

(No Model.)

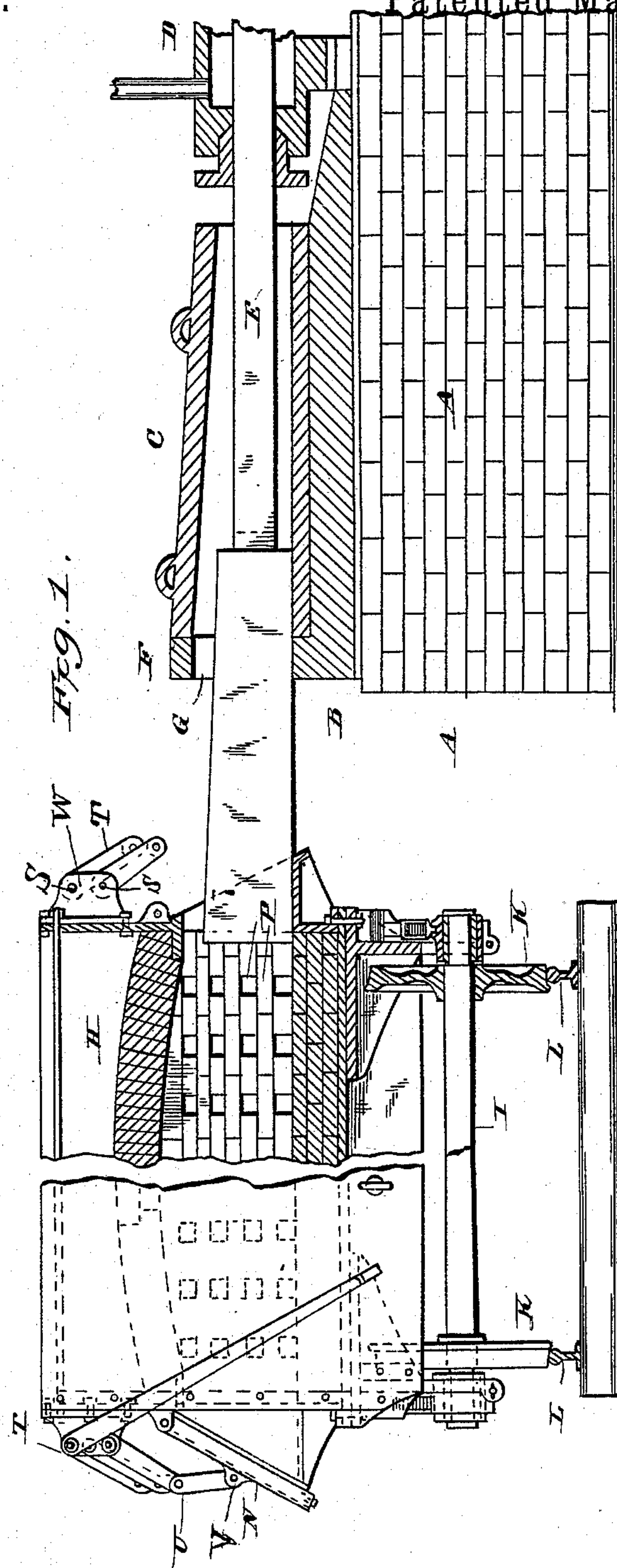
3 Sheets—Sheet 1.

T. CRITCHLOW.

SOAKING FURNACE FOR INGOTS.

No. 278,512.

Patented May 29, 1883.



Witnesses.

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H. A. Saulman.

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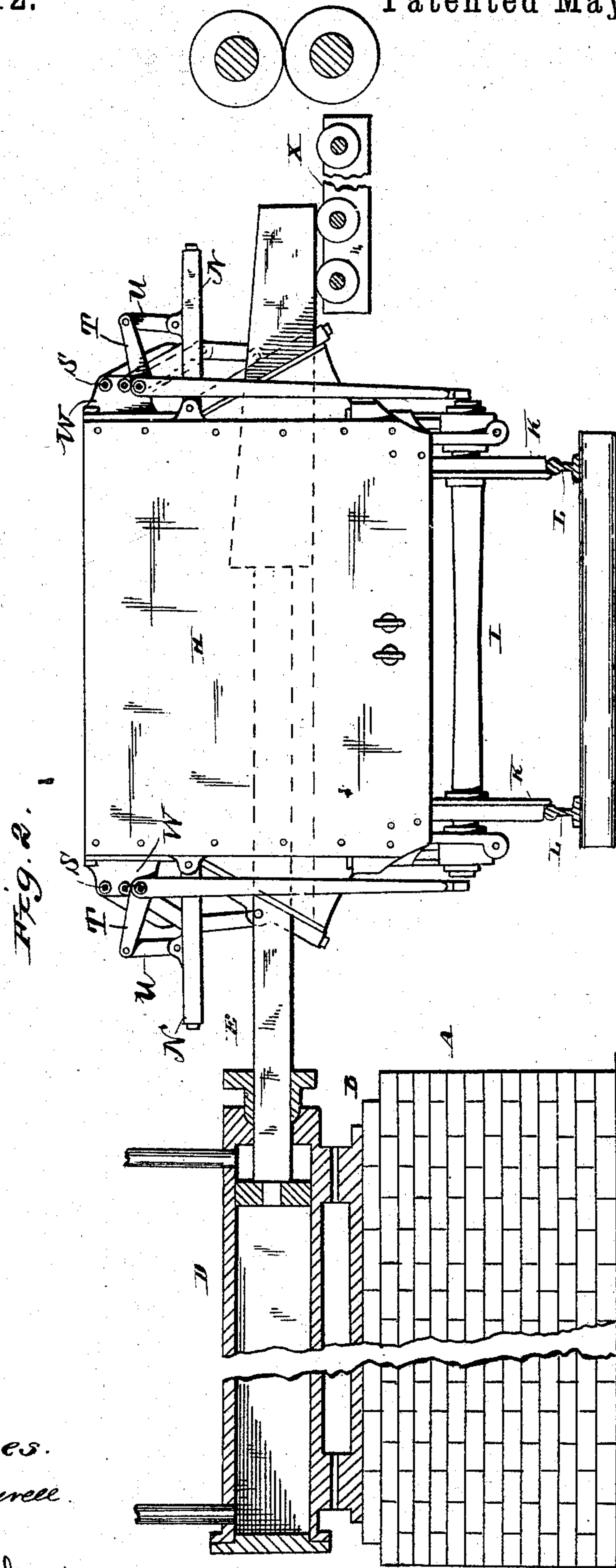
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3 Sheets—Sheet 3

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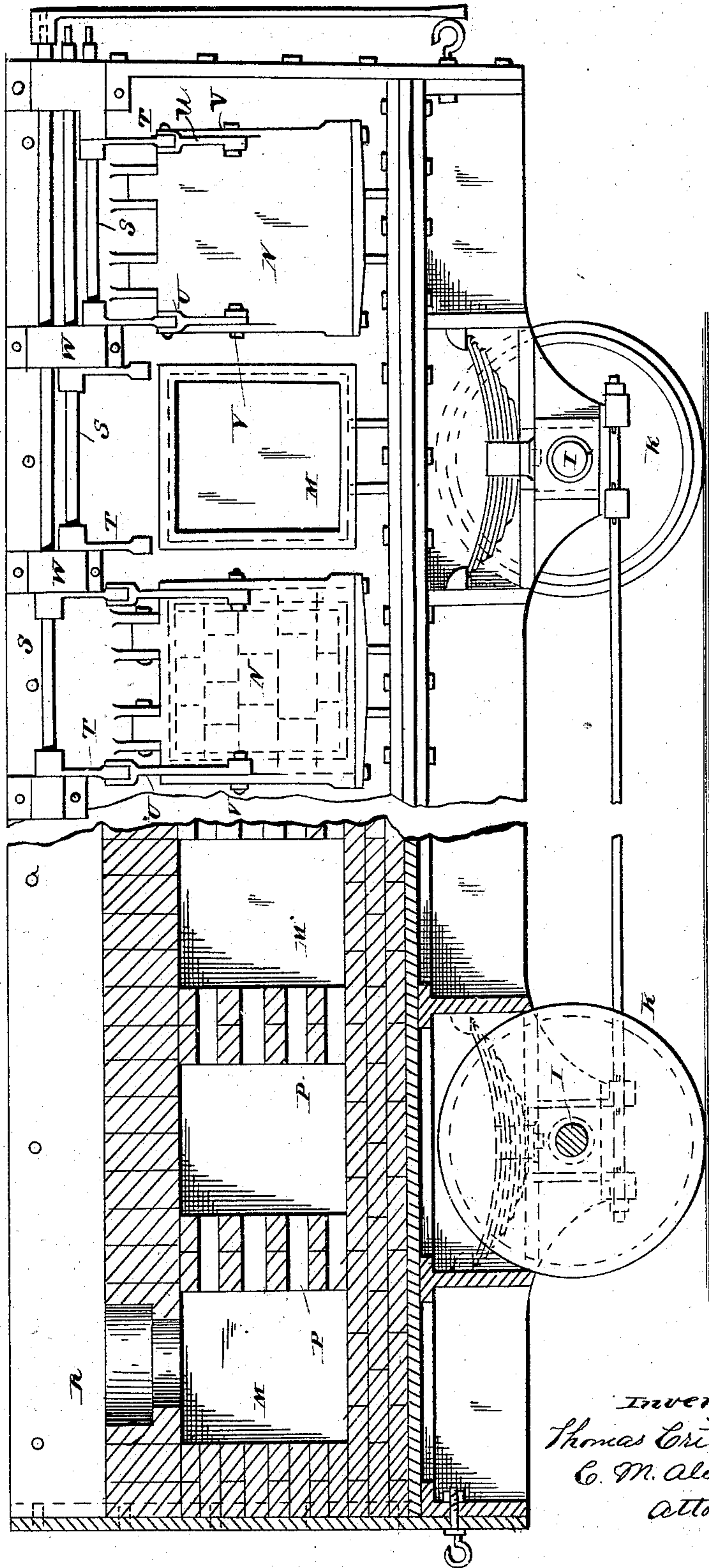
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Fig. 3.

H



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UNITED STATES PATENT OFFICE.

THOMAS CRITCHLOW, OF PITTSBURG, PENNSYLVANIA.

SOAKING-FURNACE FOR INGOTS.

SPECIFICATION forming part of Letters Patent No. 278,512, dated May 29, 1883.

Application filed January 4, 1883. (No model.)

To all whom it may concern:

Be it known that I, THOMAS CRITCHLOW, of Pittsburg, in the county of Allegheny, and in the State of Pennsylvania, have invented certain new and useful Improvements in Soaking-Furnaces for Ingots; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making a part of this specification.

This invention relates to certain improvements in the method and apparatus for working steel ingots; and it has for its objects to utilize the heat which the ingots contain by reason of the casting process by which they are produced, and thereby to obviate the reheating and the consequent handling of the ingots after being cast and before being submitted to the hammer, and thus reduce the cost of manufacture to a minimum, as more fully hereinafter specified.

Ordinarily it has been customary to strip the ingots after being cast, and to put them aside in the open air or in suitable pits until required for use. The ingots at the time they are taken from the mold, as above intimated, have a large amount of internal heat, which is lost while they are put aside for further treatment. By my invention all this heat, which has hitherto been wasted, is utilized, and the storage-room heretofore required is to a great extent dispensed with, permitting the ingots to be worked in much more limited space than heretofore, which is an important advantage. These objects I attain by the means illustrated in the accompanying drawings, in which—

Figure 1 represents a view, partly in section and partly in elevation, showing my invention, and illustrating the ingot as it is about to be moved from the mold and inserted in the soaking-furnace. Fig. 2 represents a view of my invention, partly in vertical section and partly in side elevation, showing the ingot as it is passing out of the soaking-furnace onto the blooming-table rollers, or the rollers for conveying the ingots to the hammer; and Fig. 3 represents a view, partly in section and partly in side elevation, showing my improved soaking-furnace in detail.

The letter A indicates a bed of masonry or any other suitable support, which is provided

with a metallic bed, B, upon which the mold C may be placed.

The letter D indicates a horizontal hydraulic press, which is secured to the bed A or otherwise located so that its plunger E will be in line longitudinally with the mold, as indicated in Fig. 1 of the drawings, and can be projected into the mold to discharge the ingot as required. The mold-bed at its forward end has an upright abutment, F, against which one end of the mold sets, in order to confine it to the bed as the ingot is forced out. The said abutment has an opening, G, through which the ingot passes on its way to the soaking-furnace.

The letter H indicates a portable soaking-furnace, which consists of a metallic frame of suitable construction mounted upon axles I, having flanged wheels K, which are adapted to travel upon rails or tracks L. The said furnace is lined and roofed with refractory material—such as fire-brick—and is provided with openings M, having hinged doors N at opposite sides for the insertion and removal of the ingots. The soaking-furnace may be provided with any number of compartments for the reception of the ingots, the walls or partitions forming such compartments being formed with connecting-openings P, as shown. In constructing these partitions brick-work is preferably employed, the openings being formed in laying the bricks in such manner as to leave spaces between certain of the bricks, as indicated in Figs. 1 and 3 of the drawings. In order to provide for heating the furnace, if it should be found necessary, the compartment at one end is provided with an opening, R, by means of which the heated gases from a stationary furnace may be introduced through any suitable conductor. The compartment at the opposite end of the soaking-furnace is provided with a similar opening, through which the spent products of combustion may pass off. The doors are opened and closed by means of a series of rods, S, and arms T, the arms having connected to them the links U, which are also connected to lugs V on the doors. The rods are journaled in suitable bearings, W, at the upper sides of the furnace, and at their ends are squared for the application of a wrench or key by means of which they may be turned to open or close the doors.

The letter X, Fig. 2, indicates the blooming-rolls' table, upon which the ingots are discharged and from which they are conveyed to the blooming-rolls or to the hammers, a hydraulic press similar to the one already mentioned being employed for this purpose, as seen in Fig. 2 of the drawings. By preference the piston of this press is set in line with the the pass (usually the first or larger pass) of the rolls, the object being to force the ingot from the furnace, when its respective chambers are brought in like relative position with respect to the pass in proper position on the feed-tables, to be advanced to the pass and rolled. It will thus appear that by my invention the molds in which the ingots are cast are in direct communication with the blooming-rolls or with the reducing-hammer employed for operating upon the ingot, during its marketable reduction, the line of rails L leading from such molds to the place of location of the said rolls or hammer. By reason of the free communication between the several compartments of the furnace through the apertures in the dividing-walls thereof, before alluded to herein, a perfect equalization and distribution of the heat emitted from the respective inclosed ingots is effectually obtained, as well as a communication of the heat-charging aperture R with the discharging-aperture, the result of which quality of communication is to give to the ingot first put into the furnace the benefit of the heat given out by those subsequently put in.

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

1. In machinery for the manufacture of iron and steel, the combination of the hydraulic press, with a mold containing the ingot and a heating-furnace having side openings and doors, the longitudinal axes of the press and the mold being in line with the chamber of the furnace, whereby the ingot may be discharged from the mold, forced into and inclosed in the furnace-chamber, as and for the purpose set forth.

2. In machinery for the manufacture of iron and steel, the combination of the ingot-mold, its bed constructed to hold the mold against displacement and to admit of the discharge of the ingot, and the portable soaking-furnace provided with communicating chambers and with door-openings and doors in its sides, with

the hydraulic press and piston adapted to extend into the mold and force the ingot therefrom into the furnace, in the manner and for the purposes set forth.

3. The combination, in a portable soaking-furnace, of the perforated partitions or dividing-walls and the induction and eduction openings, substantially as specified.

4. The combination, with the portable soaking-furnace, of the doors and the bars and links, whereby they may be opened and closed independently of each other, substantially as specified.

5. In machinery for the manufacture of iron and steel, the combination of the hydraulic press and the ingot-mold located in line therewith, with the portable soaking-furnace having a series of transverse chambers terminating in openings at the sides of the furnace, the blooming-rolls and their feed-tables, and the hydraulic press located in line therewith, whereby the ingots may be discharged from the mold into the furnace, transferred in the latter to the rolls, and discharged therefrom upon its feed-tables, substantially as described.

6. In machinery for the manufacture of iron and steel, the combination of the blooming-rolls and their feed-tables, with the portable soaking-furnace having a series of chambers and means for independently opening and closing the same, and the hydraulic press and its piston, the said furnace being adapted to be so placed as to bring its respective chambers in line with the pass in the rolls, and the press being located approximately in line with the pass, whereby the ingot is discharged in position to be acted upon, substantially as described.

7. An ingot-soaking furnace having its top, bottom, and ends closed and provided with a series of horizontal cells or chambers, each having a door and being approximately of the size of the ingot and adapted to communicate with each other, the top being provided with induction and eduction openings, substantially as described.

In testimony whereof I affix my signature; in presence of two witnesses, this 1st day of January, 1883.

THOS. CRITCHLOW.

Witnesses:

JOHN S. KENNEDY,
ROBT. S. YOUNG.