

E. S. DAVIS.
MELTING FURNACE.
APPLICATION FILED MAY 28, 1912.

Patented Nov. 26, 1912.

2 SHEETS-SHEET 1.

1,045,528.

Fig. 1.

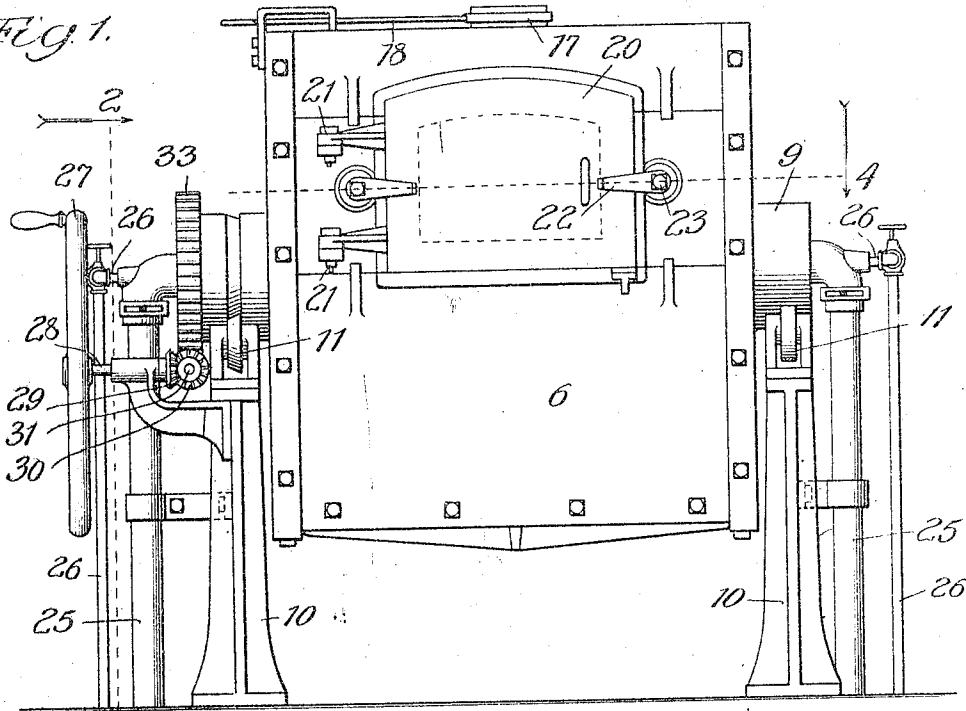
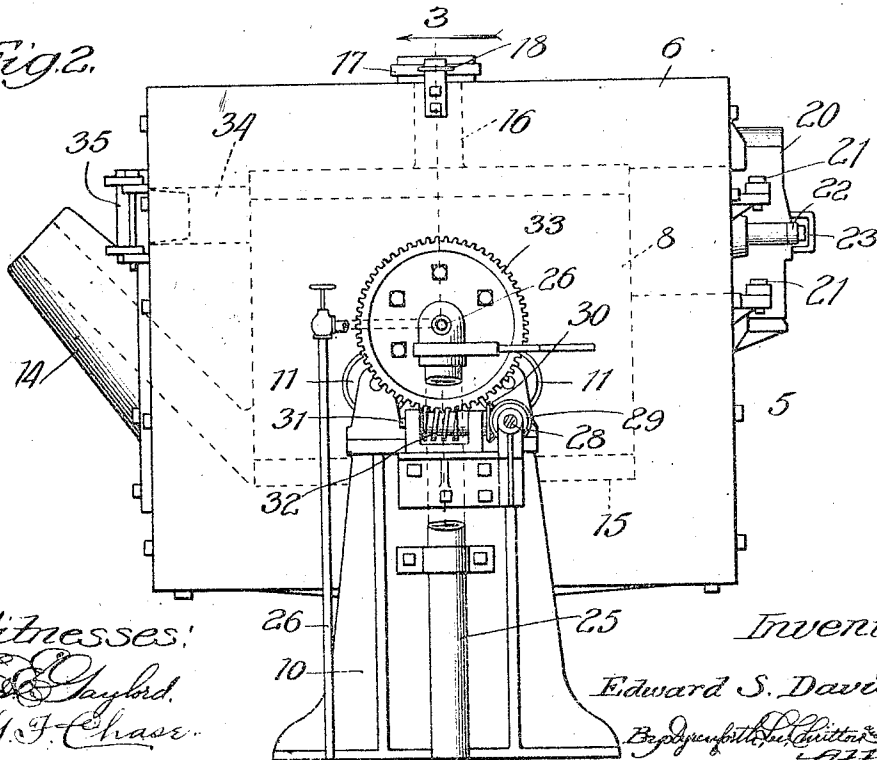


Fig. 2.



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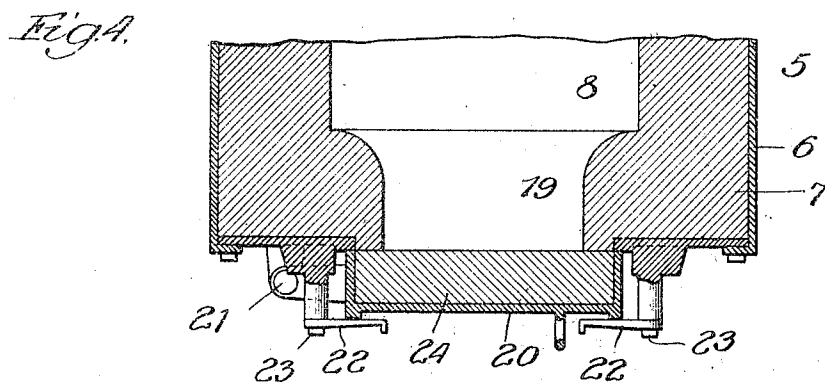
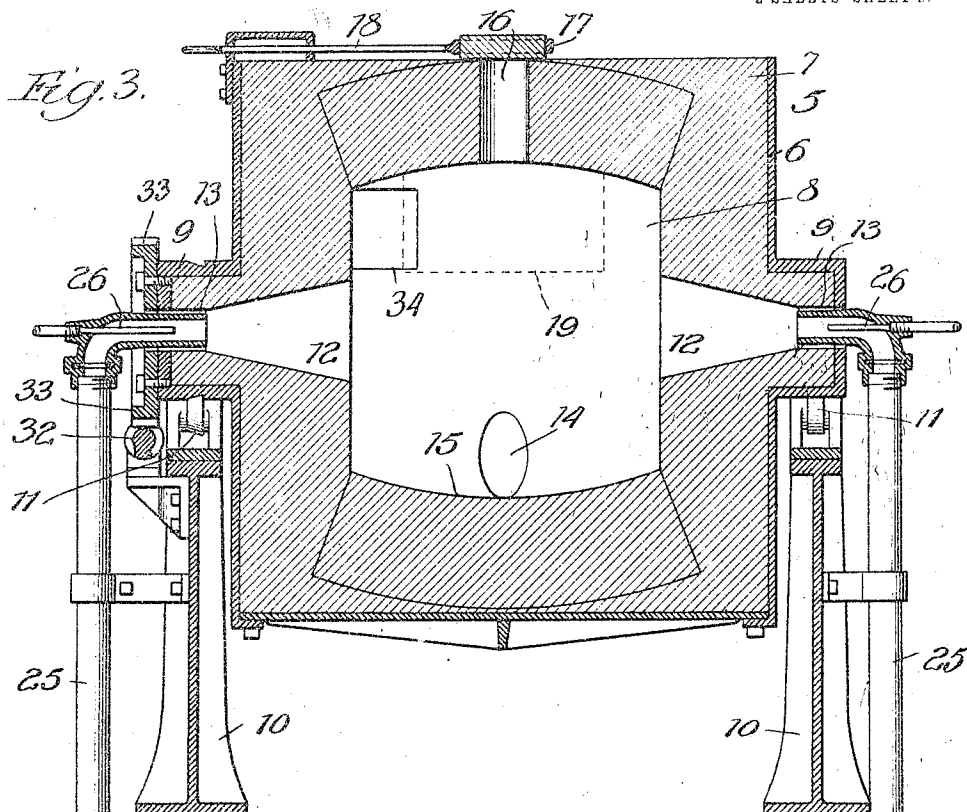
Edward S. Davis,
By J. S. Davis, Attorney.

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UNITED STATES PATENT OFFICE.

EDWARD S. DAVIS, OF EVANSTON, ILLINOIS.

MELTING-FURNACE.

1,045,528.

Specification of Letters Patent.

Patented Nov. 26, 1912.

Application filed May 28, 1912. Serial No. 700,165.

To all whom it may concern:

Be it known that I, EDWARD S. DAVIS, a citizen of the United States, residing at Evanston, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Melting-Furnaces, of which the following is a specification.

My invention relates to improvements in melting furnaces for use, more particularly, for melting non-ferrous metals and of the type known as tilting furnaces, wherein provision is made for tilting the furnace during the operation of melting the metal to a position in which the base of its pouring-spout is uncovered, in order that the spout may be heated and thus prevent the metal from chilling when it is poured from the furnace through the spout.

Furnaces of this type as hitherto constructed present a number of disadvantages, chiefly among which is the necessity for the charging thereof at the top of the furnace, which is objectionable, especially as the furnaces are oftentimes of considerable height, and thus elevated platforms are required to be used by the workmen in charging the furnaces, the workmen are thus required to work above the latter, and the pouring-floor and charging-floor are not definitely separated, with the manifest objections. Furthermore, the shapes in which prior constructions of furnaces of this type have been provided are such as to prevent the use of standard forms of lining sections, and the method of heating employed is such as to prevent the securing of the maximum effectiveness of the fuel, and produces oxidation of the metal being operated on, to an objectionable degree.

My object is to provide improvements in furnaces of the type above referred to to the end of overcoming the above-stated objections, thereby reducing the cost of construction of the furnaces and repair and replacement of the linings thereof, permitting the furnaces to be charged from a lower level than is possible as hitherto provided, and preferably at such a level as will permit the workmen to charge the furnaces from the floor, providing for the separation of the pouring-floor from the charging-floor, and securing greater efficiency from the fuel

used without producing objectionable oxidation of the charge.

Referring to the accompanying drawings—Figure 1 is a view in rear elevation of a furnace constructed in accordance with my invention. Fig. 2 is a section taken at the line 2 on Fig. 1, and viewed in the direction of the arrow. Fig. 3 is a section taken at the line 3 on Fig. 2, and viewed in the direction of the arrow; and Fig. 4, a broken plan section taken at the line 4 on Fig. 1, and viewed in the direction of the arrow.

The furnace proper is represented at 5 and is shown as formed of a metal shell 6 of generally rectangular form lined, as represented at 7, with refractory brick to afford a melting chamber 8. The shell 6 is provided at opposite sides with laterally projecting, lined, tubular extensions 9 forming hollow trunnions, upon which the furnace proper 5 is adapted to be supported, to be rocked back and forth, as hereinafter described, on a frame formed of a pair of standards 10 spaced apart and provided at their upper ends with rollers 11 journaled thereon and spaced apart, and upon which the furnace 5 is supported at its trunnions 9 on said frame, the lining 7 being so formed as to provide flaring openings 12 there-through which communicate with the chamber 8 and the passages 13 through the trunnions.

At the front side of the furnace 5 is a pouring-spout 14, which is lined with refractory material and opens at its lower end into the central part of the front wall of the chamber 8 close to the floor of said chamber, said floor being concaved transversely of the furnace chamber, as represented at 15 (Figs. 2 and 3). The top of the chamber 8 contains a vent 16 controlled by a damper 17 provided with a handle 18 for manual actuation thereof for the purpose hereinafter explained, the opening represented at 19 and through which the furnace is charged with the metal to be melted, being located in the rear wall of the chamber 8 and controlled by a door 20 hinged to the shell 6, as represented at 21 and adapted to be releasably held in closed condition by lugs 22 pivotally supported on studs 23 secured to the furnace. As shown,

the shell 6 is offset about the opening 19, and the door 20 is lined on its inner side with refractory material, as represented at 24, in order that the metal of said door shall not be subjected to the intense heat in the chamber 8.

The chamber 8 may be heated in any suitable manner, and by any suitable fuel. Oil as the fuel, however, is preferred, and in the drawings I have illustrated the furnace as adapted for use with this kind of fuel. To this end I provide at opposite sides of the furnace air-blast pipes 25, which extend at their open inner ends into the passages 13 in the trunnions, and pipes 26, leading from a supply (not shown) of suitable fuel oil, under pressure, and extending at their discharge ends into the open ends of the pipes 25. The arrangement of the burners thus provided at opposite sides of the furnace causes jets of flame to be introduced into the chamber 8 from opposite sides thereof, the oppositely-directed jets of flame meeting at substantially the center of the chamber 8 and by their impingement against each other deflecting the flame both upwardly and downwardly, thus producing a reverberatory action of the flame in the chamber, whereby the metal charged therein, as hereinafter described, is highly heated to melt it without undue oxidation thereof. The operation of the furnace is as follows: As is the common practice in operating furnaces of this type, the metal to be melted is introduced into the chamber 8 in small quantities from time to time as the melting progresses, until the chamber 8 is charged with the requisite quantity of metal. After each successive charging, as stated, the furnace is tilted on its trunnions 9, as by means of a hand-wheel 27 fixed on a shaft 28 journaled on one of the uprights 10 and carrying a bevel pinion 29 meshing with a similar pinion 30 fixed on a shaft 31 carrying a worm 32 meshing with a worm wheel 33 secured to one of the trunnions, to cause the lower end of the spout 14 to be uncovered by the metal charged into the chamber and thus permit the flame in the latter to discharge through the spout to heat it, in order that the metal, while being poured from the furnace, shall not be chilled. The furnace is charged with the metal to be melted, as stated, through the opening 19, the operator, previous to each charging operation, tilting the furnace back to horizontal position and opening the damper 17 to cause the flame and gases to vent from the chamber 8 while charging takes place.

It is desirable in the manufacture of certain alloys that the metal in molten condition be puddled, and to permit this to be done conveniently I provide an opening 34 in the front wall of the chamber 8, controlled by a hinged door 35, through which opening the operator may introduce a suitable puddling-tool into the furnace for the purpose stated.

The advantages of my improved furnace will be manifest. The provision of the charging-opening 19 in the rear wall of the chamber 8 enables the workmen to charge the latter with metal by standing on the floor on which the furnace is supported, and without requiring them to stand over the furnace, and furthermore widely separates the charging-floor from the pouring-floor. The provision of the rectangular-shaped shell permits of the lining thereof with brick of standard shapes, thereby minimizing the cost of construction of the furnace and facilitating and cheapening renewals and repairs; and the provision of the opposed burners, as stated, serves to produce the requisite heat in the chamber 8 without inducing oxidation of the metal and depositing of carbon upon the walls of the chamber.

What I claim as new and desire to secure by Letters Patent is—

1. In a furnace, the combination with a support, of a melting-chamber trunnioned on said support to be tiltable thereon and provided with a pouring-spout at one side, a charging-opening in another side thereof, and a vent, for the purpose set forth.

2. In a furnace, the combination with a support, of a melting-chamber trunnioned on said support to be tiltable thereon and provided with a pouring-spout at one side, a charging opening in its opposite side, and a vent, for the purpose set forth.

3. In a furnace, the combination with a support, of a melting-chamber trunnioned on said support to be tiltable thereon and provided with a pouring-spout at one side, a charging-opening in another side thereof, and a vent in its top, for the purpose set forth.

4. In a furnace, the combination with a support, of a melting-chamber trunnioned on said support to be tiltable thereon and provided with a pouring-spout at one side, a charging-opening in its opposite side, and a vent in its top, for the purpose set forth.

5. In a furnace, the combination with a support, of a melting-chamber trunnioned on said support to be tiltable thereon and formed of a shell of rectangular shape lined with refractory material, said chamber being provided with a pouring-spout and containing a charging-opening, the floor of said chamber being transversely concaved, for the purpose set forth.

6. In a furnace, the combination with a support, of a melting-chamber trunnioned on said support and tiltable thereon, said chamber comprising an outer shell lined with refractory material and containing a damper in its top, a charging-opening in a

side thereof, a removable closure for said opening, a pouring-spout for said chamber in the wall thereof opposite to that containing said charging-opening, and fuel burners extending into said trunnions at opposite sides of said chamber and communicating with the latter for introducing jets of flame into said chamber from opposite sides there-

of for impingement against each other, said chamber containing a puddling-opening in a wall thereof, for the purpose set forth.

EDWARD S. DAVIS.

In the presence of—

NELLIE B. DEARBORN,
RALPH A. SCHAEFER.