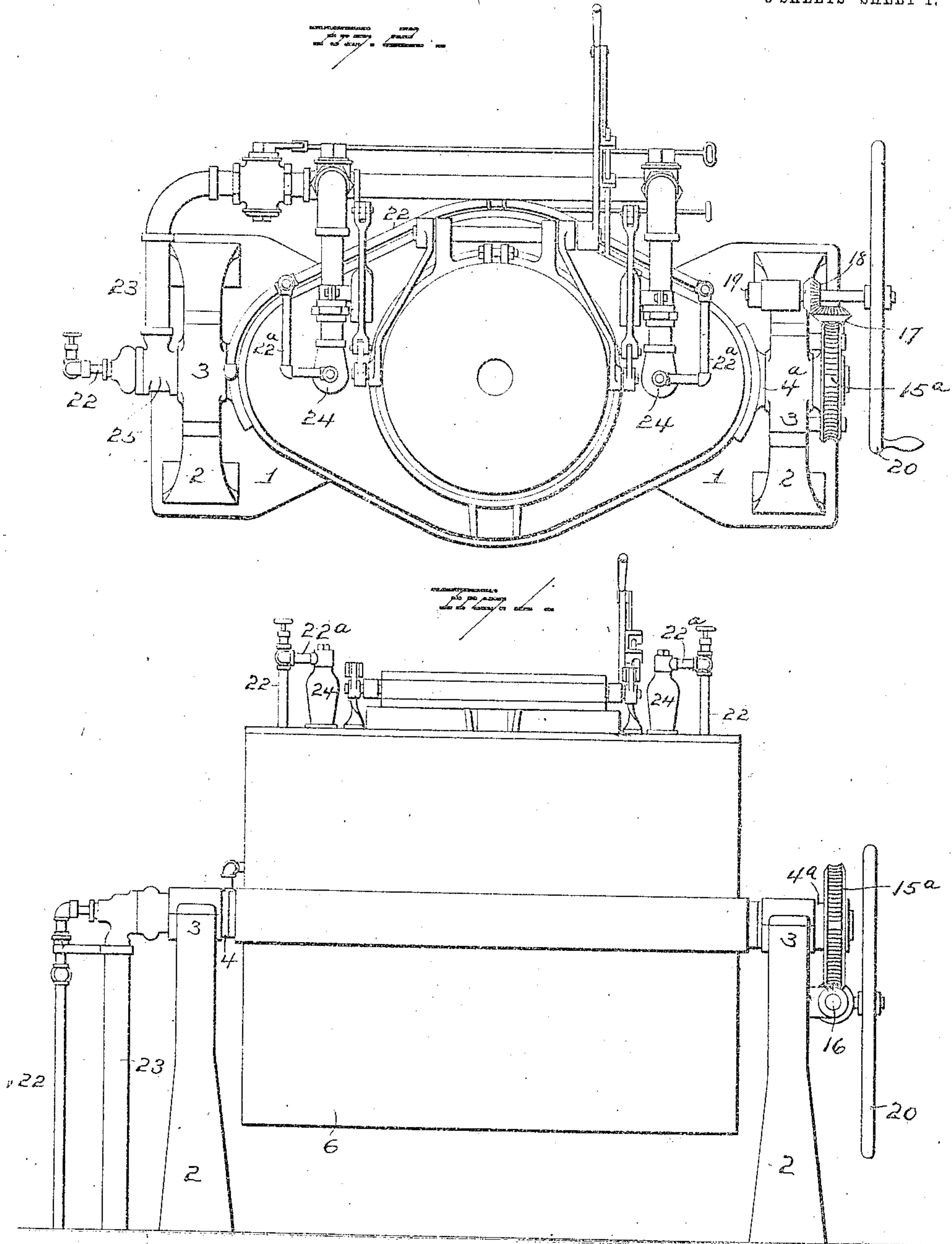


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CRUCIBLE FURNACE.  
APPLICATION FILED DEC. 10, 1909.

932,906.

Patented Aug. 31, 1909.

3 SHEETS—SHEET 1.



WITNESSES  
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Fig. 5.

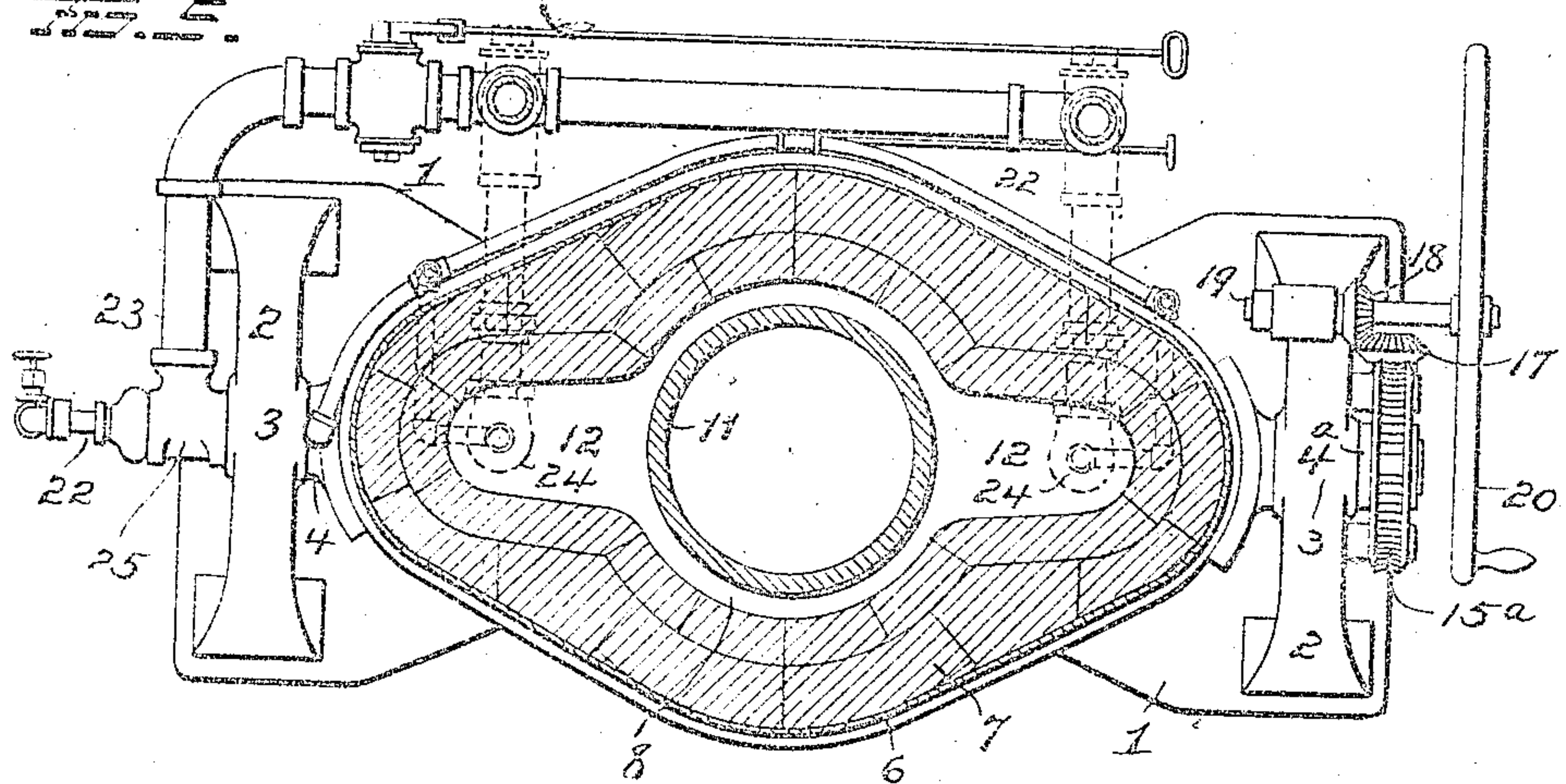
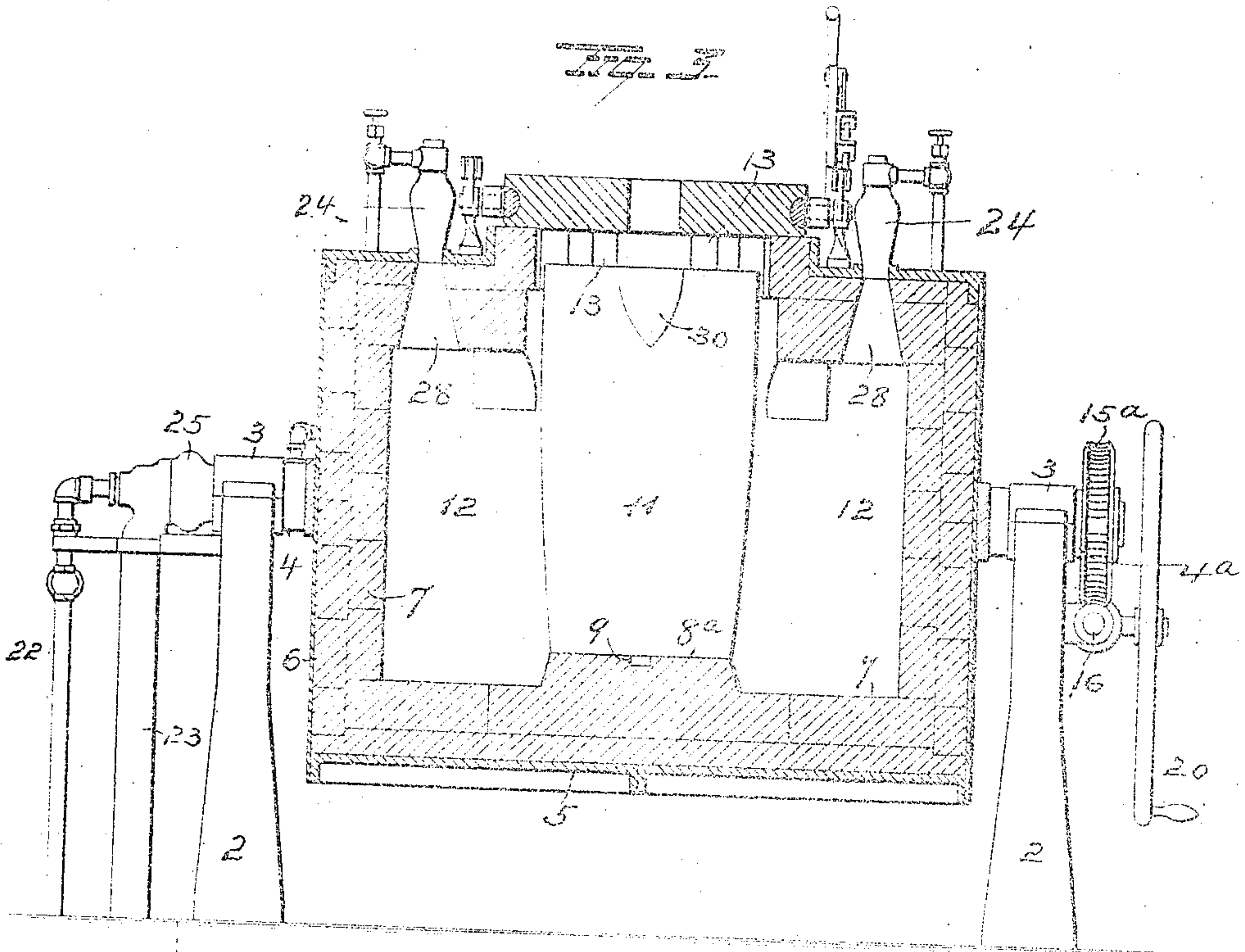


Fig. 6.



WITNESSES

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C. J. Downing.

INVENTOR

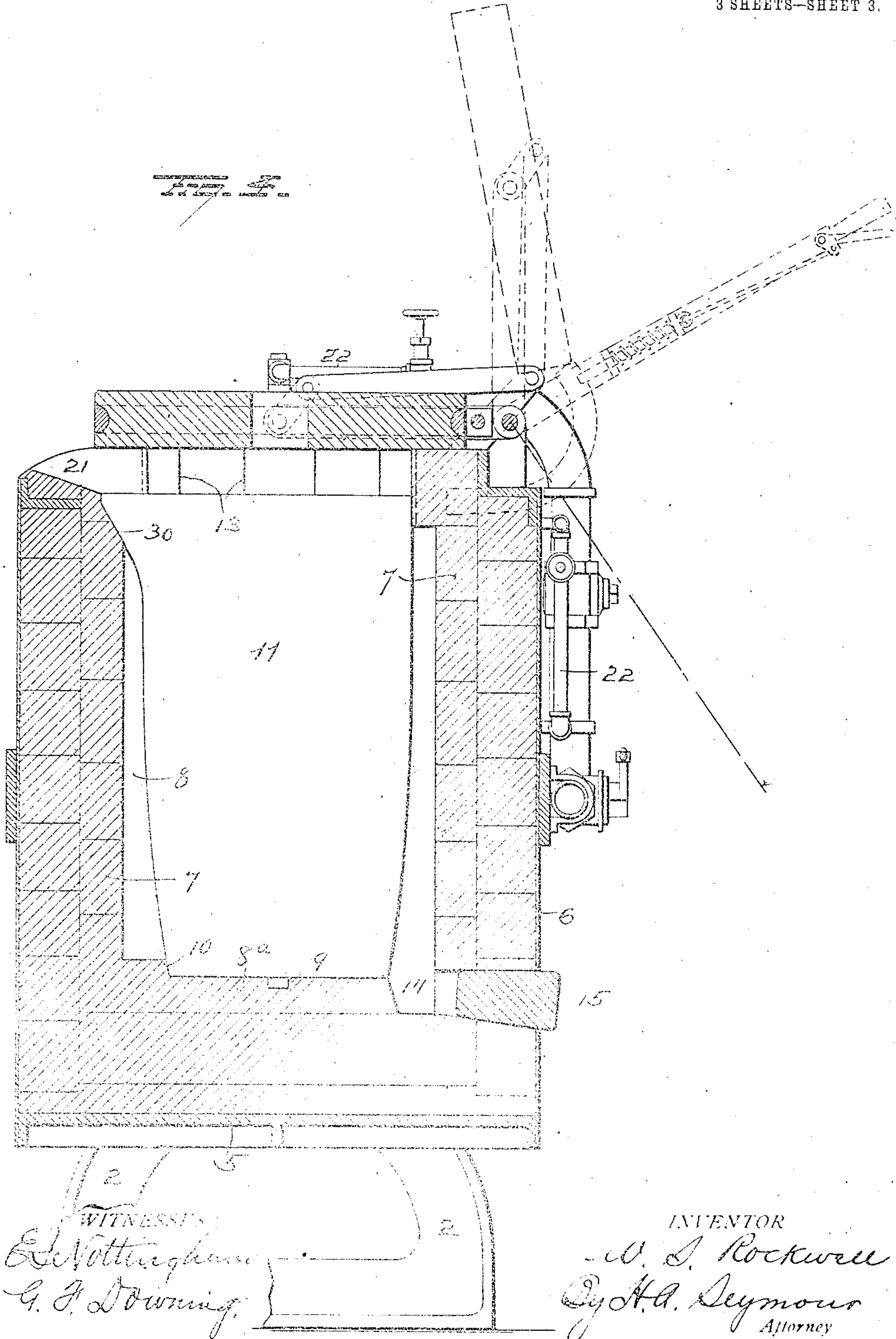
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# UNITED STATES PATENT OFFICE.

WALTER S. ROCKWELL, OF NEW YORK, N. Y., ASSIGNOR TO W. S. ROCKWELL COMPANY, OF  
NEW YORK, N. Y.

## CRUCIBLE-FURNACE.

932,906.

Specification of Letters Patent. Patented Aug. 31, 1909.

Application filed December 10, 1908. Serial No. 466,835.

*To all whom it may concern:*

Be it known that I, WALTER S. ROCKWELL, of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Crucible-Furnaces; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an improvement in crucible furnaces and more particularly to the furnace shown and described in my application No. 443,432 filed July 14th, 1908. In the furnace disclosed in my pending application, the combustion chamber is to one side of the crucible chamber, the latter being in open communication with the combustion chamber. While this construction is admirably adapted for small crucibles for melting small quantities of brass or other metals, I have found that when using a large crucible, or when melting the more refractory metals such as nickel, steel, etc., it is necessary to have a more intense heat than can be obtained by a single burner at one side, and as great an envelopment of the crucible by the flame as possible. This I have accomplished by providing the furnace with two combustion chambers, located on opposite sides of, and in open communication with the crucible chamber.

In the accompanying drawings, Figure 1 is a view in elevation of my improved furnace. Fig. 2 is a plan view of same. Fig. 3 is a view in vertical longitudinal section. Fig. 4 is a view in vertical transverse section through the crucible chamber, and Fig. 5 is a view in horizontal section.

1 represents a base carrying the legs 2, which are provided at their upper ends with bearings 3 for the trunnions 4 and 4<sup>a</sup> of the furnace.

The furnace is of oblong shape as shown in Figs. 2 and 5 with rounded ends and sides, and is made up of a bottom 5, and an outer shell 6, the latter extending up to the top casting to which it is bolted or riveted. The oblong casing, thus constructed, is provided with a double lining 7 of fire brick, and is provided in its central section, or crucible chamber 8 with a pedestal 8<sup>a</sup> grooved on the top as at 9, to permit the heat to pass under the crucible, and is also

provided with the shoulder 10, which supports the lower end of the crucible, and prevents the latter from sliding forwardly during the operation of tilting the furnace.

The combustion chambers 12, are, as shown in Figs. 3 and 5, located on opposite sides of the crucible chamber 8, and in direct communication therewith. These chambers 12 are narrower than the crucible chamber, with their top in a plane below the plane of the top of the crucible chamber, thus forming a support for the top of the crucible, and by which the latter is held and supported when the furnace is tilted, the walls of the furnace forming this top support for the crucible, are corrugated as at 13, the corrugations forming flues through which the spent gases pass.

The crucible chamber is provided at its lower end with the lighting opening 14 normally closed by the removable plug 15.

The shell of the furnace is provided, as previously explained, with the trunnions 4 and 4<sup>a</sup>. The trunnion 4<sup>a</sup> is provided at its free end with the worm wheel 15<sup>a</sup>, which meshes with a worm on shaft 16, carrying bevel pinion 17 meshing with pinion 18 on shaft 19, the latter carrying hand wheel 20. By rotating the hand wheel the furnace may be tilted in a direction to discharge the contents of the crucible 11 through the discharge spout 21, and by rotating the hand wheel 20 in the opposite direction, the furnace will be restored to its original upright position. The opposite trunnion 4 is hollow for the passage of the fuel supply pipe 22. This pipe passes through the elbow of the air supply pipe 23, and through trunnion 4, and out of the latter intermediate the furnace and bearing 3, as shown in Fig. 5, and from thence, passes around one side of the furnace, below the top thereof, with branch pipes 22<sup>a</sup> leading upwardly and discharging into the burners 24, the main supply pipe and each branch pipe being provided with valves for regulating the supply of oil to the burners. The main pipe 22 is also provided within the air supply pipe, or within the hollow trunnion 4, with a slip joint so as to permit that portion of the pipe carried by the furnace, to move with the furnace. The air supply pipe which also leads to both burners 24, is provided with a slip joint connection at 25, so as to permit that portion of the pipe connected with the



burner to move with the furnace. The burners 24 are connected to the fuel and air pipes, and fit snugly within openings in the top casting of the furnace, which openings communicate with bell shaped openings 28, in the top lining of the furnace, one over each combustion chamber. With this construction the fuel will be vaporized, commingled with the air and intensely heated and ignited before entering the combustion chambers, where the fuel is thoroughly consumed. The blasts being downward, lengthwise the intensely heated combustion chambers, all the oxygen will be consumed thus producing a practically smokeless furnace.

The crucible 11 is the ordinary graphite crucible in which the metal to be melted is placed. This crucible may be provided with a cover for protecting the contents from oxidation, and with a spout 30 conforming in location to the spout 21 in the furnace. The furnace is also provided with a cover 31, which may be provided with suitable lever mechanism for raising and lowering it.

The crucible chamber 11 is as shown, directly between, and in open communication with both combustion chambers, and as the crucible is of less diameter than its chamber and is located centrally therein, there is an even distribution of heat on all sides of the crucible. The location of the burners at the tops of the combustion chambers, gives the longest possible time for the thorough mixing of the heat producing elements, and complete combustion before such elements, and particularly the oxygen of the air, can come in contact with the crucible, thus prolonging the life of the latter. At the same time combustion being practically complete by the time the fuel elements have reached the bottom of the combustion chamber, the greatest amount of heat is developed at that point where it is most needed, while the spent gases and clean flame passing up and around the crucible, serve to heat the upper part of the latter.

By the use of two burners and two combustion chambers, so located that the flames come together in the crucible chamber, a more intimate mixture of the fuel and oxygen of the air is obtained resulting in more rapid combustion and consequently a more intense heat. This intense heat also has a freer access to all sides of the large crucible, by reason of the direct radiation of the rays of heat from two spheres of combustion than would be possible from a single burner and a single combustion chamber.

It is evident that many slight changes might be resorted to in the relative arrangement of the parts shown and described without departing from the spirit and scope of

my invention, hence I would have it understood that I do not wish to confine myself to the exact construction and arrangement of parts shown and described, but,

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

1. A crucible furnace comprising a body having a chamber for the crucible, and a plurality of combustion chambers in open communication with the crucible chamber, a burner located at the top of each combustion chamber and projecting downwardly to discharge into its chamber, and means for tilting the furnace.

2. In a furnace, the combination with a body having a crucible chamber and a plurality of combustion chambers communicating with the crucible chamber, the crucible chamber having an opening near its bottom, of a burner located at the top of each combustion chamber and discharging downwardly into its chamber.

3. In a furnace, the combination with a body having three communicating chambers one of which is open at the top, a crucible located in the open top chamber, a cover for closing said opening and means for handling said cover, of a plurality of burners discharging into the other chambers and means for tilting the furnace.

4. In a furnace, the combination with a body having a crucible chamber, and two combustion chambers, the crucible chamber being intermediate the two combustion chambers and communicating with both, of a burner discharging into the top of each combustion chamber.

5. In a furnace, the combination with a body provided with a centrally located crucible chamber having an open top and two combustion chambers located on opposite sides of the crucible chamber and communicating therewith, the combustion chambers being closed at the top, of a burner for each combustion chamber and means for tilting the furnace.

6. In a furnace, the combination of a body having a crucible chamber and a plurality of communicating combustion chambers, the crucible chamber having an opening through its side adjacent to the bottom thereof, and a burner discharging into the top of each combustion chamber.

In testimony whereof, I have signed this specification in the presence of two subscribing witnesses.

WALTER S. ROCKWELL.

Witnesses:

THOMAS G. TURNER,

FRANK ALFRED CALHOUN.