J. E. HEWITT.

MELTING FURNACE.

APPLICATION FILED SEPT. 27, 1907.

**918,150.**

**Patented Apr. 13, 1909.**

3 SHEETS—SHEET 1.

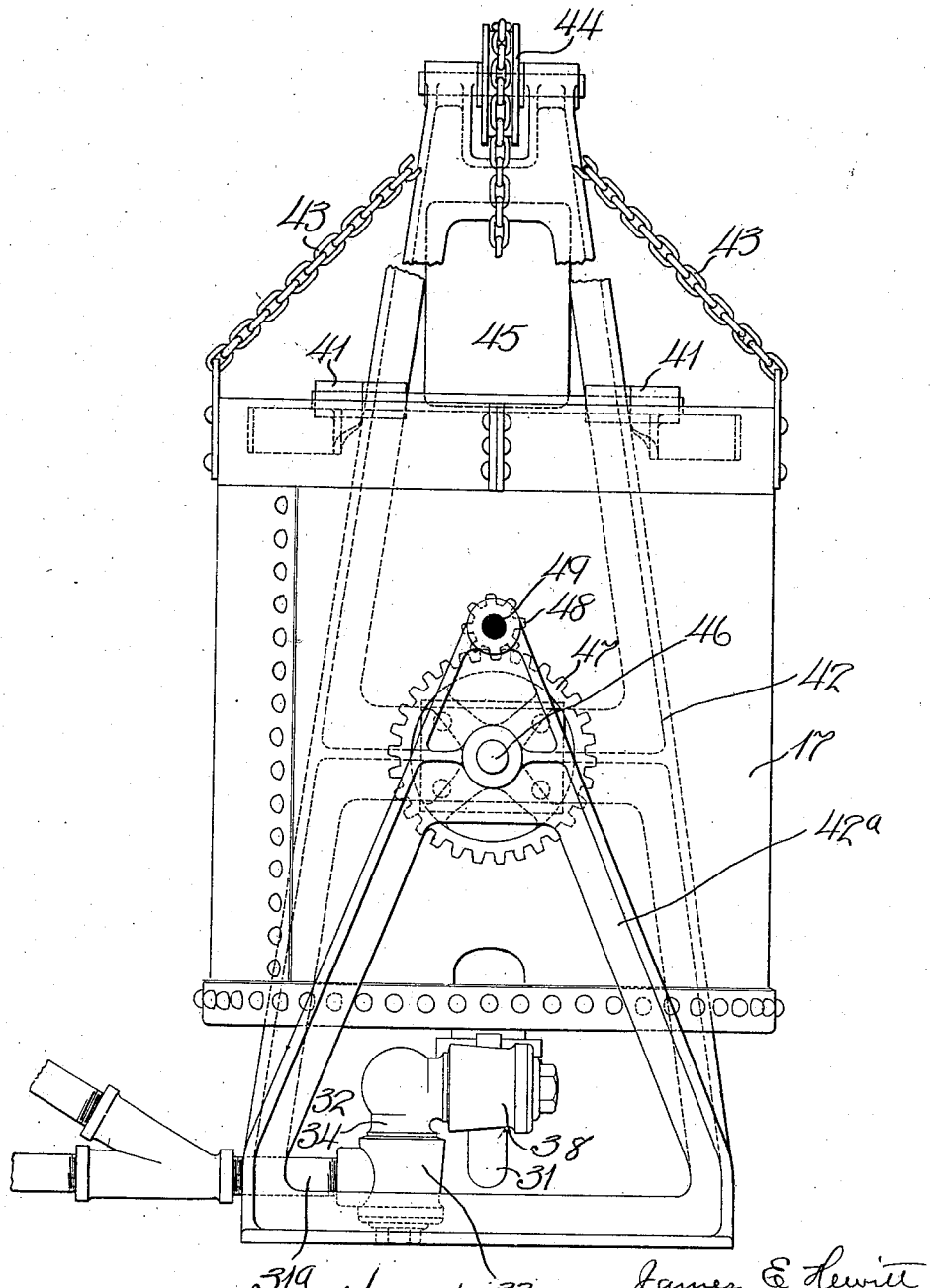



Fig. 1.

WITNESSES:

Ralph Lancaster

Frank L. Stubbs.

James E. Hewitt
INVENTOR.

BY W. B. Hutchinson.
ATTORNEY.

THE NORRIS PETERS CO., WASHINGTON, D. C.

J. E. HEWITT.

MELTING FURNACE.

APPLICATION FILED SEPT. 27, 1907.

**918,150.**

Patented Apr. 13, 1909.

3 SHEETS—SHEET 2.

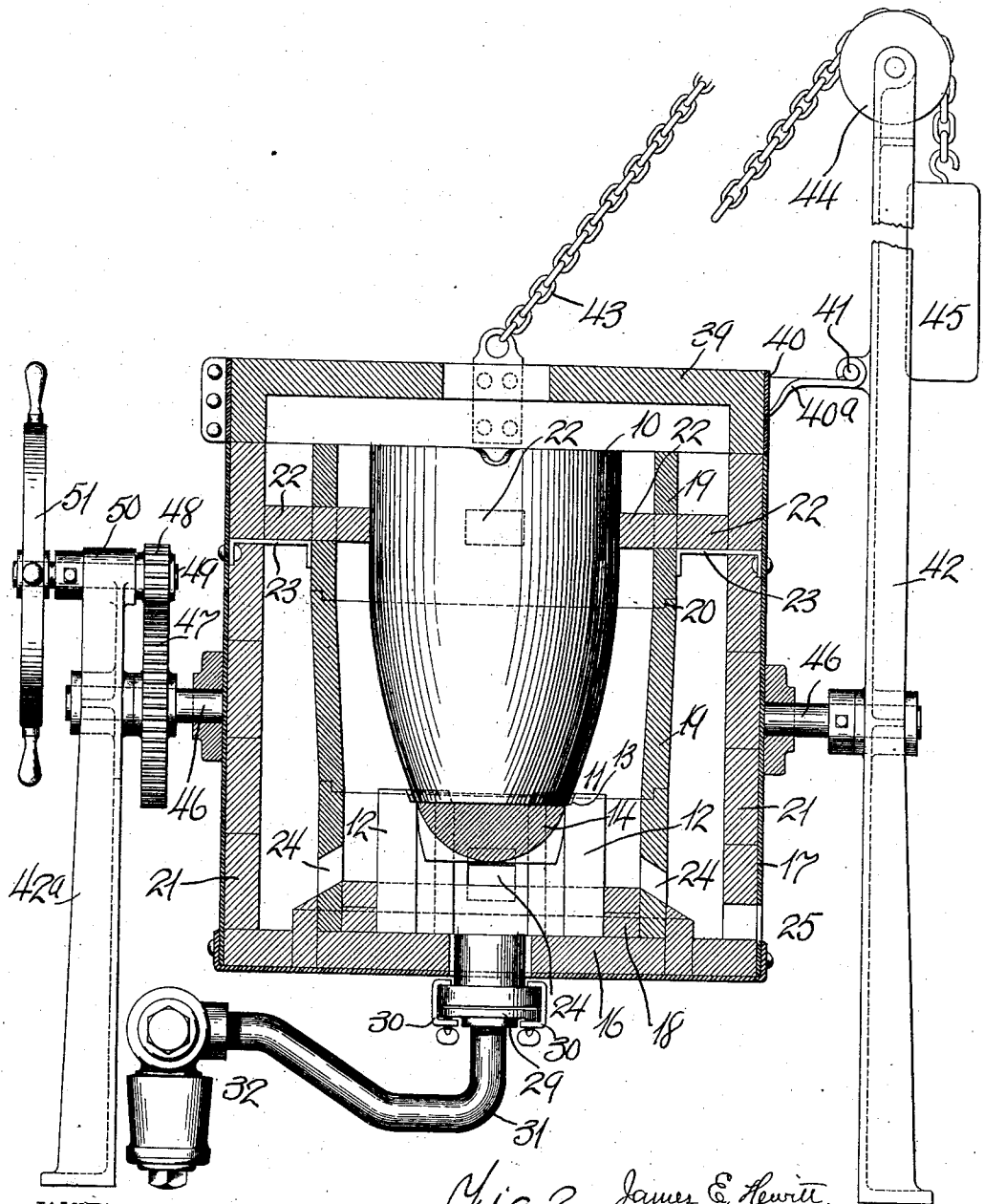



Fig. 2.

WITNESSES:

Ralph Lancaster

Frank L. Stutts.

James E. Hewitt,

INVENTOR.

BY W. D. Hutchinson.

ATTORNEY.

THE NORRIS PETERS CO., WASHINGTON, D. C.

J. E. HEWITT.

MELTING FURNACE.

APPLICATION FILED SEPT. 27, 1907.

**918,150.**

Patented Apr. 13, 1909.

3 SHEETS—SHEET 3.

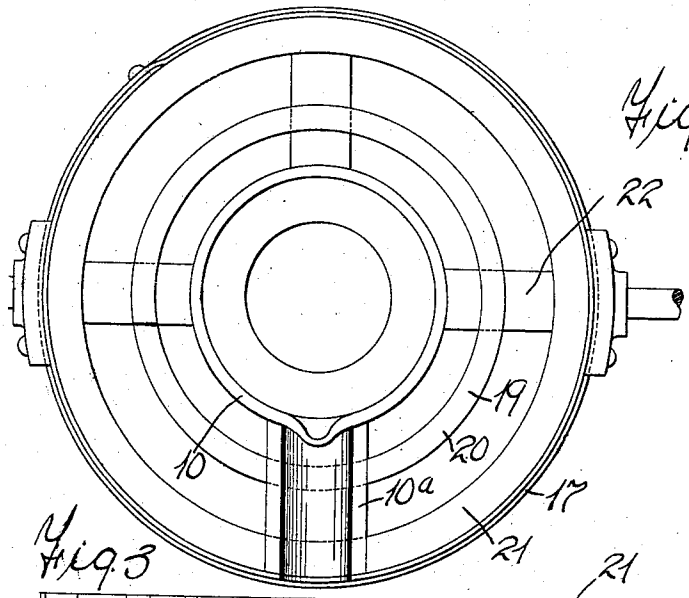



Fig. 3

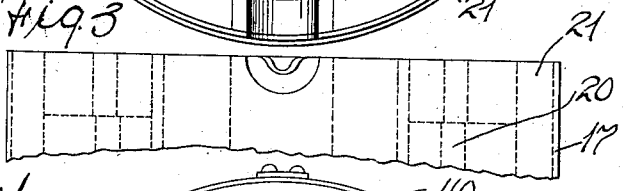



Fig. 4.

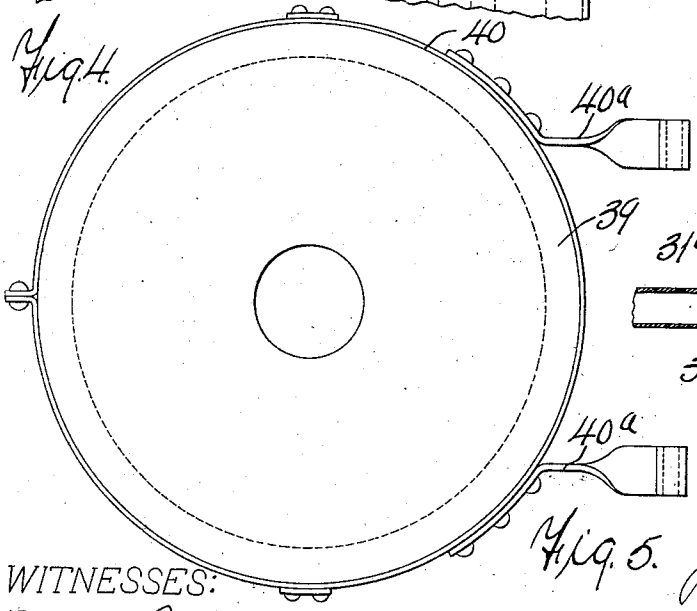



Fig. 5.

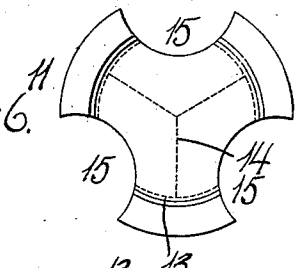



Fig. 6.

Fig. 7.

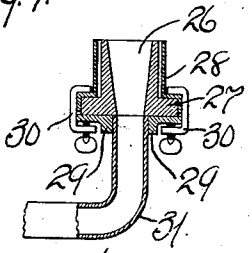



Fig. 8.

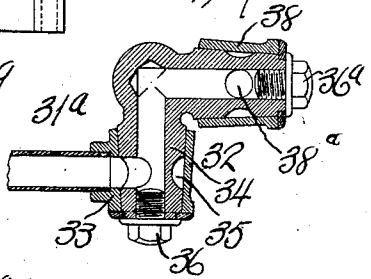



Fig. 9.

WITNESSES:

Ralph Lancaster

Frank L. Stubbs.

James E. Hewitt.

INVENTOR.

BY W. D. Hutchinson,

ATTORNEY.

THE NORRIS PETERS CO., WASHINGTON, D. C.

# UNITED STATES PATENT OFFICE.

JAMES E. HEWITT, OF NEWARK, NEW JERSEY, ASSIGNOR OF ONE-FOURTH TO CHRISTIAN FRANZ, OF NEWARK, NEW JERSEY.

## MELTING-FURNACE.

No. 918,150. Specification of Letters Patent. Patented April 13, 1909.

Application filed September 27, 1907. Serial No. 394,804.

*To all whom it may concern:*

Be it known that I, JAMES E. HEWITT, of the city of Newark, county of Essex, and State of New Jersey, have invented a new and useful Improvement in Melting-Furnaces, of which the following is a full, clear, and exact description.

My invention relates to improvements in melting furnaces, and especially to that class of furnaces which melt brass, copper, composition metals, and other metals.

My invention is further intended as an improvement on furnaces which use oil and gas or their combinations, as fuel. In many of such furnaces it is the practice to admit the fuel at the side, and the crucible in which the metal is melted is often insulated by layers of fire brick. My invention is intended to improve on this type of furnace and to provide means for admitting the fuel directly beneath the pot or crucible, to provide a suitable insulation between the inner combustion chamber and the shell of the furnace, to the end that all the heat may be utilized for melting, and further, to arrange the parts mechanically so that the furnace can be economically made, easily managed, and operated so as to produce a more satisfactory and economical result than furnaces heretofore used for the purpose.

With these ends in view my invention consists of a melting furnace, the construction and operation of which will be hereinafter described and the novel features claimed.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar reference characters indicate corresponding parts in all the views.

Figure 1 is a side elevation of a furnace showing my improvements. Fig. 2 is a vertical cross-section of the furnace. Fig. 3 is a plan view thereof with the cover removed. Fig. 4 is a broken side elevation of the top part of the furnace. Fig. 5 is a plan view of the cover. Fig. 6 is a plan view of the supporting block on which the crucible rests. Fig. 7 is a side elevation of the crucible block. Fig. 8 is a detail sectional view of a form of burner adapted for use with the furnace, and Fig. 9 is a detail longitudinal section of one of the joints of the fuel pipe.

The furnace uses a crucible or pot 10, which can be of the usual kind, but instead of resting on an ordinary block or support and having the fuel admitted at the side, it is sustained on a hollow block 11 which has suitable leg portions 12, and which has at the top a seat 13 on which the crucible rests. The top part of the block immediately beneath the seat 13, is convex on the under side, and shaped to distribute the rising heat and products of combustion to the sides and to the openings or ports 15, which are best shown in Fig. 6, and which are formed by cutting away the sides of the block. There can be any necessary number of these ports or openings, but I find that three are sufficient for good results. The block 11 rests on the bottom 16 which is arranged substantially as usual in a shell 17, and is of fire brick or other suitable heat resisting and insulating material. The bottom part of the block 11 is also preferably incased in and steadied by a hearth 18, also preferably of fire brick, and rising from this hearth and encircling the crucible 10, is a wall 19 of fire clay or other suitable substance, this wall being preferably made up in sections which fit together by matched joints 20 as shown best in Fig. 2. The shell 17 is lined with fire-brick 21, or with similar insulating material, and it will be seen that a substantial air space is left between the parts 19 and 21, thus forming an excellent insulation for heat and preventing loss by radiation. It will be observed that the inner wall 19 forms a combustion chamber within it, and that this combustion chamber is, as stated, thoroughly insulated. The crucible rests on the seat 13 of the block 11, and is steadied near the top by the staying blocks 22, which are preferably fire clay, which are supported by brackets 23 attached to the shell 17 and abutting against the wall 19, and thus the brackets serve the double purpose of supporting the blocks 22 and spacing the wall 19 with reference to the wall 21.

Leading through the wall 19 at necessary points, and preferably just above the hearth 18, are openings or ports 24, so that in case a crucible breaks, the metal can run out through the openings 24 and also out through the opening 25 which leads through the lining 21 and shell 17. This opening 25 is large

enough so that in case of an accident of the kind stated, the slag can also be raked out through it.

The burner used in connection with the furnace can be of any kind suitable for burning gas or oil, or gaseous and oily combinations, and I have shown a burner 26 with a flaring mouth, and with flanges 27, and the burner is incased in a casing or sleeve 28 corresponding to the shape of the burner, and the flange 27 rests upon a collar 29 of the feed pipe 31, while the parts, that is the burner, its casing and the collar, are held together by suitable clamps 30. The burner extends through the bottom wall 16 of the furnace, and the clamps 30 by striking the furnace bottom, prevent the burner from being shoved up in too far. The pipe 31 connects with a supply pipe 31ª by means of a joint 32 which can turn in two directions, thus providing for the necessary adjustment, but this matter is not claimed in detail. As shown the joint has a sleeve 33 connecting with the pipe 31ª and receiving one end of the elbow 34, which has a port 35 to connect with the pipe 31, and the parts are held together by a bolt 36. A similar sleeve 38 covering ports 38ª, connects with the pipe 31, and the parts are held together by a bolt 36ª. Any other suitable joint can be substituted for that shown, and any sort of fuel suitable for the purpose can be used.

It will be seen that when the fuel enters the hollow block 11, it impinges on the part 14 of the said block, and is deflected by the said part through the openings 15 and up around the crucible so that excellent space for combustion is provided, and the heat being insulated as already shown, does its work without waste on the crucible and its contents.

The furnace is provided with a suitable cover 39, for which no novelty is claimed, and this is lined with fire brick or its equivalent and has a band 40 encircling it, to which are attached the leaves 40ª which are hinged as shown at 41 to one side 42 of the supporting frame. The cover is connected by chains 43 with the counter-balance 45, and one of the chains runs over a guide pulley 44. This arrangement is substantially as usual and is not shown in detail nor claimed.

To provide for easy manipulation, the furnace is hung on trunnions 46, one of which is journaled in the side frame 42 and the other in the shorter frame 42ª, and one of the trunnions is connected by a gear 47 and pinion 48 with the shaft 49, which is journaled as shown at 50 and has a hand-wheel 51. The furnace is tipped for pouring the metal, and for convenience an extension spout 10ª is arranged beneath the spout of the crucible, as shown best in Fig. 3. This arrangement just described for tipping the furnace, is not claimed as new, and instead of the mechanism shown, any suitable tipping means can be used.

The essential features of my invention are comprised within the shell 17, and the invention lies chiefly in the manner of supporting the crucible, insulating the inner combustion chamber, and the means for admitting the fuel directly beneath the crucible and for distributing it as stated.

Obviously the furnace can be made in any usual design, of the required size, and can be provided with any preferred form of burner, support, or other accessories, without affecting the principle of the invention. Moreover, for small uses, the furnace need not be made to tip, but the combustion chamber and supporting block can be used as shown.

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

1. A melting furnace comprising a shell, an inner combustion chamber separated from the shell by an air space, and a crucible supporting hollow block in the chamber bottom, said block having a seat to support a crucible, side openings, and convex top walls arranged to deflect the fuel and products of combustion to the said openings.

2. In a furnace of the kind described, the crucible support, comprising a hollow block having side openings, a seat in the top to receive the crucible, and a top part convex on the under side and arranged to deflect fuel through the side openings.

3. A furnace comprising an outer shell, an inner combustion chamber formed of separable partitions having approximately horizontally disposed joints, said combustion chamber having its walls separated from the shell by an air space, crucible sustaining blocks extending inwardly from the shell near the upper end of the combustion chamber, and a hollow crucible sustaining block in the chamber bottom, said block having side openings, the top part of the said block having a convexed under side for directing the products of combustion to the openings in said block.

4. A furnace comprising an outer shell, an inner combustion chamber formed of separable partitions having approximately horizontally disposed joints, said combustion chamber having its walls separated from the shell by an air space, crucible sustaining blocks extending inwardly from the shell near the upper end of the combustion chamber, a hollow crucible sustaining block in the chamber bottom, said block having side openings, and means for directing fuel into the block.

5. A furnace comprising an outer shell and an inner combustion chamber, said inner combustion chamber being formed of ver-

tically separable sections, a crucible supporting block having side openings for the passage of fuel, the top of said block being convexed on its under side and arranged to deflect fuel through the side openings.

6. A furnace comprising an outer shell, an inner combustion chamber, a hearth in the combustion chamber, a crucible support held by the hearth, said crucible support having openings in its side, the top of said crucible support having a convexed under surface for directing products of combustion to said openings.

JAMES E. HEWITT. [L. S.]

Witnesses:
CHARLES J. KIERAN,
JOHN A. ROBBINS.