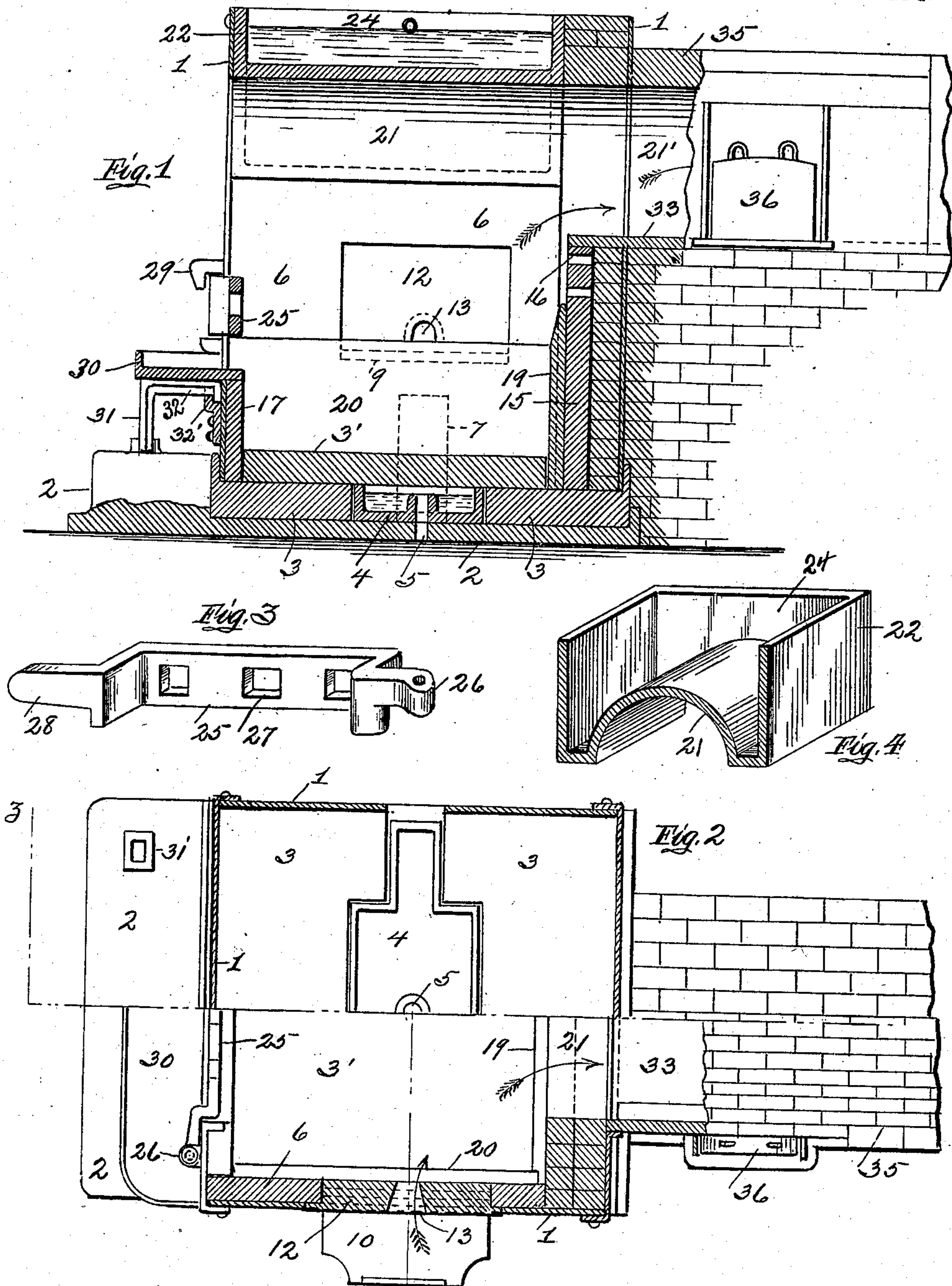


No. 867,861.

PATENTED OCT. 8, 1907.

W. F. WESTLUND.  
KNOBBLING FURNACE.  
APPLICATION FILED MAR. 22, 1906.

2 SHEETS—SHEET 1.



Witnesses:  
*Wm. G. Matter*  
*Joseph Schannemann*

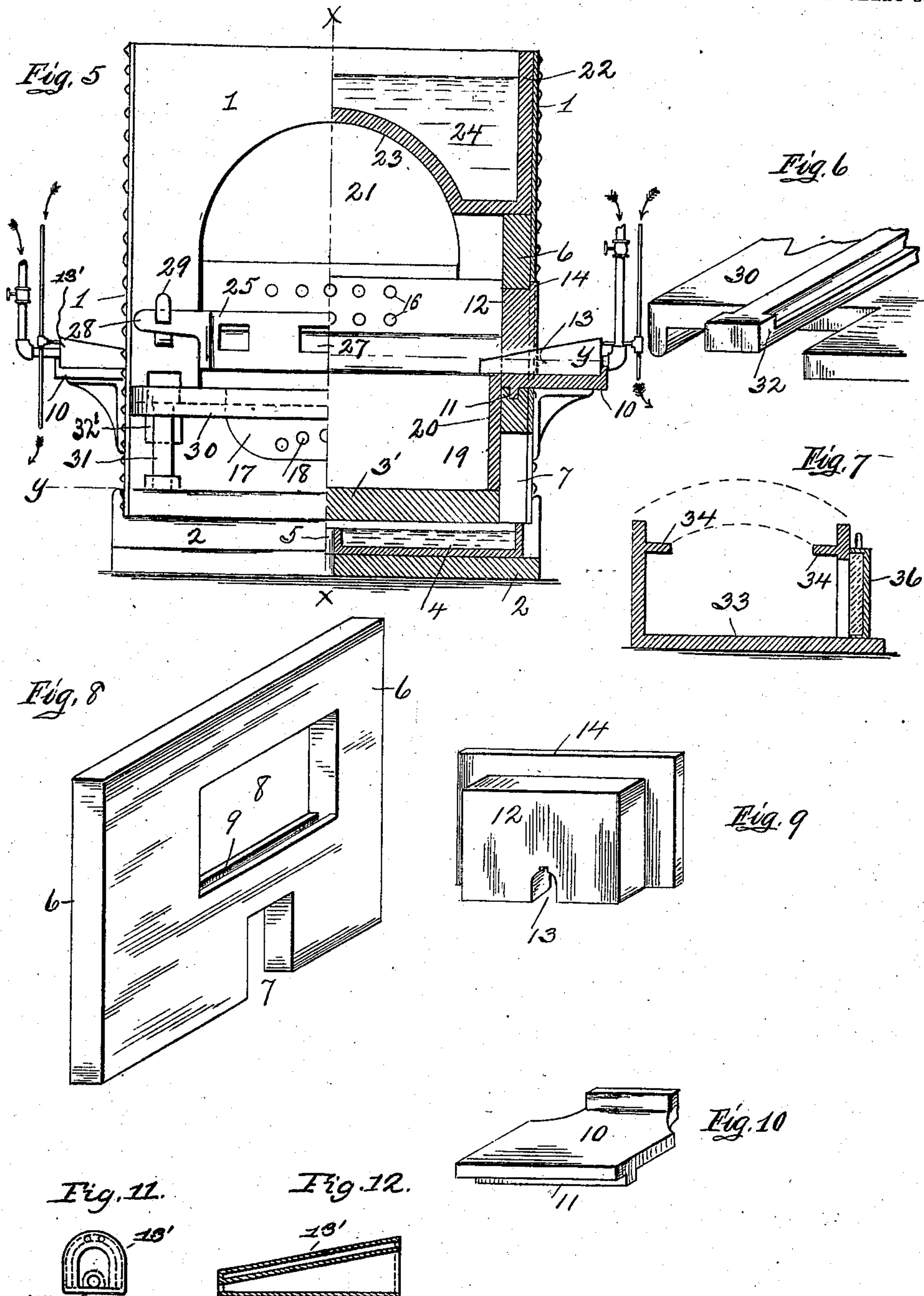
Inventor:  
*William F. Westlund*  
by his attorney  
*M. E. Harrison*

No. 867,861.

PATENTED OCT. 8, 1907.

W. F. WESTLUND.  
KNOBBLING FURNACE.  
APPLICATION FILED MAR. 22, 1906.

2 SHEETS—SHEET 2.



WITNESSES:  
*Wm. G. Walter*  
*Joseph Schannamen*

INVENTOR:  
*William F. Westlund,*  
*by his Attorney,*  
*H. E. Harrison.*



# UNITED STATES PATENT OFFICE.

WILLIAM F. WESTLUND, OF WASHINGTON, PENNSYLVANIA.

## Knobbling-Furnace.

No. 867,861.

Specification of Letters Patent.

Patented Oct. 8, 1907.

Application filed March 22, 1906. Serial No. 307,351.

*To all whom it may concern:*

Be it known that I, WILLIAM F. WESTLUND, a citizen of the United States, residing at Washington, in the county of Washington and State of Pennsylvania, have  
5 invented certain new and useful Improvements in Knobbling-Furnaces; and I do 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, reference  
10 being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

This invention relates to an improved knobbling furnace, or furnace for manufacturing charcoal iron, and  
15 it comprises certain details of construction and combination of parts as will be fully described hereinafter.

In the accompanying drawings:—Figure 1 is a central sectional elevation of my improved knobbling furnace taken on the line  $x-x$ , of Fig. 5, the said furnace being  
20 constructed and arranged in accordance with my invention. Fig. 2 is a sectional plan view taken on the line  $y-y$ , of the same figure. Fig. 3 is a perspective view of the front gate detached from the furnace. Fig. 4 is a reduced perspective sectional view of the top  
25 water-box. Fig. 5 is a front sectional elevation of the furnace taken on the line  $z-z$ , of Fig. 2. Fig. 6 is an inverted perspective view of a portion of the front apron, showing the manner of attaching the same to the outside jacket of the furnace. Fig. 7 is a transverse  
30 sectional elevation of the flue casting, detached from the furnace. Fig. 8 is a perspective view of one of the interchangeable merit or side plates placed at either side of the furnace. Fig. 9 is a similar view of the merit box used in the above mentioned plates. Fig.  
35 10 is a perspective view of one of the twyer plates. Fig. 11 is an end elevation of one of the twyers removed from the furnace. Fig. 12 is a side sectional elevation of the same.

The improved furnace as a whole comprises a fire  
40 chamber having a relatively low front wall and side walls and a relatively high rear wall, the smoke flue leading horizontally from the latter and with a flat bottom.

The improved device further comprises detachable  
45 wall sections bearing upon the relatively low side walls and forming continuations of the same, these side wall sections having transverse apertures to receive twyer aprons. Bearing upon the side wall sections and against the adjacent face of the elevated rear wall and above  
50 the flue leading therethrough is a cover section having vertical sides and an arched bottom and forming a water receptacle.

The front of the furnace above the relatively low front wall and beneath the top section is entirely open,  
55 so that free access is had to the entrance to the flue,

and to the floor of the same. Charging doors are formed in the sides of the flue and communicating with the flat bottom of the same.

The details of the construction will now be more clearly set forth. 60

To construct a knobbling or charcoal iron furnace in accordance with my invention, I form from sheet iron or steel a box-shaped jacket, securely riveted together, open at the top and bottom, and having a large opening at the front, through which the metal in the furnace is  
65 worked, and a lesser opening at the rear to form a flue connection with a suitable draft-stack. This jacket 1, is arranged upon a suitable bed-plate 2, rectangular in form, a portion of which projects beyond the front of said jacket, and formed with a flange at the rear. 70  
Placed upon this bed-plate 2 are heavy cast iron bosh-plates 3, and an intermediate box 4, with central drain 5, the said box being adapted to contain a quantity of water for the purpose of cooling the bottom plate 3' of the furnace if the operator so desires. 75

Arranged over the water box 4, is the bottom plate 3' of the furnace, and at each side of the same are placed in a vertical position, heavy side plates 6, the said side plates being formed with rectangular openings 8, the bottom edge of which is grooved (9,) for the reception  
80 of a flange 11 formed on the underside of twyer aprons 10, which are locked and held in a horizontal position by the insertion of plates 12, formed with flanges 14, the said aprons being used to support the twyers which furnish the hot or cold air-blast to the fire chamber of  
85 the furnace. These twyers 13' are of ordinary form, are water cooled and project a short distance into the fire chamber.

At the rear of the fire chamber is a heavy plate 15, having a series of air-openings 16 at the top, and at the  
90 front of said chamber is a cinder plate 17, through which openings 18 are formed to permit the cinder formed during the process of purifying the iron to run off. This fire chamber is provided at the rear with a lining 19 for the protection of the rear plate 15, and  
95 with lining 20 at either side to preserve the merit plates 6. Placed upon and supported by the side plates 6 is a box-shaped casting 22, open at the top and formed with a longitudinal arch 21 leading to the chimney flue 21', the said box forming a receptacle 24, in  
100 which water is constantly kept, making a water cooled top for the furnace.

Removably attached to the front of the jacket 1 is a working apron 30, which comprises a platform formed with suitable legs 31, and means 32 for in-  
105 terlocking with cleats 32' attached to said jacket. Above this front apron 30 and hinged (26,) across the open front is a piece 25, which serves to keep the stock confined within the fire chamber, the said piece or semi-charging door being provided with poke openings 110



27, and with a latch 28, adapted to engage with a rotatable bolt 29, by means of which the said door may be held closed.

The flue 21' leading to the draft stack is formed by a casting, comprising a flat bottom 33, vertical walls with inwardly projecting horizontal flanges 34, which support the brick arch 35, one of the vertical walls of said flue-casting being formed with an opening or charging door 36. This construction of a flue as above described will admit of a charge being placed on the bottom of the flue and gather such degree of heat from the waste products of combustion passing over the same, during the melting of the metal or charge in the fire chamber, after which time the said melted charge is removed from the fire chamber, the charge in the flue raked into the fire chamber and another put in its place.

In the operation of the furnace, as above described, from three to five hundred weight of metal constitutes a charge, which can be converted into charcoal iron by the use of from thirty to thirty six bushels of charcoal in about forty five minutes, at which time the charge is worked in the usual manner and removed.

A number of these furnaces have been built and are in successful operation in this vicinity, and it has been demonstrated that the iron manufactured is equal to the best grade of "Swedish iron."

By the construction and arrangement of the furnace, the fire chamber is formed with removable sections, which may be removed when defective and replaced by others, the large plates 6, at the side being interchangeable from one side of the fire chamber to the other.

Various slight modifications and changes may be made in the details of construction without departing from the spirit of the invention. Therefore I do not wish to confine myself to those shown and described, but wish to claim all such modified forms as would come properly within the general scope of the invention.

1. A knobbling furnace comprising a fire chamber having relatively low front and side walls and an elevated rear wall with the smoke flue leading through said rear wall and provided with a horizontal bottom and with charging doors communicating with said flues, wall sections detachably engaging the side walls of said furnace and having means for receiving twyer devices, a top sec-

tion bearing upon said side wall sections and against the elevated rear wall section and above the flue aperture thereof.

2. A knobbling furnace comprising a fire chamber having relatively low front and side walls and with an elevated rear wall having a smoke flue leading therethrough and provided with a horizontal bottom and with charging doors communicating with said flue, wall sections detachably bearing upon said side walls and provided with means for supporting twyer devices, a top section provided with vertical sides and an arching bottom and forming an open water receptacle and bearing upon said side wall sections and against said elevated rear wall and above the flue opening therein.

3. A knobbling furnace comprising a fire chamber having a relatively low front wall and a relatively high rear wall with the smoke flue leading through the rear wall and formed with a horizontal bottom, and with charging doors communicating with the flue, a detachable top section bearing upon the side walls and against the elevated rear wall and above the flue opening therein, whereby a relatively large opening in front of the furnace is produced with the entrance to the flue and the flat bottom of the same accessible through said opening.

4. A knobbling furnace comprising a fire chamber having a relatively low front and a relatively high rear wall, with the smoke flue leading therethrough and formed with a horizontal bottom and with charging doors communicating with the flue, the top section bearing upon the side walls and against the rear wall and above the flue opening therein and formed with vertical sides and an arched bottom constituting an open water receptacle.

5. A knobbling furnace comprising a fire chamber formed in detachable and interchangeable sections, a detachable top to said fire chamber having means for supporting a non-heat conducting element, twyer devices associated with said fire chamber, a flue leading from said chamber and having a flat bottom, and means for depositing charges of metal in the said flue in position to be transferred to the fire chamber.

6. A knobbling furnace of the class described, comprising a metal jacket, a fire chamber disposed within said jacket and formed of detachable and interchangeable sections, a detachable cover to said chamber and constituting a receptacle adapted to support a non-heat conducting element and with an arched lower portion above the fire in the chamber, a smoke flue leading from said fire chamber and having a charging door, twyers associated with said fire chamber, and means for maintaining the charge in said fire chamber.

In testimony whereof, I affix my signature, in presence of two witnesses.

WILLIAM F. WESTLUND.

Witnesses:

WM. G. WALTER,

JOSEPH SCHANNAMEN.