

No. 665,880.

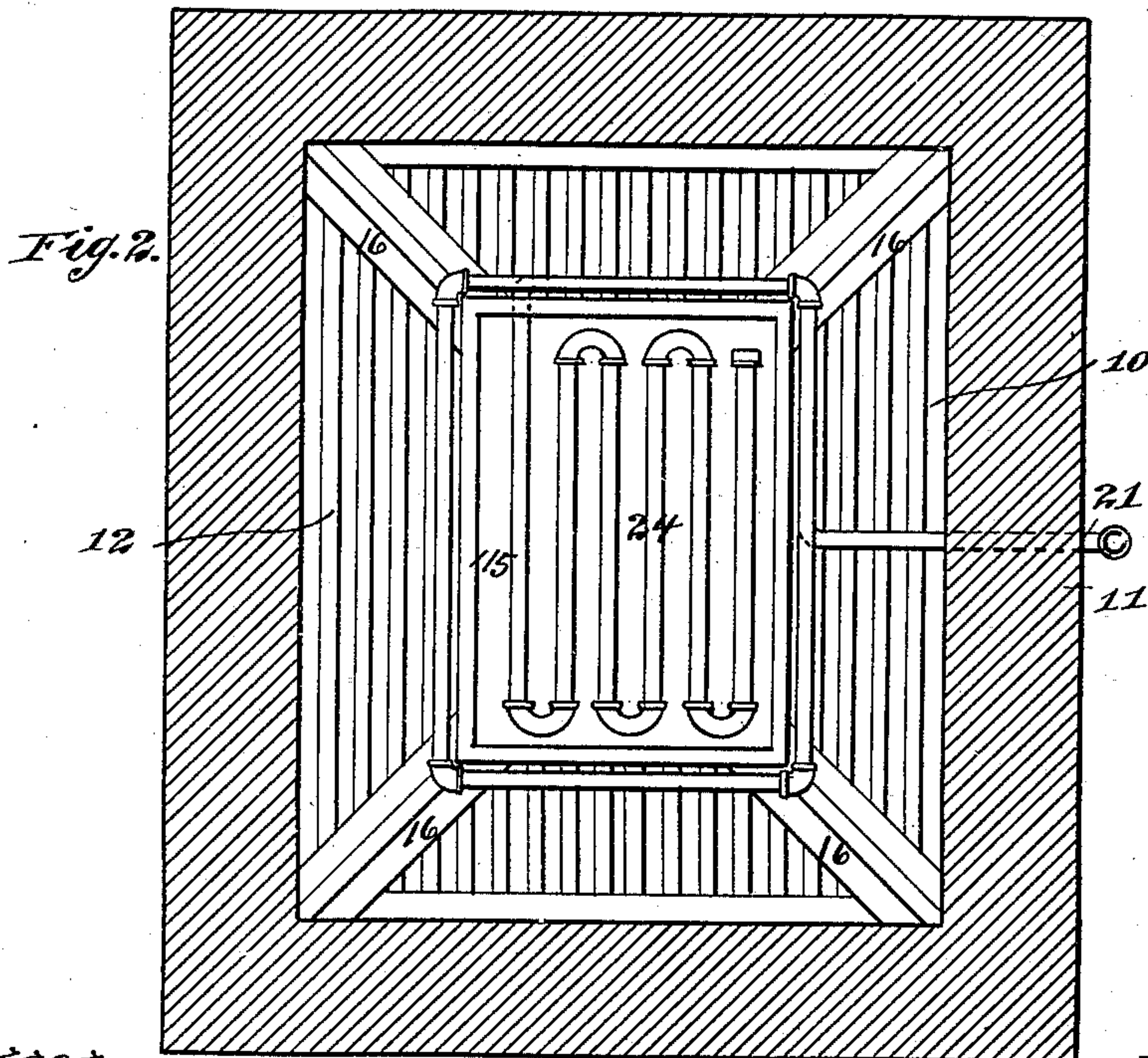
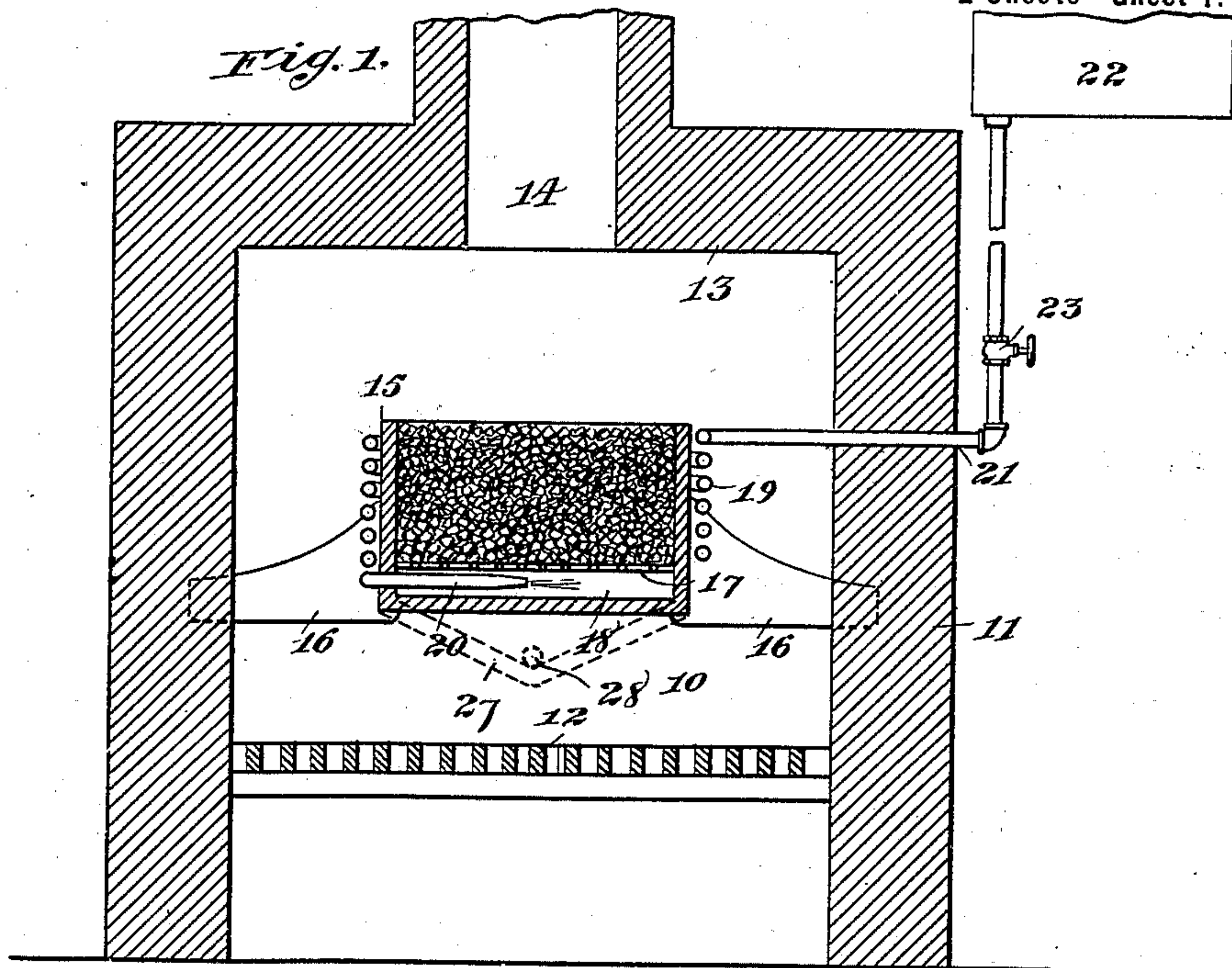
Patented Jan. 15, 1901.

A. A. CROSBY.
CRUCIBLE OR RETORT.

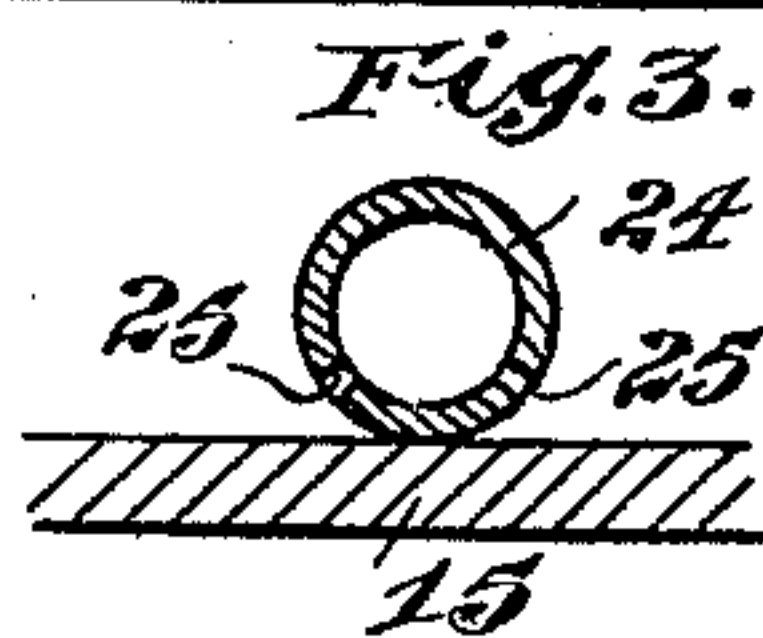
(Application filed Apr. 18, 1898.)

(No Model.)

2 Sheets—Sheet 1.



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2 Sheets—Sheet 2.

Fig. 4.

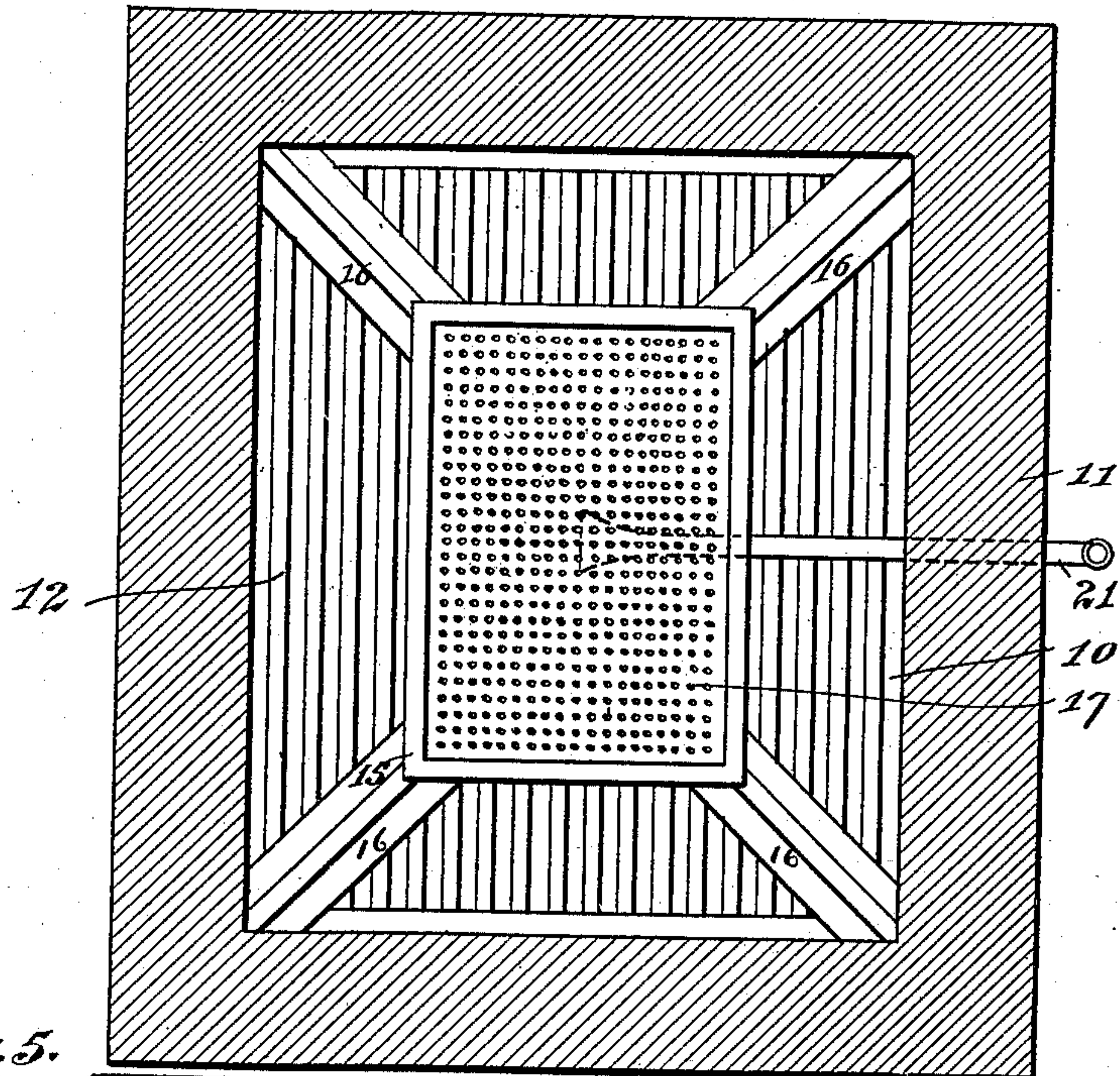


Fig. 5.

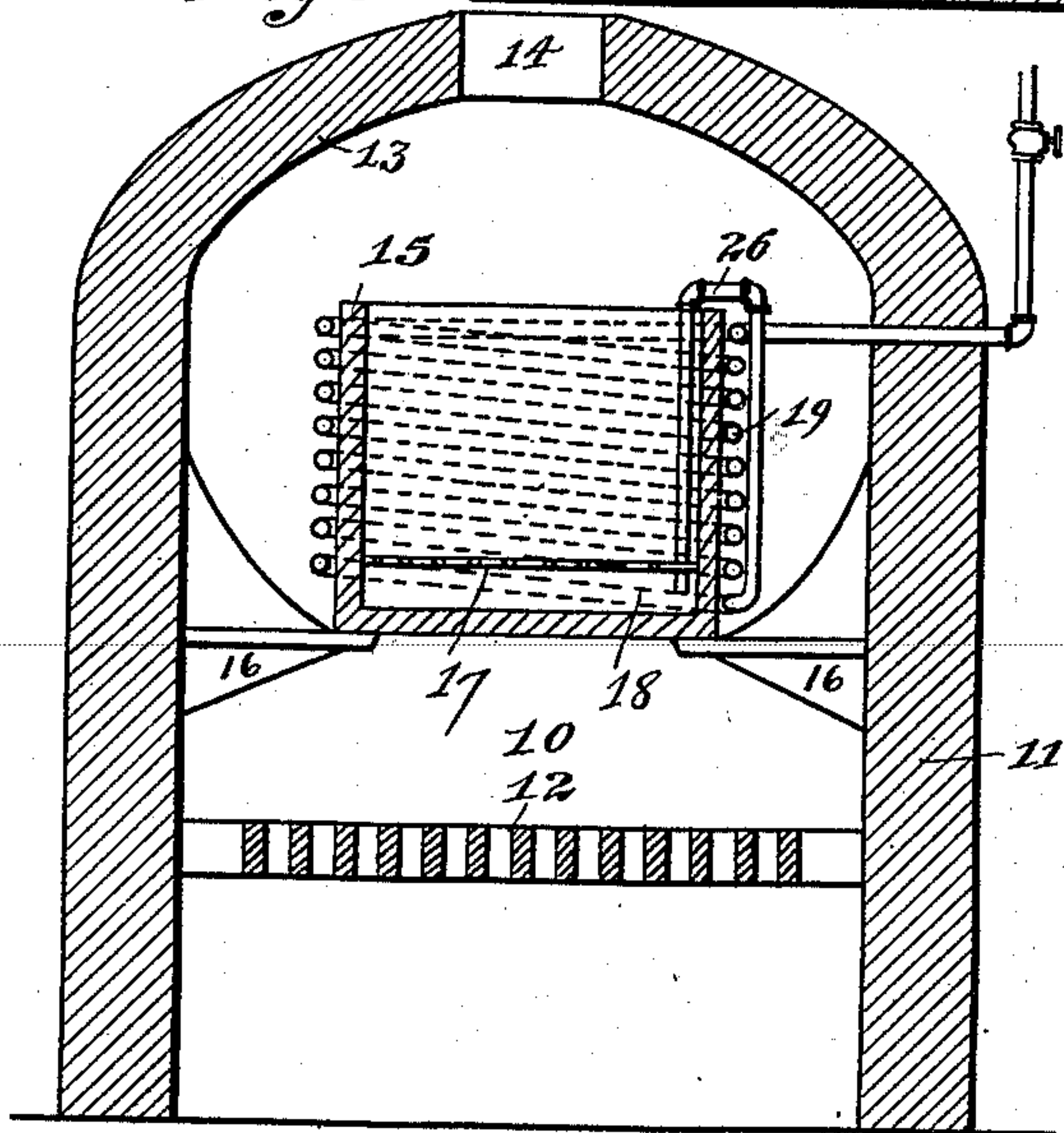
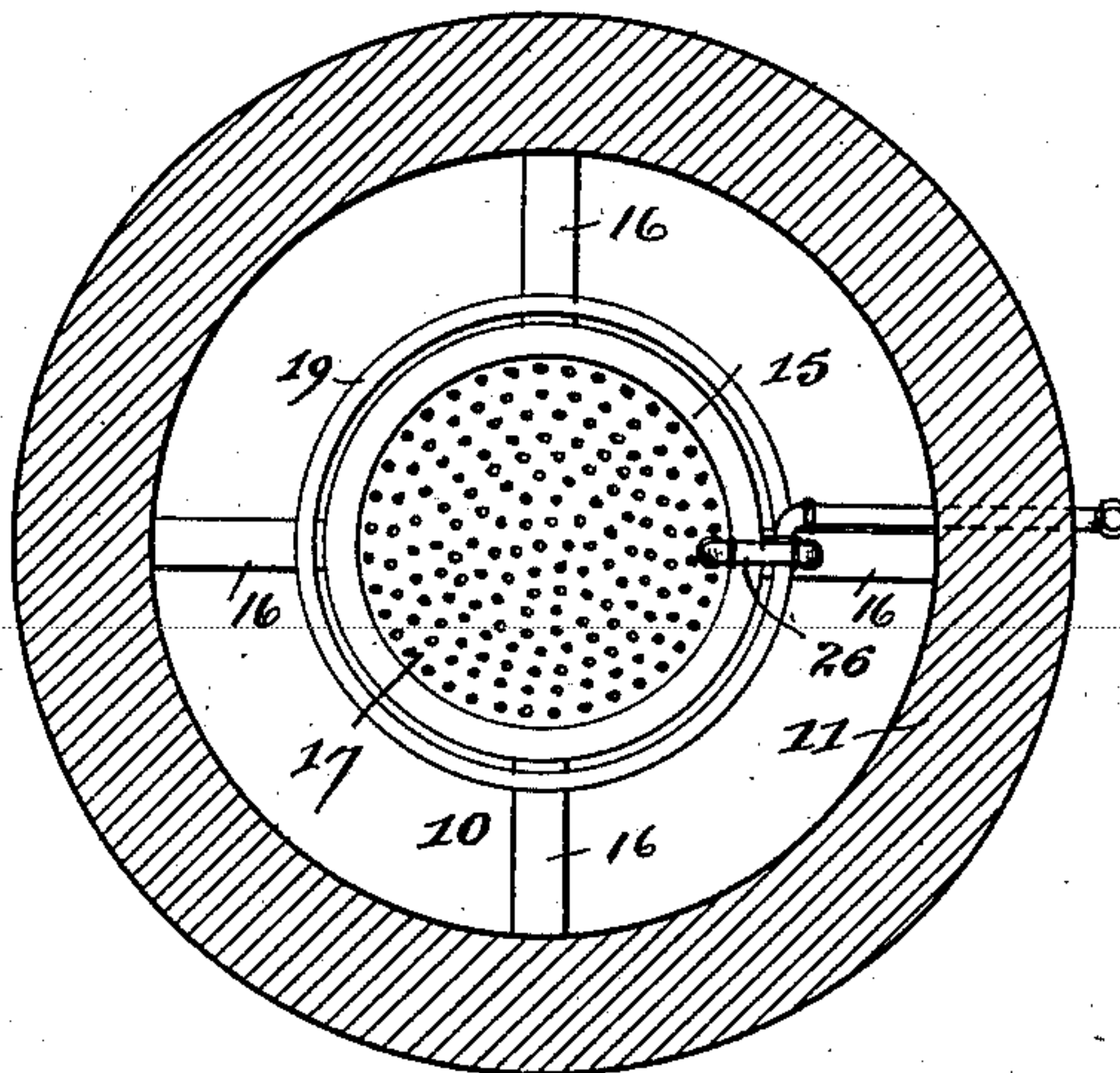


Fig. 6.



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UNITED STATES PATENT OFFICE.

ARTHUR A. CROSBY, OF CHICAGO, ILLINOIS.

CRUCIBLE OR RETORT.

SPECIFICATION forming part of Letters Patent No. 665,880, dated January 15, 1901.

Application filed April 18, 1898. Serial No. 677,984. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR A. CROSBY, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Crucibles or Retorts, of which the following is a specification.

This invention relates to crucibles or retorts, and has for its object to provide a construction whereby in devices of this description the contents of the vessel may be thoroughly and equally exposed to a very high temperature, whereby said contents may be brought to a higher degree of heat than in such retorts as ordinarily constructed or they may be brought to a given temperature in a shorter space of time than usual.

To these ends the invention consists in a crucible or retort provided with means whereby a combustible gas or liquid fuel may be introduced into the lower part of the interior thereof, so that the contents of the vessel will not only be exposed to the temperature of the furnace in which the vessel is placed, but will also be exposed to the heat of the gas within the vessel, which will pass up through the contents thereof, and thereby more thoroughly, equally, and quickly heat the same.

In the accompanying drawings, Figure 1 is a vertical sectional view through a furnace having a crucible or retort embodying my invention. Fig. 2 is a plan view of the same, illustrating a modified construction of the crucible or retort. Fig. 3 is a detail sectional view, on an enlarged scale, of a portion of the structure shown in Fig. 2. Fig. 4 is a plan view similar to Fig. 2, illustrating another modification of the device. Fig. 5 is a vertical sectional view illustrating yet another modified form of my invention, and Fig. 6 is a plan view of the same.

In Figs. 2, 4, and 6 the wall or casing of the furnace is shown in section.

In the said drawings, 10 indicates a suitable furnace, which may be of any approved construction and which, as shown, comprises the walls 11, grate 12, roof 13, and flue 14. Within the furnace, above the grate thereof, is located the crucible or retort 15, which may be of any suitable material and form.

In the drawings I have shown in Figs. 1, 2, and 4 a square or box-shaped crucible or retort of iron or other suitable metal, while in

Figs. 5 and 6 I have shown a cylindrical crucible or retort of the same material; but the crucible or retort may, if desired, be built up of clay, brick, or other suitable material in any desired form. The crucible or retort may be supported in position by brackets 16 or in any other suitable manner.

In the construction shown in Figs. 1, 4, 5, and 6 I have shown the crucible or retort as provided at a short distance above its bottom with a diaphragm or false bottom 17, provided with a large number of apertures, whereby the gas may be permitted to pass up through said diaphragm from the gas-chamber 18 thus formed in the bottom of the crucible or retort into the body of the crucible or retort above said diaphragm. The structure shown in Fig. 1 is adapted for use with a liquid hydrocarbon which will be vaporized by heat, and I have shown a coil of pipe 19 surrounding the body of the crucible or retort and having one extremity extending into the crucible or retort below the diaphragm 17 thereof, as shown at 20. This coil may be supplied with the liquid hydrocarbon from any suitable source, and in the present instance I have shown a supply-pipe 21, connecting the coil with an elevated reservoir 22 for the hydrocarbon, the connecting-pipe 21 being provided with a controlling-valve 23.

As a substitute for the perforated diaphragm 17 (shown in Fig. 1) I may employ a plurality of parallel connected pipes 24, arranged in the bottom of the crucible or retort and having apertures to permit the escape of the gas. In practice I prefer when this form of the device is employed to locate the apertures on opposite sides of the central planes of the pipes, directing the same downward and outward, as indicated at 25 in Fig. 3.

Under certain circumstances the liquid will be exposed to a sufficient heat to vaporize the same without the employment of a heating-coil, which latter in this case may be dispensed with. A construction of this character is shown in Fig. 4 of the drawings, wherein the supply-pipe 21 passes directly into the interior of the chamber 18, where such portions of the liquid as have not been vaporized in passing through the pipe 21 assume a gaseous form.

It may be inadvisable, particularly when the

device is employed in connection with crucibles or retorts already in existence, to form an aperture in the wall of the crucible or retort for the passage of the pipe which conveys the oil or gas to the interior thereof. In such cases I provide an inverted-U-shaped pipe 26, which connects with the lower part of the coil 19 in case this latter is employed and extends over the edge of the crucible or retort and downward into the same toward the bottom thereof, as shown in Figs. 5 and 6 of the drawings.

The crucible or retort hereinbefore described, while adapted for use in widely-different fields, is more particularly adapted for the treatment of ores by roasting or by a similar process of heating. It will be seen that the body of the crucible or retort proper being filled with the ore above the diaphragm 17 or above the pipes 24, in case these latter are employed, the hydrocarbon or other fuel introduced through the pipe 21 and coil 19 will be vaporized and form a gas, which, issuing from the apertures of the diaphragm 17 or of the pipe 24, will be ignited and, passing up through the material in the crucible or retort, will thoroughly and rapidly heat said contents in all its parts. It will be seen that the contents of the crucible or retort are not only exposed to the full heat of the furnace, which latter, however, must operate upon said contents gradually, always affecting the external or exposed parts thereof more than the interior, but said contents are also thoroughly and equally heated by the highly-heated gas introduced into the crucible or retort as to those interior portions which are not as thoroughly exposed to the action of the furnace as the external portions. By reason of this construction and operation a crucible or retort of very high efficiency is obtained. The invention is also especially adapted for smelting, and in Fig. 1 I have shown in dotted lines a V-shaped bottom 27 for the retort or crucible wherein the molten metal may collect and from which it may be drawn by means of a tap-hole 28 or the like.

I claim—

1. In an apparatus for roasting or smelting ores or the like, the combination with a heating-furnace, of a crucible located within the combustion-chamber of said furnace and adapted to be heated thereby, and a pipe for introducing a supply of hydrocarbon fuel to the interior of said crucible, said supply-pipe having a portion thereof exposed to the furnace heat whereby the hydrocarbon is vaporized and its delivery end extended into the crucible and terminating near its bottom wall, whereby the combustible gas is caused to pass upwardly through the charge, substantially as described.

2. In an apparatus for roasting or smelting ore or the like, the combination with a furnace, of a crucible located therein and adapted to be heated thereby, of a supply-pipe for introducing a hydrocarbon fuel into said crucible, said supply-pipe having a portion thereof exposed to the furnace heat and its delivery end extended into the crucible and terminating near the bottom wall thereof, and means located above the delivery-terminal of the supply-pipe and below the charge-space, for distributing the hydrocarbon fuel, whereby it is caused to pass upwardly through the entire charge of material under treatment, substantially as described.

3. The combination, with a heating-furnace, of a crucible or retort placed therein and adapted to be heated thereby, a reservoir or other source of supply of hydrocarbon, and a coil of pipe or the like surrounding the crucible or retort and exposed to and adapted to be heated by the furnace, said coil of pipe being connected to the reservoir or other source of supply at one end and extending at the other end into the lower part of the interior of the crucible or retort, substantially as described.

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