the ring 6. When the arm 30 is at the level of the ring 6, the turntable 13 may be turned in either direction to bring the arm 30 under the groove 5 which, at the top of the cylinder, will cause the car to discharge its load down the desired chute, on the tipping of the rails by the corresponding stop 29.

Over-tipping of the car may be prevented by any suitable means, the means for this purpose which are shown in the drawing consisting of stops 35 below the stops 29 and at a greater distance from the axis of the cylinder 1 than are said stops 29; that is, the arm 30 passes the stops 35 as the table ascends, but engages with said stop 35 when the car is tipped as shown in Fig. 3.

The table 13 may have a notch or recess 36 therein underneath the arm 30 to allow that arm to clear the table when the car is tipped to the full extent permitted by the stops 35.

In order to prevent the admission of water to the casing when the turntable is in its

lowest position and is in a position in which the arm 30 is not alined with some one of the guides 5, a detent device is used, such, for instance, as that shown in the drawing and consisting of a pivoted lever or arm 33 which is connected by a pitman rod 34 with the lever 18 for operating the valve 17 aforesaid, the said lever or detent 33 being so arranged and placed that, in any position of the turntable except those wherein the arm 30 is alined vertically with a groove 5, said detent will strike the ring 14 if it is attempted to turn on the water-pressure to elevate the table, but which detent, if the table be in position wherein the arm 30 is alined with a groove 5, will, on operating said lever 18 to turn on the power, enter a notch or recess 15 in the flange 14 and permit the power to be turned on, but its engagement with the flange 14 prevents the turning on of the power as aforesaid.

Coke or iron is loaded on the car N at any convenient point and the car is then run to the cylinder 1 and into the same upon the said rails 23, the turntable having first been brought to the proper position by means of a lever and a socket 28. Thereupon the turntable 13 is turned to bring the arm 30 in vertical alinement with the proper vertical groove 5, after which, by raising the rod 19, the table is caused to rise until the arm 30 has engaged with the corresponding stop 29 and has tipped the rails and car as illustrated, when the rod 19 may be lowered halfway (at which point another notch therein may be provided, halfway between the two shown) to hold the table in its uppermost position until the car is empty, after which the rod 19 is dropped and the car is lowered to the bottom and run out of the cylinder to be again loaded. The car is made to deliver its load into either furnace or on to the floor adjacent to either furnace by causing the arm 30 to engage with one or another of the grooves 5. When a car is run upon the rails 23, the latch 27 is first moved to its inoperative position, and when the car is on the track, that latch is moved to engage it underneath the wheel O on its rail and nearest it.

The invention is not limited to the precise form thereof, nor to the details, shown in the drawings and above described, but it may be otherwise embodied without departing from the spirit and the scope of the claims herein.

What I claim as new and desire to secure by Letters Patent of the United States is—

1. In a furnace-charging apparatus, a vertically movable turntable combined with rails hinged thereto, a car-stop connected with said rails, an arm or lever connected with said rails, and a stop coacting with said arm or lever to tilt the said rails.

2. In a furnace-charging apparatus, a ver-

2. In furnace-charging apparatus, a vertically movable turntable combined with a pair of wheel rails hinged thereto, a car-stop connected with said rails, an arm or lever connected with said rails, a stop coacting with said arm to tilt said rails, and a second stop for limiting said tilting.
3. In a furnace-charging apparatus, a vertically movable turntable combined with wheel-rails hinged thereto, a car-stop connected with said rails, and a latch movable relatively to said rails for chocking a car in place thereon.
4. In furnace-charging apparatus, a vertically movable turntable, wheel rails hinged thereto, a car-stop connected to said rails, an arm connected with said rails, and a plurality of stops for coaction individually with said arm to tip said car in as many different positions of the turntable.
5. In furnace-charging apparatus, a vertically movable turntable, combined with wheel-rails hinged thereto, an arm connected to said rails, and a vertical guide for said arm, said arm and said guide being disengaged in the lowermost position of the arm.
6. In furnace-charging apparatus, a vertically movable turntable, combined with wheel-rails hinged thereto, vertical bearers for said table, an arm connected with said rails, and a plurality of vertical guides for said arm for individual coaction therewith.
7. In furnace-charging apparatus, a vertically movable turntable, combined with wheel-rails hinged thereto, an arm connected with said rails, and a plurality of guides for individual coaction with said arm in different positions of the turntable.
8. In furnace-charging apparatus, a vertically movable turntable, a cylindrical casing provided with guides for said table and with guiding grooves, wheel-rails hinged to said table, and an arm connected with said rails and adapted to coact with said grooves, in combination.
9. In furnace-charging apparatus, a vertically movable turntable, combined with wheel-rails hinged thereto, an arm and a car-stop connected with said rails, a vertical guide for coaction with said arm, said arm and said guide being disengaged in the lowermost position of said arm and a stop for coaction with said arm to tip said rails, in combination.
10. In furnace-charging apparatus, a vertically movable turntable, combined with wheel-rails hinged thereto, an arm and a car-stop connected with said rails, a plurality of vertical guides for coaction with said arm independently, and a plurality of stops for independent coaction with said arm to tip said rails.
11. In furnace-charging apparatus, a vertically movable turntable, combined with guides therefor, wheel-rails hinged thereto, an arm and a car-stop hinged to said table, a plurality of vertical guides for individual coaction with said arm, and a plurality of stops for individual coaction with said arm to tip said rails.
12. In furnace-charging apparatus, a vertically movable turntable, combined with a cylindrical casing provided with vertical guides for said table and with guiding grooves, wheel-rails hinged to said table, and an arm connected with said rails and adapted to coact with said guiding grooves.
13. In furnace-charging apparatus, a rotatable hydraulic plunger, a platform fixed thereon and provided with recesses underneath, a valve for controlling the supply of fluid to said plunger, a detent coacting with said recessed part of said platform when the latter is in its extreme down position to prevent the opening of said valve at such time except when a recess is opposite said detent.
14. In furnace-charging apparatus, a hydraulic plunger, a platform fixed thereon and recessed underneath, a valve controlling the fluid supply for operating said plunger, a plurality of vertical guides, an arm connected to said platform and adapted to coact with said guides to prevent turning of said platform as it rises, means whereby said platform may be turned to bring said arm into coaction with any guide, and means for preventing the operation of said valve until said arm is in position to coact with a guide.
15. In furnace-charging apparatus, a vertical cylinder provided with platform-guides and with guide-grooves inside the same, combined with a vertically movable turntable or platform adapted to coact by its periphery with said platform-guides, wheel-rails hinged to said table, an arm connected with said rails and adapted to coact with said guiding-grooves, and means for locking a car in place on said rails.
16. In furnace-charging apparatus, a vertical cylinder provided internally with table-guides and with guide-grooves, combined with a vertically movable turntable adapted to coact by its periphery with said table-guides, wheel-rails hinged to said table, an arm connected with said rails and adapted to coact with said guide-grooves, means for locking said car in place on said rails, and stops at the tops of said guide-grooves for coaction with said arm in tipping the rails and car.
17. In furnace-charging apparatus, a vertical cylinder provided internally with table-guides and guide-grooves, combined with a vertically movable turntable adapted to coact by its periphery with said table-guides, wheel-rails hinged to said table, an arm connected with said rails and adapted to coact with said guide grooves, means for locking a car in place on said rails, stops at the upper ends of said grooves for coaction with

said arm in tipping the rails and car, and stops for coaction with said arm to limit such tipping.

18. The combination of a pair of furnaces placed adjacent to each other, a vertical cylinder adjacent to said furnaces, chutes whereby said cylinder may deliver into said furnaces and upon the charging floor, a vertically movable turntable within said cylinder, rails hinged to said table and provided

with means for locking a car thereon, and means whereby said rails are tipped to cause the car to deliver into any of said chutes.

Signed at New York in the county of New York and State of New York this twentieth day of August, A. D. 1908.

DAVID GILES.

Witnesses:

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BESSIE NATKINS.