

No. 630,259.

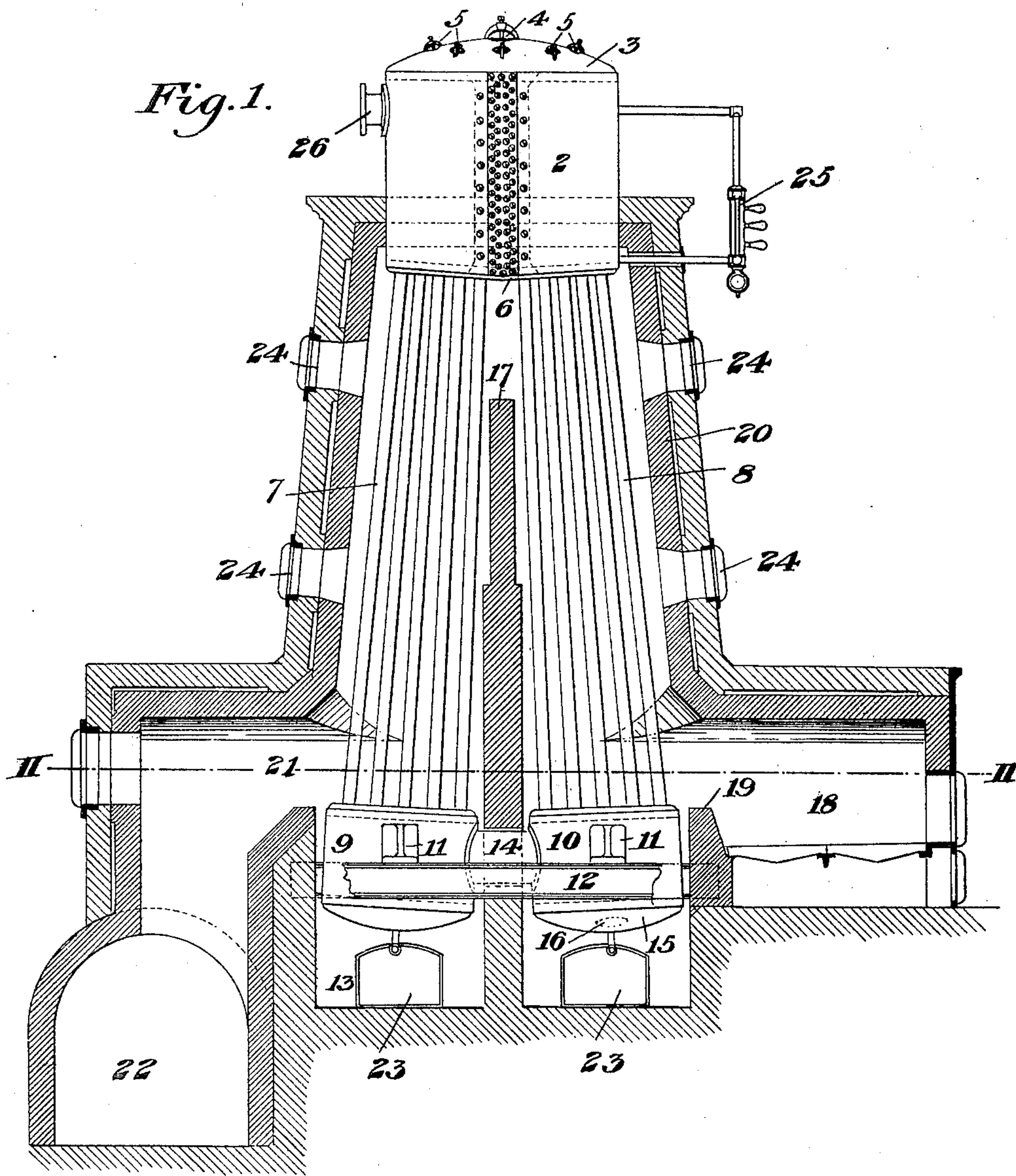
Patented Aug. 1, 1899.

W. W. McKELVEY.
WATER TUBE BOILER.

(Application filed Mar. 2, 1899.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses
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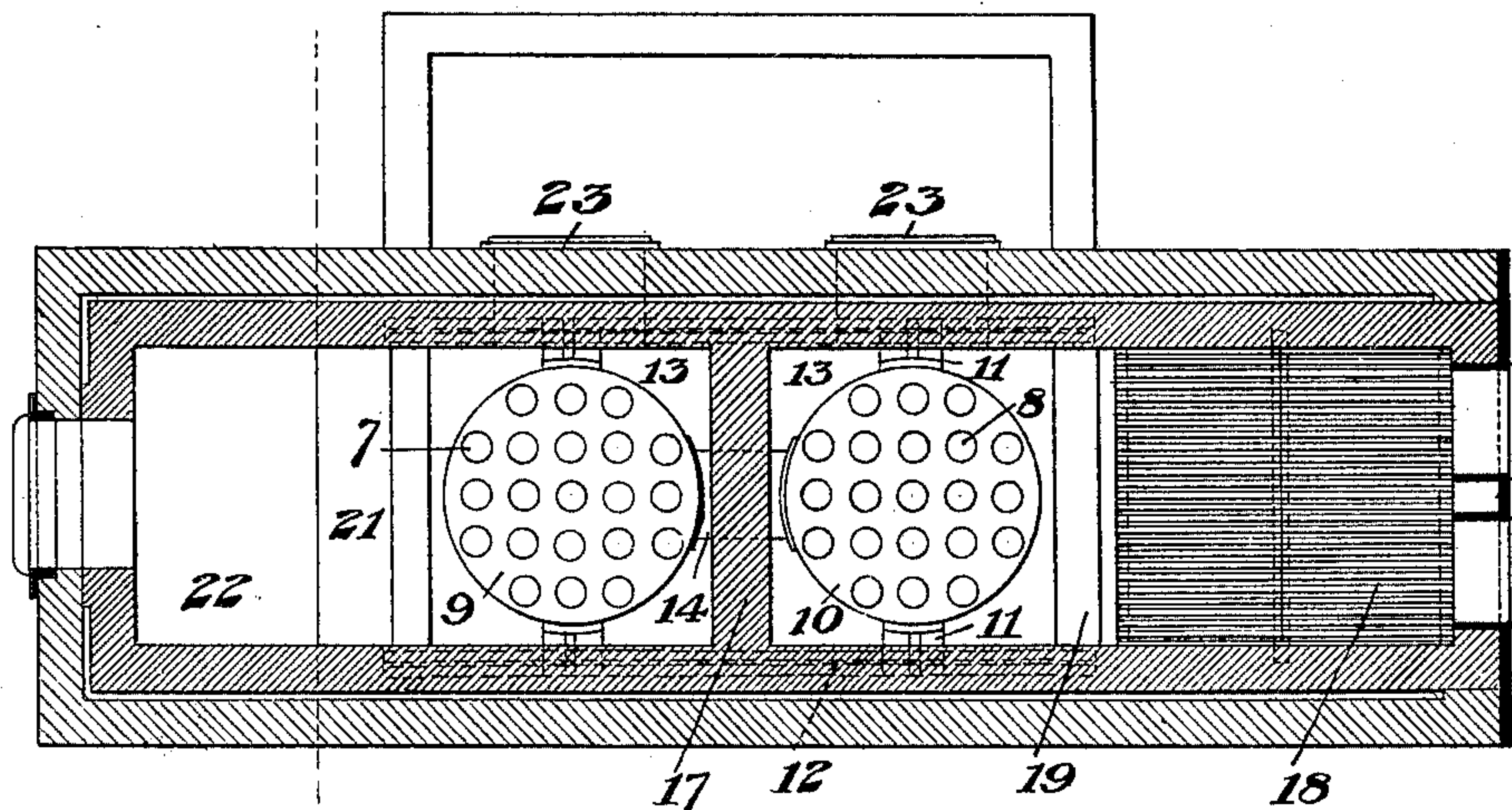
W. W. McKELVEY.
WATER TUBE BOILER.

(Application filed Mar. 2, 1899.)

(No Model.)

2 Sheets—Sheet 2.

Fig. 2.



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UNITED STATES PATENT OFFICE.

WILLIAM W. McKELVEY, OF YOUNGSTOWN, OHIO, ASSIGNOR TO THE
WILLIAM B. POLLOCK COMPANY, OF SAME PLACE.

WATER-TUBE BOILER.

SPECIFICATION forming part of Letters Patent No. 630,259, dated August 1, 1899.

Application filed March 2, 1899. Serial No. 707,555. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM W. McKELVEY, of Youngstown, in the county of Mahoning and State of Ohio, 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 of my improved boiler, and Fig. 2 is a horizontal section on the line 11 11 of Fig. 1.

My invention relates to vertical water-tube boilers, and more especially to that type where in a vertical upper steam and water drum is employed, with tubes extending downwardly from its lower head; and its object is to improve the efficiency of this type of boilers and extract the heat from the circulating gases to a greater extent than was heretofore possible, and, further, to provide a stronger and longer-lived structure and one which may be easily cleaned and repaired.

In the drawings, 2 represents an upper steam and water drum of cylindrical shape, having a dome-shaped upper head 3, provided with a manhole 4 and surrounding hand-holes 5. The lower head 6 of this drum is bent so as to produce a central transverse ridge, the opposite segmental portions of the head extending from the center outwardly at a slight angle to the horizontal. Into the half portions of the head 6 thus formed extend two sets or banks of tubes 7 and 8, which are inclined in opposite directions and enter the upper heads of vertical cylindrical mud-drums 9 and 10, respectively. The upper heads of these mud-drums are inclined to accord with the inclination of the tubes and the lower head of the steam and water drum, the entire mud-drum in each case being supported in a slightly-inclined position upon the supporting-brackets 11, though, if desired, these drums may be set vertically and their upper heads inclined inwardly toward the center. The brackets 11 are supported upon I-beams 12, which extend on both sides of the mud-drums and are carried in the masonry foundation inclosing the pits 13 for the mud-drums.

The mud-drums are connected by a large water-leg 14, and the dome-shaped head 15 of

one of these drums is provided with a manhole 16, through which both drums may be entered for cleaning and repairs.

The entire weight of the boiler is supported upon the beams 12, and the mud-drums are spaced apart from their inclosing walls to allow for expansion and make the boiler independent of its inclosing walls. A vertical partition-wall 17 extends upwardly between the banks of tubes 7 and 8, and the furnace or combustion-chamber 18 is located at one side of one of the banks of tubes and provided with a bridge-wall 19, which protects the mud-drum from the hot gases and products of combustion.

The inclosing shell or wall 20 of the boiler surrounds the structure and incloses the lower portion of the steam and water drum, and the draft-flue 21 leads from the lower part of the shell at a point opposite to the location of the furnace, thus compelling the hot gases to pass upwardly among one set of tubes, thence across the lower head of the steam and water drum, and then downwardly among the other set of tubes.

I have shown the draft-flue as leading to an underground flue 22; but it will be understood that it may be connected with overhead flues or that a chimney may be built at the rear of the boiler, into which this flue may open directly.

The pits 13 are provided with doors 23, through which accumulated dust may be removed, and the outer shell of the boiler is provided with doors 24, which may be opened to permit blowing the dust and soot from the tubes and tube-sheets. The steam and water drum is provided with the usual water-column 25 and with the connection 26 for the steam-main.

When the boiler is in operation, the tubes 8 being subjected to a higher heat than the tubes 7 a strong circulation will take place, passing upwardly through the tubes 8, down through the tubes 7, and forward through the water-leg 14.

The advantages of my invention will be apparent to those skilled in the art, since a double pass is given to the gases, while at the same time the boiler is easily and cheaply constructed by reason of the tubes entering the

heads of the vertically-extending cylindrical drums. By oppositely inclining the sets of tubes the requisite space is given for the central partition-wall, which is supported independently of the tubes. By carrying the boiler upon the beams supporting the mud-drums it is free to expand or contract without injuring the setting.

Many changes may be made in the form and arrangement of the drums, the tubes, and the setting without departing from my invention, since

I claim—

1. A vertical water-tube boiler having a single vertically-extending steam and water drum with upper and lower heads, tubes extending from the lower head to the upper heads of a plurality of lower mud-drums, a partition between the tubes leading to one drum and those leading to the other, a source of heat opening into the lower portion of one set of tubes, and an outlet-flue at the lower portion of the other set of tubes, whereby the gases pass upwardly through the first set and thence over the top of the partition-wall and downwardly through the second set; substantially as described.

2. A vertical water-tube boiler, having a single upper vertically-extending drum, with

a lower head having oppositely-inclined portions two vertically-extending mud-drums, two oppositely-inclined banks of tubes connecting the upper heads of the mud-drums with the lower head of the upper drum, a partition-wall between the sets of tubes, a source of heat at the lower portion of one set of tubes, and an outlet-flue at the lower portion of the other set; substantially as described.

3. In a vertical water-tube boiler, a vertical cylindrical upper drum having a lower head with oppositely-inclined portions, lower mud-drums with correspondingly-inclined upper heads, outwardly-inclined sets of tubes connecting the portions of the lower head of the upper drum with the heads of the mud-drums, a partition-wall between the sets of tubes extending upwardly to a point below the upper drum, a source of heat leading into one bank of tubes, and an outlet-flue near the lower end of the other bank; substantially as described.

In testimony whereof I have hereunto set my hand.

W. W. McKELVEY.

Witnesses:

C. W. McCLURE,
G. B. BLEMMING.