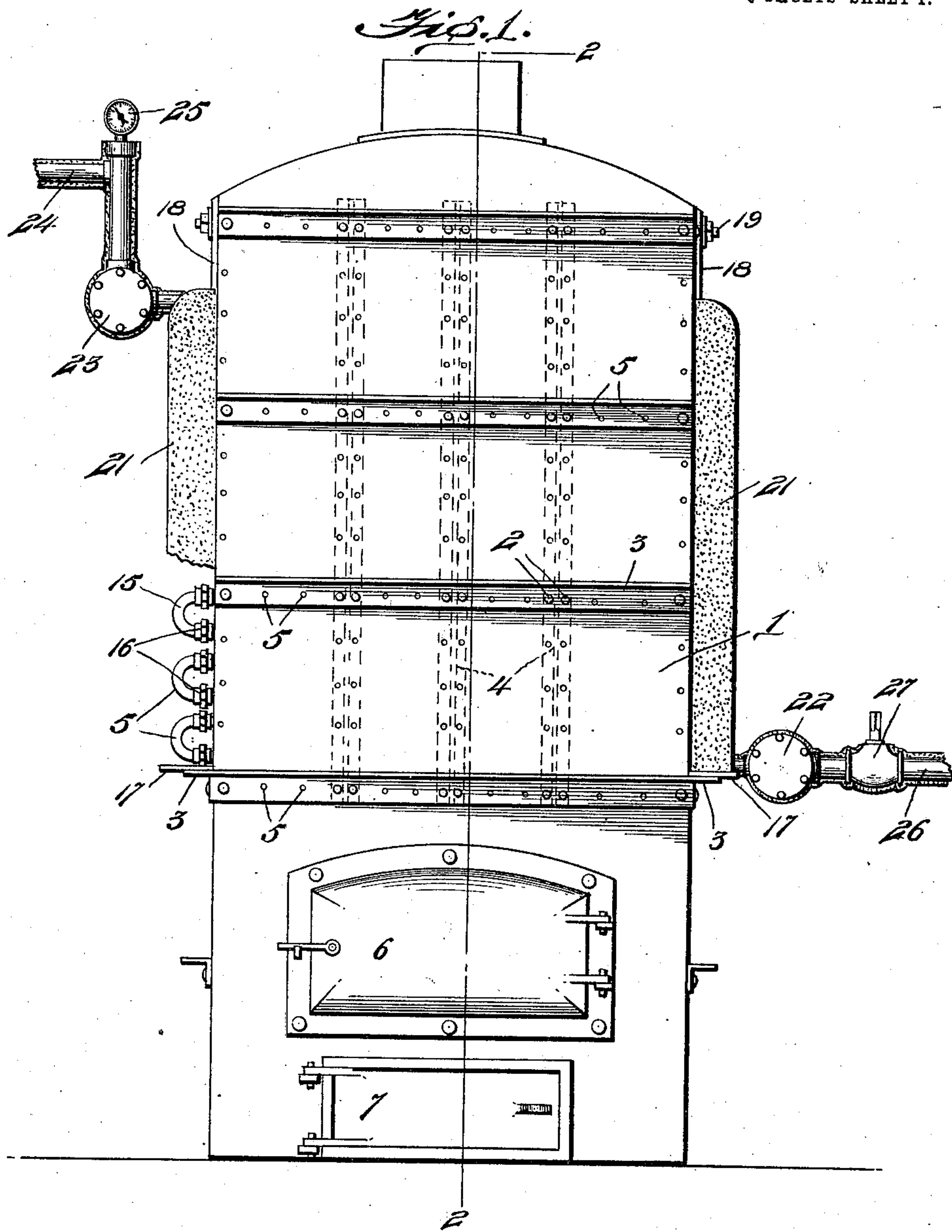


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SUPERHEATER.
APPLICATION FILED OCT. 11, 1909.

996,765.

Patented July 4, 1911.

3 SHEETS-SHEET 1.



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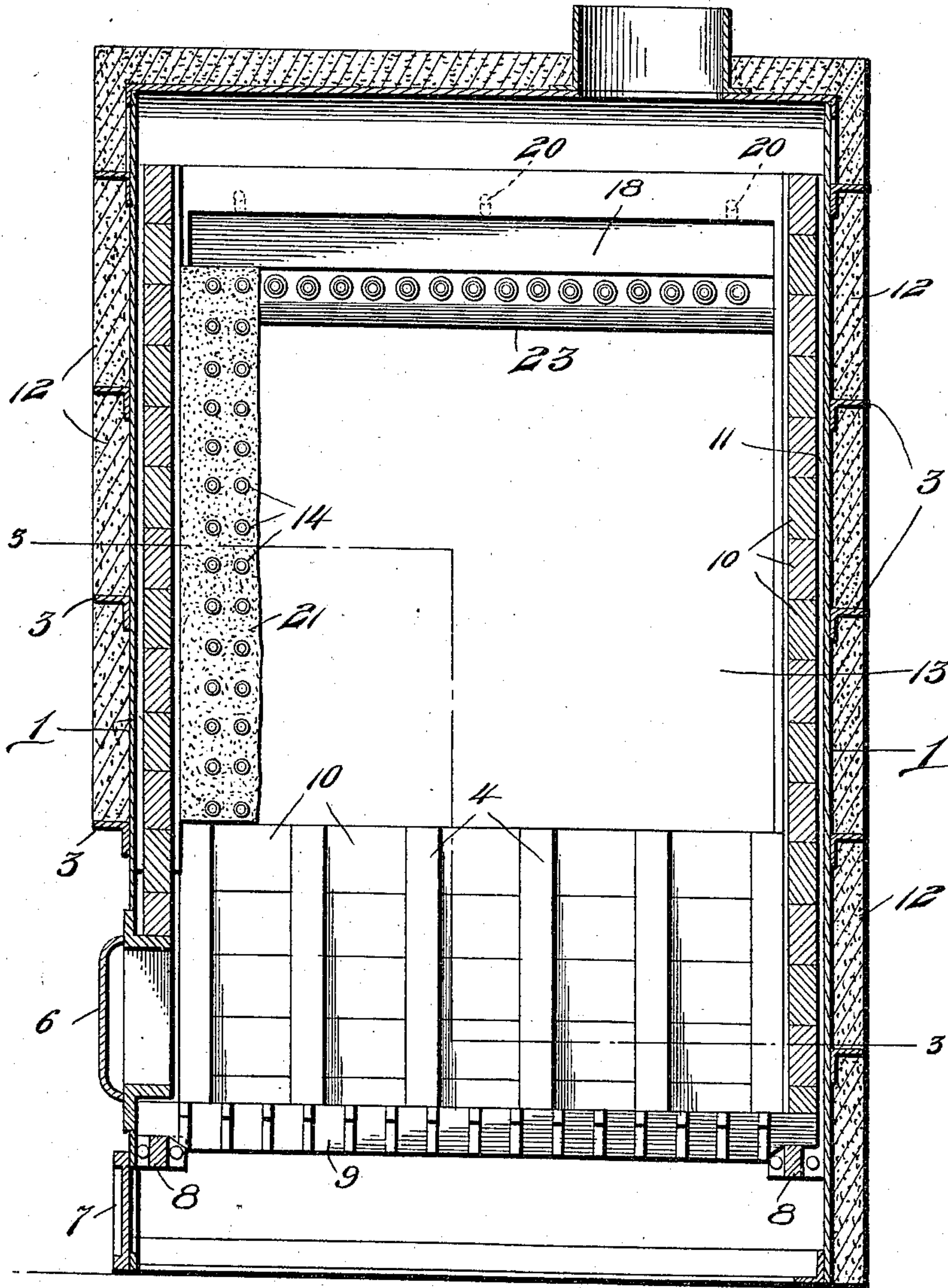
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3 SHEETS—SHEET 2.

Fig. 2.



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3 SHEETS—SHEET 3.

Fig. 3

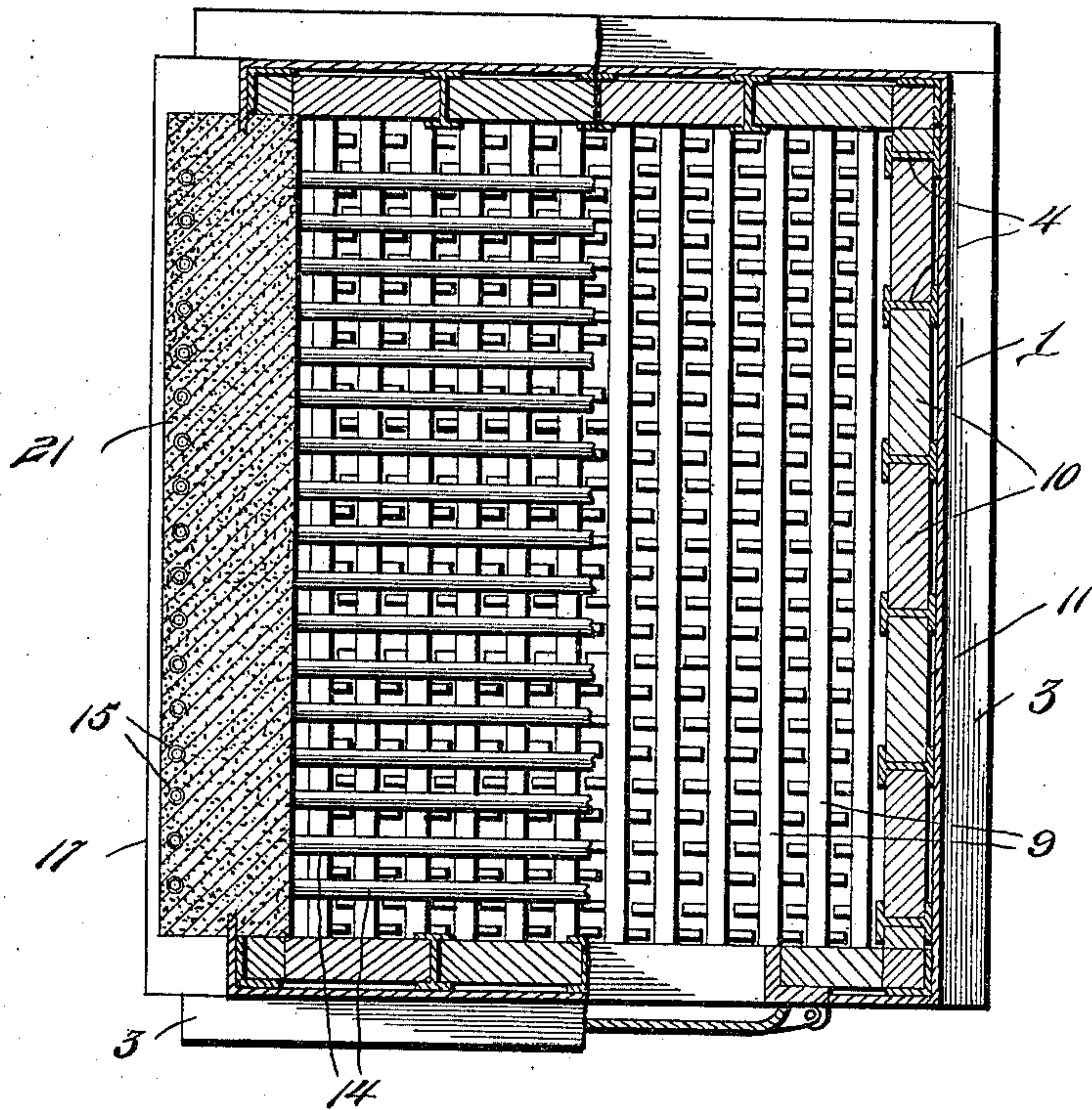


Fig. 4.

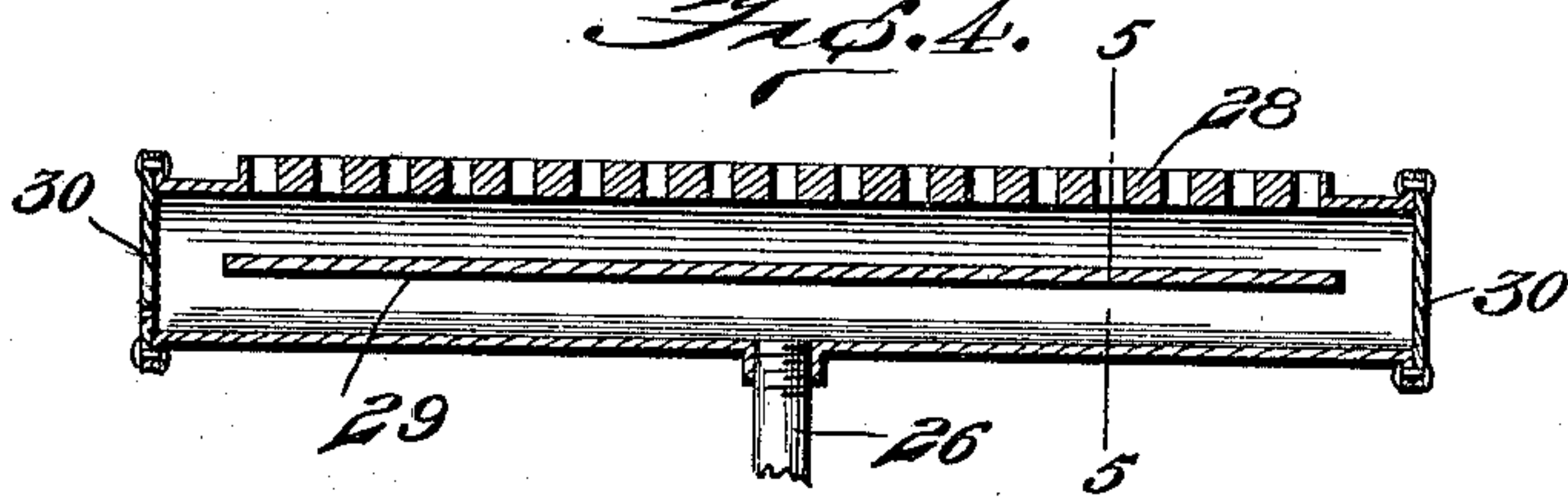
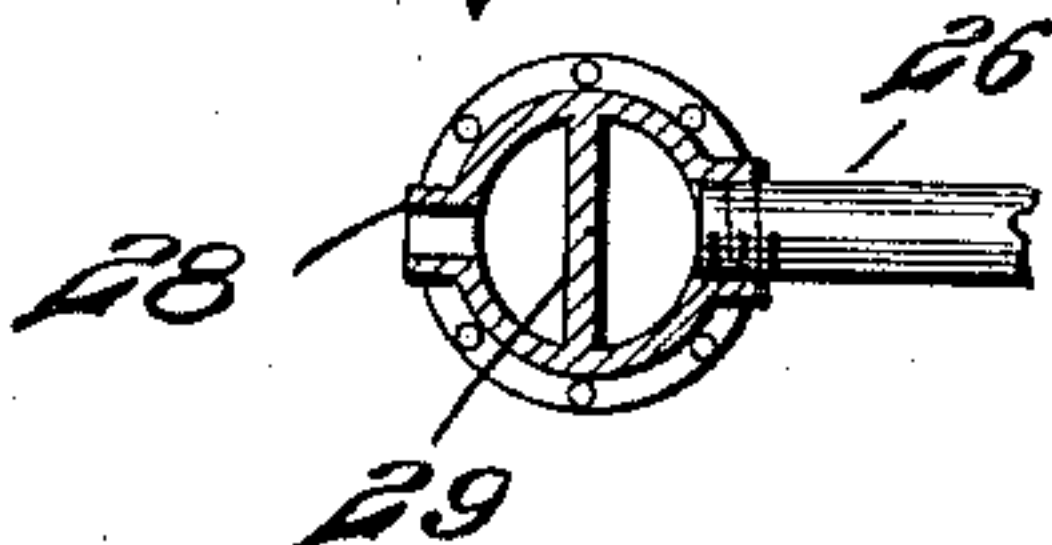


Fig. 5.



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UNITED STATES PATENT OFFICE.

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SUPERHEATER.

996,765.

Specification of Letters Patent.

Patented July 4, 1911.

Application filed October 11, 1909. Serial No. 522,086.

To all whom it may concern:

Be it known that I, CHARLES HOWARD, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Superheaters, of which the following is a specification.

My invention relates to improvements in superheaters, and it consists in the constructions, combinations and arrangements herein described and claimed.

An object of my invention is to provide an improved superheater, in which all joints are protected from the action of the products of combustion and normally exposed for inspection and repair.

A further object of my invention is to provide an inexpensive and durable form of superheater, which will have a maximum capacity and in which all parts are readily accessible.

A further object of my invention is to provide an improved superheater constructed to insure a constant degree of superheat under all practical conditions of uniform operation.

In the accompanying drawings, forming a part of this application and in which similar reference symbols indicate corresponding parts in the several views: Figure 1 is a front elevation illustrating one embodiment of my invention; the outer lagging of asbestos being omitted for clearness; Fig. 2 is a section on the line 2—2 of Fig. 1; Fig. 3 is a section on the line 3—3 of Fig. 2; Fig. 4 is a horizontal axial section through the supply manifold drum, and Fig. 5 is a section on the line 5—5 of Fig. 4.

Referring to the drawings, 1 indicates plates, preferably of sheet metal, which are clamped by rivets 2 between series of outer horizontal angle-bars 3 and inner vertical I-beams 4; said beams and bars constituting supports and stiffening braces which are riveted throughout their lengths at 5 to the casing plates 1. The lower portion of the casing constitutes a fire-box provided with the usual fire and ash-pit doors 6 and 7, and having transverse rests 8 for supporting grate bars 9 beneath the series of I-beams 4; said grate bars constituting a support for vertical series of fire-brick 10 fitted between the several I-beams. It will be noted that such fire-brick lining is spaced from the casing plates 1 by the outer heads

of the I-beams, thereby providing an air space 11; and that the inner heads of said beams firmly retain the several fire-brick detachably in position. The outer series of angle-bars 3 provide efficient supports for an outer lagging 12 of non-heat-conducting material, such as fire-brick, asbestos, etc.

The upper portion of the casing constitutes a combustion chamber for the reception of a series of pipe coils; the side walls of said chamber being removed to provide a pair of registering openings 13 for the passage of sets of vertical series of pipes 14 which extend across the combustion chamber and through the side openings 13; the several pipes of each set being connected in a continuous coil by suitable bends 15 secured to their outer ends by couplings 16. The pipe coils rest upon plates 17 on the adjacent angle-bars 3, and shutters 18, for closing the openings 13 above the several pipe coils, are secured to the casing by bolts 19 passing through elongated holes 20 in said shutters. The openings 13 are sealed by closures of non-heat-conducting material 21, which also constitute supports for preventing displacement of the several pipe coils. I have found that a very advantageous construction is to place a wooden frame or backing of boards, suitably grooved to permit passage of the pipe coils, within the combustion chamber, and then plaster an asbestos, or other refractory, mortar against said backing and about the portions of the pipe coils extending through the backing. This wood backing is then burned out upon starting a fire on the grate for drying and setting the mortar.

The lower members of the several pipe coils communicate with a common supply drum 22 for conducting steam thereto, and the upper members of the coils communicate with a discharge drum 23, which directs the superheated steam through a pipe 24 to any desired point; said discharge pipe 24 being shown provided with a pyrometer 25. A pipe 26, shown provided with a reducing valve 27, conducts steam from a boiler to the medial portion of the supply drum, and the pipe coils preferably communicate with said drum along a diametrically opposite portion 28 of the latter. A baffle plate 29 extends across the drum 22 between the connections 26 and 28, and terminates at a distance from the ends 30 of

said drum; said baffle acting to equalize the distribution of the steam among the several pipe coils.

I have illustrated and described a preferred and satisfactory construction, but changes could be made within the spirit and scope of my invention.

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

1. In a superheater, the combination of a fire-box, a combustion chamber communicating with said fire-box and provided with an opening in each side wall, sets of steam pipes extending through such openings and across said chamber, closures of non-heat-conducting material for sealing such openings and supporting said sets of pipes, and means exterior to said closures for connecting the several pipes of each set in a continuous coil, substantially as described.

2. In a superheater, the combination of a fire box, a combustion chamber communicating with said fire-box and provided with openings in its opposite side walls, sets of steam pipes extending in vertical series through such openings, closures of non-heat-conducting material for sealing such openings and supporting said pipes, means exterior to said closures for connecting the several pipes of each set in a continuous coil, a supply manifold communicating with the lower pipes of the several coils, and a receiving manifold communicating with the upper pipes of said coils, substantially as described.

3. In a superheater, the combination of a

casing comprising plates clamped between series of inner vertical I-beams and outer horizontal bars, said casing having a portion of its side walls removed for the passage of pipe coils therethrough, a grate extending beneath said I-beams for supporting vertical series of fire-brick fitted between the several adjacent beams, and closures of non-heat-conducting material for sealing such side walls and supporting said pipe coils, substantially as described.

4. In a superheater, the combination of a casing comprising plates clamped between series of inner vertical I-beams and outer horizontal bars, a portion of the side walls of said casing being removed to provide a pair of registering openings, pipe coils extending through such openings and resting on said outer horizontal bars, and closures of non-heat-conducting material for sealing such openings and supporting said coils, substantially as described.

5. In a superheater, the combination of a horizontal series of pipe coils, a manifold drum communicating with said several coils, means for admitting steam at the medial portion of said drum, and a baffle plate extending across said drum and terminating at a distance from the ends thereof, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES HOWARD.

Witnesses:

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G. AYRES.