

(No Model.)

3 Sheets—Sheet 1.

N. R. WILSON.
DETACHED CRUCIBLE FOR LEAD FURNACES.

No. 403,815.

Patented May 21 1889.

Fig 1.

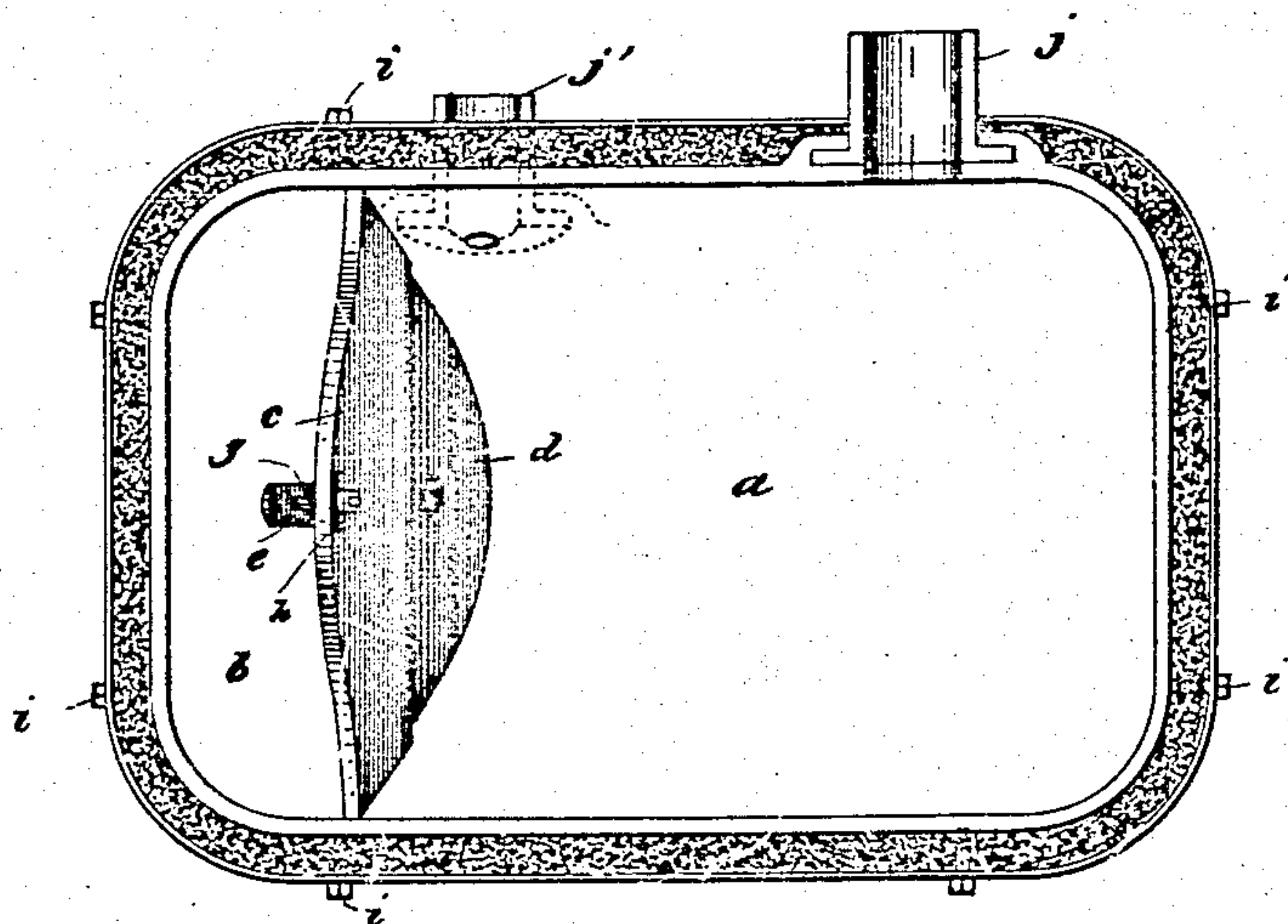
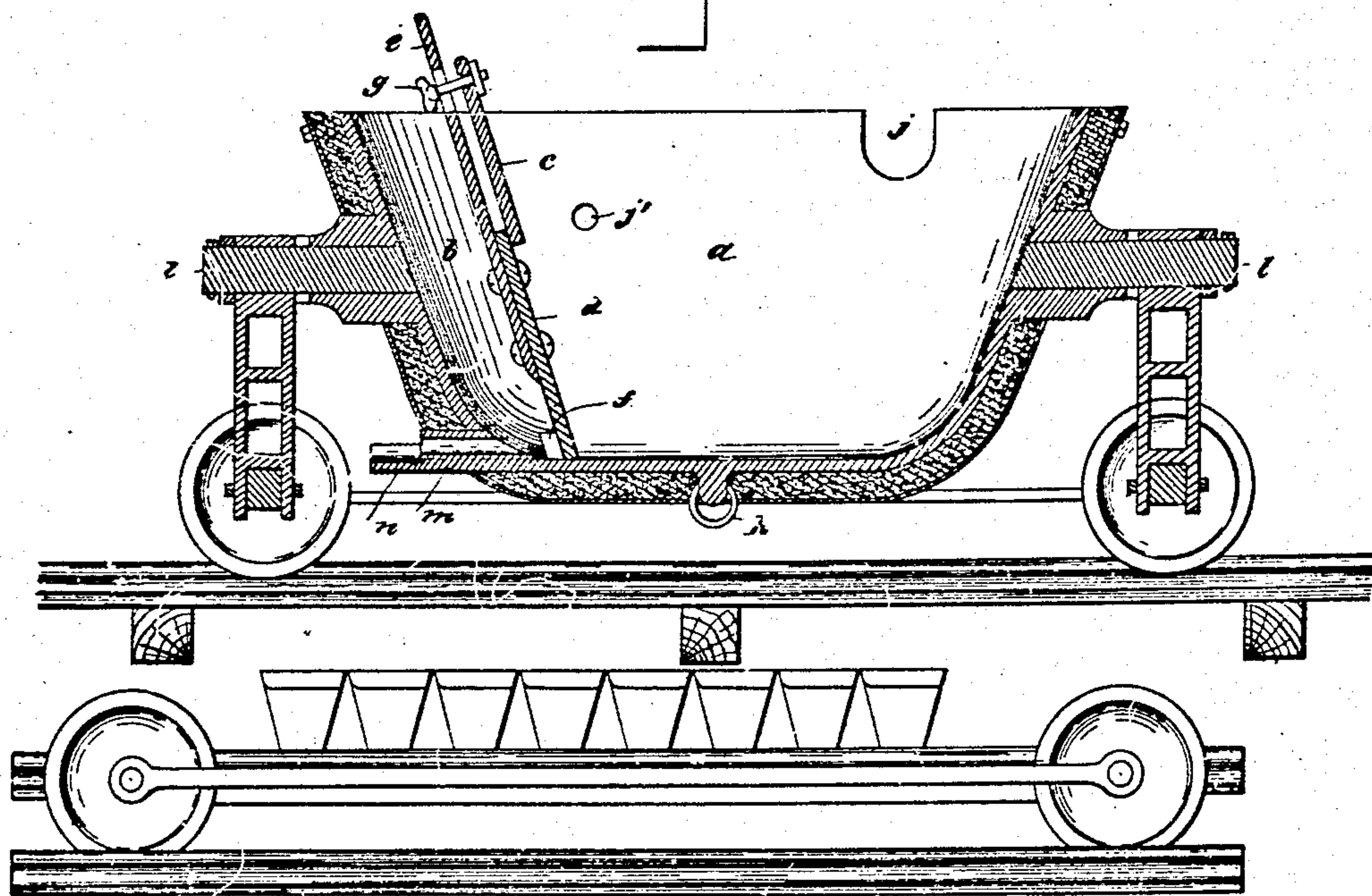


Fig 2.



Witnesses.

Lilla Hanna

John F. Nelson

Inventor
Newton R. Wilson
By *Knights Bros*
Attorneys

(No Model.)

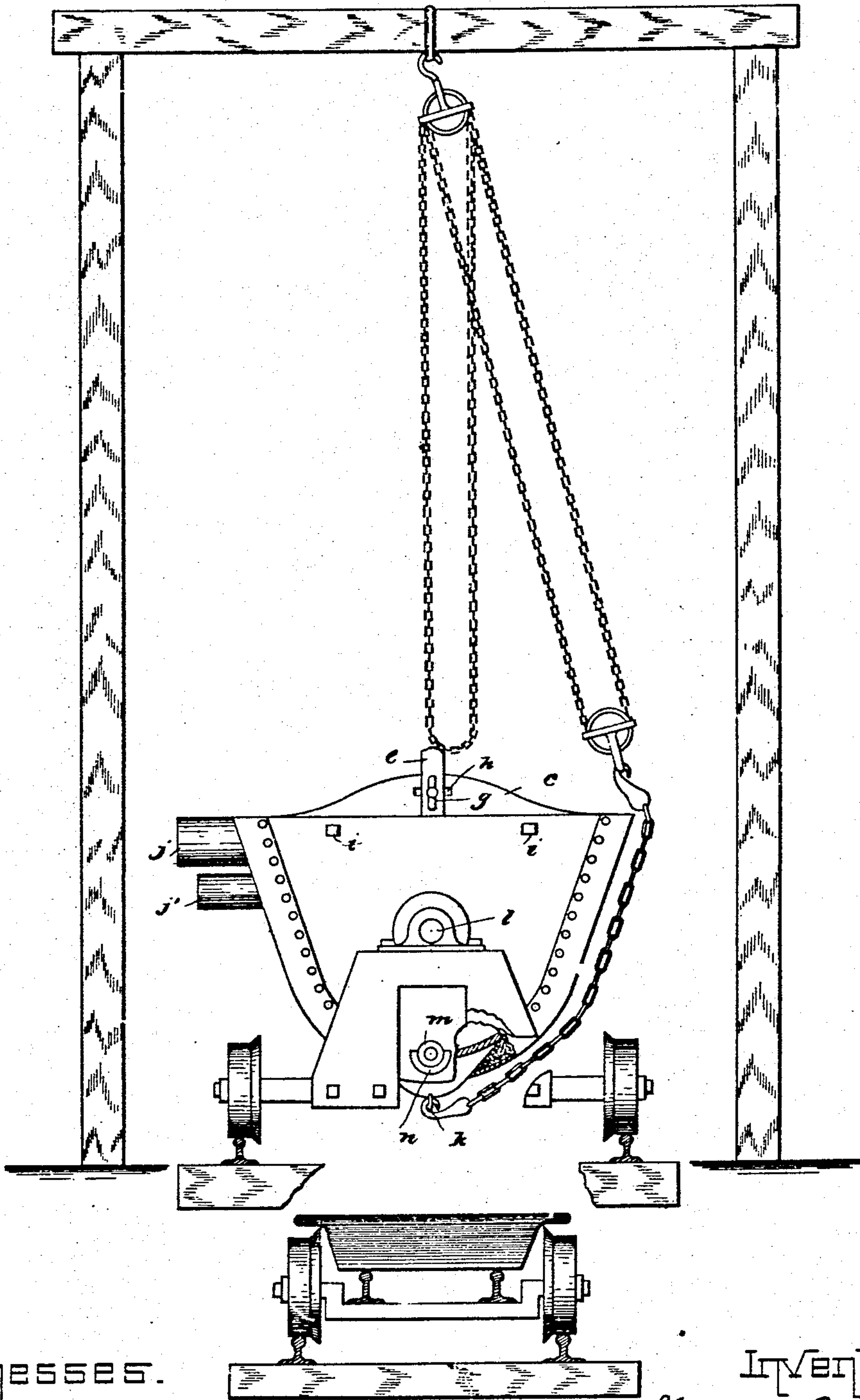
3 Sheets—Sheet 2.

N. R. WILSON.

DETACHED CRUCIBLE FOR LEAD FURNACES.

No. 403,815.

Patented May 21 1889.



Witnesses.
Lillie Hanna
John F. Nelson

Fig. 3.

Inventor,
Newton R. Wilson
By *Knigh & Bros*
Attorneys

(No Model.)

3 Sheets—Sheet 3.

N. R. WILSON.

DETACHED CRUCIBLE FOR LEAD FURNACES.

No. 403,815.

Patented May 21 1889.

Fig. 4.

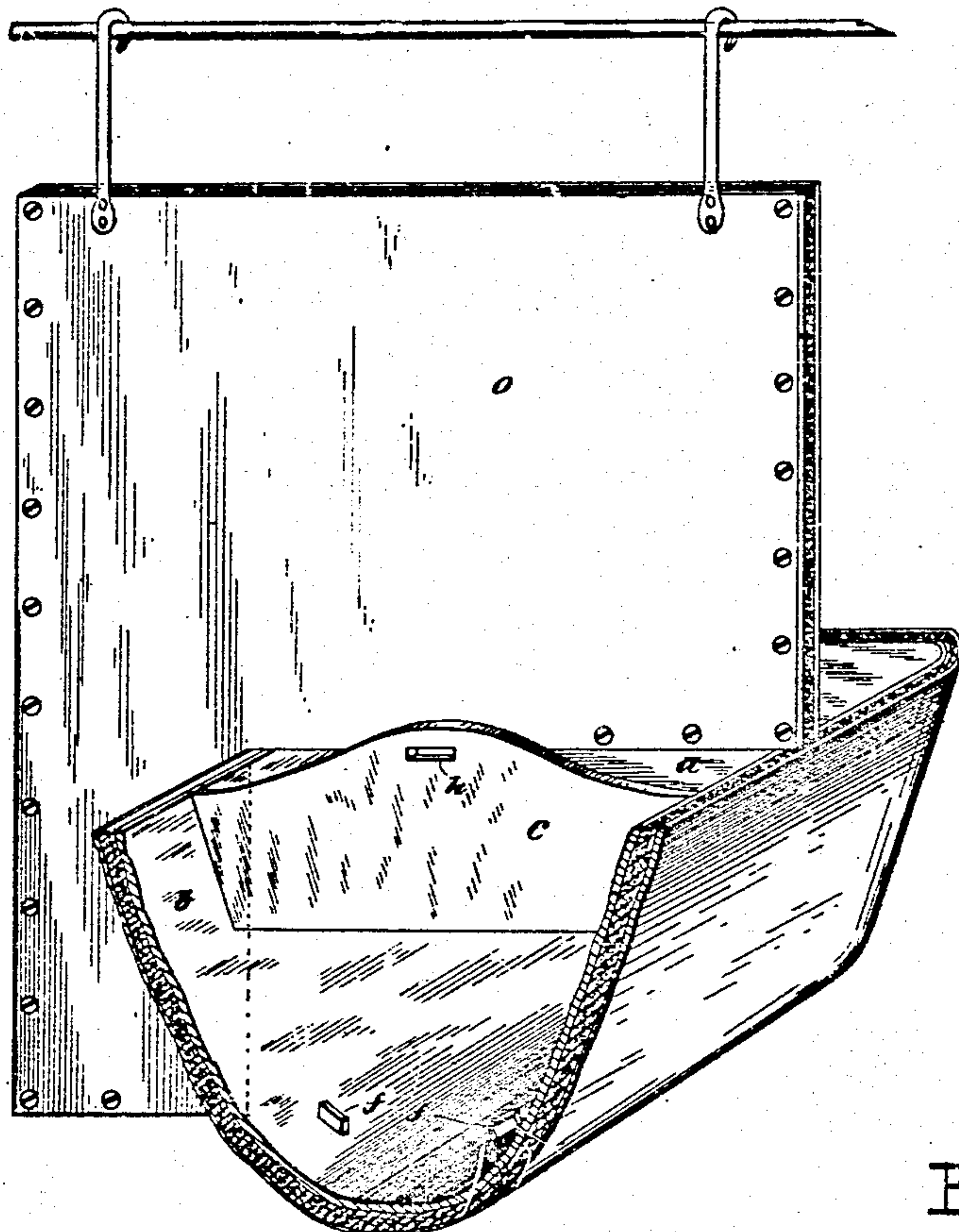


Fig. 5.

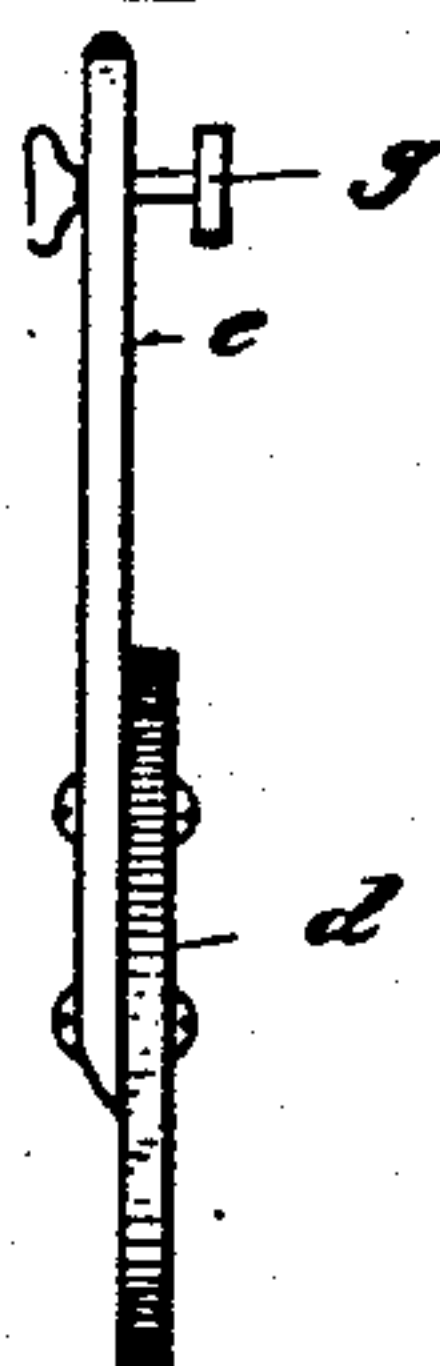
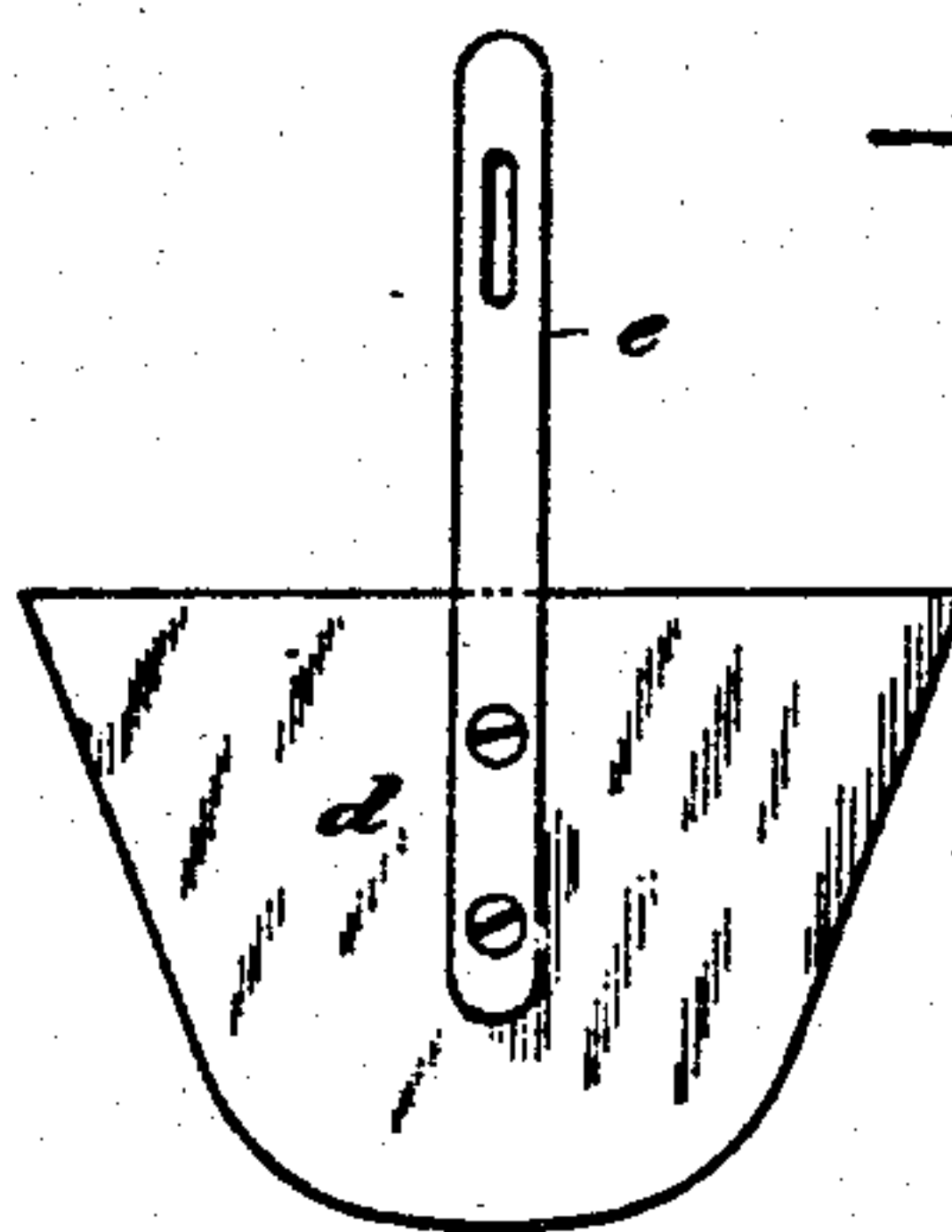


Fig. 6.



Witnesses.

Lillie Hanna

John F. Nelson

Inventor

Newton R. Wilson

By

Knights Bros

Attorneys

UNITED STATES PATENT OFFICE.

NEWTON R. WILSON, OF SOCORRO, TERRITORY OF NEW MEXICO.

DETACHED CRUCIBLE FOR LEAD-FURNACES.

SPECIFICATION forming part of Letters Patent No. 403,815, dated May 21, 1889.

Application filed August 14, 1888. Serial No. 282,722. (No model.)

To all whom it may concern:

Be it known that I, NEWTON R. WILSON, a citizen of the United States, residing at Socorro, county of Socorro, and Territory of New Mexico, have invented certain new and useful Improvements in Detached Crucibles for Lead-Furnaces, of which the following is a specification, reference being had to the accompanying drawings.

10 In said drawings, Figure 1 is a plan view of a crucible constructed in accordance with my invention. Fig. 2 is a vertical sectional view thereof, showing the same in position above the bullion-racks. Fig. 3 is an end view showing, in addition, the dumping mechanism. Fig. 4 is a perspective detail view showing a view of the crucible with part broken away, and also of the screen for protecting the workmen from the glare of the furnace and molten metal. Fig. 5 is a side view of the gate. Fig. 6 is a face view thereof.

25 This is a contrivance to be used in lead-smelting for the separation of lead or base bullion, matte, speiss, and slag, and to overcome the difficulties encountered in the common crucible-furnace and in all forms of detached crucibles heretofore used from the frequent solidification of the molten material in the crucible or fore-hearth.

30 The invention consists of a cast-iron box or bowl whose upper section is divided into two compartments, *a* and *b*—called, respectively, “slag-compartment” and “lead-compartment”—by a partition, *c*, extending only a short distance down into the bowl. The lower section is also divided temporarily into two compartments by a movable gate, *d*, provided with a handle, *e*. This gate fits accurately the section of the bowl, and when in place its top rests against the bottom of the partition, and is held in place by means of the lugs *f f* on the bottom of the bowl and the turn-clamp *g*, working through the handle *e* and the slot *h* in the partition *c*, or it may be held in any other suitable manner. The bowl is surrounded by a sheet-iron casing attached to it by studs *i i*, screwed into its upper edge, leaving a small space between the casting and the sheet-iron casing, which is filled with a non-conductor of heat, such as mineral wool. On one side of the bowl are

attached two cast-iron spouts—the upper, *j*, an overflow-spout for slag, and the lower, *j'*, for matte and speiss. On the bottom of the bowl is cast a lug containing an iron ring, *K*, to which a chain and pulley may be attached for dumping, Fig. 3. There are two trunnions, *l l*, attached to the casting, one at each end, upon which it turns and by which it is suspended upon a truck running upon a track, as shown.

At the bottom of the lead-compartment is cast a projection, *m*, Figs. 2 and 3, extending through the sheet-iron casing and having a hole bored through it connecting with the interior of the lead-compartment. At the outer end of this projection is a small spout, *n*. Below the detached crucible is a bullion-rack, consisting of two pieces of railroad-iron mounted upon wheels running upon a track and carrying a number of bullion-molds. Hanging above the crucible, between the lead and slag compartments and extending down upon the side away from the furnace, is a screen, *o*, Fig. 4, made by riveting two pieces of light sheet-iron to a light iron frame having an air-space between.

Where desired, a cover may be placed over the slag-compartment similar to those now in use, with this difference, that the cover is to be overlaid with a non-conducting coating in the same manner as the body of the crucible.

35 The method of using the crucible is as follows: The gate *d*, being luted with slag around its edges, is put in place and the crucible is run up in front of the smelting-furnace so that the spout from the furnace projects over into the slag-compartment at the point C. The tap-holes *j'* and *m* being stopped with plugs of clay or other material, the furnace is tapped and the lead or base bullion, matte, speiss, and slag are all allowed to flow into the slag-compartment of the crucible. The different substances arrange themselves in the crucible according to their specific gravities, the lead being at the bottom and speiss, matte, and slag above, in the order named. When the slag-compartment is full, the slag overflows through the spout *j* and is caught in slag-pots and removed. When sufficient lead has accumulated in the slag-compartment to rise somewhat above the bottom of the partition *c*, the gate *d* is removed and the

lead allowed to flow into the lead-compartment. All speiss, matte, and slag are held back by the partition *c*. As the lead continues flowing into the fore-hearth, it is kept at almost
 5 a constant height on a level with the bottom of the partition *c* by dipping from the lead-compartment. At intervals speiss and matte are tapped through the hole *j'*. The screen
 10 *o* is hung in position to protect the workmen from the heat and smoke when dipping or tapping lead. When it becomes necessary to remove the crucible from the furnace, all the lead is allowed to flow from it through the hole at *m* into the bullion-molds underneath.
 15 The crucible is then pushed away from the furnace and run under a trestle, Fig. 3, on which is hung a pulley. A chain is now attached to the ring at the bottom and the bowl is inverted and its contents allowed to drop
 20 into a pit below.

I am aware that numerous attempts have been made to separate lead from speiss, matte, and slag by the use of detached crucibles or fore-hearths of various forms. They have all
 25 been open to serious objections, the principal one of which arises from the fact that the only communication between the slag and lead compartments is through a hole in the bottom of the partition separating these com-
 30 partments. Many substances—such as copper and zinc—form difficultly-fusible lead, and although these alloys readily flow from the hot furnace they immediately chill in the fore-hearth, forming “mushy lead,” as it is
 35 technically called, which at first floats in a thick scum or in large lumps on the surface of the lead, but, if allowed to remain, soon solidifies and forms a tough crust over the thin lead below. This crust grows thicker
 40 and thicker, building down toward the bottom

of the fore-hearth, and soon puts an end to its operation. In the fore-hearth herein described this difficulty is overcome by the movable gate, which, completely shutting off
 communication between the compartments, so
 45 that no slag can get into the lead-compartment while the fore-hearth is being filled, allows a short partition extending only to the surface of the lead, or very slightly below it, to be used. The thick scum formed on the
 50 surface of the lead flows, or by means of an iron hook may readily be drawn, under this partition as fast as formed, and all danger of the contents of the fore-hearth becoming
 55 chilled is obviated. I believe that the principle of removing the lead from the surface of the lead-bath in the fore-hearth, instead of from the bottom, as has always previously been done, is entirely new, and that no fore-hearth heretofore used can be operated in
 60 this manner.

Having thus described the invention, the following is what I claim as new therein and desire to secure by Letters Patent:

1. A detached crucible having a fixed partition and a movable gate applied or adapted to be applied thereto, substantially as and for the purposes set forth.

2. The combination, in a detached crucible, of a fixed partition, having a straight horizontal lower edge at such height as to afford an
 70 open and unobstructed passage thereunder for the mushy surface lead, with a detachable gate adapted to completely shut off said passage, substantially as set forth.

NEWTON R. WILSON.

Witnesses:

CHAS. ALLEN,
 C. T. HUGHES.