

No. 733,783.

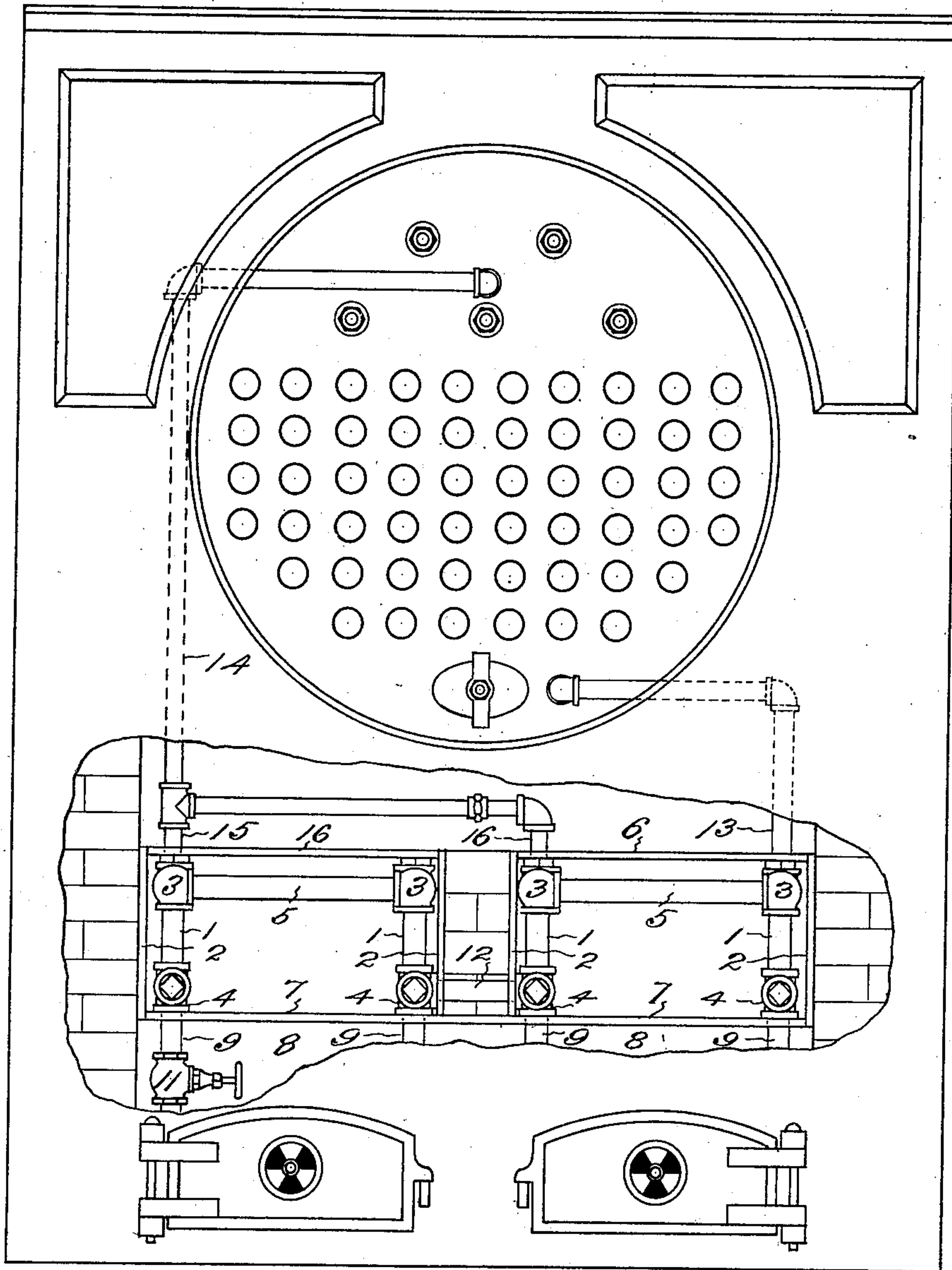
PATENTED JULY 14, 1903.

B. J. WHITE.
FEED WATER HEATER.
APPLICATION FILED JUNE 4, 1903.

NO MODEL.

2 SHEETS—SHEET 1.

Fig. 1



Witnesses:
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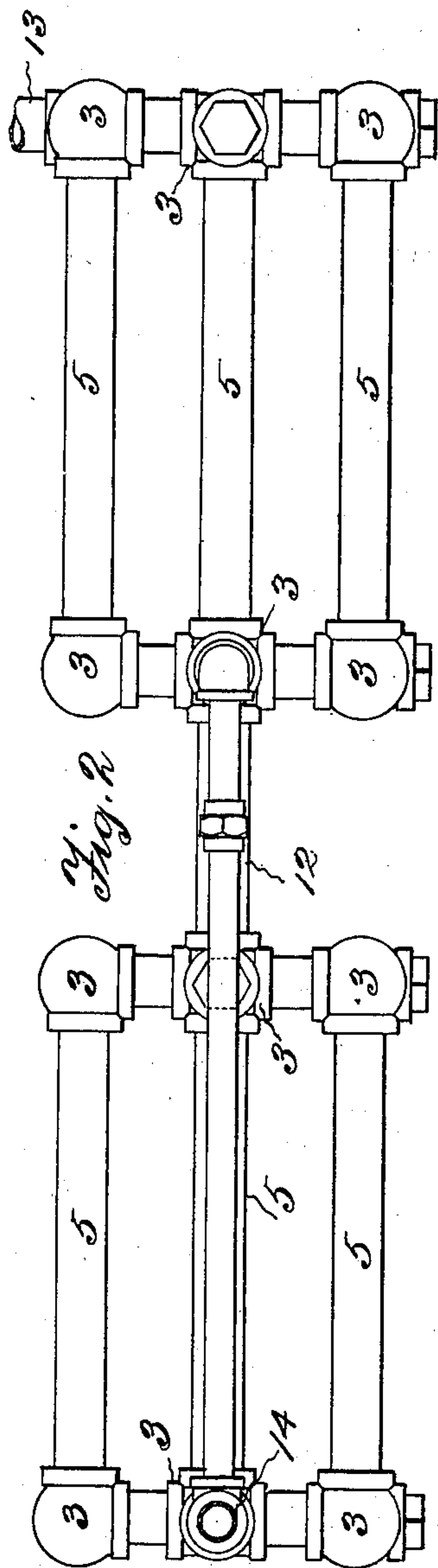
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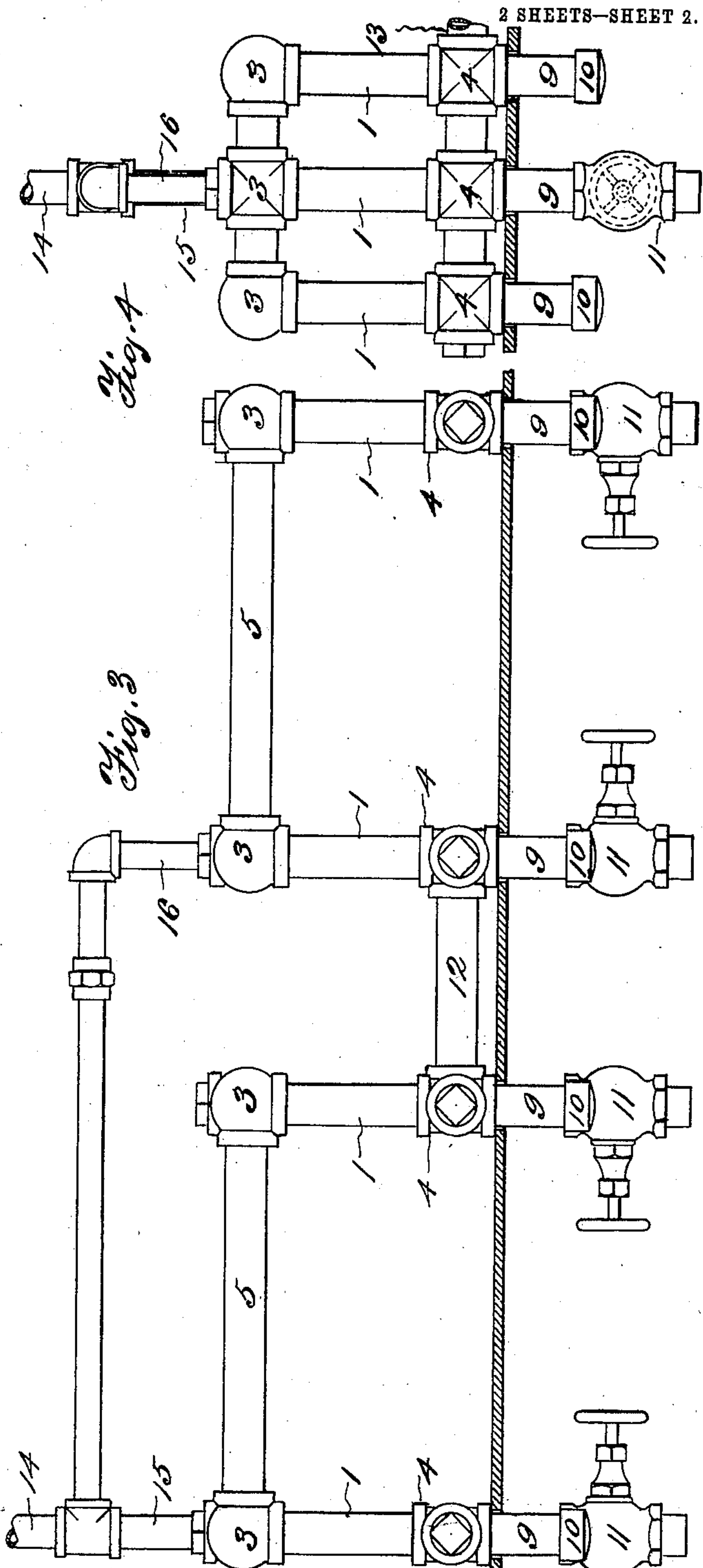
APPLICATION FILED JUNE 4, 1903.

NO MODEL.

2 SHEETS—SHEET 2.



Witnesses:
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Inventor:
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UNITED STATES PATENT OFFICE.

BURDETTE J. WHITE, OF WESTFIELD, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO HERBERT ARTHUR GARVEY, OF WESTFIELD, MASSACHUSETTS.

FEED-WATER HEATER.

SPECIFICATION forming part of Letters Patent No. 733,783, dated July 14, 1903.

Application filed June 4, 1903. Serial No. 180,085. (No model.)

To all whom it may concern:

Be it known that I, BURDETTE JOHN WHITE, a citizen of the United States, residing at Westfield, in the county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in Feed-Water Heaters and Furnace-Mouth Protectors, of which the following is a specification.

This invention relates to an apparatus which is designed to be located in the mouth of a steam-boiler furnace for the purpose of protecting the plates about the mouth from the intense heat of the fire in the furnace and which at the same time may be utilized for heating feed-water.

The object of this invention is to provide an apparatus of this nature which is cheaply constructed and easily placed in position, which effectively reduces the temperature of the plates in the mouth of the furnace and efficiently heats the feed-water, which will not become cracked or leaky by reason of expansion and contraction, and which can be quickly cleaned, so as to insure a free circulation and maximum efficiency at all times.

The embodiment of the invention that is illustrated has pipes arranged vertically inside of each fire-door adjacent to the mouth cheek-plates, pipes arranged horizontally between the vertical pipes below the mouth arch-plate, pipes extending from the vertical pipes through the mouth base-plate into the ash-pit, and connections with the boiler for insuring a circulation of water and vapor through these pipes.

Figure 1 of the drawings shows a view of the front of a boiler having two fire-openings with a portion removed to expose the protective apparatus in the mouths. Fig. 2 shows a plan of the protective apparatus on larger scale. Fig. 3 shows a front view, and Fig. 4 shows an edge view, of the same.

The apparatus shown has three pipes 1 arranged vertically adjacent to the cheek-plates 2 on each side of each fire-opening in the furnace. Each vertical pipe has a fitting 3 at the top and a fitting 4 at the bottom. The lower fittings of each set of vertical pipes are coupled together, and the upper fittings are also coupled together, so that each vertical pipe is at the bottom and top in communica-

tion with the adjacent vertical pipe. The upper fitting of each vertical pipe is also connected with the fitting of the corresponding pipe on the opposite side of the mouth by a horizontal pipe 5. The horizontal pipes extend across the top of the mouth just below the arch-plate 6. The vertical and horizontal pipes form practically three square arches, one back of the other in each mouth. The lower fitting of each vertical pipe rests upon the base-plate 7, and connected with each of these fittings and extending downwardly through the base-plate into the ash-pit 8 is a pipe 9. The lower end of each of these pipes may be provided with a cap 10 or a valve 11. By simply removing the caps and opening the valves all sediment can be blown from the vertical pipes, so that they may be easily kept clean to allow a free circulation of water.

When the apparatus is arranged for a boiler with a double fire-opening, as illustrated, the middle pipe on the inside of one opening may be connected with the middle pipe on the inside of the other opening by a horizontal pipe 12. This allows communication from the lower part of one arch to the lower part of the other arch of the apparatus. A pipe 13 leads from the lower part of the boiler to one of the lower fittings of one arch, preferably the fitting at the lower end of the inmost vertical pipe. This pipe may, however, lead from a hot-well, pump, or any other source of supply rather than the boiler, if desired. A pipe 14 leads to the upper part of the boiler. A pipe 15 connects the middle upper fitting of one arch and a pipe 16 connects the middle upper fitting of the other arch with this pipe, that leads to the upper part of the boiler. These pipes are connected with the arches on the side farthest from where the connection with the lower part of the arch is made. The pipes from the upper part of the arches are preferably smaller than the pipes to the lower part of the arches. The cooler water from the lower part of the boiler or from the other source of supply enters the lower inlet-pipe and rises through the three pipes on that side of the mouth, then flows horizontally through the three pipes at the top. The cooler water then drops through the three pipes on the other side, while the warmer water flows up-

wardly through the outlet-pipe to the boiler. The cooler water that drops to the bottom of the first arch crosses over to the next arch and flows upwardly and across in a similar manner and when sufficiently heated rises to the boiler.

All of the fittings used in the construction of this apparatus may be made of the same material as the pipes, so that the expansion and contraction of all will be equal, and all of the fittings and the pipes may be made of malleable iron, so that there will be no tendency to crack under variations of temperature. These parts can be readily procured and can be easily assembled originally or can be readily replaced if one part becomes damaged by any steam-fitter.

The pipes can be kept free from sediment and rust by simply unscrewing the caps at the lower ends of the pipes that project from the vertical pipes into the ash-pit, so that a free circulation is secured at all times. Thus not only will the temperature of the pipes and fittings and of the adjacent plates be kept even and moderate, but the water will be uniformly heated. This insures long life to the parts and effects an economical use of fuel.

I claim as my invention—

1. A feed-water heater and furnace-mouth protector comprising vertical pipes adjacent to the cheek-plates, horizontal pipes connect-

ing the vertical pipes below the arch-plate and pipes projecting from the vertical pipes through the base-plate into the ash-pit, substantially as specified.

2. A feed-water heater and furnace-mouth protector comprising vertical pipes adjacent to the cheek-plates, horizontal pipes connecting the vertical pipes below the arch-plate, connections between the upper ends and between the lower ends of the adjacent vertical pipes, and pipes projecting downwardly from the vertical pipes through the base-plate into the ash-pit, substantially as specified.

3. A feed-water heater and furnace-mouth protector comprising vertical pipes adjacent to the cheek-plates, malleable-iron fittings at the top and bottom of the vertical pipes, couplings connecting the fittings at the bottom and couplings connecting the fittings at the top of the adjacent vertical pipes, horizontal pipes connecting the fittings at the top of the vertical pipes with the fittings of the opposite vertical pipes, pipes extending from the fittings at the lower ends of the vertical pipes through the base-plate into the ash-pit, and pipes connecting a lower fitting on one side and an upper fitting on the other side with the boiler, substantially as specified.

BURDETTE J. WHITE.

Witnesses:

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