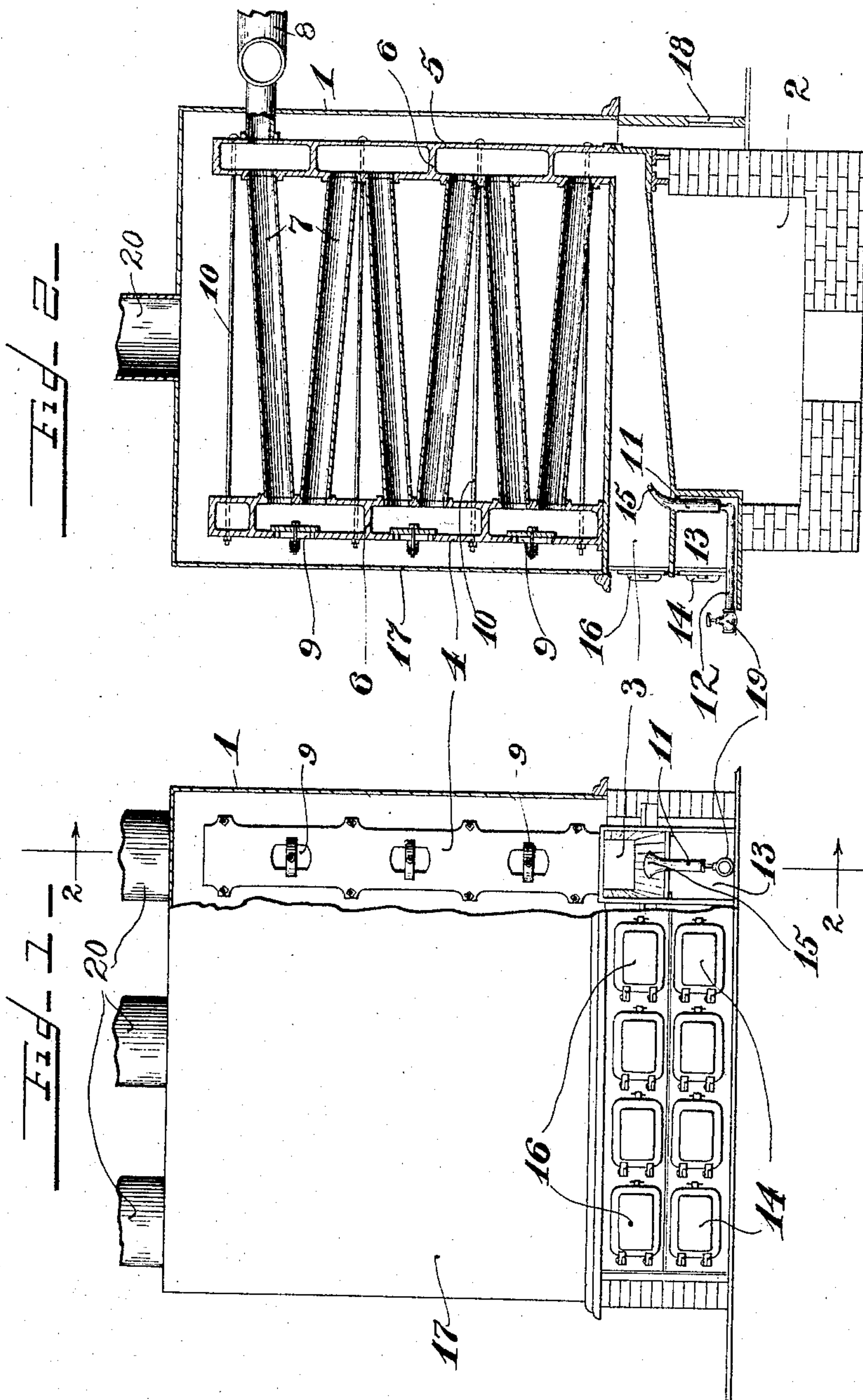


No. 781,169.

PATENTED JAN. 31, 1905.

J. D. YORK.
HEATING APPARATUS.
APPLICATION FILED OCT. 10, 1902.

2 SHEETS—SHEET 1.



Witnesses:

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Lynn A. Williams

BY

Inventor

John D. York

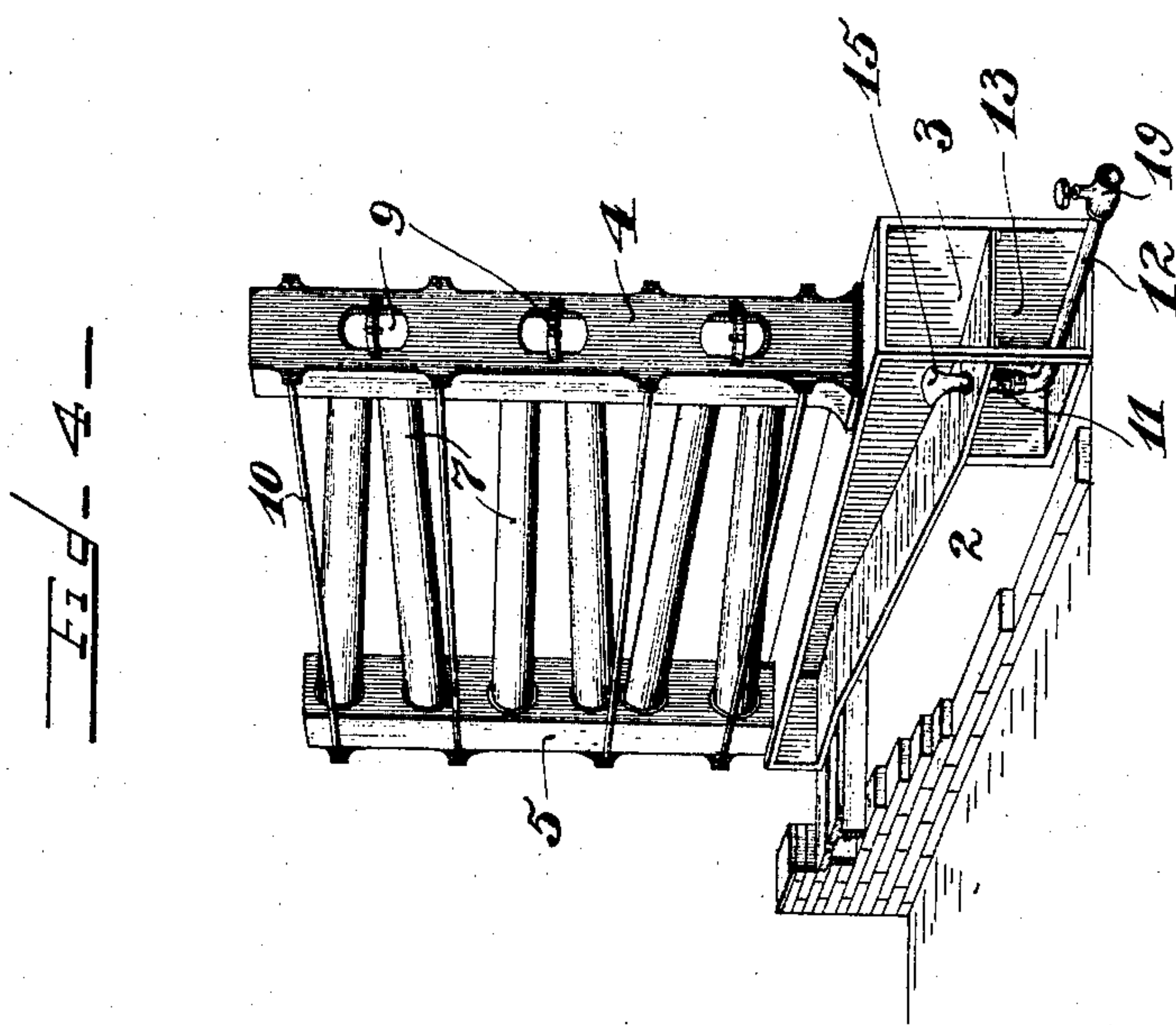
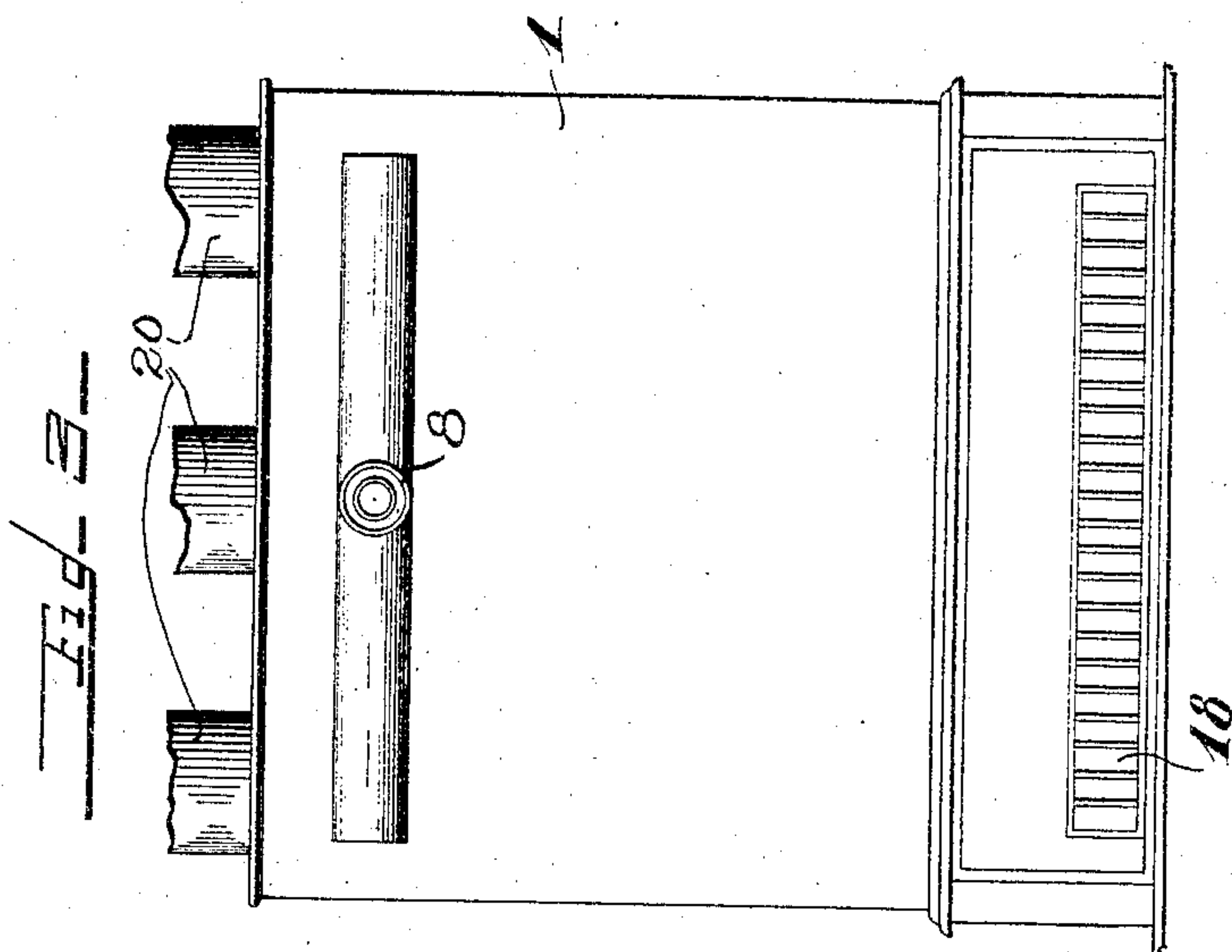
Charles A. Brown
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2 SHEETS—SHEET 2.



Witnesses:
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UNITED STATES PATENT OFFICE.

JOHN D. YORK, OF CHICAGO, ILLINOIS.

HEATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 781,169, dated January 31, 1905.

Application filed October 10, 1902. Serial No. 126,757.

To all whom it may concern:

Be it known that I, JOHN D. YORK, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have
5 invented a certain new and useful Improvement in Heating Apparatus, (Case No. 4,) of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of
10 this specification.

My invention relates to heating apparatus, and more particularly to that class of heating apparatus in which the circulation of air is depended upon for the distribution.

15 My invention contemplates the provision of a heating device in which the fuel to be burned is some suitable hydrocarbon, either gaseous or liquid. Heating apparatus has heretofore been constructed for the purpose of utilizing
20 heating effects due to the combustion of a hydrocarbon through the agency of a hydrocarbon-burner; but as the heat from a hydrocarbon-burner may be very intense the surfaces of the heating apparatus coming in contact
25 with the flame from such a burner have been somewhat subject to deterioration, and when it has been found necessary to replace the worn-out portions of such apparatus it has been necessary to entirely stop the operation
30 of the heating apparatus for the time being.

It is one of the principal objects of my invention to provide a hydrocarbon-burning heating apparatus of such a construction that parts of the apparatus may be removed and
35 replaced without materially effecting the satisfactory operation of the apparatus as a whole. Furthermore, by the employment of my improved construction I am enabled to provide a heating apparatus in which sufficient heat-
40 ing-surface is subjected to the heating action of a considerable number of hydrocarbon flames that the apparatus is not subject to a rapid deterioration of any of its parts.

Further objects and desirable results attained in the use of my improved heating apparatus will be apparent to those skilled in the art.

50 In the present embodiment thereof I have shown my invention as applied to hot-air furnaces, which may desirably be employed for

heating buildings and the like. However, my invention may be employed for heating drying-rooms or kilns or for other purposes in which an ordinary stove or radiator might be used.

My invention will be best understood by reference to the accompanying drawings, in which—

Figure 1 is a front elevation of a hot-air furnace employing my improved construction, 60 parts being broken away to show the interior construction thereof. Fig. 2 is a cross-sectional view taken on line 2 2 of Fig. 1. Fig. 3 is a rear elevation. Fig. 4 is a perspective view of one section of my hot-air furnace, 65 parts being broken away to reveal the construction thereof.

Similar characters of reference apply to like parts in all the views.

In accordance with the present embodiment 70 of my invention I provide an inclosing casing 1, to which cold air may be supplied by the air-duct 2, suitable passages being provided, with openings near the upper part of the chamber formed by the casing 1 for the purpose 75 of conveying the heated air to registers or other points by means of distributing-pipes 20, there to be utilized for heating purposes. Within this casing 1 I provide what I may term a "sectional" radiator. Each of these 80 radiator-sections consists of a flue 3, within which the combustion of the hydrocarbon preferably takes place. Leading from the rear part of the combustion-flue 3 is a radiator-tube, which may desirably be either coiled or 85 zigzagged back and forth through the chamber in order to provide a large heating-surface for the radiation of the heat caused by the combustion of the hydrocarbon. While this zigzag tube might be constructed in many differ- 90 ent ways, I shall herein show a preferred construction in which there are front and back standards 4 and 5. These standards are hollow and intercepted by the walls 6 6. Suitable tubes 7 7 lead from a box-like compartment in one of 95 the standards to a box-like compartment in the other standard. The arrangement of the hollow standards, their intercepting-walls, and the tubes is best illustrated in Fig. 2, in which it will be seen that the gases of combustion pro- 100

duced in the flue 3 will pass first into the lowest compartment in the rear standard, then through the lowest tube to the lowest compartment in the front standard, thence through
 5 the box-like compartment to the second tube, through the second tube to the next higher compartment in the rear standard, thence through this box-like compartment to the next higher tube, and so on through the entire
 10 number of radiating-tubes, the products of combustion thus passing gradually upward through a long winding passage-way to the top of the chamber inclosed by the casing 1, where a flue 8 is provided for the escape of the gases
 15 of combustion to a chimney. Although the flames of a hydrocarbon-burner are accompanied by very little dirt in the shape of soot or ash, still I find it desirable for the purpose of cleaning out the tubes 7 to provide the hand-
 20 holes 9 9, as indicated in the front of standard 4. The front and rear standards, with the intervening tubing, are desirably held together by the retaining-bolts 10 10.

I desirably effect the combustion of the hydrocarbon, especially when the same is normally in a gaseous state, through the agency of a Bunsen burner 11, a detailed description of which will be unnecessary, because it is well known to those skilled in the art. Such
 25 a Bunsen burner may be supplied with hydrocarbon fuel through the pipe 12, the base of the burner being desirably installed in a special chamber 13, to which the access of air may be regulated by a draft 14. A deflector
 30 15 is desirably placed above the burner to prevent the flame from the burner from impinging directly upon the upper surface of the flue 3. Each section is further provided with a door 16 in order to afford access to the combustion-flue to ignite the burner or to regulate
 40 the same.

Within the chamber inclosed by the casing 1, as previously described, I may install any suitable number of these sections, as described.
 45 The sections are desirably constructed so as to fit together nicely and to form the lower part of the front wall of the hot-air furnace. The combustion-flues 3 of the adjacent sections are desirably of such size as to permit
 50 the ready passage of air from the air-duct 2 between them.

The operation of this hot-air furnace is apparent. One or more of the Bunsen burners are lighted, the hot gases of combustion then
 55 passing through the combustion-flue 3 and through the winding passage-ways, as previously described, to the upper part of the chamber, where they pass out to the flue 8. Air entering through the air-duct 2 becomes heated and passes up around and between the tubes
 60 and passage-ways above described and into distributing-pipes 20. Heat is radiated through the walls of the combustion-flues and tubing to the air passing around them. When the
 65 air reaches the upper part of the chamber, it

will be sufficiently warmed for the purpose desired. The temperature imparted to the air passing from the upper part of the chamber may be regulated by varying the number of Bunsen burners which are lighted, thereby
 70 varying the amount of radiating-surface. The regulation may be further accomplished by the regulation of the amount of hydrocarbon fuel burned by each of the burners.

It will thus be seen that by the employment
 75 of my invention a furnace is constructed in which the amount of heating accomplished may be regulated and varied to a nicety. The front wall 17 of the casing 1 is desirably made readily removable, so that in case of partial
 80 derangement of any one of the sections in the furnace the same may be readily removed and repaired or replaced by a similar section. On account of this desirable provision the continuous operation of the furnace is not materially
 85 affected.

Although it is not an essential or material point in my present invention, I have indicated at 18 a ventilator-duct which may be
 90 used for the purpose of withdrawing foul air from the rooms in a building, and thereby improving the circulation of air.

Valves are supplied at 19 to regulate the supply of fuel to the burners.

While I have described a specific embodiment of my invention adapted to burn hydrocarbon fuels in a gaseous state, I do not wish to limit myself thereto, since it will be at once apparent that by a slight modification of the burner employed liquid hydrocarbons might
 95 equally well be utilized. Many other changes and modifications in the present embodiment of my invention might profitably be employed without departing from the spirit thereof, and I therefore do not wish to limit myself to the
 100 precise disclosure herein particularly set forth and described; but,

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In a heating apparatus of the class described, the combination with a chamber through which a current of air may pass, of a plurality of combustion-flues located near the bottom of said chamber, a radiator passage-way leading from each of said combustion-flues through said chamber, and a hydrocarbon-burner in each of said combustion-flues, one of said combustion-flues and its associated burner and radiator passage-way comprising a unitary structure readily removable from
 110 the chamber, substantially as described. 115

2. In a heating apparatus of the class described, the combination with a plurality of heater-sections, each section comprising a combustion-flue located at the lower part thereof, a hydrocarbon-burner located in said combustion-flue, radiator passage-ways for receiving the heat of combustion, of a common flue for carrying away from said passage-ways the products of combustion, a chamber inclosing
 120 125 130

all said sections, means for causing the circulation of air through said chamber and about said passage-ways, and distributing-pipes for leading away the heated air from said chamber, each of said sections being a unitary structure and readily removable from said chamber, substantially as described.

In witness whereof I hereunto subscribe my name this 4th day of October, A. D. 1902.

JOHN D. YORK.

Witnesses:

LYNN A. WILLIAMS,
HARVEY L. HANSON.