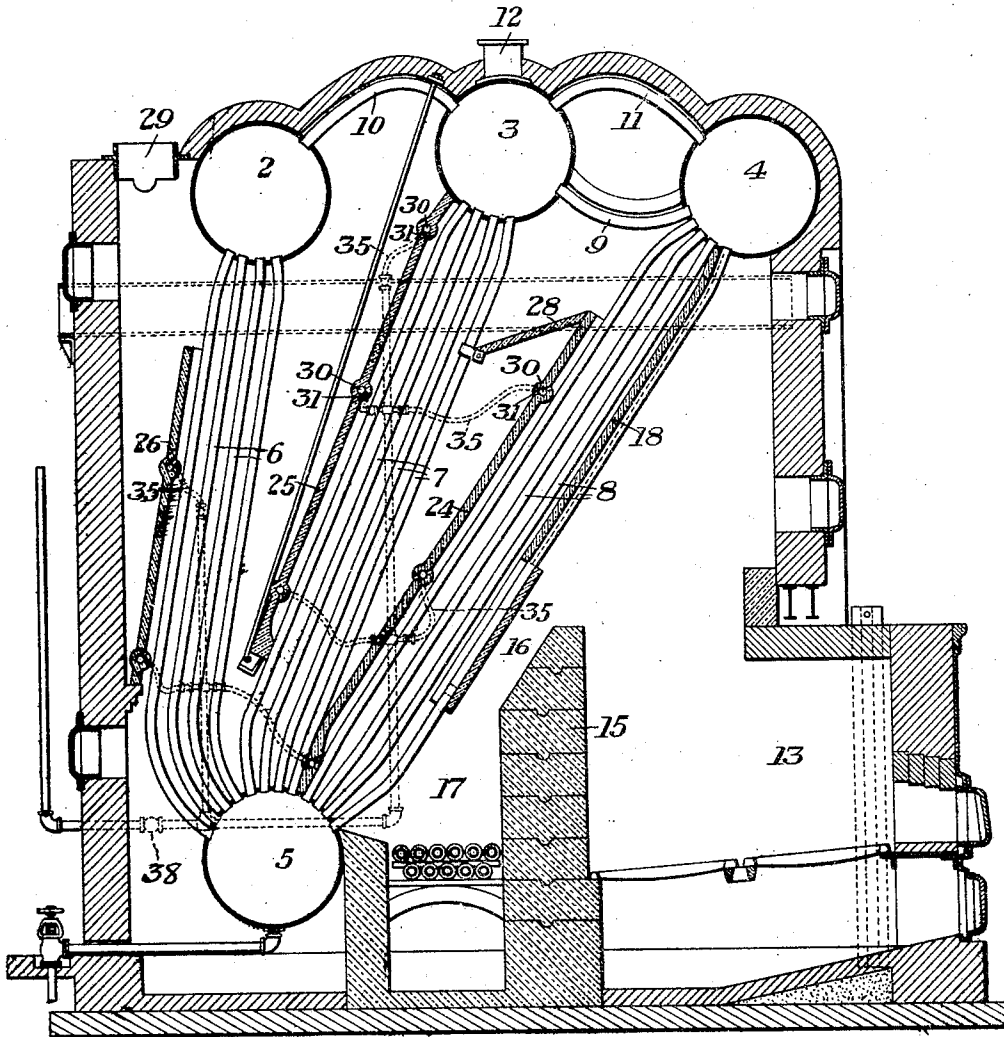


J. E. BELL.
WATER TUBE BOILER.
APPLICATION FILED JAN. 24, 1917.

1,275,366.

Patented Aug. 13, 1918
3 SHEETS—SHEET 1.

Fig. 1.



WITNESSES

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J. T. M. Connor

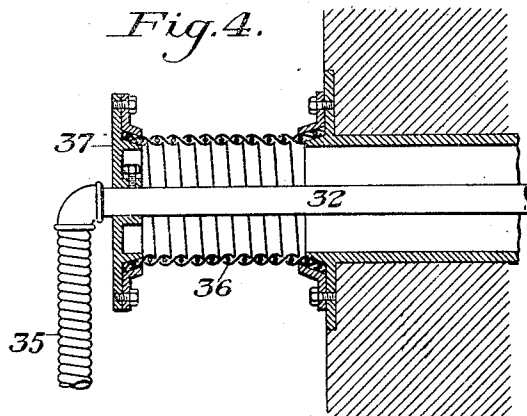
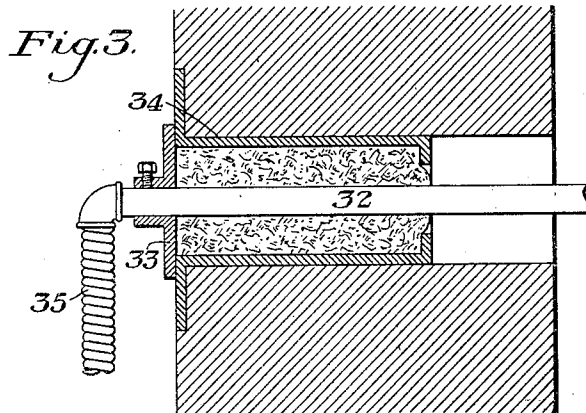
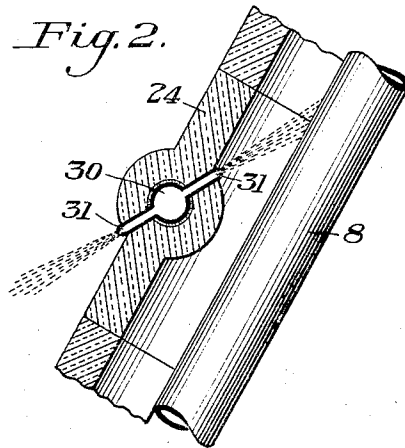
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WITNESSES

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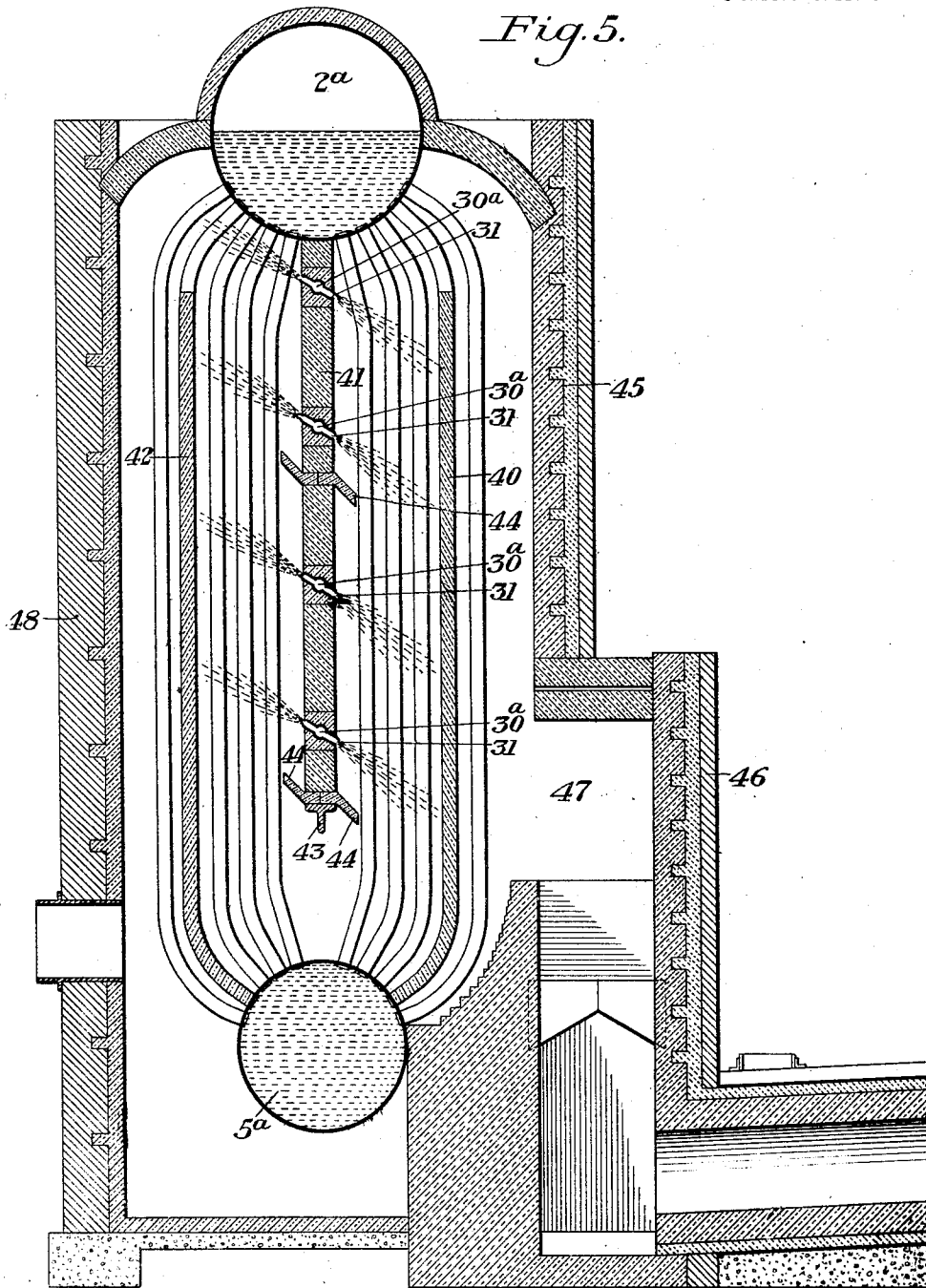
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3 SHEETS—SHEET 3.

Fig. 5.



WITNESSES

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Att'y

UNITED STATES PATENT OFFICE.

JOHN E. BELL, OF NEW YORK, N. Y.

WATER-TUBE BOILER.

1,275,366.

Specification of Letters Patent.

Patented Aug. 13, 1918.

Original applications filed June 23, 1915, Serial No. 35,788, and July 21, 1915, Serial No. 41,089. Divided and this application filed January 24, 1917. Serial No. 144,188.

To all whom it may concern:

Be it known that I, JOHN E. BELL, a citizen of the United States, residing at New York city, in the county of New York and State of New York, have invented a new and useful Improvement in Water-Tube Boilers, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which:

Figure 1 is a sectional side elevation showing one form of boiler construction embodying one form of my invention.

Fig. 2 is an enlarged detail view showing the arrangement of one of the blowers in the baffling in back of the banks of tubes.

Figs. 3 and 4 are detail views showing different forms of expansible connections for the blower; and

Fig. 5 is a view similar to Fig. 1 showing another form of boiler with my improved blower in connection therewith.

My invention relates to water tube boilers, particularly those of the vertical type, wherein transverse upper and lower drums are connected by banks of tubes over which the gases are caused to pass in series by baffling devices.

The object of my invention is to provide a new and improved form of blower or blowers associated with the baffling in such a manner as to readily clean the various passes.

This application forms a division of my applications Serial No. 35,788, filed June 23, 1915, and Serial No. 41,089, filed July 21, 1915.

Figs. 1, 2, 3 and 4 of this case, together with the description thereof, are the same as Figs. 10, 12, 14 and 15 in my application, Serial No. 35,788; while Fig. 5, together with the description thereof, is the same as Fig. 1 in my application, Serial No. 41,089.

The precise nature of my invention will be best understood by reference to the accompanying drawings, which will now be described, it being premised, however, that changes may be made in the details of construction and the arrangement of the baffles, as well as the arrangement of the blowers,

without departing from the spirit and scope of my invention as defined in the appended claims.

Referring to the form shown in Figs. 1 and 2, the reference characters 2, 3 and 4 designate the usual upper transverse steam and water drums of a Stirling type of boiler, and 5 a transverse mud drum. These drums are connected by the three banks of tubes 6, 7 and 8, the water spaces of the drums 3 and 4 being preferably connected by water circulators 9, and the three upper drums being preferably connected by steam circulating tubes 10 and 11. The steam is preferably taken off from the middle drum 3, as shown by the outlet 12.

In the form of boiler shown, there is a "dog-house" furnace 13 having a bridge wall 15, and in the front part of the front bank of tubes, I provide a baffle coacting with the upper part of the bridge wall to form a throat or outlet 16 through which the flame and gases are led into the secondary combustion chamber 17. The upper portion 18 of this front baffle preferably lies back of the front row of tubes and may be of the form shown in Fig. 2, consisting of bricks or blocks having openings therethrough for the purpose hereinafter described.

With this front baffle, I preferably employ baffles 24, 25 and 26 extending along the back of the three banks, the baffle 24 extending up from the mud drum and terminating short of the steam and water drum, and preferably provided with a rearwardly extending shelf 28 at its upper end to throw the gases into the second bank. The baffle 25 extends outwardly from the drum 3 along the rear of the middle bank and terminates short of its lower end; while the baffle 26 covers a portion of the rear bank and holds the gases in this bank as they rise to the uptake 29 or outlet to the stack.

Certain of the blocks or tiles of the baffles 24, 25 and 26 are provided with transverse openings for the reception of transversely extending pipes 30, each of which is provided with upwardly and downwardly extending nozzles 31 directed in the same direction as the draft; that is, upwardly

among the tubes of the front bank, downwardly among the tubes of the second bank and upwardly among the tubes of the third bank. The nozzle pipes are preferably of relatively large diameter drawn down at the ends and pierced with small holes. The pressure is thus brought to the openings and strong jets provided, which gradually flare out and sweep the tubes on all sides, the draft sweeping out the soot and dust thus dislodged. The double jets shown may also assist in the draft.

I preferably make the cavities in the bricks or tiles larger than the blower pipes and surround the pipes therein with some plastic covering, such as asbestos or hot blast cement, to make a neat joint.

Each of these blower pipes extends out through an opening in the side wall and may be connected by a flexible hose and a valve to the steam pipe. The connection through the side wall must be such as to permit the pipe to move with the boiler heating surface and still be substantially air tight. Such a connection is shown in Fig. 3 where the steam pipe 32 which is a continuation of the pipe 30, or is secured thereto in any desired manner. This pipe 32 is secured to the movable plate 33 coacting with the outer plate 30 of a stuffing box 34 which may be filled with asbestos packing, 35 being the flexible hose connection.

In Fig. 4 I have shown a form where instead of a stuffing box a flexible metal hose 36 is employed connecting the plate 37 with the side wall of the setting.

With this blower system, I propose to use a quick closing valve in the main steam line. In using the blower, the operator will first open the connecting valve to a single pipe and then open the quick closing valve 38, leave the steam blast on for part of a minute, and then close the quick closing valve and after that the valve connected to the blower pipe. This will be done in succession with the different blower pipes.

In Fig. 5, 2^a designates the steam and water drum, and 5^a the mud drum, which are connected to each other by water tubes bent at their upper and lower edges in the usual manner, and connected to the tube sheets or upset portions of the drums. The tubes are shown as divided into four sets by means of a front baffle 40, a middle baffle 41, and a rear baffle 42. The front and rear baffles are preferably made of special tile and are supported between adjacent tubes in the same rows and extend from the mud drum to a point adjacent to the steam and water drum. These front and rear baffles, in connection with the central baffle, form two up and two down serial passes for the gases.

The central baffle 41 is preferably a substantial wall of refractory brick carried on the lower transverse T-beam support 43, and

extending therefrom up to the steam and water drum. Within this wall are preferably built the deflector tiles 44, which as shown are inclined in the direction of flow of the gases. By this inclination these deflector tiles serve to direct the gases into the heating surface without material obstruction of the flow.

In this construction the front wall 45 is adjacent to the front row of tubes, it being shown as stepped inwardly from the wall 46 of the combustion chamber 47 to bring it nearer to the tubes. Similarly the rear setting wall 48 is arranged close to the rear row of tubes.

Located within the middle wall or baffle 41 are a series of blower pipes 30^a which are provided with nozzles 31 for blowing soot from the tubes within two of the passes.

The advantages of my invention result from the provision of blowers combined with the baffling to give efficient blowing operation at any desired time without the insertion of additional devices.

I claim:

1. A boiler setting having a plurality of drums, sets of tubes connecting said drums, a baffle between the sets of tubes extending from one wall of the setting to a wall opposite thereto to form serial passes for the gases over the tubes, an outlet to the stack from the last pass, a blower pipe in said baffle extending approximately the full width thereof, a plurality of jets extending from the blower pipe on opposite sides thereof, said jets being spaced along the length thereof, and extending in the general direction of the path of the gases to assist the draft and blow the soot toward the outlet, substantially as described.
2. A boiler setting having a plurality of drums, sets of tubes connecting said drums, a baffle between the sets of tubes extending from one wall of the setting to a wall opposite thereto to form serial passes for the gases, an outlet from the last pass leading to the stack, blower pipes in said baffle extending approximately the full width thereof, a plurality of nozzles connected to said blower pipes, the nozzles extending in opposite directions from opposite sides of one of said blower pipes, said nozzles being spaced along the length of the blower pipes and extending in the general direction of the path of the gases to assist the draft and blow the soot toward the outlet, substantially as described.

3. A boiler setting having a plurality of drums, sets of tubes connecting said drums, a plurality of baffles between said sets of tubes extending from one wall of the setting to a wall opposite thereto to form serial passes for the gases, an outlet leading from the last pass to the offtake flue or stack, a plurality of blower pipes in each baffle ex-

tending approximately the full width thereof, a plurality of nozzles extending in opposite directions from the blower pipe through one of the baffles, while the nozzles in some of the baffles merely extend in one direction, said nozzles being spaced along the length of the pipe and extending in the general direction of the path of the gases to assist

the draft and blow the soot toward the outlet, substantially as described.

In testimony whereof I have hereunto set my hand.

JOHN E. BELL.

Witnesses:

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LINDNER T. SUMMERS.