

No. 757,570.

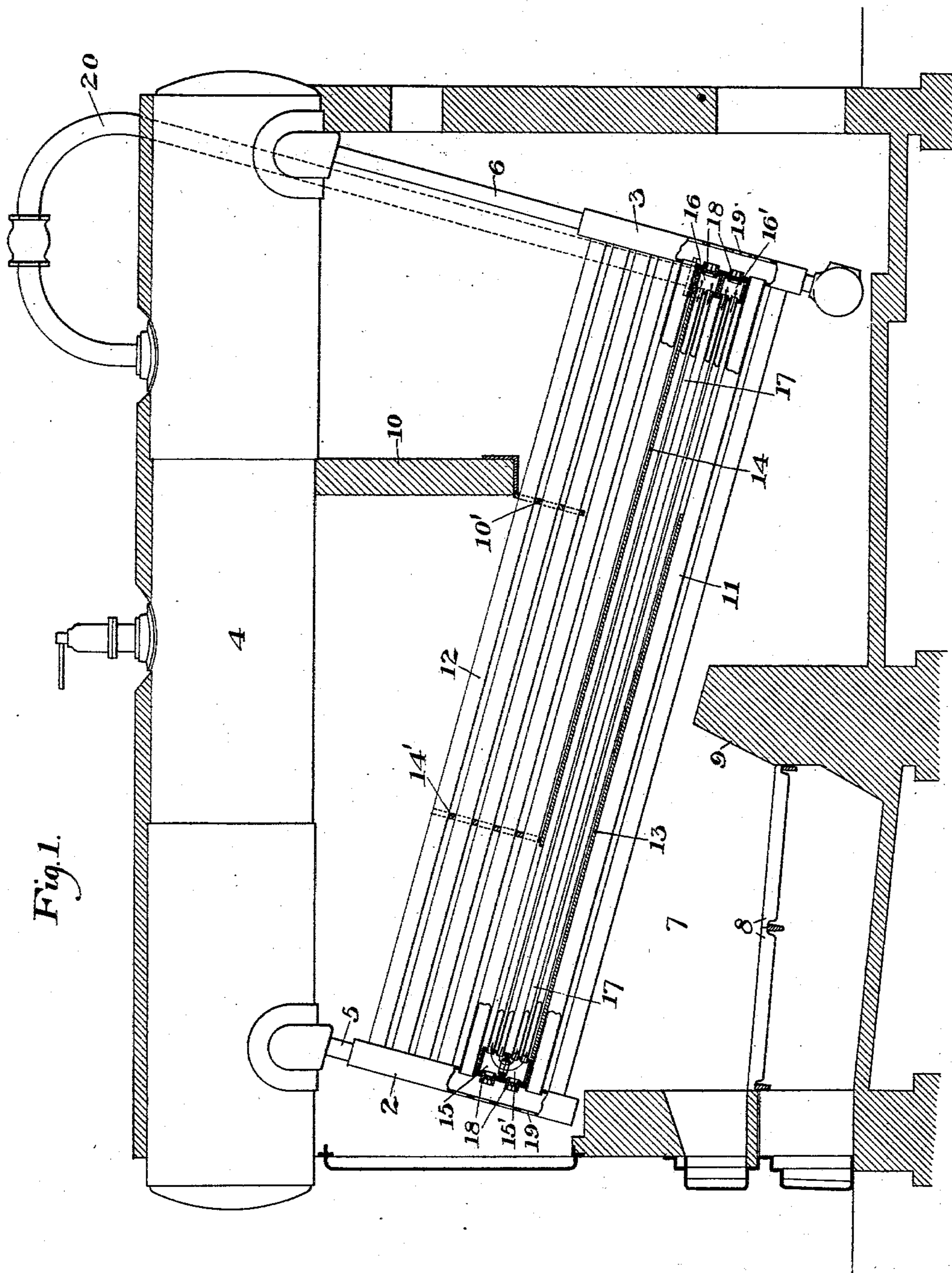
PATENTED APR. 19, 1904.

J. P. SNEDDON.  
SUPERHEATER.

APPLICATION FILED APR. 20, 1903.

NO MODEL.

3 SHEETS—SHEET 1.



WITNESSES  
Warren U. Swartz  
J. M. Corbin

INVENTOR  
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3 SHEETS—SHEET 2.

Fig. 5.

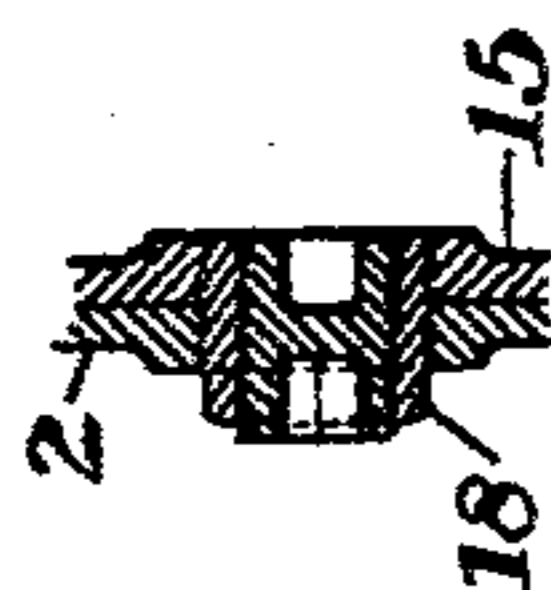


Fig. 3.

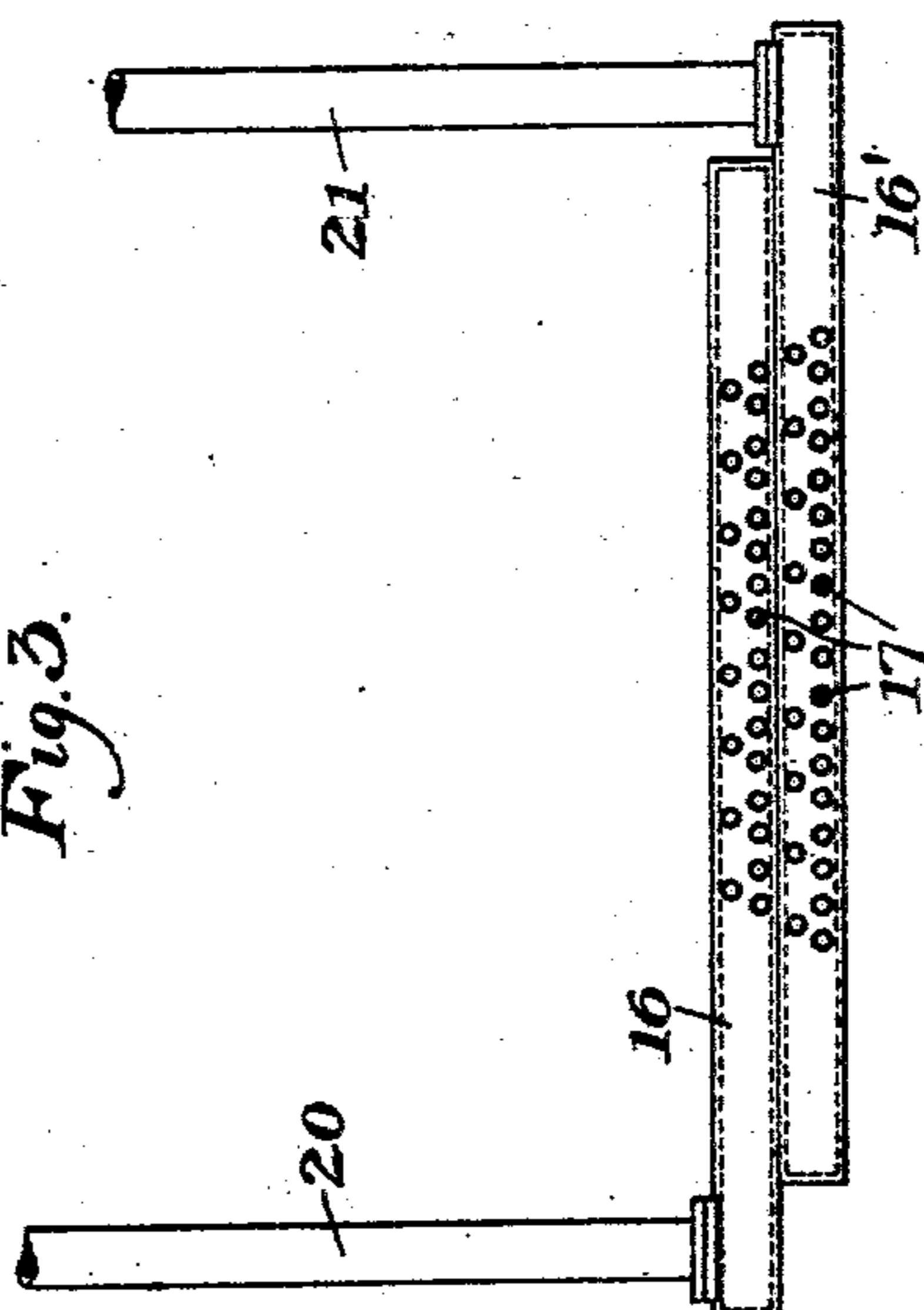
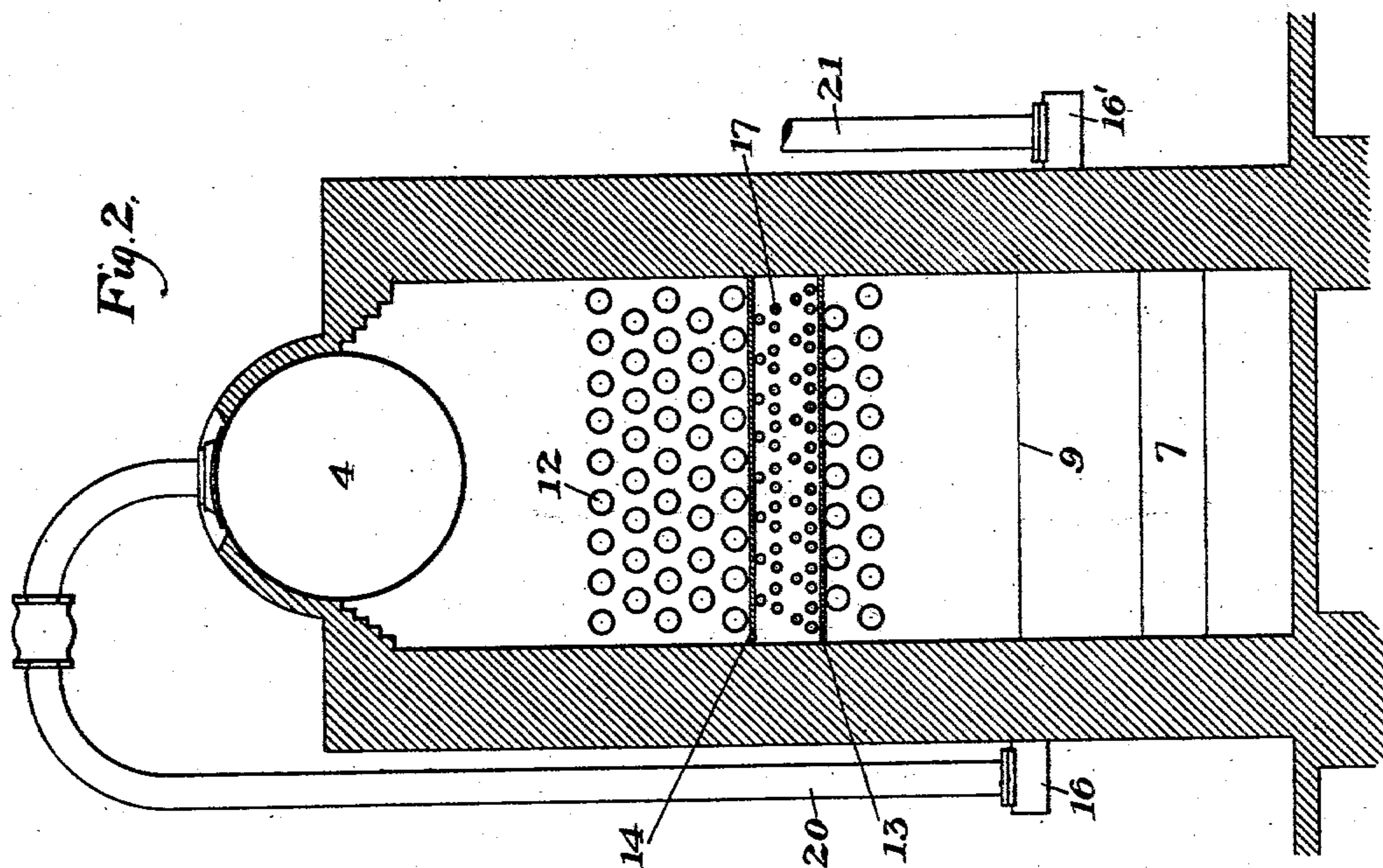


Fig. 2.



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3 SHEETS—SHEET 3.

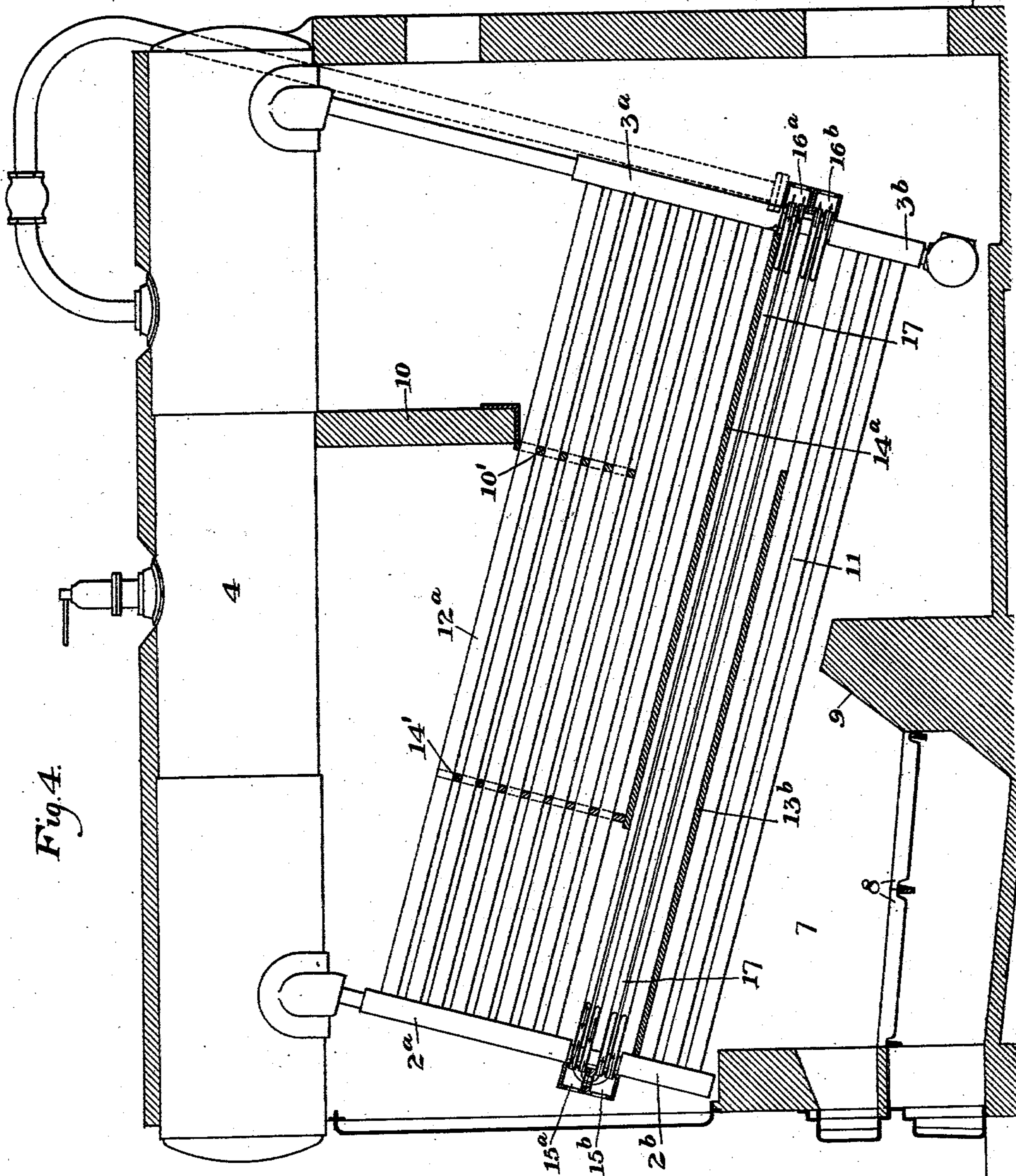


Fig. 4.

WITNESSES

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# UNITED STATES PATENT OFFICE.

JAMES P. SNEDDON, OF BARBERTON, OHIO, ASSIGNOR TO THE STIRLING COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF NEW JERSEY.

## SUPERHEATER.

SPECIFICATION forming part of Letters Patent No. 757,570, dated April 19, 1904.

Application filed April 20, 1903. Serial No. 153,407. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES P. SNEDDON, of Barberton, Summit county, Ohio, have invented a new and useful Superheater, 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 the water-tube boiler with my superheater in position. Fig. 2 is a cross-section of the same. Fig. 3 is a detail view showing the arrangement of the headers and the entrance and exit pipe. Fig. 4 is a view similar to Fig. 1, showing a modified construction; and Fig. 5 is a detail.

My invention relates to the use of superheaters within the boiler—setting of water-tube boilers, and particularly to boilers of the type wherein water-tubes connect front and rear headers or chambers; and the object of the invention is to so arrange the superheater with respect to the water-tubes that the full volume of the gases will first sweep over some of the water-tubes, then over the superheater-tubes after leaving the first water-tubes, and will then pass over other water-tubes on their way to the outlet. By this arrangement a high efficiency is afforded, the degree of superheat may be regulated by varying the number of water-tubes in the first pass, and the heating-surface may be correctly proportioned to the grate-surface according to well-known standards. The disadvantages of previous constructions, where the superheater is either placed in the outlet after leaving all the water-tubes or above the tubes, so that the gases sweep over the ends of all the tubes, thence over the superheater-tubes, and thence back over other parts of the same water-tubes, are avoided by my arrangement of the superheater between the water-tubes.

In the drawings, referring to the form of Figs. 1, 2, and 3, 2 represents the front headers, 3 the rear headers, and 4 a longitudinal upper steam and water drum. This drum is connected by nipples 5 to the front headers

and by tubes 6 to the rear headers. The tubes are shown as inclined downwardly and rearwardly, though they may be inclined in either direction, the furnace being either at the lower end or higher end of the tubes. The steam and water drum or drums may also be longitudinal or transverse and in the latter case may be located at either end of the boiler.

I show the furnace at 7, the grate-bars 8 extending to the usual bridge-wall 9.

10 is the usual transverse baffle-wall located above the rear portion of the tubes.

Instead of using a continuous bank or set of tubes I preferably separate the tubes into two sets—a lower set 11 and an upper set 12.

The lower set is shown as consisting of two rows, though any desirable number of tubes may be used in this set, according to the amount of superheat and heating-surface desired. Over the lower set 11 a baffle-partition 13 extends from their front ends through a major portion of the length of the tubes, and beneath the set of tubes 12 a similar horizontal baffle 14 extends from the rear ends of the tubes forwardly a major part of their length. I also show a vertical baffle 14' at the end of baffle 14 and a second baffle 10' depending from the wall 10. These added baffles hold the gases in intimate contact with the tubes above the baffle 14.

In the space between the two sets of tubes and between the baffles I locate the superheater, which is shown as consisting of two horizontal headers or boxes 15 15' and 16 16', located at each end and connected by small superheater-tubes 17. The superheater-headers in this form are placed on the inner sides of the water-tube headers and are pierced with holes arranged to register with the standard holes for the water-tubes in the boiler-headers. The superheater-headers are nipped to the boiler-headers by either expanded or threaded nipples 18. These nipples 18 are interiorly threaded at their inner ends to receive closing-plugs shutting off communication between the superheater-headers and the boiler-headers, except when they are removed

for cleaning the superheater-tubes or for repairs. The hand-holes 19 in the outer faces of the boiler-headers corresponding to the nipped holes in the front faces of the superheater-headers are capped in the usual manner. The superheater-tube holes are arranged in groups, so that they may be removed through the hand-holes cut in the boiler-headers.

The rear headers 16 16' of the superheaters have no communication with each other, while the front headers are nipped vertically together, so that the steam entering the upper header 15 will pass into the lower header 15' and thence pass rearwardly through the tubes connecting the lower headers.

The steam may be introduced and taken from the superheater in any desirable manner. For this purpose I have shown the rear headers 16 16' as extended in opposite directions at their opposite ends, these ends projecting through the casing or brickwork and being connected, respectively, with a steam-inlet 20, leading from the steam-space of the boiler, and with a steam-outlet pipe 21, leading to the steam main or valve.

In the form of Fig. 4 the front and rear headers for the water-tubes are shown as cut into two parts transversely, forming upper headers 2<sup>a</sup> and 3<sup>a</sup> and lower headers 2<sup>b</sup> and 3<sup>b</sup>. These headers are connected together by nipples or pipes 22 in the ordinary manner, as in double-deck boilers. In this form I show the superheater-headers 15<sup>a</sup> 15<sup>b</sup> and 16<sup>a</sup> 16<sup>b</sup> as arranged outside of the boiler-headers, their construction being substantially the same as before, the outer hand-holes being capped in the usual manner.

The lower set of water-tubes may extend into horizontal headers, these headers being nipped together and connected to the drum at the front and rear. In such case the superheater-headers would preferably be arranged horizontally, but need not be connected in any way to the boiler-headers, nor would the superheater-tubes need be arranged in groups for removal.

The advantages of my invention result from the interposing of the superheater between the water-tubes and also from the baffle arrangement, causing the gases to first sweep over some of the water-tubes, then over the superheater in the next pass, and then over further water-tubes in the successive pass after leaving the superheater. By this construction the degree of superheat may be easily varied, since the fewer the water-tubes in the lower set the higher will be the superheat, and vice versa. The heat remaining in the gases after leaving the superheater will be economically extracted in the upper set of water-tubes, which may be provided with further horizontal or vertical baffles, as de-

sired. The amount of heating-surface can be properly proportioned to the amount of grate-surface and high efficiency and economy afforded. The superheater is easily accessible for cleaning and repairs and does not interfere with the cleaning or repairing of the water-heating surface. In the first form by removing the front plugs of the superheater-nipples the superheater becomes a part of the water-heating surface and increases the evaporative power.

The horizontal baffle 14 may be arranged above the lower tubes of the set 12, so that the gases in the second pass may contact with water-tubes as well as with the superheater-tubes. Any desirable system for flooding the superheater may be used, and many other variations may be made in the form and arrangement of the headers, the tubes, the steam, and water drum or drums, the furnace, &c., without departing from my invention.

I claim—

1. A water-tube boiler having end boxes connected by water-tubes, a superheater interposed between the water-tubes and baffles between the superheater and the water-tubes and arranged to direct the gases over one set of water-tubes, thence over the superheater-tubes, and thereafter over other water-tubes; substantially as described.

2. A water-tube boiler having front and rear headers connected by inclined tubes, said tubes being arranged in a plurality of sets, a superheater between the sets, and baffles on each side of the superheater and arranged to direct the gases among the lower water-tubes, thence over the superheater-tubes after leaving the water-tubes, and thereafter over further water-tubes after leaving the superheater-tubes; substantially as described.

3. A water-tube boiler having front and rear headers connected by inclined water-tubes, said tubes being arranged in separated horizontal sets, a superheater between the sets, said superheater having end boxes or headers connected by steam-tubes, and baffles above and below the superheater and arranged to direct the gases among the lower water-tubes, thence over the superheater-tubes in the next reverse pass, and then over further water-tubes in the successive pass; substantially as described.

4. A water-tube boiler having front and rear headers connected by inclined water-tubes, a superheater arranged between the water-tubes and having end headers through which the superheater-tubes may be reached and baffles between the superheater and the water-tubes above and below it; substantially as described.

5. A water-tube boiler having front and rear headers connected by inclined water-tubes, and a superheater arranged between

the water-tubes, said superheater having tubes arranged to give the steam a double pass through the superheater-tubes before passing the point of use; substantially as described.

- 5 6. A water-tube boiler having front and rear headers connected by inclined water-tubes, and a superheater arranged between the water-tubes, said superheater having end headers connected by tubes, the headers being

arranged to allow withdrawal of the steam- 10 tubes through the headers of the water-tubes; substantially as described.

In testimony whereof I have hereunto set my hand.

JAMES P. SNEDDON.

Witnesses:

W. T. LUCAS,  
J. C. FRANK.