

No. 724,482.

PATENTED APR. 7, 1903.

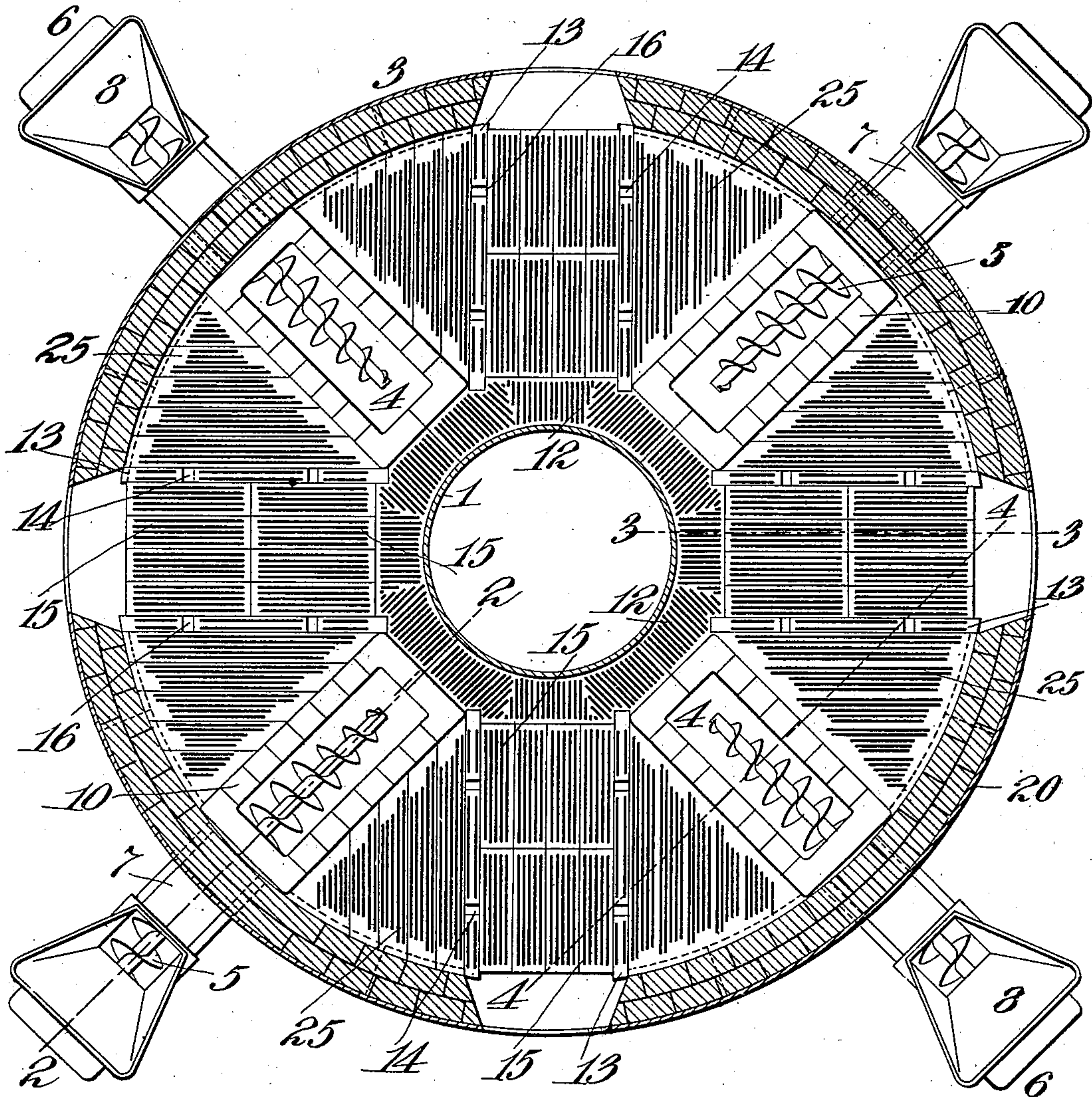
J. MACCORMACK.
FURNACE FOR VERTICAL BOILERS.

APPLICATION FILED JUNE 19, 1902.

NO MODEL.

3 SHEETS—SHEET 1.

Fig. 1



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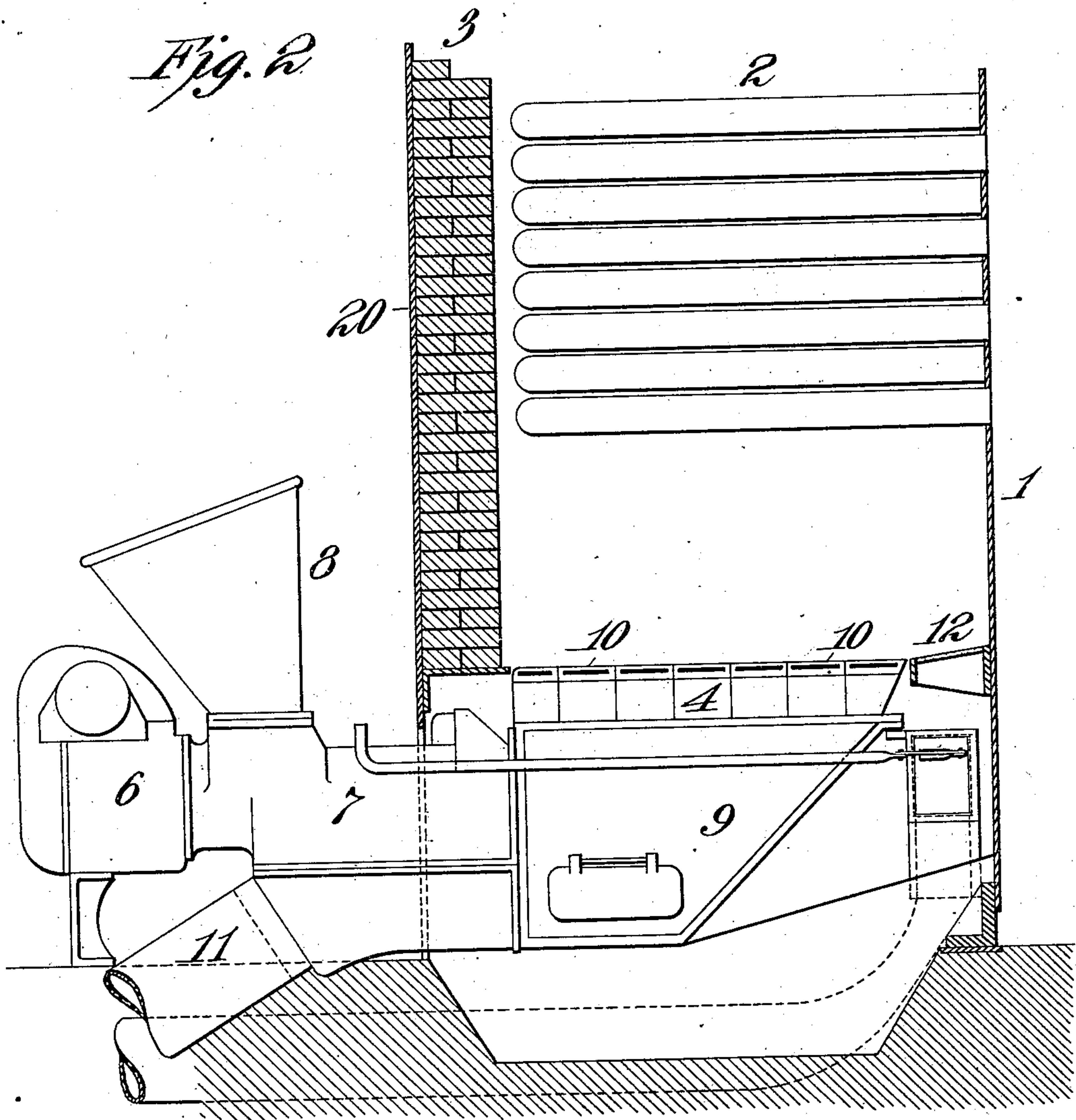
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3 SHEETS—SHEET 2.



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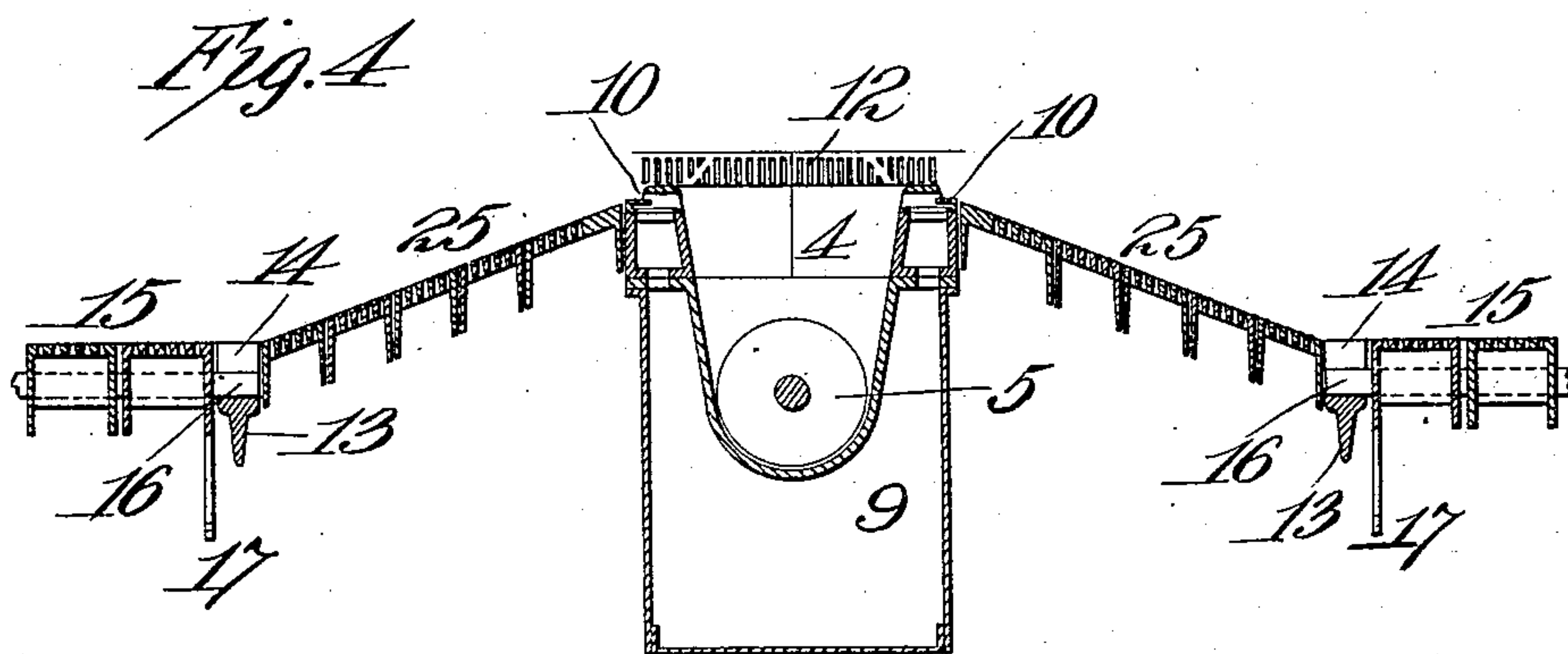
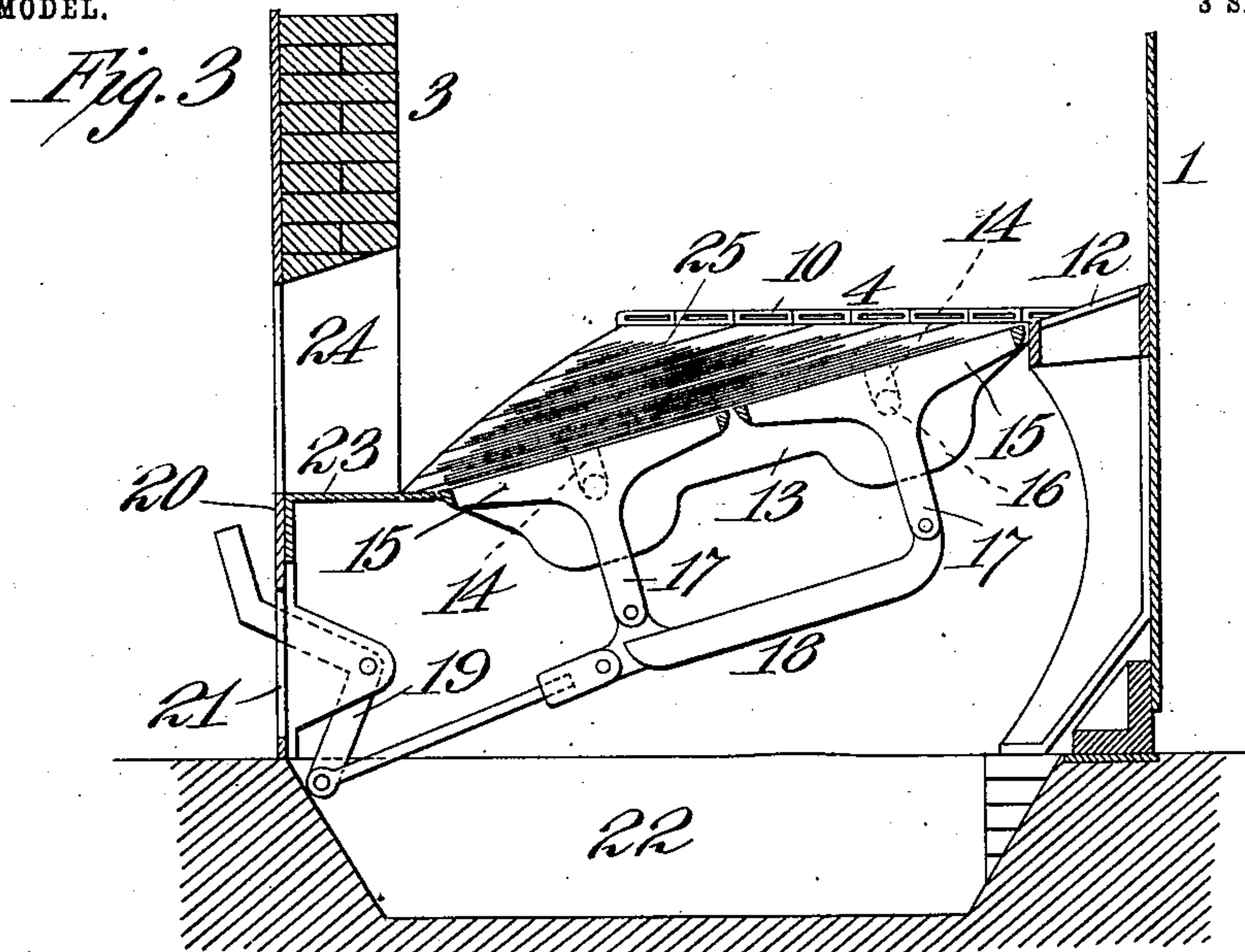
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NO MODEL.

3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

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FURNACE FOR VERTICAL BOILERS.

SPECIFICATION forming part of Letters Patent No. 724,482, dated April 7, 1903.

Application filed June 19, 1902. Serial No. 112,308. (No model.)

To all whom it may concern:

Be it known that I, JOHN MACCORMACK, a citizen of the United States, residing at Bayonne, in the county of Hudson and State of New Jersey, have invented a certain new and useful Improvement in Furnaces for Vertical Boilers, of which the following is a description.

My invention relates to an improved furnace for vertical boilers in which automatic stokers are utilized; and my object is to produce a furnace for the purpose which shall be simple in construction, capable of being readily and economically installed, and in connection with which automatic stokers may be practically and efficiently employed.

So far as I am aware no scheme has up to the present time been suggested by which automatic stokers can be effectively used in connection with vertical boilers except by the employment of an auxiliary heating-chamber similar to a Dutch oven, in which combustion is effected and from which the products of combustion are conveyed to the boiler.

With my new arrangement I employ automatic stokers which are located at the bottom of the boiler in the space now ordinarily occupied by the furnace, so as not to thereby increase the horizontal area of the apparatus or complicate the construction thereof. Preferably the stokers which I employ are of the well-known type using an endless conveyer-screw working in a fuel-magazine, the sides of which are provided with twyers, over which the fuel is forced by the action of the screw. Two or more of the automatic stokers, by preference of the type indicated, are employed, which are arranged radially between the vertical shell of the boiler and the inclosing wall thereof, and between the several stokers are arranged suitable grate-surfaces for receiving the fuel ejected from over the sides of the fuel-magazine and permitting proper combustion thereof. Preferably each of these grate-surfaces includes a central section formed of dumping and shaking grates and toward which the fuel is slowly progressed, so that by their operation ashes can be removed and any clinkers broken up.

In order that the invention may be better understood, attention is directed to the ac-

companying drawings, forming part of this specification, and in which—

Figure 1 is a cross-sectional view through an ordinary vertical boiler of the porcupine type, the section being taken immediately above the furnace and illustrating only the vertical shell and not the water-tubes; Fig. 2, a vertical sectional view on the line 2 2 of Fig. 1; Fig. 3, a sectional view on the line 3 3 of Fig. 1, and Fig. 4 a cross-sectional view on the line 4 4 of Fig. 1.

In all of the above views corresponding parts are represented by the same numerals of reference.

The boiler illustrated is of the common porcupine type, being provided with a vertical cylindrical shell 1, from which radiate the water-tubes 2, the latter being surrounded by a heavy casing 3. Mounted within the space between the shell 1 and the casing 3 are four automatic stokers, as shown, although it will of course be obvious that a greater or less number may be employed. Each stoker is composed, preferably, of a fuel-magazine 4, open at the top, in which is located a feed-screw 5, operated by a small steam-engine 6 on the outside. The magazine 4 connects with a tunnel 7, in which the conveyer-screw 5 is mounted, and fuel is supplied to said tunnel from a hopper 8. Surrounding the fuel-magazine is a wind-box 9, which supplies air to twyers 10, which are located at the top of the magazine in the usual way. Air under pressure is supplied to the wind-box from an air-pipe 11. Stokers of this type are of common form, and their details do not require specific description or illustration.

Mounted between the inner ends of the stokers and the casing 1 of the boiler are auxiliary grate-sections 12, laid in place so as to be readily removable. Extending from the rear corners of the stokers toward the casing or wall 3 are heavy supporting-bars 13, provided with bearing-recesses 14 therein. These bars are arranged at an angle and inclined downwardly toward the wall 3, as shown in Fig. 3. Mounted between each pair of the supporting-bars 13 are two sets of dumping-grates 15 15, the trunnions 16 of which are supported in the bearings 14. An arm 17 connects with each dumping-grate, which arms

are connected together by a link 18 and are operated from a lever 19, working in a slot in the metal jacket 20, which surrounds the casing-wall 3. At one side of this slot and in line with the dumping-grates the wall 3 and jacket 20 are cut away to form a door 21, through which ashes may be removed from the ash-pit 22. When the dumping-grates are in the normal position, (shown in Fig. 3,) their outer edge extends in line with a bed-plate 23, on which any clinkers or ashes may accumulate which may have passed the dumping-grates and which may be removed through a door 24 when desired.

Arranged between the automatic stokers and the supporting-bars 13 for the dumping-grates are sectional stationary grates 25, which obviously incline downwardly toward the dumping-grates and toward the wall 3 of the boiler, the inclination of these stationary grate-surfaces being generally indicated in Fig. 3. These stationary grates 25 are preferably supported on suitable brackets carried, respectively, by the automatic stokers and by the furnace-wall 3, so as to be readily removed when desired.

In operation the fuel will be forced by the conveying-screws 5 over the sides of the fuel-magazines, so as to accumulate on the stationary grate-surfaces 25, down which the fuel will travel by reason of the inclination of said surfaces and by the added accumulation of fresh fuel forced out of the fuel-magazines. In its passage over the grate-surfaces 25 combustion of the fuel will take place, which combustion progresses after the fuel has reached the dumping-grates 15. From time to time these grates may be shaken or dumped, if desired, to remove ashes or to break up any clinker.

Having indicated the general construction and arrangement of the elements comprising my invention in connection with a vertical boiler of the porcupine type, the applicability of the improvements to vertical boilers of other types will be apparent.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is as follows:

1. The combination with the cylindrical casing and inclosing wall of a vertical boiler, of a plurality of automatic stokers radially mounted within the space between said casing and wall, and inclined grate-surfaces arranged between said automatic stokers, substantially as and for the purposes set forth.

2. The combination with the cylindrical casing and inclosing wall of a vertical boiler, of a plurality of automatic stokers radially mounted within the space between said casing and wall, grate-surfaces arranged between said automatic stokers, and means for shaking and dumping a portion of said intermediate grate-surfaces, substantially as and for the purposes set forth.

3. The combination with the cylindrical casing and surrounding wall of a vertical boiler, of a plurality of automatic stokers horizontally mounted in the space between said casing and wall, dumping-grates between said stokers arranged at an angle with respect to the same, and stationary inclined grate-surfaces for conveying fuel from said stokers to the dumping-grates, substantially as and for the purposes set forth.

4. The combination with the cylindrical casing and surrounding wall of a vertical boiler, of a plurality of automatic stokers horizontally mounted in the space between said casing and wall, dumping-grates between said stokers arranged at an angle with respect to the same, and stationary sectional grate-surfaces for conveying fuel from said stokers to the dumping-grates, substantially as and for the purposes set forth.

This specification signed and witnessed this 23d day of May, 1902.

JOHN MACCORMACK.

Witnesses:

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