No. 724,058. PATENTED MAR. 31, 1903.

J. C. SMITH.

SMOKE CONSUMING FURNACE.

APPLICATION FILED APR. 22, 1902.

NO MODEL.

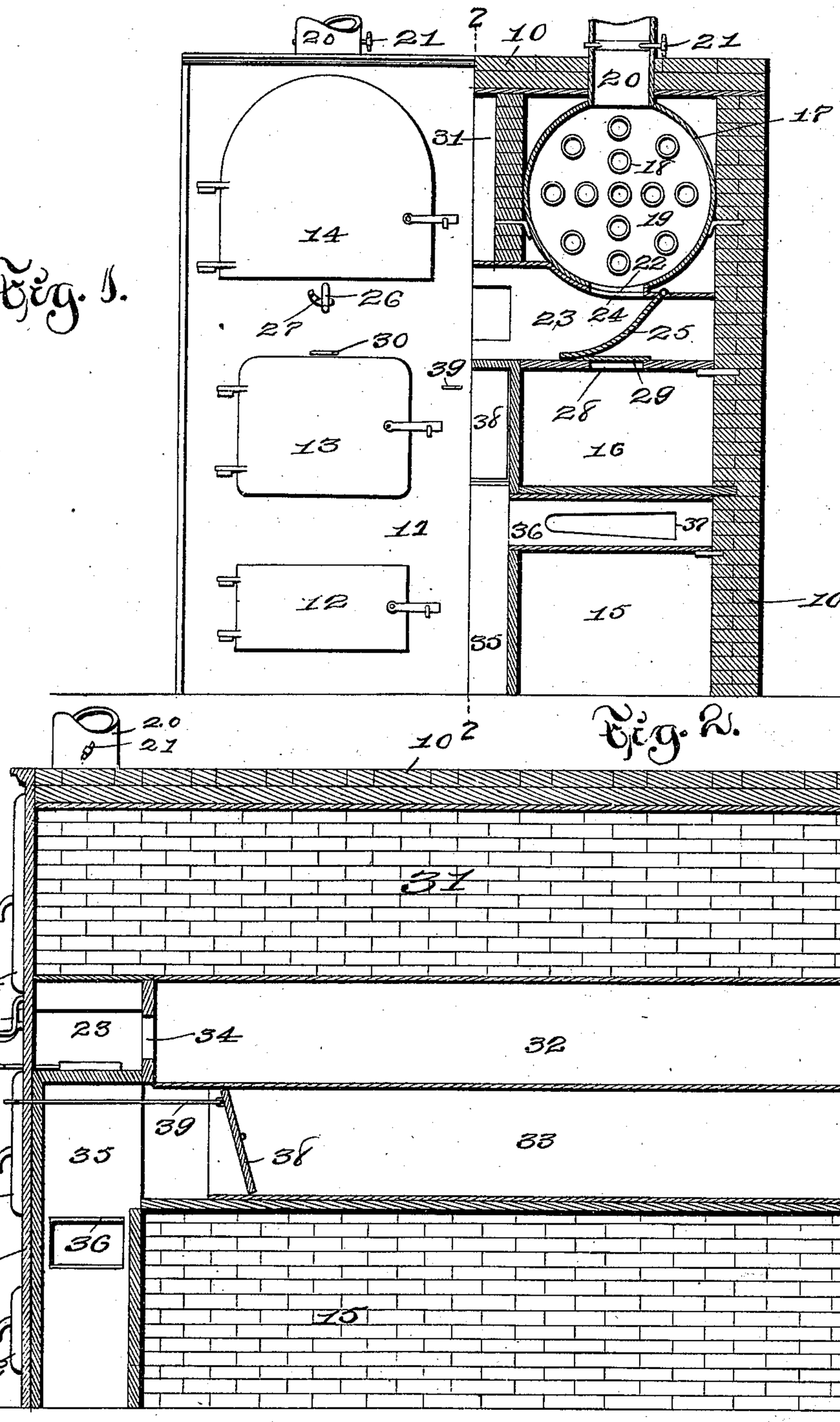

Fig. 1.

Fig. 2.

Witnesses:
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UNITED STATES PATENT OFFICE.

JOHN C. SMITH, OF DES MOINES, IOWA.

SMOKE-CONSUMING FURNACE.

SPECIFICATION forming part of Letters Patent No. 724,058, dated March 31, 1903.

Application filed April 22, 1902. Serial No. 104,231. (No model.)

To all whom it may concern:

Be it known that I, JOHN C. SMITH, a citizen of the United States, residing at Des Moines, in the county of Polk and State of Iowa, have invented certain new and useful Improvements in Smoke-Consuming Furnaces, of which the following is a specification.

The object of my invention is to provide simple, durable, and inexpensive means to be applied to ordinary boiler-furnaces where two or more are arranged adjacent to each other, whereby the operator may readily, quickly, and easily direct the products of combustion from one furnace to pass over the fire in an adjacent furnace, to the end that the volatile gases and black smoke usually generated in large quantities when the operator is placing fuel on one furnace may pass over the fire of the adjacent furnace and be wholly consumed, thereby utilizing all the valuable products of combustion in heating one or the other of the boilers and preventing the escape of volatile and black smoke from the furnace, all of which may be accomplished without interfering with the operation of the furnaces or require skilled service in firing.

My invention consists in certain details in the construction, arrangement, and combination of the various parts of the device, whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claims, and illustrated in the accompanying drawings, in which—

Figure 1 shows a front elevation of two boiler-furnaces arranged side by side, one showing furnace-front and the other shown in vertical transverse section a short distance in the rear of the furnace-front; and Fig. 2 shows a vertical central longitudinal section shown through the indicated line 2 2 of Fig. 1.

Referring to the accompanying drawings, I have used the reference-numeral 10 to indicate the side wall and top of the furnace, and in the accompanying drawings two complete furnaces are shown side by side. The numeral 11 is used to indicate a cast-metal furnace-front having a door 12 leading to the ash-pit, a door 13 leading to the fire-box, and a door 14 leading to the chamber in the front of the boiler-flues. The numeral 15 indicates the ash-pit, 16 the fire-box, and 17 the boiler, having the flue 18 and the chamber 19 in front of the flues, a smoke-stack 20 communicating with this chamber 19 and provided with the damper 21. These parts are all of the old construction, and hence further detailed description of them is deemed unnecessary.

In the bottom of the chamber 19 is an opening 22, and located beneath said opening 22 in the rear of the furnace-front is a passage-way 23, preferably having metal top, bottom, and sides and extending from the opening 22 in one boiler to a corresponding opening in an adjacent boiler, and in cases where a large number of boilers are arranged in series this passage-way is designed to extend throughout the entire series, openings 24 being provided to communicate with each of the openings 22. Mounted beneath each of the openings 24 is a hinged valve 25, having a crank-arm 26 connected therewith and projects through the furnace-front, a notched rack-bar 27 being placed on the furnace-front to engage said crank-arm and hold it in any position in which it may be placed. This valve 25 is so shaped that when in its open position, as shown in Fig. 1, it will rest upon the bottom of the passage-way 23, and thus close the passage-way 28 to the fire-box, and when moved upwardly it closes the passage-way to the boiler-front. Directly beneath the openings 24 is an opening 28, and on top of this opening is a slide 29, directed by the handle 30, projecting through the front of the furnace, so that said opening 28 may, if desired, be closed by said slide. However, it is to be understood that this slide is necessary only in cases where more than one furnace are arranged in series and provided with my improvements. Where there are only two furnaces, no slides 29 are necessary.

The reference-numeral 31 indicates a chamber formed by the wall between the two furnaces, and in this chamber are two passage-ways 32 and 33, preferably made of sheet-metal pipes, rectangular in cross-section, and leading from the rear of the furnace where they communicate with the outside atmosphere. The upper one, 32, communicates direct through the opening 34 with the passage-way 23, and the lower one communicates direct with the air-distributing boxes 35, located beneath the passage-way 23 and having lateral chambers 36 arranged at the front

of the furnace and directly below the grate. These lateral chambers 36 are provided with openings 37 in their rear surfaces, through which the air may be discharged under the grates. In the passage-way 33 is a damper 38, controlled by the rod 39, which extends through the furnace-front. It is obvious that the side wall of the furnace will become heated, and thereby produce a current of heated air passing through the pipe 32 under the passage-way 23, mingling with the smoke and gases therein before they are discharged into the furnace to thereby aid combustion, and the air through the pipe 33 is, as above stated, discharged beneath the grates.

In practical use and assuming that two furnaces are connected in series and that a fire is burning in each and assuming, further, that the operator is about to place fresh fuel on one of the fires, he first closes the damper 21 of the furnace to be fired and then opens the valve 25 thereof, and, as above explained, the slide 29 is dispensed with when cases of only two furnaces are connected in series. Obviously the product of combustion in the furnace being fired cannot escape through the flue 20, but will be compelled to pass downwardly through the openings 22 and 24 and then later through the passage-way 23, where they are commingled with the heated air delivered by the pipe 32, and they will be finally discharged through the opening 29 into the fire-box of the adjoining furnace, and obviously all of the volatile and black smoke will be consumed. As soon as the black smoke and gases from the furnace being fired have passed off the dampers 21 are both opened and the smoke passes through both the flues 20 in the old way.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States therefor, is—

1. The combination with two or more boiler-furnaces, each furnace having an independent fire-box, boiler, flue, and a damper in each flue, a passage-way connecting the chamber in front of the boiler-flues with each other, said passage-way having openings in its bottom to communicate with the fire-chambers, a valve in said passage-way capable of closing the openings from the passage-way into the chambers at the ends of the boilers, or of closing the openings leading to the fire-chambers, for the purposes stated.

2. The combination with two or more boiler-furnaces, each furnace having an independent fire-box, boiler, flue, and a damper in each flue, a passage-way connecting the chamber in front of the boiler-flues with each other, said passage-way having openings in its bottom to communicate with the fire-chambers, a valve in said passage-way capable of closing the openings from the passage-way into the chambers at the ends of the boilers, or of closing the openings leading to the fire-chambers, and a pipe or chamber in the furnace-walls communicating with the outside atmosphere or discharged into the said passage-way, a second smaller pipe or chamber, an air-distributing box communicating therewith and discharging under the grates, and a damper in said second pipe or chamber, substantially, as and for the purposes stated.

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