

T. S. BLAIR, JR.

FURNACE.

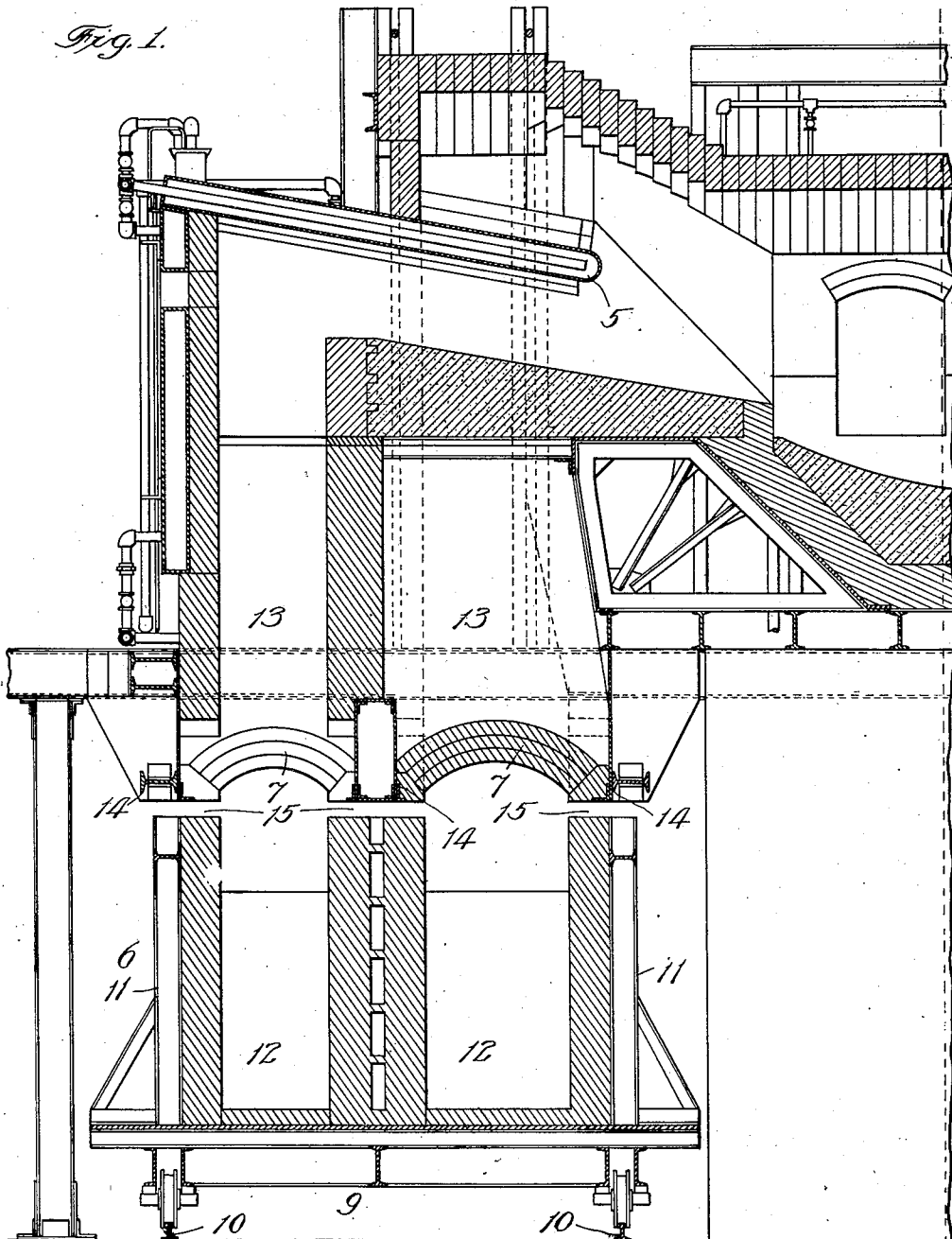
APPLICATION FILED JULY 10, 1911.

1,012,236.

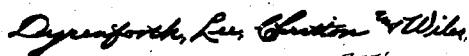
Patented Dec. 19, 1911.

3 SHEETS-SHEET 1.

Fig. 1.



Witnesses:
E. C. Gayles.
G. F. Chase

Inventor: 
Thomas S. Blair, Jr.,
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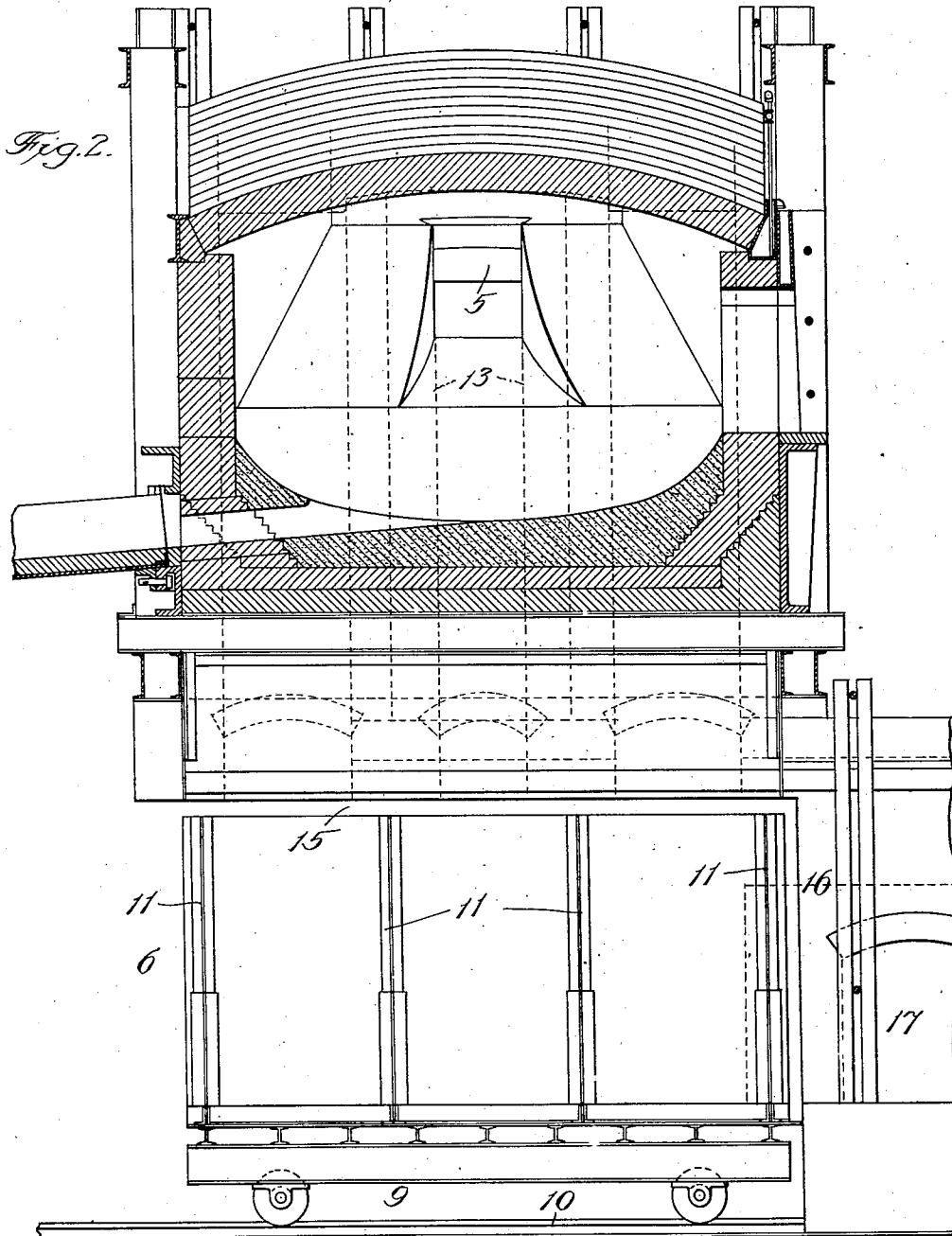
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3 SHEETS—SHEET 2.



Witnesses:
E. C. Gaylord
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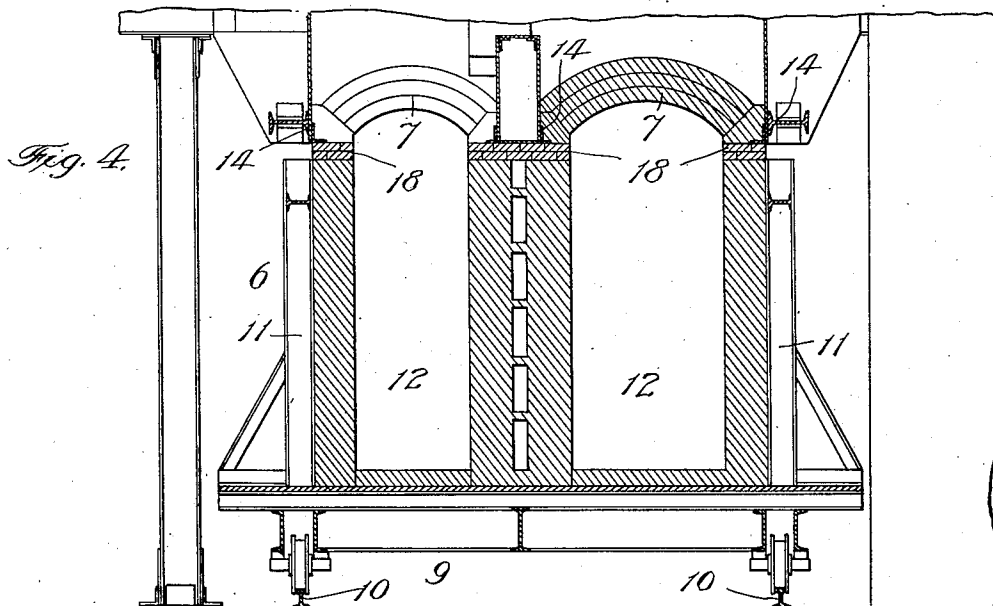
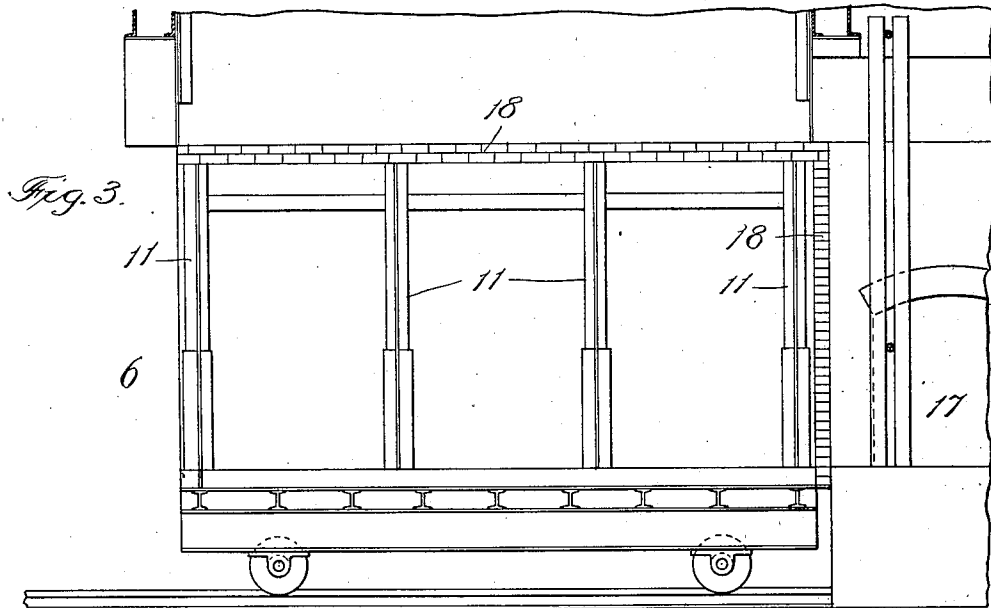
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

THOMAS S. BLAIR, JR., OF ELMHURST, ILLINOIS, ASSIGNOR TO THE BLAIR ENGINEERING COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

FURNACE.

1,012,236.

Specification of Letters Patent.

Patented Dec. 19, 1911.

Application filed July 10, 1911. Serial No. 637,685.

To all whom it may concern:

Be it known that I, THOMAS S. BLAIR, JR., a citizen of the United States, residing at Elmhurst, in the county of Kane and State of Illinois, have invented a new and useful Improvement in Furnaces, of which the following is a specification.

My invention relates to an improvement of the slag-pocket feature of a regenerative metallurgical, and particularly an open-hearth furnace.

In the usual operation of an open-hearth furnace for the manufacture of steel, the resultant filling of the slag-pockets with slag necessitates periodically stopping the operation of the furnace for cleaning out these pockets. This cleaning is not only destructive of the brick-work of the pockets and very expensive in that way, but the necessary interruption for the cleaning purpose in production by the furnace greatly augments the expense by the consequent loss of product. This expense is particularly heavy in the operation of basic furnaces. Attempts have heretofore been made to remedy the difficulties referred to by providing, for collecting the slag, receptacles adapted to be placed for the purpose within the permanent walls of the furnace-structure in position to receive the slag, for removal when filled to be replaced by empty ones. However, such attempts have been found impractical because the slag adheres to the walls of the structure and the receptacles can not be removed without seriously damaging or destroying such walls; and, besides, the temperature in the slag-pockets is altogether too high to permit men to work in them.

I overcome all difficulty in the matter by providing the slag-pocket structure as a removable portion or section of the furnace-structure, whereby it may be readily and, relatively speaking, quickly removed when filled and as readily replaced by an empty one; and this constitutes, generally stated, my invention.

In the accompanying drawings, Figure 1 is a broken view in longitudinal vertical section of one of the two similar ends of an open-hearth furnace provided with my improvement; Fig. 2 is a section on line 2, Fig. 1; Fig. 3 is a view like that presented in Fig. 2 of the slag-pocket in side elevation showing the temporary brick-fillings in the spaces which separate its walls from the ad-

jacent permanent walls of the furnace-structure, and Fig. 4 shows the same with the slag-pocket in cross-sectional elevation.

The furnace, as shown in the drawings for illustrating my improvement, contains, aside from the latter, no features of novelty requiring it to be herein described in detail, although it is represented as equipped with a hollow water-cooled metal hood 5 in accordance with reissued Letters Patent No. 12,939, granted to me April 13, 1909, to supplant the brick arch for separating the air and gas-ports. In this connection it is proper to say, basing the statement on numerous instances of practical demonstration, that a furnace equipped with my said patented invention would remain intact to enable it to be continued in regular operation for an indefinitely-long period were it not for the periodical interruption referred to made necessary for the emptying of the slag-pockets.

The slag-pocket structure 6, according to my improvement, is a complete structure in itself separate from the remainder of the furnace, aside from the slag-pocket arches 7 and their means of support, hereinafter described. It consists, in its preferred form, of a wheeled carriage 9, for convenient moving on a track 10 provided in proper position at each end of the furnace, having metal posts 11, suitably braced, rising at intervals from the carriage-bed to provide a frame-work for the brick walls forming the slag-pockets 12. The lower ends of the port down-takes 13 are provided with suitable metal-binding 14 for supporting the slag-pocket arches 7 at the lower ends of the down-takes, whereby these arches are separate from the slag-pocket walls and not dependent on them for support. The dimensions of the structure 6 are such as to adapt it to fit under the down-takes of the flues, registering its pockets therewith to receive the slag produced by the operation of the furnace and filling out the structure of the latter as when the slag-pockets are formed integral therewith in the usual way. On placing a slag-pocket carriage 6 in position, it leaves a narrow opening 15 between the upper ends of the pocket-walls and the down-take walls and a similar opening 16 between the wall of the flue 17 leading to the regenerative chambers and the adjacent wall of the pocket-structure. These spaces

are then temporarily closed by bricking them up, as represented at 18, to form tight joints connecting the slag-pockets with the port down-takes and with the regenerative chambers.

When it becomes desirable to remove the slag-pockets by reason of the slag which has filled into them, the bricks 18 are knocked in to destroy the bond between the carriage-walls and permanent furnace-walls, but without thereby disturbing any other part of the furnace-structure, when the slag-pot carriage may be withdrawn to be replaced by another; whereupon the spaces 15 and 16 are again bricked up.

Instead of requiring in time, for effecting the removal of the slag and rebuilding the slag-pockets and down-takes, as heretofore, from a week to ten days, with the attendant loss of product of the furnace and that due to the expenditure of a very considerable amount of labor and fuel to bring the furnace back to melting temperature, the whole operation, of removing the slag and restoring the slag-pocket equipment in a furnace in accordance with my improvement, may be accomplished in a few hours, thus also enabling a large portion of the heat of the furnace to be retained, so that the furnace may be gotten back to normal working conditions with very little delay and expenditure of labor and fuel. Moreover, the slag-pockets may be renewed without any loss of time, fuel or labor more than attends the operation of burning out the flues, which is periodically necessary, if the time selected for effecting removal and renewal of the slag-pockets in the manner described be that of burning out the flues.

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

1. The combination with a regenerative furnace, having a furnace port down-take, and a flue leading to a regenerative chamber, of a slag pocket structure forming the connection between the down-take and the regenerative flue, said slag pocket being bodily placeable into and removable from its operative position.

2. The combination with a regenerative furnace, having furnace port down-takes and flues leading to the regenerative chambers, of a slag pocket structure forming the connection between the down-takes and the regenerative flues, said slag pocket structure

being bodily placeable into and removable from its operative position.

3. The combination with a regenerative furnace having a furnace port down-take and a flue leading therefrom to a regenerative chamber, of a slag pocket structure forming the connection between the down-take to the regenerative flue, said slag pocket structure comprising a carriage provided with a slag pocket forming walls and bodily placeable into and withdrawable from its operative position.

4. The combination with a regenerative furnace having a furnace port down-take and a flue leading therefrom to a regenerative chamber, of a slag pocket structure forming the connection between the down-take and the regenerative flue, said slag pocket structure comprising a wheeled carriage having a wall supporting frame rising from its bed with pocket-forming walls in said frame and bodily placeable into and removable from its operative position.

5. The combination with a regenerative furnace having a furnace port down-take, and a flue leading to a regenerative chamber, of a slag-pocket structure forming the connection between the down-take and the regenerative flue, the pocket-forming walls of the slag pocket structure registering with but spaced from the ends of the port down-take walls and those of the adjacent walls of the regenerative flue when the slag-forming pocket is in operative position, and means temporarily filling in said spaces, said slag-pocket structure being adapted to be bodily withdrawable from its operative position.

6. The combination with a regenerative furnace having a furnace port down-take and a flue leading to a regenerative chamber, of a binding about the lower end of the port down-take, and an arch supported on said binding, a slag-pocket forming the connection between the down-take and the regenerative flue with its pocket-forming walls registering with but spaced from the ends of the down-take walls and the adjacent walls of the regenerative flue and brick filling in the spaces and forming a temporary joint therewith, said structure being bodily withdrawable from its operative position.

THOMAS S. BLAIR, Jr.

In the presence of—

L. HEISLAR,
R. SCHAEFER.