

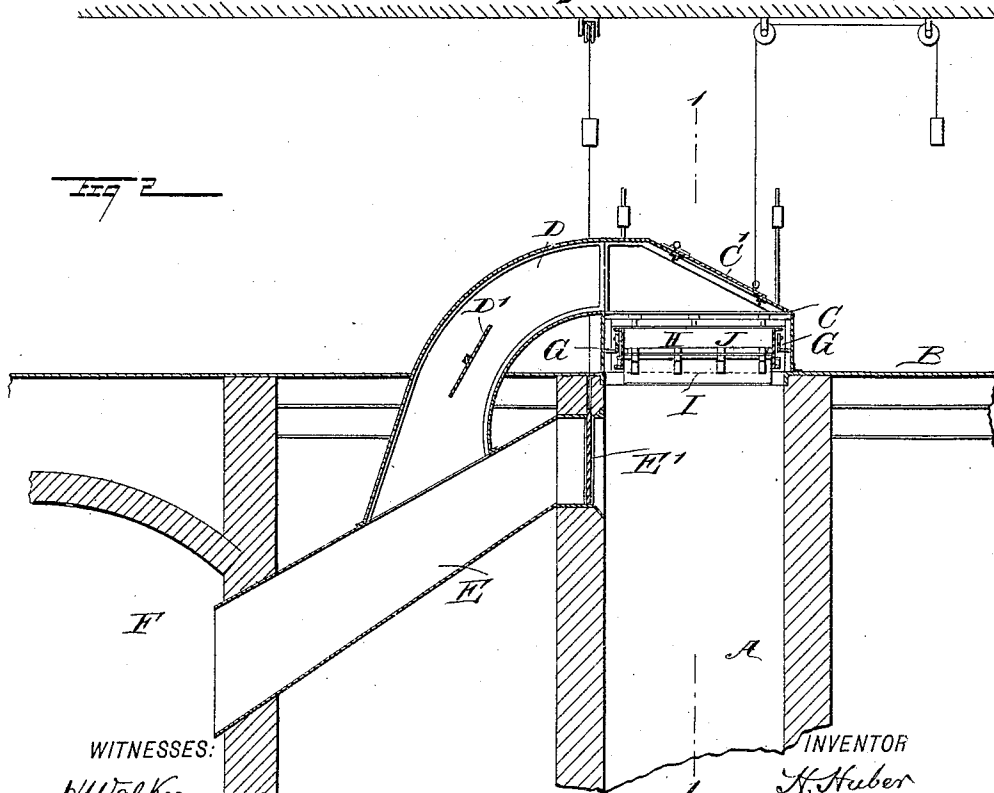
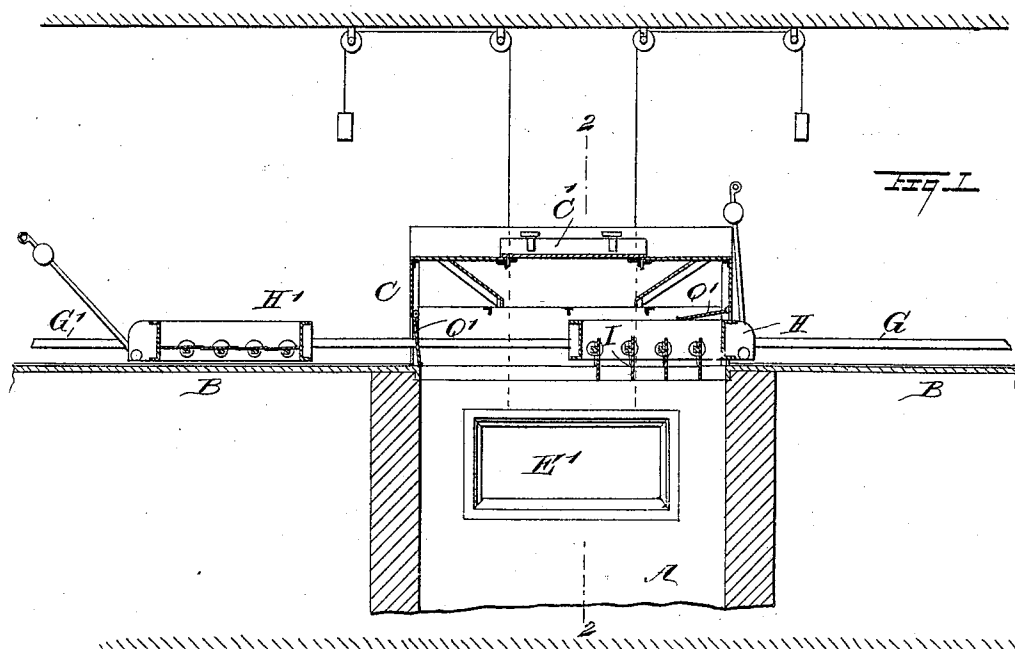
(No Model.)

3 Sheets—Sheet 1.

H. HUBER.  
SMELTING FURNACE.

No. 552,372.

Patented Dec. 31, 1895.



WITNESSES:  
*H. Walker*  
*C. Sedgwick*

INVENTOR  
*H. Huber*  
BY *Munn & Co.*  
ATTORNEYS.

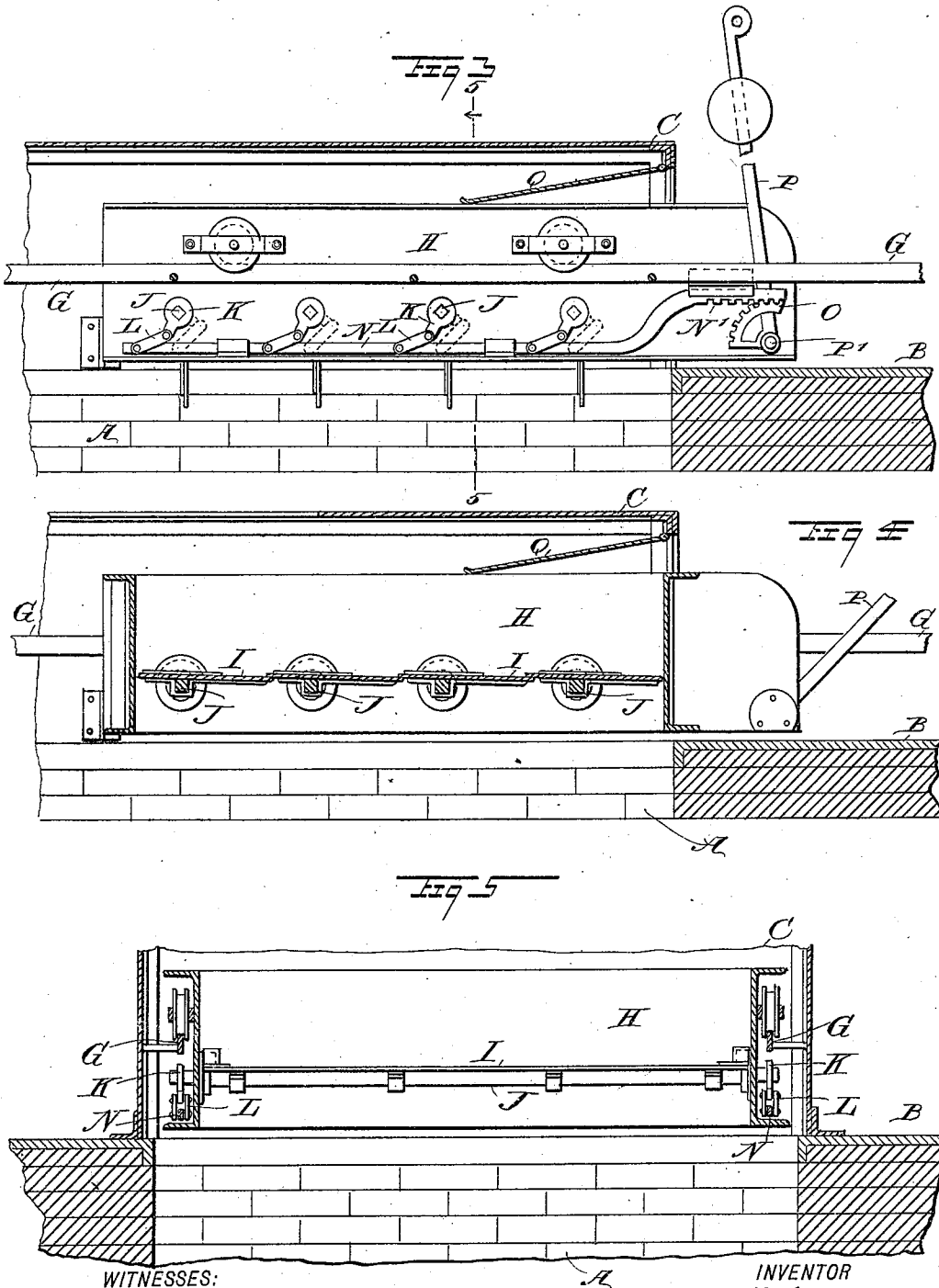
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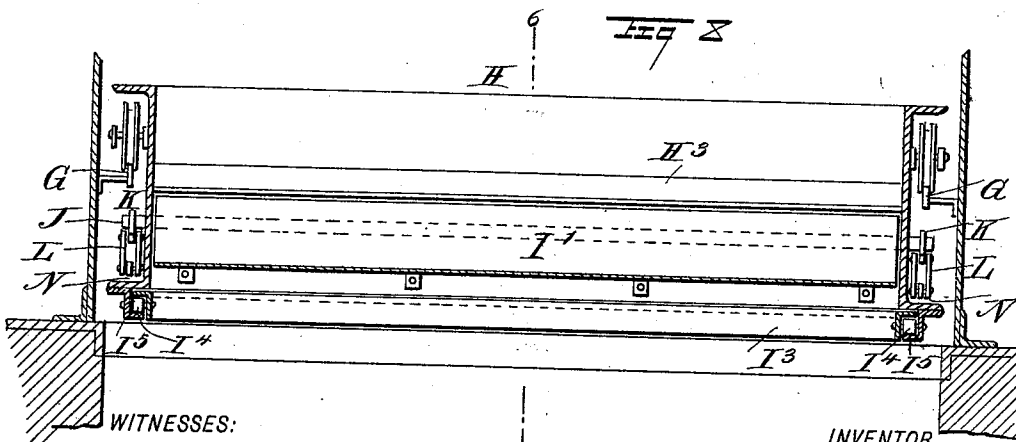
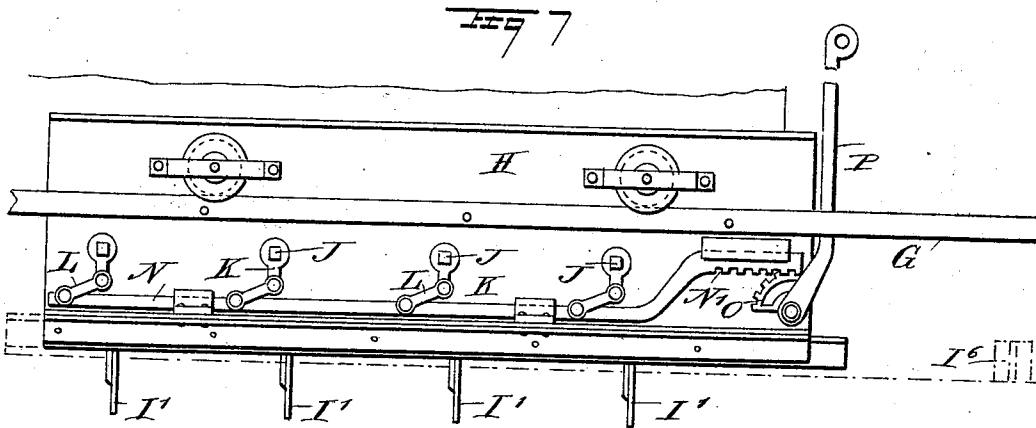
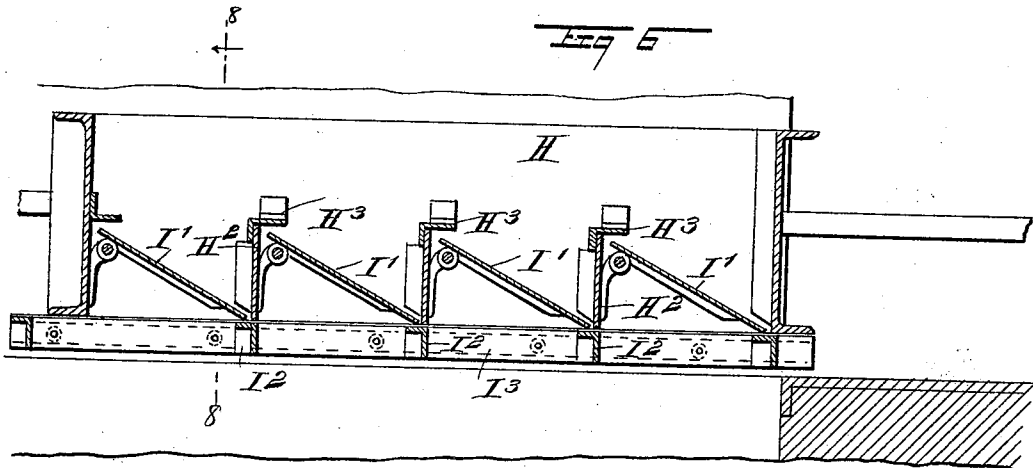
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# UNITED STATES PATENT OFFICE.

HERMANN HUBER, OF KANSAS CITY, MISSOURI.

## SMELTING-FURNACE.

SPECIFICATION forming part of Letters Patent No. 552,372, dated December 31, 1895.

Application filed March 29, 1894. Serial No. 505,612. (No model.)

*To all whom it may concern:*

Be it known that I, HERMANN HUBER, of Kansas City, in the county of Jackson and State of Missouri, have invented new and useful Improvements in Smelting-Furnaces, of which the following is a full, clear, and exact description.

The object of the invention is to provide certain new and useful improvements in smelting or stack furnaces, to facilitate the charging of the furnace, and enable the operator to properly prepare the charge previous to its introduction into the stack and permit of an even and uniform distribution of the charge in the stack.

The invention consists of certain parts and details and combinations of the same, as will be hereinafter described, and then pointed out in the claims.

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

Figure 1 is a sectional side elevation of the improvement on the line 1 1 of Fig. 2. Fig. 2 is a transverse section of the same on the line 2 2 of Fig. 1. Fig. 3 is an enlarged sectional side elevation of the charging device with the car in elevation. Fig. 4 is a similar view of the same with the car in section. Fig. 5 is a transverse section of the same on the line 5 5 of Fig. 3. Fig. 6 is a longitudinal section of a modified form of charge-car on the line 6 6 of Fig. 8. Fig. 7 is a side elevation of the same, and Fig. 8 is a transverse section of the same on the line 8 8 of Fig. 6.

On the upper end of the stack A and on the charging-floor B is arranged a hood C, having an outlet-flue or downtake D curved downwardly and leading to a second downtake or flue E, connecting one side of the stack A directly below the charging-floor B with the dust-chamber F, into which the gases and fumes arising from the burning charge in the stack A pass to receive further treatment to save the valuable articles carried by the fumes, as is well known.

The purpose of providing two flues D and E is to prevent the escape of smoke and gases into the room at the mouth of the stack, and this is attained by providing the flue D and

hood to cover the mouth of the furnace and receive the gases. By means of the dampers the respective flues are closed according to the operation of the charging-car, all of which will be readily understood from the foregoing description.

Arranged in the upper end of the flue E is a slide-valve E', which is mounted to be capable of vertical movement and which has connected to it at equidistant points throughout its upper edge two ropes or chains, which pass upwardly from the valve to the ceiling of the room at the mouth of the furnace and over pulleys secured to said ceiling, the free ends of the ropes being provided with weights which counterbalance the valve and make the raising and lowering thereof easier. In the flue D is arranged a second valve D', which is of the oscillatory class and which is provided outside of the flue with the usual and well-understood handle, whereby it may be manipulated. When the charging-car is operating, the valve E' will be opened and the valve D' closed, so as to cut off the opening in the flue D and open the flue E. The hood C is also provided with a hinged lid or cover C' under the control of the operator to permit inspection and examination of the upper or charging end of the stack.

In the hood C is arranged a transverse track G, extending suitable distances beyond the opposite ends of the hood along and over the charging-floor B, as plainly shown in the drawings. On this track G are adapted to travel the wheeled vehicles or charge-carrying cars H and H', each of a size corresponding to about one-half of the charge end of the stack, each car being adapted to carry one-half of a full charge for the stack, it being understood that first one car is pushed into the hood from one end and its contents discharged, after which the empty car is wheeled out of the hood and the other loaded car is pushed into the hood from the other end of the track and dumped of its contents and then wheeled out, so that the stack is charged with the full charge divided and alternately placed in the stack. By this arrangement one-half of the charge end of the stack is not obstructed while a car is unloaded, permitting the fumes arising from the burn-

ing charge in the stack to pass up into the hood and the flue D leading to the dust-chamber F by way of the flue E.

The empty cars are loaded with the material forming the charge outside of the hood, so that the operator is enabled to prepare the charge in the proper manner previous to its use and introduction into the stack.

Each of the cars is preferably of a construction shown in Figs. 3, 4 and 5, or of that illustrated in Figs. 6, 7 and 8, each car being provided with a floor made in sections I, each provided with a shaft J, journaled in suitable bearings in the sides of the cars.

The outer ends of the shafts J of each section I are provided with a crank-arm K, connected by a link L with a longitudinally-extending rod N, fitted to slide in suitable bearings on the corresponding side of the car. The outer end of the rod N is formed with rack-teeth N' in mesh with a segmental gear-wheel O, formed or secured on the fulcrum end P' of a lever P fulcrumed on the car, so that the operator on manipulating this lever can move the sections I into a downward position to dump the charge contained in the car H or H' at the time the latter is over the mouth of the stack A, (see car H, Figs. 1 and 3,) or he can move the sections I into a horizontal position to form a continuous horizontal floor in the car for filling the latter with the charge at the time the car is outside the hood C. (See car H', Fig. 1.)

In the construction of the car, Figs. 6, 7, and 8, the sections I' are arranged between transverse partitions H<sup>2</sup>, and when closed are inclined from the hinge or front end downward, the free ends of the sections resting on transverse bars I<sup>2</sup> of a frame I<sup>3</sup> arranged to slide longitudinally on the under side of the car. The frame I<sup>3</sup> is provided for this purpose on its sides with rollers or wheels I<sup>4</sup> traveling on Z-shaped iron rails I<sup>5</sup>, secured to the flanges of the car-body, as plainly shown in Fig. 8. The ends of the frame are adapted to project alternately beyond the corresponding ends of the car, so that when the car is loaded, for instance, and pushed in place over the stack, then the forward projecting end of the frame I<sup>3</sup> strikes an obstruction in the middle of the hood to push the frame I<sup>3</sup> rearward and the cross-bars from under the free ends of the sections I'. The latter then drop to discharge the load. When the car is pulled out of the hood by the operator pulling on the manipulating-lever P, then the sections I' swing again upward, and when the car finally moves into an outermost position then the rear projecting end of the frame I<sup>3</sup> strikes an obstruction I<sup>6</sup>, (see Fig. 7,) so that the frame I<sup>3</sup> is pushed forward and the cross-bars I<sup>2</sup> again move under the free ends of the sections I' to support the same. The pivoted ends of the sections are preferably covered by hoods H<sup>3</sup> (see Fig. 6) to prevent material from lodging between the shafts J and partitions H<sup>2</sup>.

It will be understood that the crank-and-link mechanism K L of the form of car shown in Figs. 6, 7 and 8 controls the sections I and that by means of this mechanism the said sections are returned to their closed position, and this mechanism also assists in supporting the sections when weighted by the load of the charge. The frame I<sup>3</sup>, however, bears the greater portion of the weight of the charge, and is necessary, owing to the great leverage that the load would command over the sections I' and the link-and-crank mechanism for controlling them.

The ends of the hood C are provided with hinged self-closing doors Q Q', hung in the path of the respective car H or H', so that on pushing a car into the hood the corresponding door is opened, and after the car has again been withdrawn from the hood the door closes, so that fumes are not liable to escape through the ends of the hood nor cold air be drawn into the furnace.

The arrangement of the flues D and E permits a perfect "blowing in and out" of the furnace, as the gate or valve E' is then opened to permit a ready escape of the smoke and gases arising from the burning fuel in the stack. After the furnace is well started and filled up to the lower edge of downtake E, then the damper E' is closed and damper D' opened, and the fumes pass upward through the hood C into the flue D and then through part of the flue E into the dust-chamber F.

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

1. A furnace provided with a charging device comprising a hood erected over the mouth of the stack, and provided with self-closing doors, a track extending transversely through the hood and over the charging floor, wheeled vehicles adapted to travel on the said rail and each provided with a floor made of sections, trunnions carried by each section and journaled in opposite sides of the car, and means, substantially as described, for manipulating the said sections to close the same or permit the same to open to discharge the load into the stack, substantially as shown and described.

2. A furnace having at its mouth a hood which embraces the same and receives the gases escaping therefrom, rails secured one to each inner side of the hood and being disposed horizontally and extended over the mouth of the furnace, a car capable of containing a charge for the furnace and provided with wheels whereby it may travel on the rails, a bottom for the car consisting of a series of sections mounted with the capacity to rock from a horizontal to a vertical position, and means for controlling said sections, substantially as described.

3. A furnace having a hood embracing its mouth and capable of receiving gases which escape therefrom, rails secured one to each

inner side of the hood and disposed horizontally over the mouth of the furnace, a wheeled car mounted on the rails and capable of being moved over the mouth of the furnace, a series  
 5 of sections forming the bottom of the car and mounted with the capacity to rock from a horizontal to a vertical position, a crank connected to the trunnion of each section, a reciprocal rod having connection with the  
 10 cranks, whereby the cranks may be moved in their characteristic lines, and a lever fulcrumed on the car and connected to the rod whereby the same may be reciprocated, substantially as described.

15 4. A furnace provided with a hood embracing its mouth and capable of receiving the gases which escape therefrom, a wheeled car for containing the charge of the furnace and capable of moving in and out of the hood, a  
 20 dumping bottom in the car, and a lever fulcrumed on one end of the car and controlling the bottom, said car being adapted to have the extremity to which the lever is attached remain outside of the hood whereby the bottom  
 25 may be readily controlled, substantially as described.

5. A furnace having a hood embracing its mouth and capable of receiving gases which escape therefrom, rails secured one to each  
 30 side of the hood and disposed horizontally and extended over the mouth of the furnace, a wheeled car mounted on the rails and capable of moving thereon, a series of sections mounted on transverse axes and forming the  
 35 bottom of the car, the said sections being capable of rocking from a horizontal to a vertical position, a crank secured to the trunnion of each section, a link pivotally connected to the crank, a longitudinal reciprocating bar  
 40 pivotally connected to the link and having one end formed with a rack thereon, a lever mounted at one end of the car and having a toothed sector fixed thereto and meshing with the rack, whereby upon the rocking of the lever  
 45 the sections may be moved as desired, substantially as described.

6. A furnace having a hood embracing its mouth and capable of receiving the gases which escape therefrom, a car capable of movement in and out of the hood, a series of  
 50 rockable sections forming the bottom of the car and capable of swinging to open or close the same, means for swinging said sections, and a sliding frame mounted below the sections and capable of engaging with each  
 55 when they are in a closed position so that the sections are braced and assisted in the support of their load, substantially as described.

7. A furnace having a hood embracing its mouth and capable of receiving the gases  
 60 which escape therefrom, a car capable of passing in and out of the hood, a series of rocking sections forming the bottom of the car and capable of swinging to open or close the same, means for controlling the sections, a sliding  
 65 frame arranged below the sections and consisting of longitudinal side bars joined by transverse cross bars, the said transverse cross bars being one for each section of the bottom and capable of having the said sections  
 70 rested upon them when they are in a closed position whereby the sections are braced and assisted in the support of their load, and a detent arranged in the path of the car and capable of engaging with the frame and of sliding  
 75 the same to permit the opening of the bottom sections, substantially as described.

8. A furnace having at its mouth a hood which embraces the same and is capable of receiving gases discharged therefrom, a track  
 80 within the hood, the same being extended directly over the mouth of the furnace, and a car movable on the track and capable of passing directly over the mouth of the furnace and of dumping its contents through said  
 85 mouth and into the furnace, substantially as described.

HERMANN HUBER.

Witnesses:

WM. B. REED,  
 CLEMENS JUNGK.