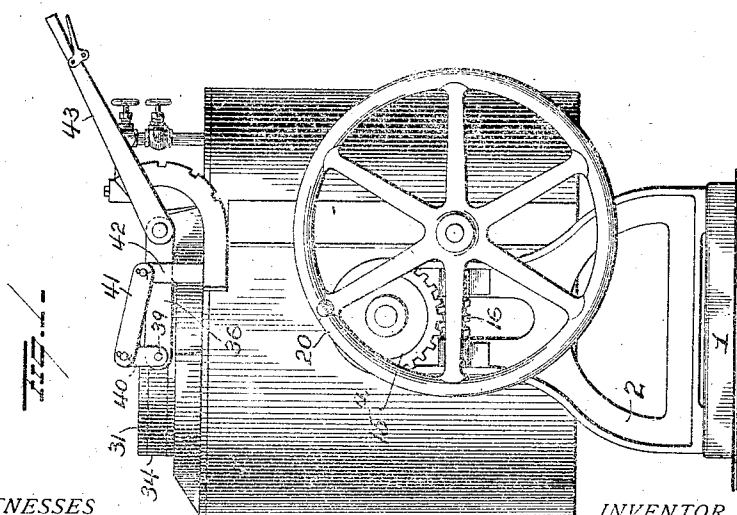
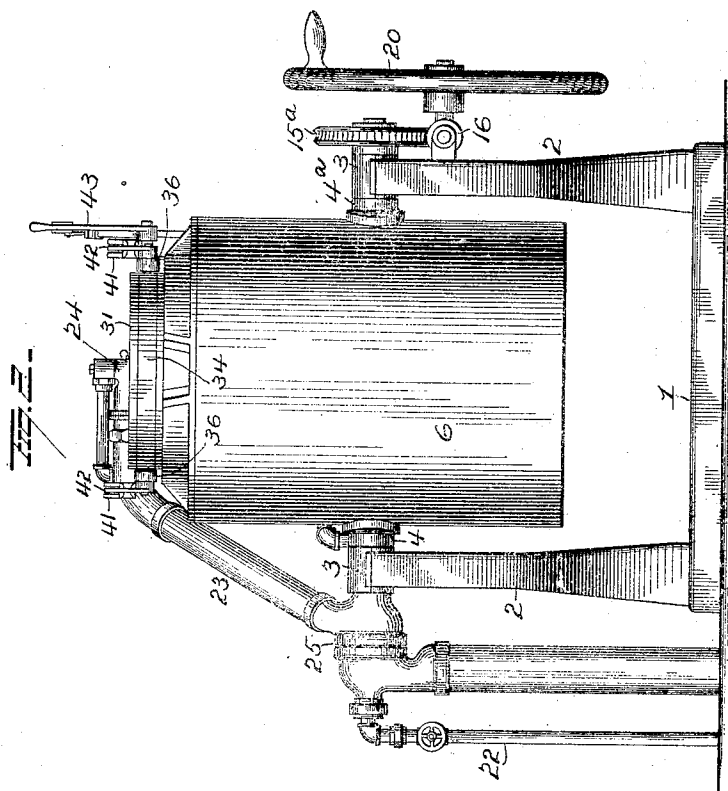


1,042,825.

W. S. ROCKWELL.
CRUCIBLE FURNACE.
APPLICATION FILED JULY 14, 1908.

Patented Oct. 29, 1912.

3 SHEETS—SHEET 1.



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Fig. 5.

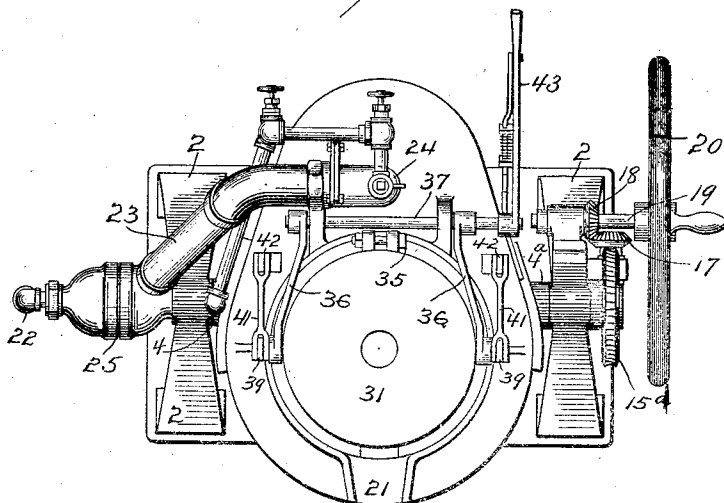
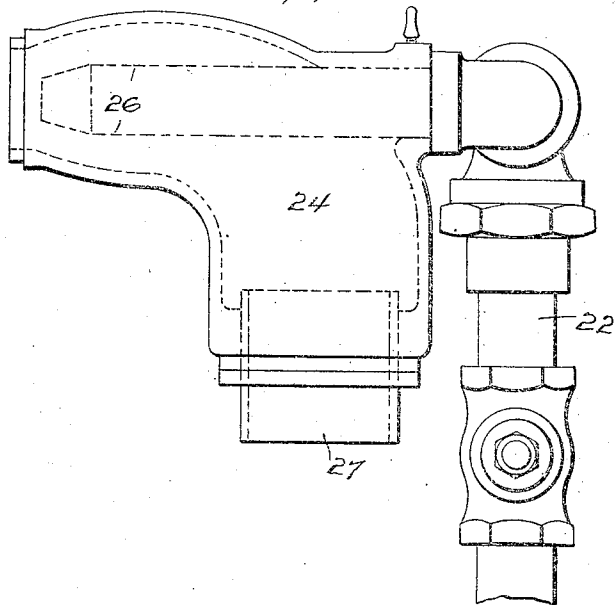


Fig. 7.



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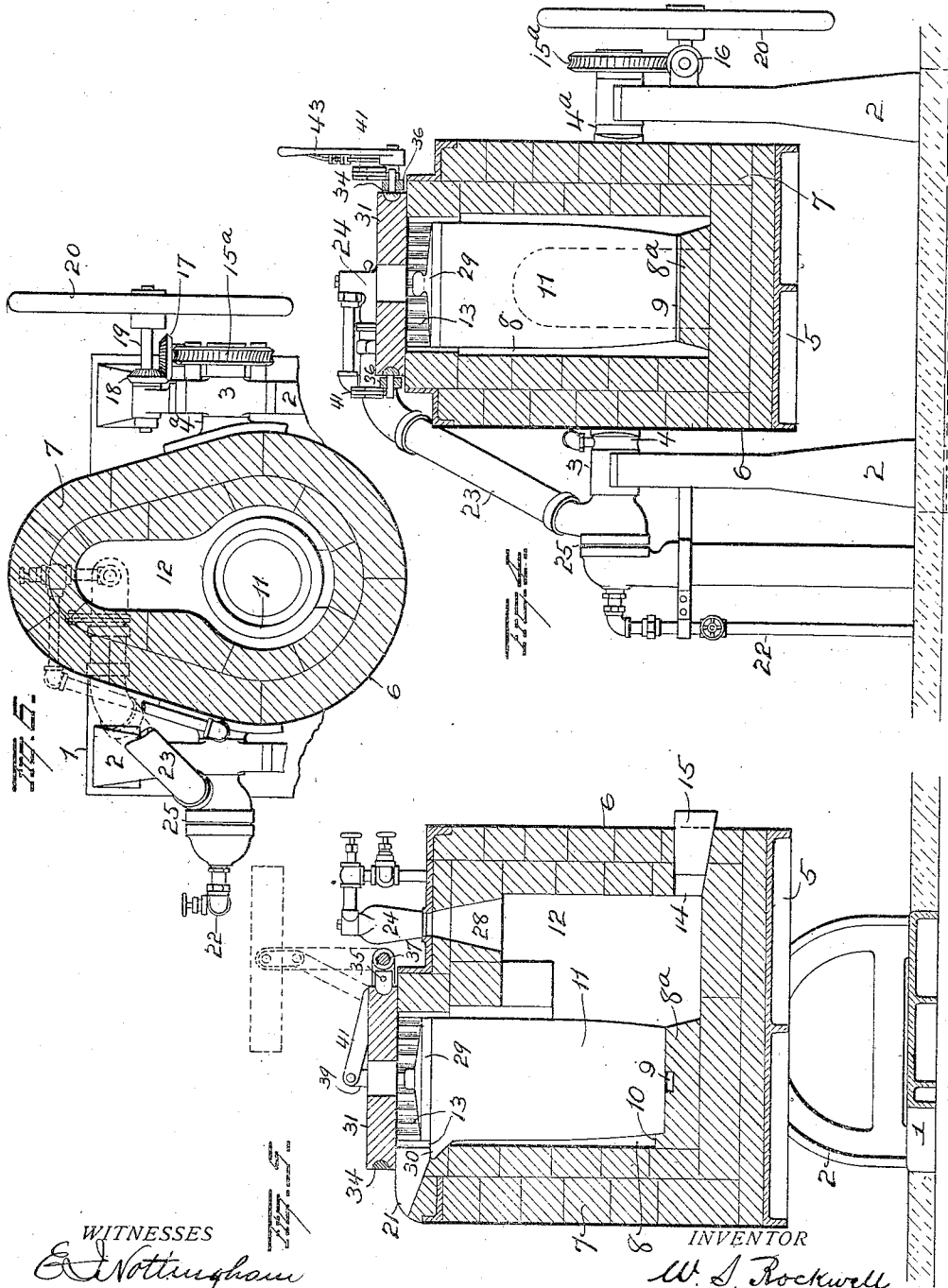
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UNITED STATES PATENT OFFICE.

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CRUCIBLE-FURNACE.

1,042,825.

Specification of Letters Patent.

Patented Oct. 29, 1912.

Application filed July 14, 1908. Serial No. 442,432

To all whom it may concern:

Be it known that I, WALTER S. ROCKWELL, of Jersey City, in the county of Hudson and State of New Jersey, 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 the object being to provide a furnace for melting small quantities of brass and other metals, so constructed as to practically eliminate loss from oxidation and volatilization.

A further object is to provide a furnace of the character described, that will be durable in construction, easily manipulated and accessible for repairing.

With these ends in view my invention consists in the parts and combination of parts and in the details of construction as will be more fully explained and pointed out in the claims.

In the accompanying drawings, Figure 1 is a view in side elevation of my improved furnace. Fig. 2 is a view in elevation at right angles to Fig. 1. Fig. 3 is a plan view. Fig. 4 is a view in vertical section through Fig. 2, the supports and pipes being in elevation. Fig. 5 is a view in vertical section through Fig. 1. Fig. 6 is a view in horizontal section, the supports and pipes being in elevation and Fig. 7 is a view in elevation of the burner.

1 represents an iron base, carrying the upright legs 2 provided at their upper ends with bearings 3 for the trunnions 4 and 4^a of the furnace.

This furnace is preferably oblong in cross section as shown in Fig. 6; and wider at one side than the other, forming in effect a receptacle egg shaped in horizontal section, and comprises a bottom 5, and an outer shell 6, the latter being bolted to the bottom and extending up to the top casting to which it is bolted or riveted. The casing, thus constructed, is provided with a double lining 7 of fire brick, and is provided in its larger section, or crucible chamber 8, with a pedestal 8^a grooved on top as at 9, to permit the heat to pass under the crucible, and is also provided with a shoulder 10, which

supports the crucible 11, and prevents the lower ends of the latter from sliding forwardly during the operation of tilting the furnace. The combustion chamber 12, is narrower than the crucible chamber 8, and its top projects below the latter thus forming, together with the walls of the crucible chamber, a support for the entire top of the crucible whereby the latter is held and supported while tilted. The walls of the furnace forming this support for the top of the crucible, are corrugated as at 13, the corrugations forming series of flues through which the spent gases pass. The combustion chamber 12 is provided at its lower end with the lighting opening 14, normally closed by removable plug 15.

The shell of the furnace thus constructed, is provided as previously explained, with the trunnions 4 and 4^a. The trunnion 4^a is provided at its outer end with a worm wheel 15^a, 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 hand wheel the furnace may be tilted in a direction to discharge the contents of the crucible 11 through the discharge opening 21, and by rotating the 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 oil supply pipe 22. This pipe passes through the air supply pipe 23, and trunnion, and out of the latter intermediate the furnace and bearing 3, as shown in Fig. 4, and from thence up to the burner 24, the oil pipes being provided with one or more valves for regulating the supply of oil to the burner, and also provided at a point within the air supply pipe 23, or the hollow trunnion 4, with a slip joint so as to permit a portion of the oil supply pipe to turn with the furnace while the other part remains stationary.

The air supply pipe 23, which also leads to the burner 24, is provided with a slip joint connection at 25 to permit that part of the pipe which is connected with the burner to move with the furnace.

The burner 24, shown detached in Fig. 7, is provided with a nozzle 26 connected with the oil pipe 22, and with a coupling 27 for the attachment of the air pipe 23, the oil

nozzle 26 terminating just above the lower end of the burner. The air entering the burner envelops the oil issuing from the nozzle 26 and thoroughly commingles with same before entering the combustion chamber 12. This burner 24 fits snugly in an opening in the top casting which opening communicates with a bell-shaped opening 28 in the top lining of the furnace, consequently the oil is vaporized and commingled with the air and intensely heated and ignited before entering the combustion chamber, where it is thoroughly consumed. The blast being downward, lengthwise the intensely heated combustion chamber, all the carbon is 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 29 for protecting the contents from oxidation, and with a spout 30 conforming in location to the discharge opening 21 in the furnace. The furnace is also provided with a cover 31 composed of tile or fire brick, peripherally grooved for the reception of the holding or clamping ring 34 the ends of which latter are connected by the bolt 35, shown in Fig. 3. This ring 34 is provided at diametrically opposite points with pins 39, which rest in the ends of arm 36 secured to shaft 37 journaled in bearings 38 carried by the top casting.

Secured to the pins 39 are the upwardly projecting arms 40, pivotally connected at their upper ends to the links 41, the opposite ends of which are pivotally connected to the upper ends of the arms 42 secured to the top casting of the furnace. From the foregoing it will be seen that if the shaft 37 be turned by the handle 43, the cover 31 will be elevated to the position shown in Fig. 5 to a plane in rear of the crucible opening in the furnace, the arms 40 and 42 and links 41 revolving the cover during its upward movement so as to bring its hot underside up and away from the operator.

The crucible 11 is so located within the furnace as to afford an even distribution of the flames and heat on all sides, and thus produce rapid and uniform melting, while the location of the burner at the top of the combustion chamber, for either fuel oil or gas, and directed toward the bottom, is such as to give 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 considerably the life of the crucible. 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 used, while the spent gases and clean flame passing up and around the crucible, serve to heat the upper parts of the latter.

By providing the furnace with an opening 14 at the bottom, and with the burner at the top, any spilled metal due to the breaking of the crucible, or from any other cause, can be poured through the opening 14 without loss and without injuring the burner. Again the location of the burner at the top, and the leading of the heat producing elements to the burner through one of the furnace trunnions, possesses the advantage of a continuous operation of the furnace at all times, as it permits the heating to be continued during the pouring operation, thus holding the metal to full heat at all times and prevents any free oxygen reaching the crucible at such times. Even if the firing be discontinued during the pouring operation, practically no free atmospheric air could reach the crucible and chill it or the metal, as the burner is fitted permanently to the body of the casing and consequently moves with the latter. Again the location of the burner at the top of the furnace, and the distance and time of travel of the heat producing elements, permits me to employ air of low pressure for atomizing purposes, which is decidedly less expensive than compressed air at high pressure.

The construction and operation of the furnace are such that after a crucible has been placed in its chamber, there is no necessity for removing it until it has worn out.

By the use of the crucible and cover, molten metal may be held in good condition and without any material loss in the event the molds are not ready to receive it as soon as melted, and by providing the casing with a removable bottom, the furnace may be tilted upside down and the bottom casting removed for repair and replacement of the lining.

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 shown and described but consider myself at liberty to make such slight changes and alterations as fairly fall within the spirit and scope of my invention.

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 combustion chamber in open communication with the crucible chamber, a burner located at the top and projecting downwardly to discharge into the combustion chamber, and means for tilting the furnace.

2. In a furnace the combination with a body having a discharge spout and a crucible chamber, a combustion chamber in open communication with the latter, a pedestal in the crucible chamber, and a crucible having a discharge spout and mounted on the pedestal with its discharge spout conforming to the discharge spout of the furnace, of a burner discharging into the combustion chamber, and means for tilting the furnace.

3. In a furnace, the combination with a body having a crucible chamber and a combustion chamber communicating with the crucible chamber, the combustion chamber having an opening near its bottom, of a burner discharging into the combustion chamber and means for tilting the furnace.

4. In a furnace, the combination with a body having a discharge spout, a crucible chamber and a combustion chamber communicating with the crucible chamber, a crucible located within the crucible chamber and terminating with its upper edge approximately in line with the discharge spout of the body, and a cover for the opening in the body of the furnace over the crucible, of a burner discharging into the combustion chamber and means for tilting the furnace.

5. In a furnace, the combination with a

body having a crucible chamber and a communicating combustion chamber, of a burner discharging into the top of the combustion chamber, and an opening through the side of the latter adjacent to the bottom thereof.

6. In a furnace, the combination with a body having a crucible chamber open at its top and a combustion chamber in open communication with the crucible chamber, of a cover for the opening in the top of the crucible chamber and means for elevating the cover and moving it rearwardly and turning the cover over while moving rearwardly.

7. A metal melting furnace comprising a casing whose lower end is closed so as to be capable of holding metal and provided with a pouring gate at its upper end, a crucible seated in said pouring gate and extending down into said casing, means for introducing fuel into the casing from the upper end thereof, and means for tilting the casing whereby the metal will be poured whether contained in the crucible or in the casing.

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

WALTER S. ROCKWELL.

Witnesses:

A. W. BRIGHT,

S. G. NOTTINGHAM.