

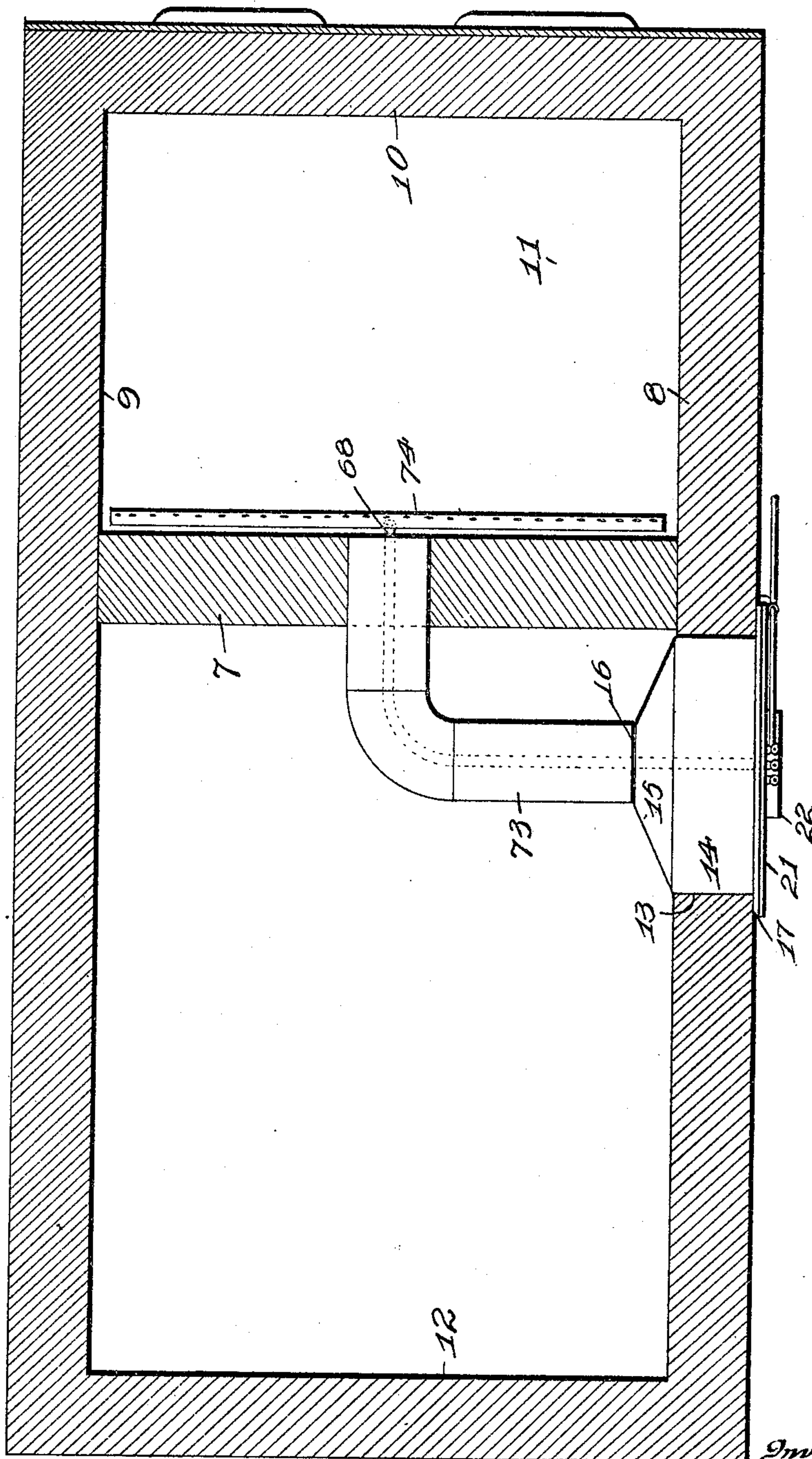
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PATENTED SEPT. 12, 1905.

R. W. HAMANN.
INDUCED DRAFT APPARATUS.
APPLICATION FILED JAN. 8, 1904.

3 SHEETS—SHEET 1.

Fig. 1.

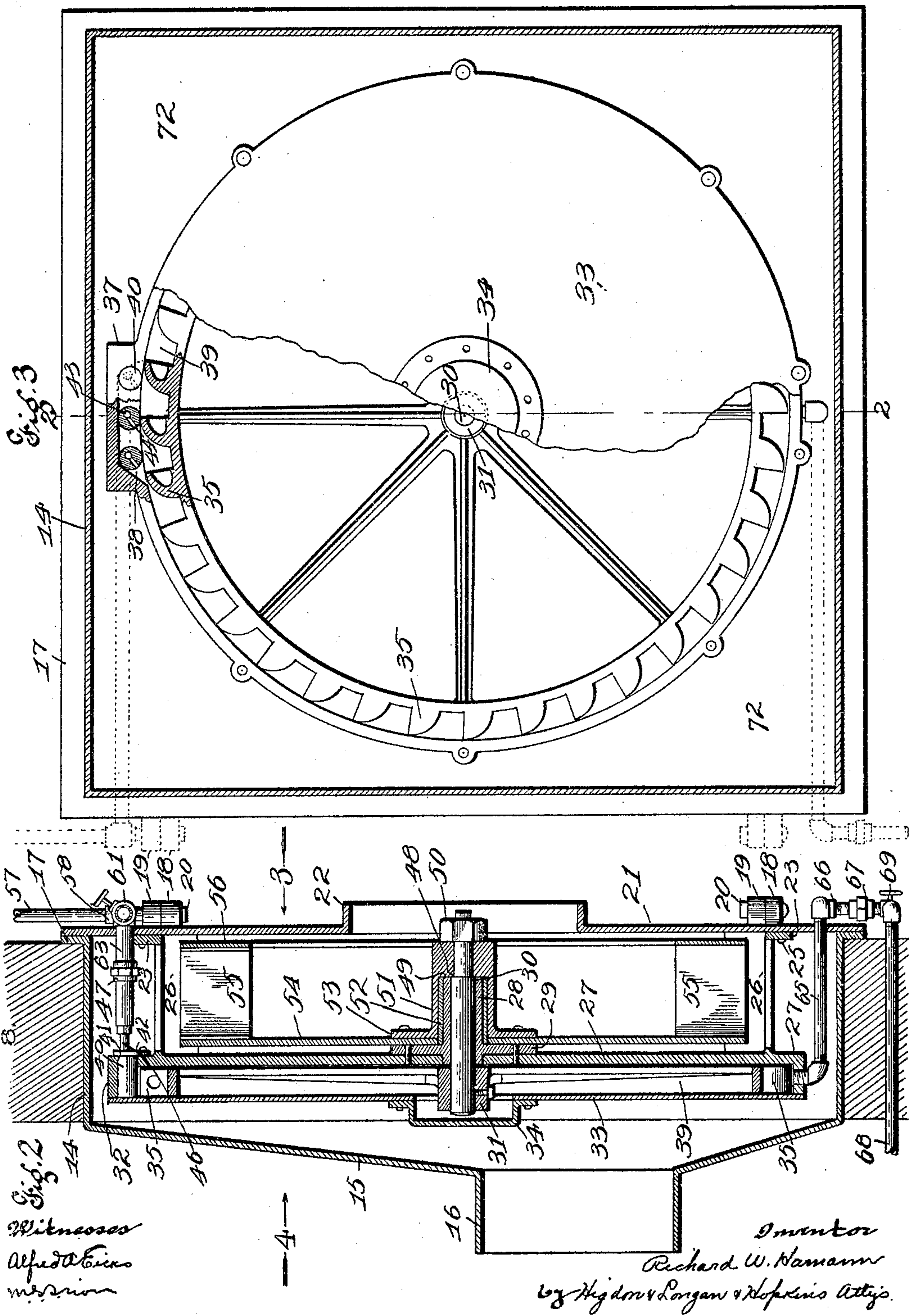


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3 SHEETS—SHEET 2.

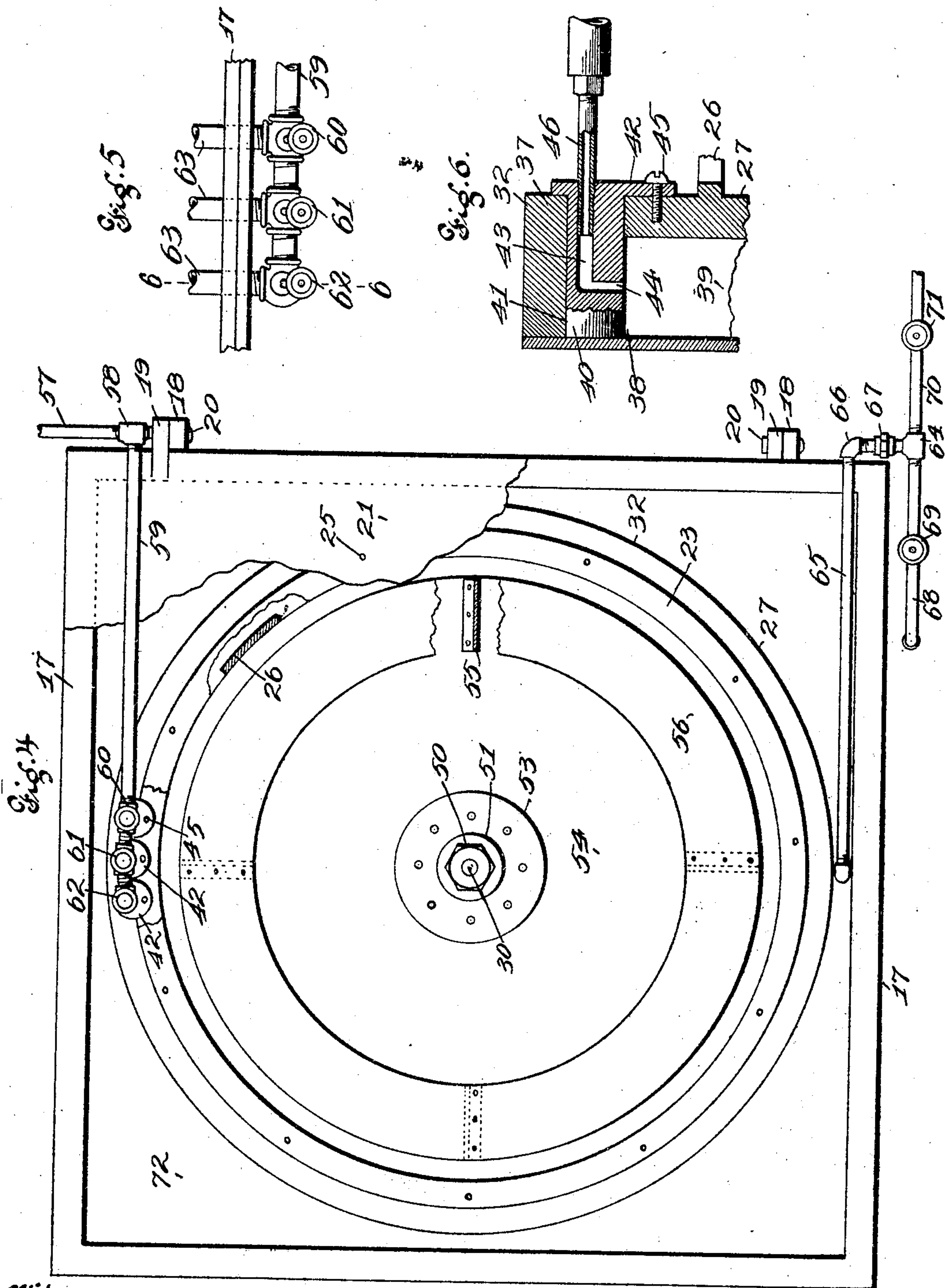


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UNITED STATES PATENT OFFICE.

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INDUCED-DRAFT APPARATUS.

No. 799,560

Specification of Letters Patent.

Patented Sept. 12, 1905.

Application filed January 8, 1904. Serial No. 188,260.

To all whom it may concern:

Be it known that I, RICHARD W. HAMANN, a citizen of the United States, residing at St. Louis, State of Missouri, have invented certain

5 new and useful Improvements in Induced-Draft Apparatus, of which the following is a specification containing a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

10 My invention relates to induced-draft apparatus, my object being to place a steam-turbine blower in the wall of the furnace, so as to conduct the draft from the blower to the fire and discharge the exhaust from the turbine at a point to supplement the force of the

15 air-draft. My invention consists in the novel features hereinafter shown, described, and claimed.

In the drawings, Figure 1 is a horizontal

20 section of the walls of a furnace, showing my induced-draft apparatus in position for use. Fig. 2 is a vertical section showing the details of construction of the turbine and fan upon an enlarged scale, said view being taken sub-

25 stantially on the line 2 2 of Fig. 3. Fig. 3 is an inside elevation as seen looking in the direction indicated by the arrow 3 in Fig. 2, parts being broken away and parts being shown in section. Fig. 4 is an outside eleva-

30 tion as seen looking in the direction indicated by the arrow 4 in Fig. 2, parts being broken away and parts being shown in section to illustrate the details of construction. Fig. 5 is an enlarged detail of the valves for controlling the steam-jets. Fig. 6 is a sectional view

35 on the line 6 6 of Fig. 5.

Referring to the drawings in detail, the bridge-wall 7 connects the side walls 8 and 9 a suitable distance back of the front wall 10,

40 as required, to form the ash-pit 11, and said walls 8 and 9 extend a considerable distance backwardly from the bridge-wall 7, the rear ends of said walls being connected by the wall 12. Said walls 7, 8, 9, 10, and 12 form

45 the boiler-setting. An opening 13 is formed in the side wall 8 immediately back of the bridge-wall 7 and below the level of the grates to receive the draft apparatus.

A casing 14 is square in elevation, as shown

50 in Figs. 3 and 4, and fits rigidly in the opening 13 of the wall 8. The hood 15 is funnel-shaped and extends from the casing 14 and terminates in the pipe-nipple 16. A flange 17 extends outwardly and forms a frame fit-

55 ting against the outer face of the wall 8,

said flange serving to make a close joint around the casing 14. The hinge members 18 are rigidly secured to the outer face of the wall 8 or to the flange 17 in any suitable way. The swinging hinge members 19 are con-

60 nected to the members 18 by the hinge-pins 20. The front plate 21 is connected to the swinging hinge members 19, said front plate being substantially the same size as the flange 17 and being in position to close the opening

65 through the casing 14.

At the center of the plate 21 is an outwardly-projecting circular rim 22, forming the air-intake opening. The ring 23 is secured to the rear face of the plate 21 by

70 screws, rivets, or bolts 25, said ring being concentric to the air-intake opening. Arms 26 extend backwardly from said ring, said arms being equally spaced around the center. The supporting-plate 27 is rigidly connected

75 to the rear ends of the arms 26, said plate being circular in form and somewhat larger than the ring 23. The bushing 28 has a flange 29 secured to the front face of the plate 27, said bushing extending through the plate 27

80 and extending forwardly from the flange 29 a considerable distance. The shaft 30 is rotatably mounted in the bushing 28, and the turbine-wheel 31 is fixed upon the rear end of said shaft. A flange 32 extends backwardly

85 from the edge of the plate 27, and the housing-plate 33 is connected to the rear edge of said flange, there being a cap 34 extending backwardly from the center of said plate 33 to form a recess for the hub of the wheel 31,

90 thus completely inclosing the turbine-wheel, the cup-shaped buckets 35 of said wheel fitting closely within the ring 23. The bearing-block 37 extends upwardly from the ring 23, said bearing-block being cored to form the

95 jet-plug chamber 38, which connects with the turbine-chamber 39.

The three jet-plugs 40 are mounted in bores 41, extending horizontally through the bearing-block 37 and chamber 38, said plugs 40

100 having eccentric heads 42. Ports 43 extend into said plugs 40 from their forward ends and connect with the jets 44, said jets discharging into the turbine-chamber 39 and the angle of said jets relative to the buckets of

105 the turbine being determined and adjusted by manipulating the heads 42, thus rotating the plugs, and when said jets have been properly adjusted set-screws 45 are inserted through the heads 42 into the plate 27 to hold the

110

plugs rigidly in position. The pipe-nipples 46 are tapped into the ports 43, and unions 47 are mounted upon the forward ends of said nipples. The ports 43 are formed in the
5 plugs 40 to one side of the center, so as to give thick walls in which to bore the jets 44 without correspondingly enlarging the plugs.

The forward end of the shaft 30 is reduced in size to form the shoulder 48, and the fan-
10 hub 49 is mounted upon the shaft against the shoulder 48 and clamped in position by the nut 50, screw-seated upon the shaft 30. The bearing-shell 51 extends backwardly from the hub 49, and a brass bushing 52, inserted
15 rigidly into said shell, rotatably fits the bushing 28. The flange 53 extends outwardly from the rear end of the shell 51, and the fan-supporting disk 54 is rigidly connected to said flange 53. Blades 55 extend forwardly
20 from the face of said disk 54, said blades being located radially equal distances apart, and the ring 56 connects the front ends of said blades.

The steam-supply pipe 57 is connected to
25 the elbow 58, and said elbow is connected to the upper hinge-pin 20. A pipe 59 leads from the elbow 58 to the globe-valve 60, and the globe-valves 61 62 are connected to the globe-valve 60. Pipes 63 connect the globe-
30 valves 60 61 62 to the unions 47, so that said globe-valves control the jets 44 each independent of the others.

The T 64 is located in vertical alinement with the hinge-pins 20. The exhaust-pipe 65
35 leads from the lower part of the turbine-chamber to the elbow 66, and said elbow 66 is connected to the T 64 by the union 67. A pipe 68 leads from the T 64 through the wall 8, said pipe being controlled by the valve 69,
40 and a pipe 70 leads from the other end of the T 64 to any suitable place, said pipe being controlled by the valve 71. The entire mechanism is mounted upon the plate 21, said plate being mounted upon the hinges turn-
45 ing upon the pins 20, so that the plate 21 swings like a door to open and close the passage through the casing 14, the exhaust-pipe turning at the union 67 and the supply-pipe turning at its connection between the pipe 57
50 and elbow 58.

If the valves 60 61 62 are opened, steam will pass through the pipe 63 and be discharged through the fine jet-holes 44 and strike the buckets 35 and rotate the turbine-wheel at a
55 high rate of speed. This will rotate the fan-wheel, thereby drawing the air through the air-intake opening 22 and by centrifugal force compressing the air in the casing 14 around the fan-wheel, and this will force the air back-
60 wardly through the opening 72 between the ring 23 and the casing 14, and the air strikes the funnel-shaped hood 15 and is conducted to the pipe-nipple 16, and from said pipe-nipple 16 the pipe 73 leads through the wall 7,
65 thus discharging the air into the ash-pit be-

low the grate. The discharge end of the pipe 73 is at the center of the bridge-wall, so that the air may spread equally in both directions.

The exhaust-pipe 68 leads under the air-
pipe 73 through the bridge-wall 7 and the per- 70 forated distributing-pipe 74, said distributing-pipe being located in front of the bridge-wall and the jet-holes of the pipe discharging upwardly, so that the exhaust-steam reinforces the air-draft. 75

By using the small jet-holes 44 I secure steam-jets of great velocity and small volume, and by having a plurality of independent cut-offs 60 61 62 I may cut off one or more of the jets without reducing the pressure and veloc- 80 ity of the remaining jet or jets.

I wish to call especial attention to the importance of having the fan-chamber open all the way around its periphery, thus rendering it unnecessary to carry the air around to a cer- 85 tain place, as in the old form of fan-chambers, but allowing the fan to discharge at all points of the periphery, thus greatly decreasing the resistance of the air and correspondingly reducing the power required to run the 90 fan.

I claim—

1. In an induced-draft apparatus: the combination with a furnace having a bridge-wall, of a blower; a pipe leading from the blower 95 through the bridge-wall; a turbine for operating the blower, an exhaust-pipe leading from the turbine forwardly through the bridge-wall; and a perforated distributing-pipe connected to the forward end of the exhaust-pipe 100 parallel with and in front of the bridge-wall; substantially as specified.

2. In an induced-draft apparatus, the combination with a furnace having a bridge-wall, of a casing mounted in the outside wall of the 105 furnace, a front plate hinged to the wall and adapted to close the casing, and having a centrally-arranged air-intake opening, arms extending inwardly from the front plate, an impact-engine mounted upon the inner ends of 110 the arms, a casing around said engine, there being an air-space around said engine, a blower mounted upon the shaft of the engine in front of the engine-casing, a steam-pipe leading to the engine, an exhaust-pipe lead- 115 ing from the engine, which pipes are so hinged as that the blower apparatus may be swung into and out of the casing, and a perforated distributing-pipe connected to the forward end of the exhaust-pipe parallel with and in 120 front of the bridge-wall; substantially as specified.

In testimony whereof I have signed my name to this specification in presence of two subscribing witnesses.

RICHARD W. HAMANN.

Witnesses:

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