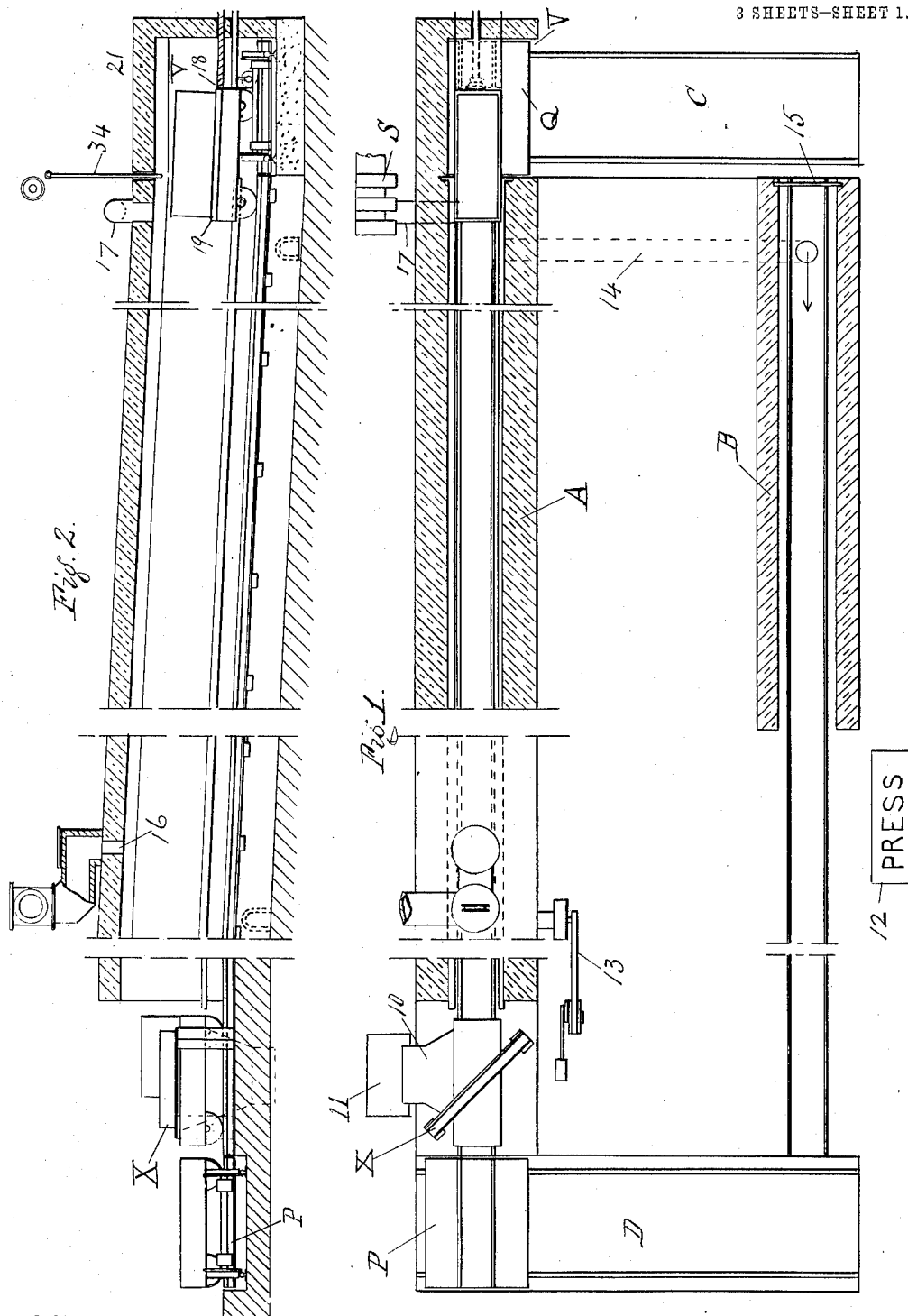


N. V. HANSELL.  
CHANNEL FURNACE.  
APPLICATION FILED NOV. 11, 1910.

1,043,695.

Patented Nov. 5, 1912.

3 SHEETS—SHEET 1.



Witnesses:  
W. E. Keir  
L. H. Grote

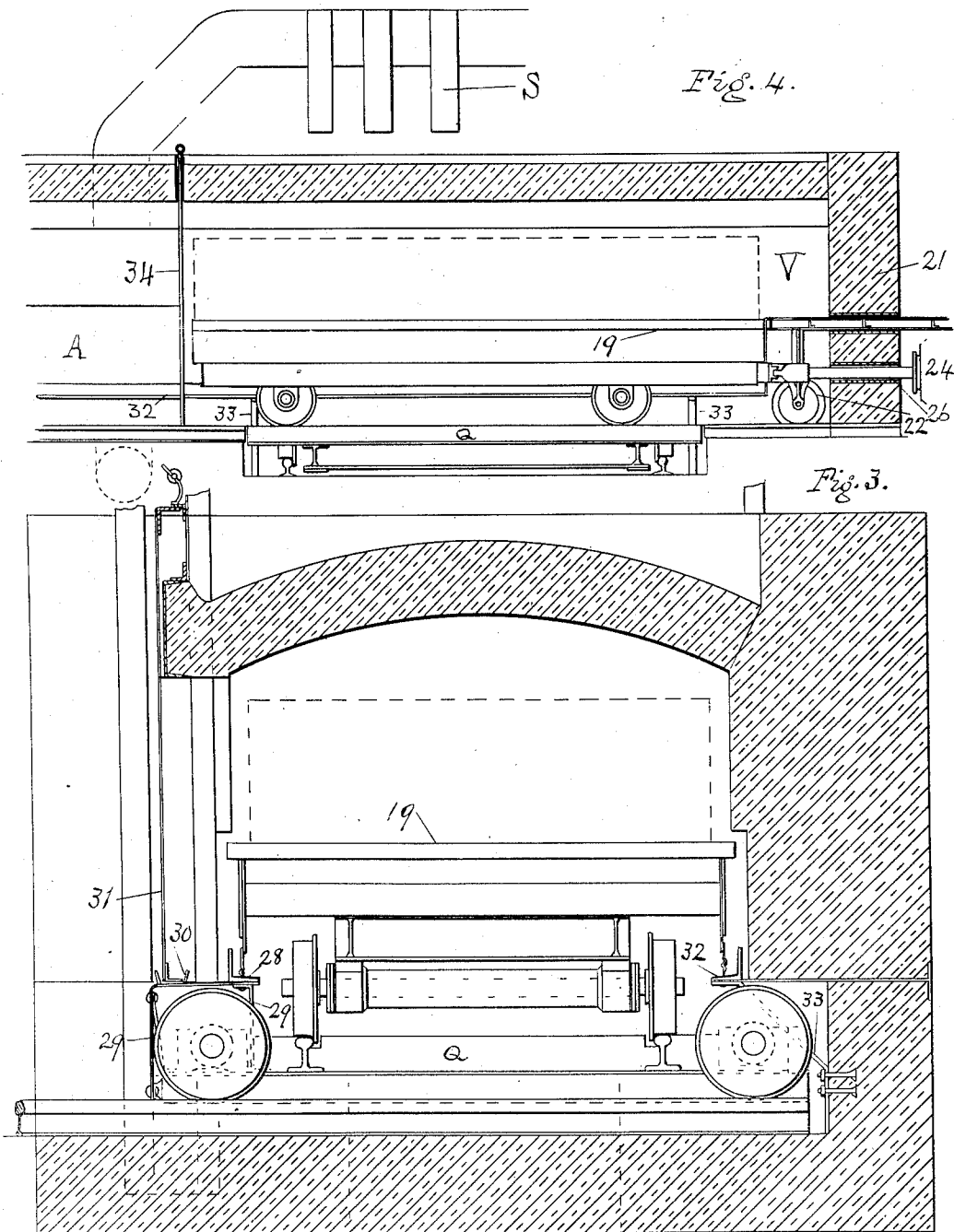
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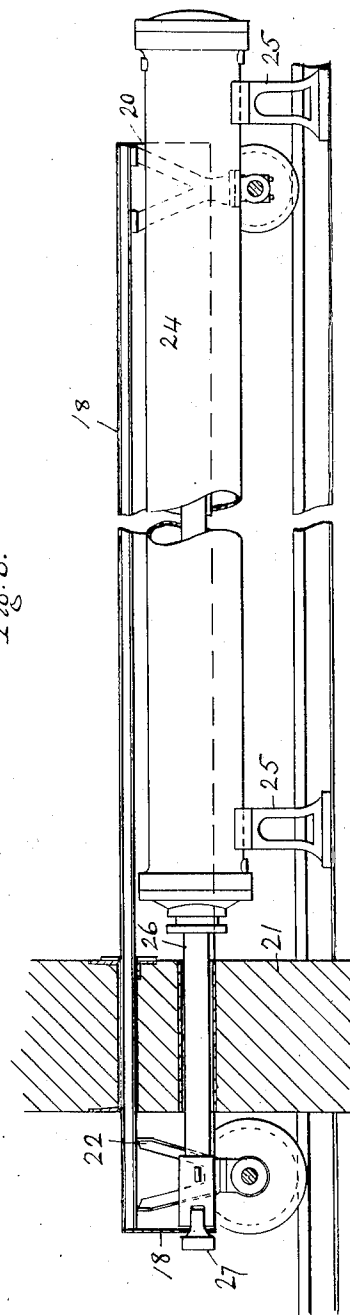
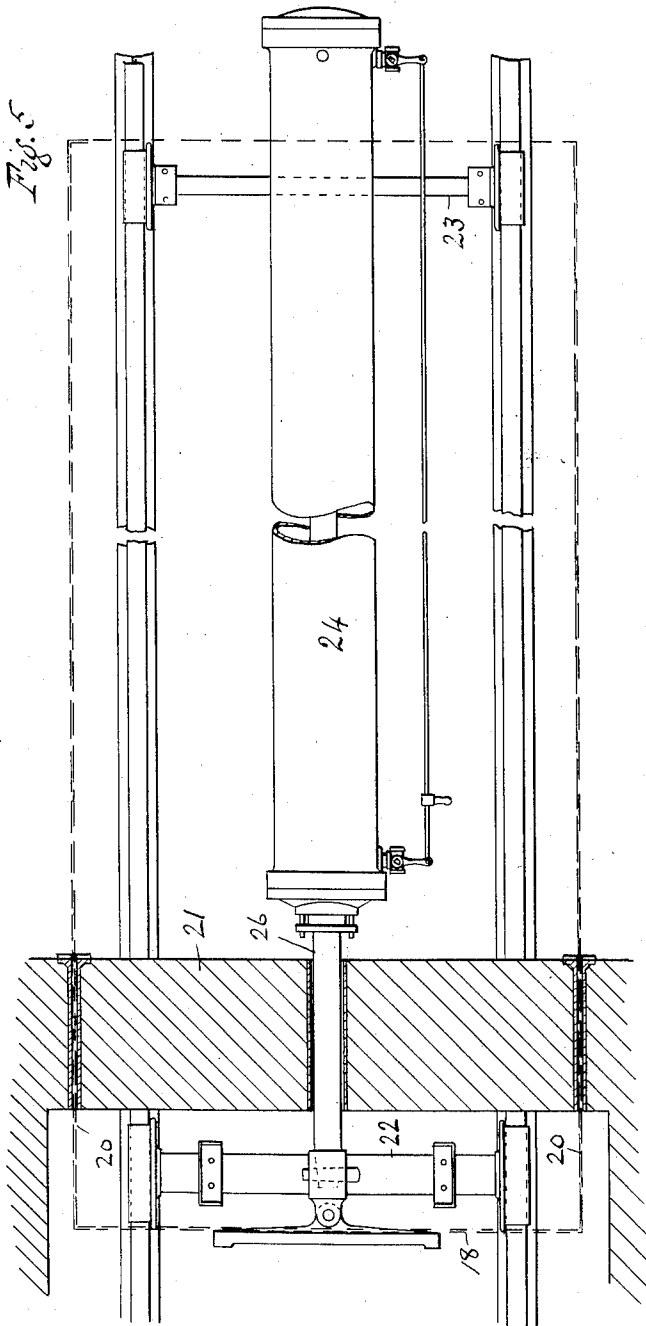
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3 SHEETS—SHEET 3.



Witnesses:  
*W. E. Kier*  
*L. H. Grote*

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*Nils V. Hansell*  
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# UNITED STATES PATENT OFFICE.

NILS V. HANSELL, OF BLOOMFIELD, NEW JERSEY, ASSIGNOR TO AMERICAN GRONDAL COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

## CHANNEL-FURNACE.

1,043,695.

Specification of Letters Patent.

Patented Nov. 5, 1912.

Application filed November 11, 1910. Serial No. 591,856.

*To all whom it may concern:*

Be it known that I, NILS V. HANSELL, a subject of the King of Sweden, and residing at Bloomfield, in the county of Essex and State of New Jersey, have invented a certain new and Improved Channel - Furnace, of which the following is a specification.

My invention relates to furnaces of the channel type and the object of my invention is to improve the same in the features hereafter described and particularly in the method of feeding the same.

In the accompanying drawings, Figure 1 is a broken diagrammatic plan of a furnace installation in which my invention is embodied; Fig. 2 is a broken longitudinal section through the combustion chamber; Fig. 3 is a vertical cross section of the entrance vestibule of the furnace; Fig. 4 is a longitudinal vertical section of the same; Fig. 5 is a horizontal broken section of my improved feed device; and Fig. 6 is a vertical broken section of the same.

In channel furnaces as heretofore constructed, and illustrated in its most generally used form in the Grondal Patent 876,712, it has been customary to load the briquet trucks at a greater or less distance from the furnace and feed the same to a preheating chamber which is alined with and forms a continuation of the furnace proper, so that the trucks are pushed through the preheating chamber directly into the combustion chamber. This is satisfactory practice where labor is cheap and there is an unlimited amount of room in which to build the furnace. But where land is valuable and labor high priced, compactness is a desideratum of considerable importance. It is furthermore customary in the old type furnace to mingle the air which is blown beneath the trucks to cool the same, with the combustion gases after they have left the combustion chamber, and to pass the commingled gas and air out of the furnace through a common chimney. The combustion gases however contain certain constituents which may form valuable by-products and if such by-products are to be recovered it is highly desirable that the combustion gases be led to the recovering apparatus in as slightly diluted condition as possible, since the by-product constituents are only weakly present in the gases at best. In the improved furnace of the present ap-

plication I have provided a more compact arrangement by locating the preheating chamber adjacent and parallel to the furnace proper. Thus from Figs. 1 and 2 it will be seen that the preheating chamber B lies parallel with the combustion chamber A, the connection between the two portions of the furnace being maintained by transverse tracks C and D from the entrance and discharge ends respectively of the combustion chamber. The labor of handling of the cars on their return to the combustion chamber A is greatly facilitated if the latter is graded up from the entrance to the discharge end (see Fig. 2) so that the cars return by gravity down the parallel track through the preheating chamber B. By reason of the elevation of the track at the discharge end of the furnace, the unloading of the cars is facilitated and if desired they may be automatically cleared of their briquets by a scraper X arranged at an angle across the channel of the furnace and just above the car floor so that as the car is gradually pressed forward by the feed device, to be described later, the briquets are swept into the chute 10 leading to a hopper 11 and the car rolls into the transfer truck P empty. Returning by gravity it is halted at the press 12 to be loaded and then permitted to descend into the preheating chamber B where it awaits its turn to be carried by the transfer truck Q to the vestibule of the combustion chamber. The preheating chamber B receives its heat from the cooling air blast forced beneath the trucks in the combustion chamber by the blower 13, and led from a point near the entrance end of the latter by a passage 14 to the preheating chamber. The slide door 15 of the latter compels the heated air to pass through the length of the chamber escaping at its upper end. The combustion gases are blown in above the trucks at 16 and travel down the furnace proper toward the entrance end where they are led from the top of the furnace at 17 to the separators diagrammatically shown at S. Throughout the length of the combustion chamber the gases are maintained separate from the cooling gases beneath the trucks in the usual way by means of sand troughs secured on the side walls of the furnace, into which dip fins on the sides of the trucks. In entrance vestibule V how-

ever, a special device must be employed to prevent the gas and air commingling as the entering truck is fed forward. The device here illustrated for that purpose is best understood from Figs. 3 to 6. As will be noted from these illustrations, I provide a shield 18 of the same width and height as the truck floor 19 and provided with side fins 20 of the same character. This shield passes through an angled slot in the rear wall 21 of the vestibule and is preferably supported on front trucks 22 within the vestibule and rear trucks 23 running on tracks outside the vestibule. As the car is fed forward it is obvious that the shield 18 following after serves to maintain the gases above the trucks separated from the cooling blast beneath the same.

While any suitable means may be employed to advance the trucks through the combustion chamber, I prefer to employ the hydraulic ram 24 illustrated, because of the practically unlimited power available for forcing the trucks up this incline and on the other hand by reason of the slow steady advance that may be thereby secured. This is of particular advantage when the feed of a single truck into the combustion chamber may occupy an hour or more, as is sometimes desirable. As illustrated, the ram cylinder is supported upon heavy stationary castings 25 outside the vestibule, while the plunger 26 passes through a hole in the rear wall of the vestibule and is supported on the forward shield truck 22. The plunger face 27 is formed in any desired fashion, preferably so as to engage the under frame of the briquet truck.

The transfer truck Q which shifts the loaded cars from the preheating chamber into the vestibule of the combustion chamber carries a longitudinal angle iron 28 upon which the side fins of the trucks travel in like manner as they travel through the sand troughs of the combustion chamber. On the same side of this truck is carried the sheet 29, the vertical portion of which serves as the lower portion of the side wall of the vestibule when the truck is in position; while the horizontal portion carries the channel 30 in which the lower edge of the side entrance door 31 of the vestibule is received.

The angle iron 32 corresponding to 28, carried by the truck, may be supported on the stationary bracket 33. This angle iron is preferably slightly angled down sidewise or its bearing face graded down as shown, the more easily to permit the side fin to ride up thereon when the truck is shifted sidewise into the vestibule.

The method of operation is readily understood. The discharged truck shifted to the head of the return track descends by gravity to the press 12. After securing its

charge it passes down farther through the preheating chamber and eventually to the transfer truck Q, one of the side fins running up on the angle iron 28. The side entrance door 31 to the vestibule being now open, the door 34 to the furnace closed, and the plunger 26 of the ram retracted, the transfer truck shifts the car into the vestibule. As the car reaches position, its other side fin sheet rides up on the angle iron 32 and the separation of the upper portion of the vestibule from the lower portion is complete. The vestibule is closed by dropping the door 31, the entrance to the furnace opened by lifting the slide 34 and the truck advanced by energizing the ram plunger. As the truck advances, the shield 18 follows through the vestibule thus maintaining the separation of the gas and air. Inasmuch as all the trucks in the furnace are in contact they are all simultaneously advanced by the ram and the one at the discharge end of the furnace is pushed on to the transfer truck P, at the same time being cleared of its load by the scraper X. When the ram has advanced the entering truck beyond the vestibule, it is retracted, the door 34 dropped and the door 31 lifted, and the empty transfer truck Q shifted to the lower end of the preheating channel to receive a fresh truck which is returned to the vestibule, as explained. While the fresh truck is thus being brought into position for passage through the furnace, the empty truck at the discharge end is being shifted to the head of the return track by the transfer truck P and the latter returned to position to receive a new truck from the furnace.

The furnace shown may be variously modified without departing from my invention, and I do not limit myself to the details of construction shown, but claim as my invention:—

1. A channel furnace having a combustion chamber and an adjacent preheating chamber, means for leading combustion and cooling gases separately through the combustion chamber and means for leading the cooling gas alone to the preheating chamber.

2. A channel furnace having a combustion chamber and a preheating chamber laterally adjacent thereto, means for leading a combustion gas to said combustion chamber above the trucks therein, means for leading a cooling gas beneath said trucks, means for maintaining said gases separated from each other, in combination with means for leading the cooling gas alone to the preheater.

3. In a channel furnace, a combustion chamber, a vestibule opening thereto for the introduction of a new truck, means for maintaining the space above and below the trucks separated, in combination with a shield arranged to follow said new truck as it is

fed forward into the combustion chamber and to maintain gases above separated from those below the trucks, substantially as described.

5 4. In a channel furnace, a combustion chamber, a vestibule opening thereto adapted to receive a fresh truck, means for isolating the gases in the upper portion of the  
10 chamber from those below the trucks, in combination with a shield arranged to follow the truck through the vestibule as it is fed forward into the combustion chamber and to prevent the commingling of said  
15 gases in the vestibule, said shield being mounted at its forward end upon wheels, substantially as described.

5 5. In a channel furnace, a combustion chamber, a vestibule opening thereto adapted to receive a new truck, means for separating the gases in the upper portion from  
20 those in the lower portion of the combustion chamber, in combination with a shield following the said truck as it is fed forward into the combustion chamber, said shield being carried at its forward end upon a  
25 truck, in combination with a hydraulic ram for feeding said new truck forward, the forward end of said ram being mounted upon said shield truck, substantially as described.

30 6. A channel furnace closed at its entrance end and open at its discharge end, in combination with means for slowly and continuously advancing trucks through the furnace together with a stationary scraper arranged  
35 at the discharge end of the furnace for automatically discharging the trucks as they are

slowly passed out of the furnace beneath the said scraper.

7. A tunnel furnace provided with a vestibule adapted to be sealed against the furnace and the external air, and having a track laid therein for bringing cars into said vestibule, in combination with a device adapted to impart a gradual and uniform movement to cars through the vestibule and  
40 furnace, said movement-imparting device consisting of a platform car running on rails and moving partly within and partly without the vestibule, a plunger attached to the forward end of the platform car and  
45 actuated by a force pump, and means for rapidly returning the platform car to its starting position.

8. A tunnel furnace provided with a vestibule for receiving cars to be fed into and  
55 through the furnace, in combination with a device for imparting to said cars a gradual and uniform forward movement, said device consisting of a platform car running on rails and having attached to one of its  
60 axles which always remains within the vestibule, a plunger passing through a wall of the vestibule and operated by a force pump, and means for rapidly returning the platform car to its starting point.

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

N. V. HANSELL.

Witnesses:

T. DEPLANCHE,  
E. D. WRIGHT.