No. 649,787. Patented May 15, 1900.

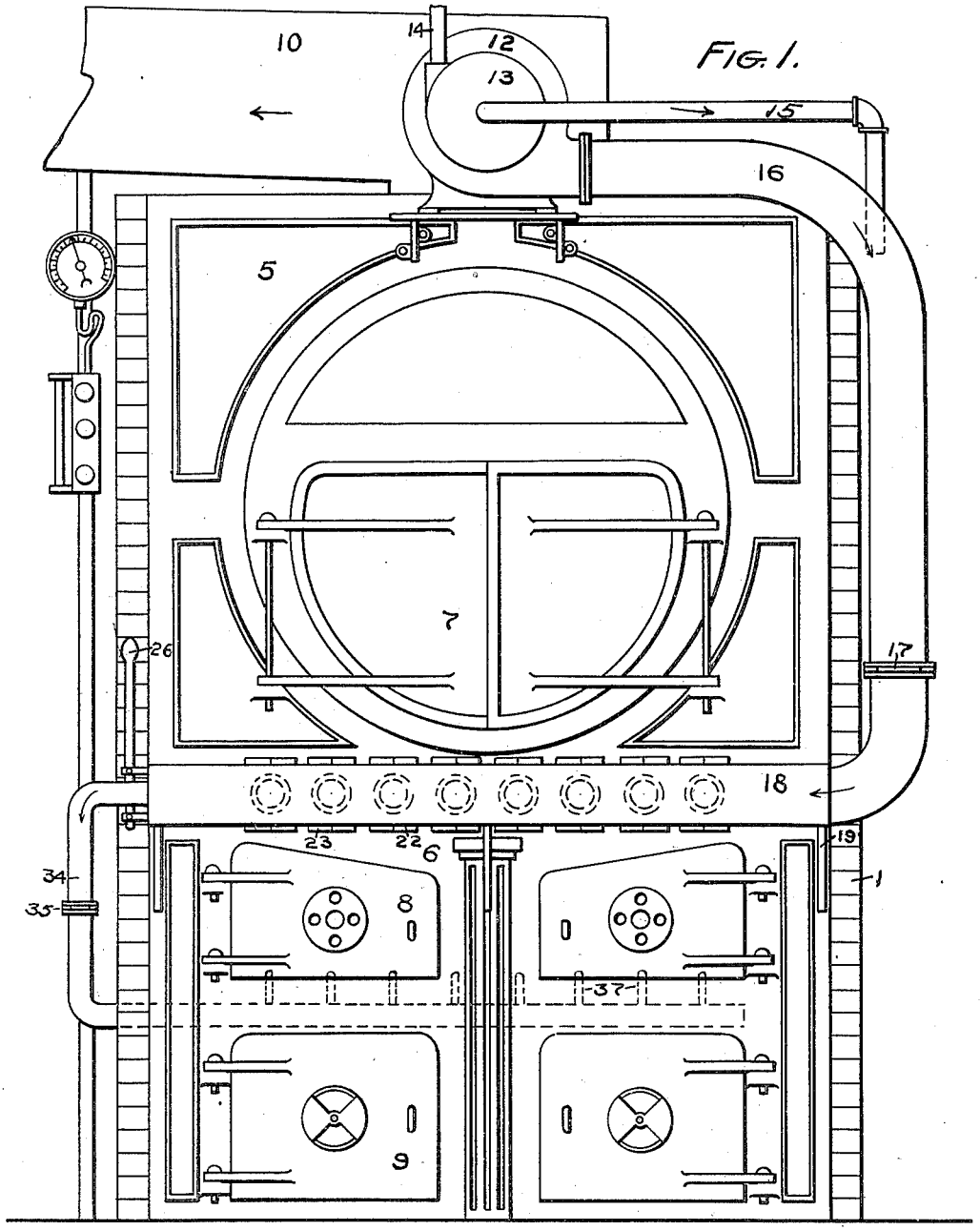
J. H. WIEST.

SMOKE CONSUMER FOR FURNACES.

(Application filed Aug. 31, 1899.)

(No Model.) 2 Sheets—Sheet 1.

FIG. 1.



WITNESSES:
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FIG. 2.

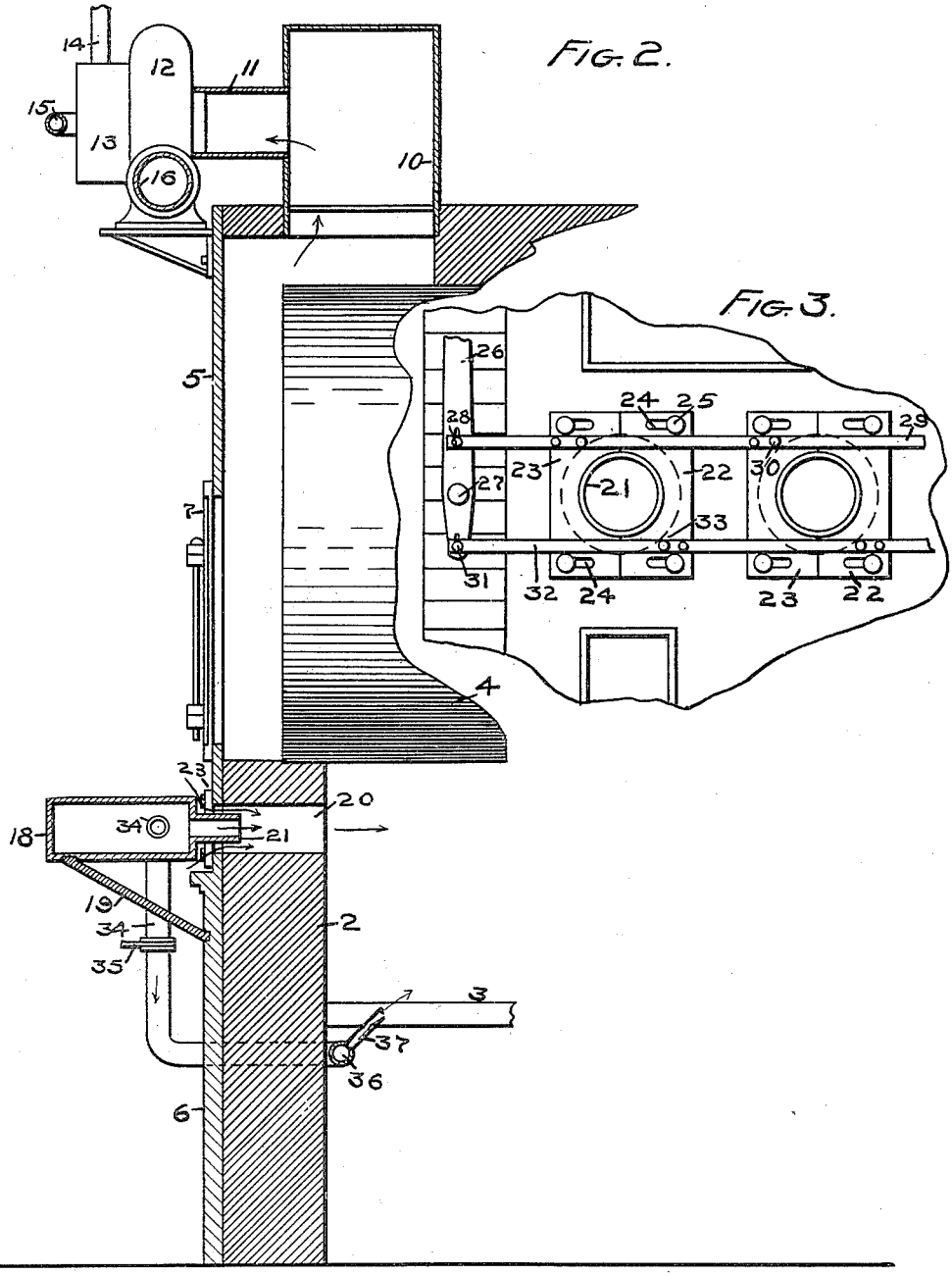

FIG. 3.

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UNITED STATES PATENT OFFICE.

JONAS H. WIEST, OF INDIANAPOLIS, INDIANA, ASSIGNOR TO THE ECONOMY SMOKE CONSUMER COMPANY, OF SAME PLACE.

SMOKE-CONSUMER FOR FURNACES.

SPECIFICATION forming part of Letters Patent No. 649,787, dated May 15, 1900.

Application filed August 31, 1899. Serial No. 729,088. (No model.)

To all whom it may concern:

Be it known that I, JONAS H. WIEST, of Indianapolis, county of Marion, and State of Indiana, have invented a certain new and useful Smoke-Consumer for Furnaces; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which like numerals refer to like parts.

This invention relates to new means for completely consuming the combustible gases arising from a furnace. In this invention the smoke is drawn from the smoke-stack by a fan and returned to the furnace by a novel mechanical arrangement wherein air is mixed with the returning smoke, so as to supply it with sufficient oxygen to render it completely combustible.

The full nature of my invention will appear from the accompanying drawings, and the description following of one form of device embodying my said invention.

Figure 1 is a front elevation of a boiler and furnace with the smoke-stack partly broken away. Fig. 2 is a central vertical section of the front portion of the boiler and furnace as shown in Fig. 1. Fig. 3 is a detail in elevation of the means for regulating the supply of air to the returning smoke.

Referring now to the details of the mechanism herein shown for the purpose of illustrating the nature of my invention, 1 are the brick side walls of a furnace and boiler, 2 being the front furnace-wall, and 3 the grate-bars in said furnace. Above the furnace a boiler 4 is mounted. A suitable front 5 is provided for the boiler and a front 6 for the furnace. The former is accessible through the doors 7 and the latter through the doors 8, leading into the fuel-chamber above the grate-bars, and the doors 9, leading into the ash-pit below the grate-bars. A suitable conduit is provided from the furnace, leading to the smoke-stack 10. From some point in the smoke-stack the smoke is withdrawn. In Fig. 2 the pipe 11 leads from the side of the rectangular smoke-stack 10 to the fan 12, arranged to exhaust from said smoke-stack. The means for driving the fan is a steam-turbine 13, mounted on the shaft of the fan and fed by the steam-inlet pipe 14, the pipe 15 being the exhaust therefrom. After the smoke is withdrawn from the smoke-stack by said fan it is expelled through the pipe 16 back to the furnace. The exhaust-pipe 15 preferably enters said pipe 16, as shown in Fig. 1. Said pipe 16 is provided with a suitable gate 17 for regulating the passage of smoke therethrough. In this way the smoke is introduced into a box 18, extending horizontally across the front of the structure in the upper portion of the chamber that lies above the grate-bars. The braces 19 tend to support said box. The front wall 2 of the furnace is provided with a series of circular horizontal openings 20. Partially extending into these from said box 18 are a series of small pipes 21, whose diameter is considerably less than the diameter of the openings 20, and the box 18 is set back sufficiently far from the front of the furnace to leave ample room for the admission of air from the outside into the openings 20. This air comes in around the short pipes 21 and is drawn in by the blast of smoke that is driven through the pipe 16 and box 18 by the fan. In this way air is mixed with the smoke in the openings 20. The amount of air thus admitted to the smoke is regulated by the means shown best in Fig. 3. As is there shown, the space about each pipe 21 is closed by horizontally-sliding plates 22 and 23. Each of these plates is provided at both its upper and lower ends with horizontal slots 24, through which bolts 25 extend that are screwed in the front 6 of the furnace. In this manner the plates 22 and 23 are slidable horizontally away from and toward each other. When drawn together, as shown in Fig. 3, they will close the air-inlet in the openings 20; but when separated they open such air-inlet and enlarge the same, according to their adjustment. In order to render the opening and closing of these sliding plates uniform, I provide a lever 26, pivoted by the bolt 27 to the side wall 1 of the construction. Above the pivotal point of said lever I pivot in a slot 28 a horizontal bar 29, that is secured by the rivets 30 to the plates 23 throughout the series. Likewise to the lever 26 on the other side of its pivotal point I pivot in a slot 31 another bar 32, which is secured by the rivet 33 to the plates 22

throughout the series. Therefore when said lever 26 is operated to the left the plates 22 and 23 are moved horizontally away from each other to provide an air-inlet. The extent of said inlet is adjusted by the extent of movement of the lever 26. By operating the lever in the opposite direction said plates are brought together and the air-inlet closed, as shown in Fig. 3. It is obvious from this description that the dimensions of the air-inlets into the openings 20 can be readily and uniformly adjusted.

In addition to the foregoing arrangement I provide a pipe 34, leading from the box 18 and entering the furnace at a point below the grate-bars, in order to introduce below the fuel such portion of the returning smoke as may be desirable from time to time. The amount of the smoke thus admitted through the pipe 34 is determined by the gate 35 in said pipe. Said pipe 34 connects with a horizontal pipe 36 in the ash-pit, from which a series of small pipes 37 extend upward at an angle toward the fuel-chamber and between the grate-bars, but not above the grate-bars.

With this construction, which I have thoroughly tested, I am enabled to practically suppress the egress of smoke from the smoke-stack, and what is doubtless of greater importance it effects a saving of about twenty-five per cent. of the fuel over a furnace without the smoke-consumer.

One advantage in placing the fan between the smoke-stack and the air-inlet instead of having the air-inlet preceding the fan is to relieve the fan from the work necessary to pass the air through it, leaving the fan only to withdraw the smoke. The outlet from the smoke-stack is on the side, so that the draft through it goes on, only the heavier particles of the gas and other material passing up through the smoke-stack. This permits the portion of such gases that is consumed and free from smoke or carbon particles to pass out through the smoke-stack and is not withdrawn by the fan.

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

1. A smoke-consumer for furnaces including a conduit leading from the smoke-stack back to the furnace, with a plurality of inlets into the furnace, means for admitting air into such inlets from the conduit, and a fan in such conduit interposed between the smoke-stack and the air-inlets.

2. A smoke-consumer for furnaces including a conduit leading from the smoke-stack back to the furnace, with a plurality of inlets into the furnace, an air-inlet into such inlets from said conduit into the furnace, means for controlling and adjusting such air-inlets, a fan in said conduit interposed between the smoke-stack and the air-inlets, and a gate or valve in said conduit.

3. A smoke-consumer for furnaces including a conduit leading from the smoke-stack back to the furnace, means for admitting air into said conduit, a fan in said conduit interposed between the smoke-stack and the air-inlet, a steam-turbine for driving said fan, and an exhaust-pipe leading from said steam-turbine into the conduit between the fan and air-inlet.

4. A smoke-consumer for furnaces including a series of openings into the fuel-chamber of the furnace, a conduit leading from the smoke-stack with small pipes entering said openings and of less diameter than said openings so as to leave an air-inlet into said openings around said pipes, movable plates for closing the air-inlet around said pipes, means for operating all of said closing-plates simultaneously, and a fan in said conduit for drawing the smoke from the smoke-stack and driving it back into the furnace.

5. A smoke-consumer including a series of openings into the fuel-chamber, a conduit leading from the smoke-stack and extending horizontally in front of the furnace opposite said openings, small pipes leading from said conduit into said openings said pipes being of less diameter than the openings so as to admit air into said openings, a pair of plates embracing each of said small pipes and slidably mounted on the front end of the furnace, a hand-lever pivoted to the furnace-wall, a bar pivoted to said hand-lever above its pivotal point and secured to the sliding plate on one side of each of said small pipes throughout the series, a bar pivoted to the hand-lever on the other side of its pivotal point and secured to the other series of plates, and a fan in said conduit interposed between the smoke-stack and air-inlet.

6. A smoke-consumer for furnaces including a conduit leading from the smoke-stack back to the furnace and divided so that one portion will enter the fuel-chamber and the other will enter the ash-pit, means for admitting air into the portion of such conduit that enters the fuel-chamber, a fan in such conduit interposed between the smoke-stack and said air-inlet, small pipes leading from the portion of the conduit entering the ash-pit and discharging between said grate-bars, and a gate or valve in said portion of the conduit leading to the ash-pit.

In witness whereof I have hereunto affixed my signature in the presence of the witnesses herein named.

JONAS H. WIEST.

Witnesses:
V. H. LOCKWOOD,
ARTHUR GREEN.