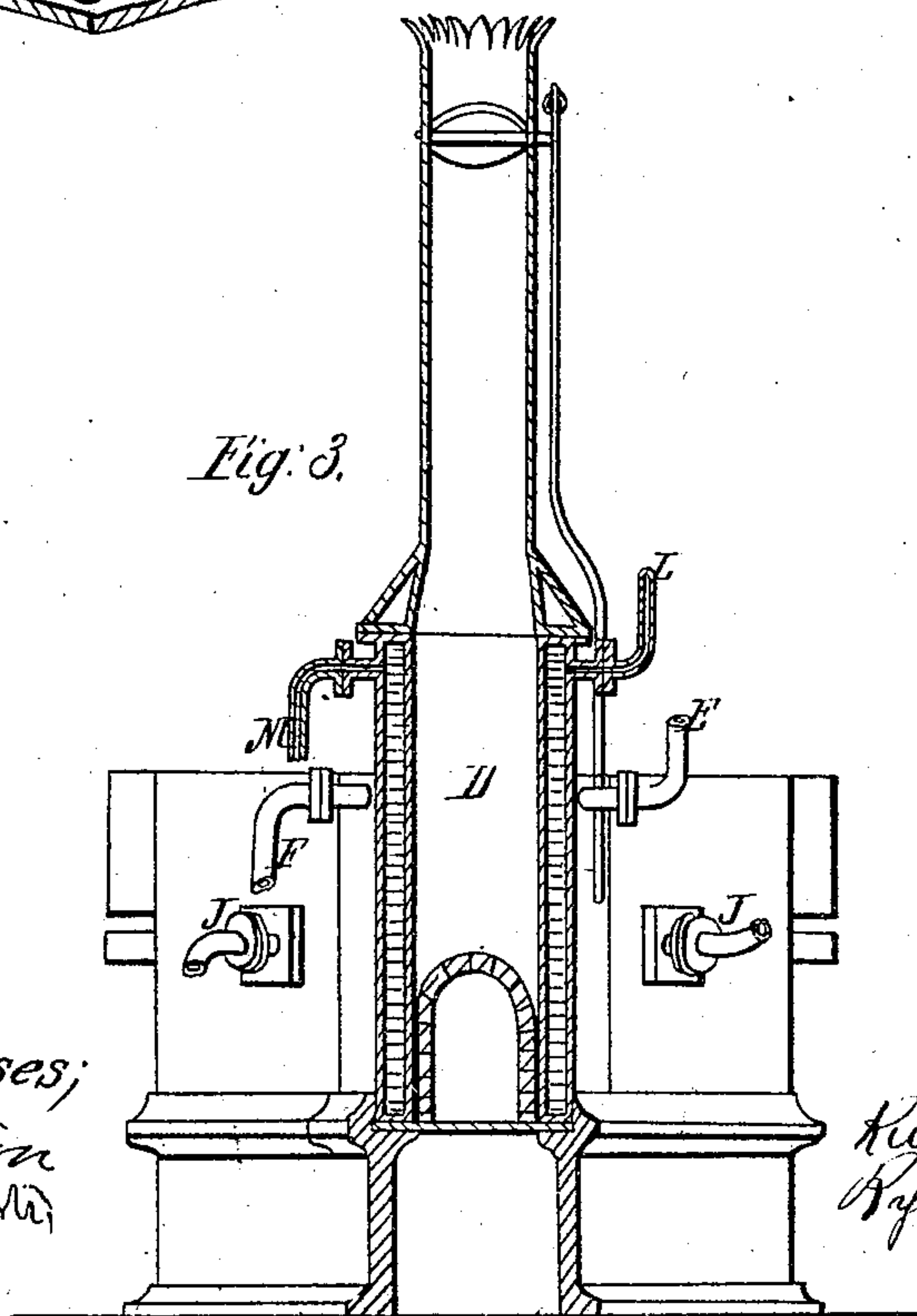
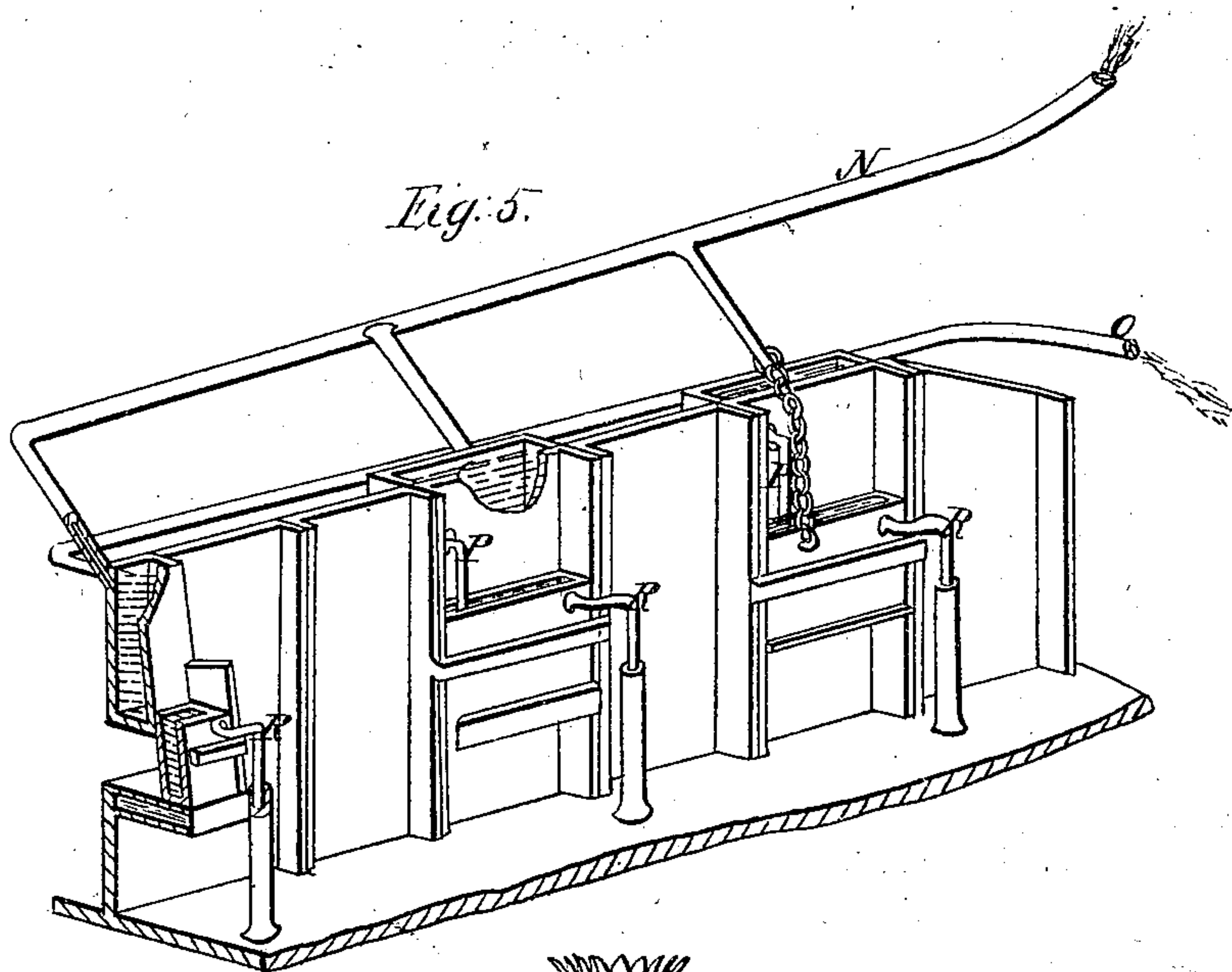


M. S. RIDGWAY & C. LEWIS.
HEATING AND PUDDLING FURNACE.

No. 64,617.

Patented May 7, 1867.



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Nathan R. S. S.

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Fig. 1.

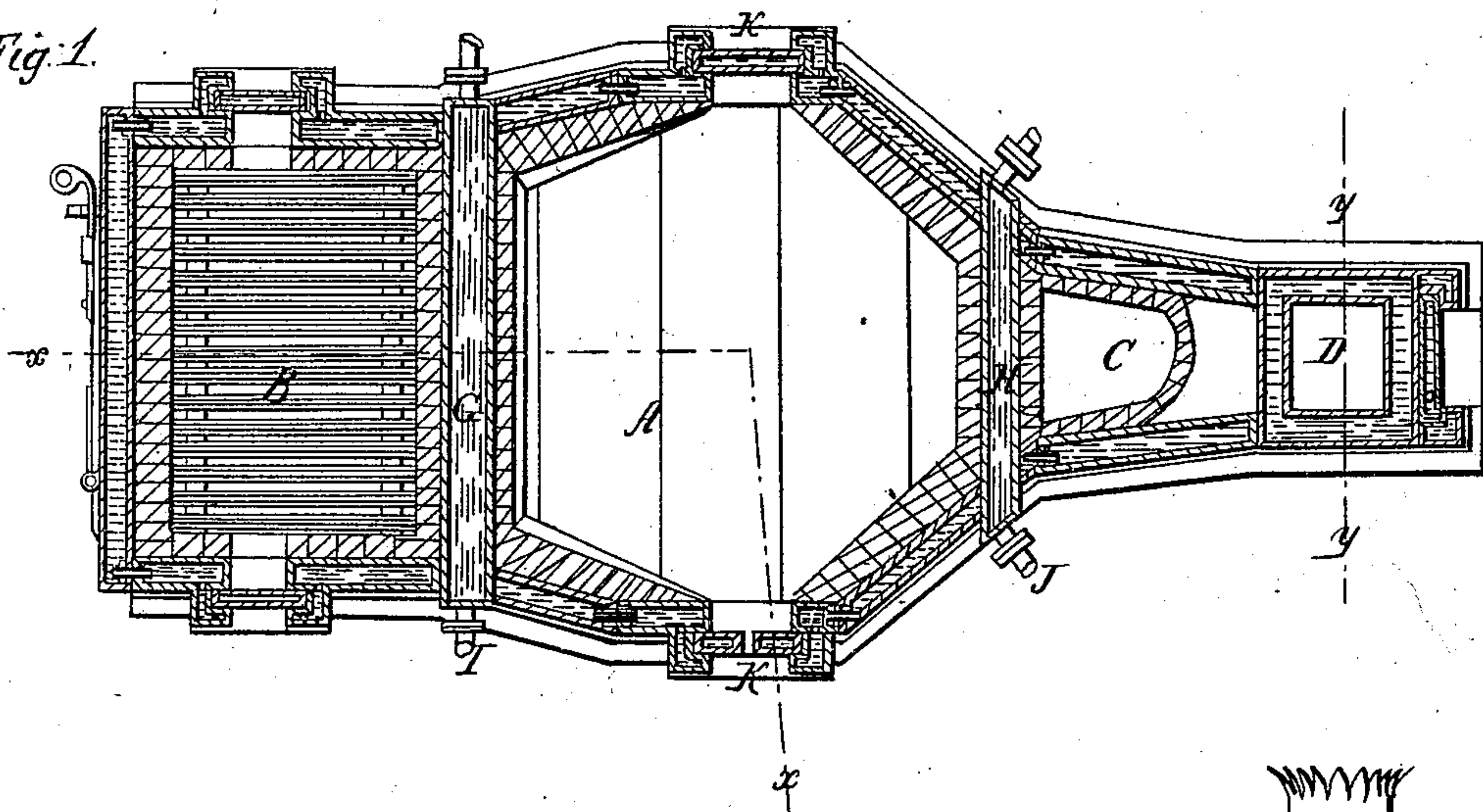


Fig. 4.

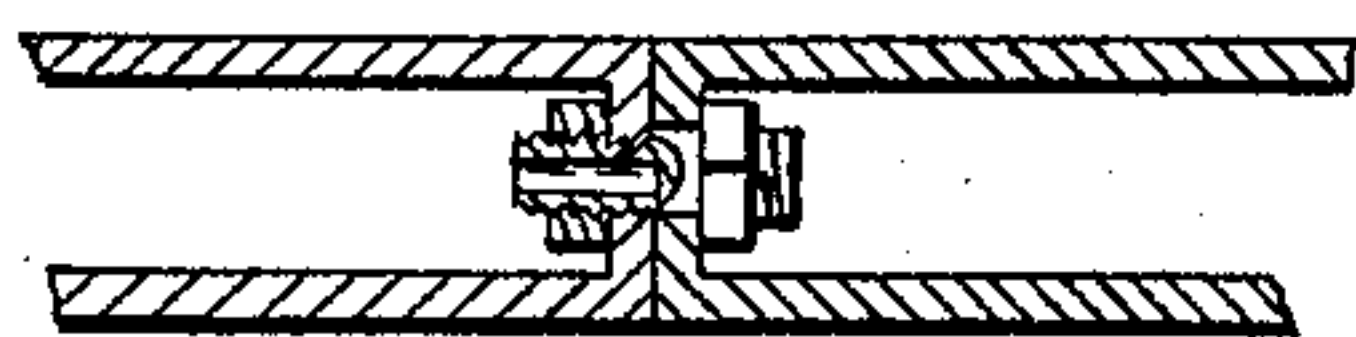
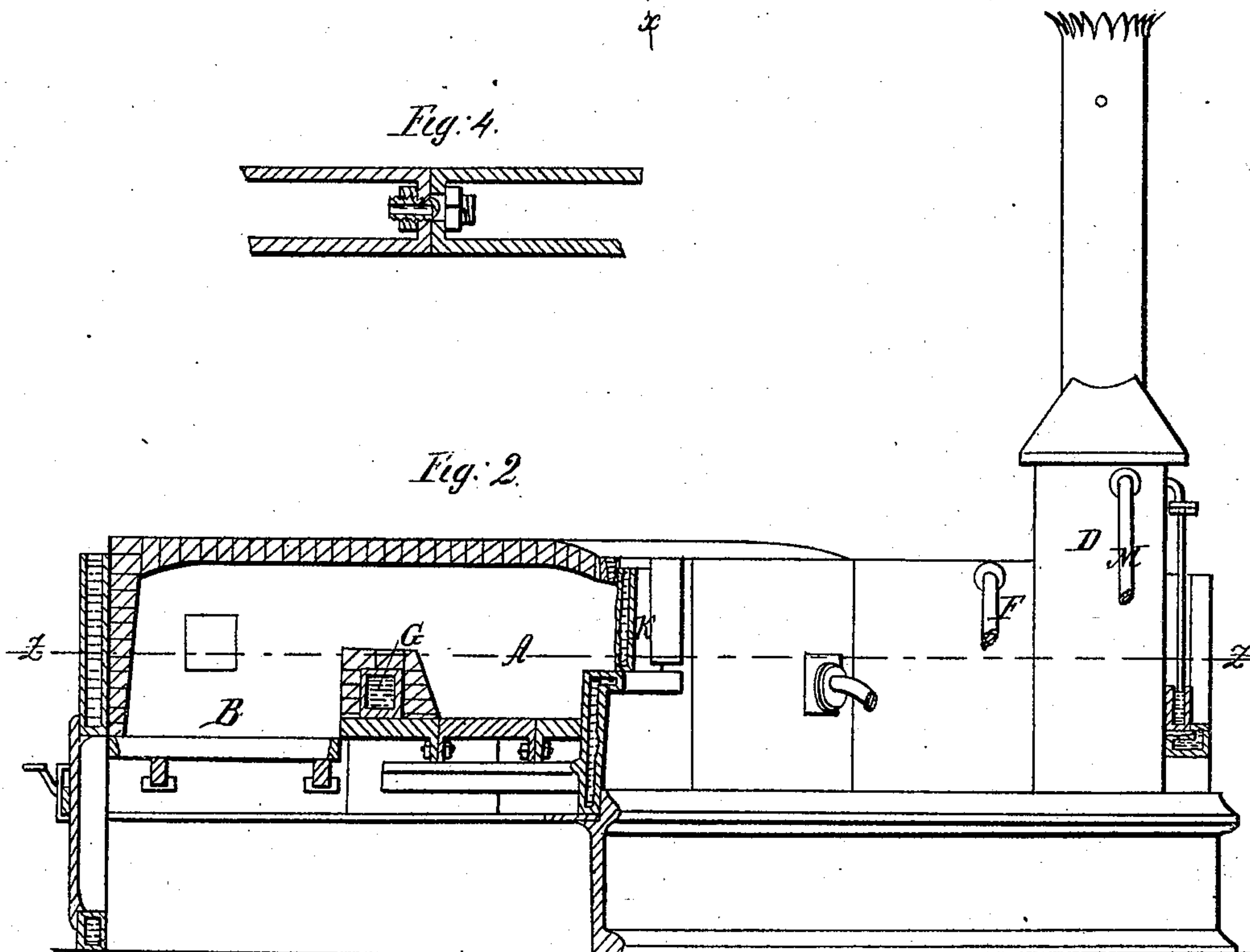


Fig. 2.



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MATTHEW S. RIDGWAY, OF DANVILLE, AND CHRISTOPHER LEWIS, OF
HARRISBURG, PENNSYLVANIA.

Letters Patent No. 64,617, dated May 7, 1867.

IMPROVEMENT IN HEATING AND PUDDLING FURNACES.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that we, MATTHEW S. RIDGWAY, of Danville, in the county of Montour, and State of Pennsylvania, and CHRISTOPHER LEWIS, of Harrisburg, in the county of Dauphin, and State of Pennsylvania, have invented a new and useful improved Heating and Puddling Furnace; and we do hereby declare the following to be a full, clear, and exact description of the same, sufficient to enable others skilled in the art to which it appertains to construct and use the same, reference being had to the accompanying drawings, making part of this specification, and in which similar letters of reference indicate corresponding parts.

Figure 1 is a horizontal section on the line *z z*, fig. 2.

Figure 2 is a section on the line *x x*, fig. 1.

Figure 3 is a vertical section on the line *y y*, fig. 1.

Figure 4 is a horizontal section showing the mode of attaching the sections by hollow bolts to allow the flow of water from section to section.

Figure 5 is a perspective view of one side of a furnace in which door-frames alone and doors are provided with double walls to hold water, the intervening plates being single.

The improvements consist in the double furnace-plates, affording space for a body of water to preserve them and moderate the exterior heat; in the hollow stack-plates furnishing a water-jacket around the stack, preserving it from injury and economizing material; in the door at the base of the stack and opening to the neck of the furnace, for the purpose of clearing it of cinders, &c. The water-plates are especially needed for the frames of the stack-holes, and working-doors, and the fore-plates, but can be applied to all the furnace-plates. The Burgess doors may be used in connection with it, but are not necessary, as the frames being protected the doors will not be materially injured, but the water-doors will not equally protect the frames. The water may be carried through in any direction, but we have shown it inducted at the stack, carried from thence around the furnace between the outer and inner plates and through the interiors of the hollow frames. The furnace-plates are by preference cast double, with cores, and the adjacent plates are united by their edges by hollow bolts with nuts, the hollow bolts being formed of short lengths of gas pipe, by which the water is carried from one hollow plate to another. The arrangement shown in fig. 5 illustrates the mode of conducting the water to the frames, leaving the intervening plates single and unprovided with water-plates, and it also shows the mode of conducting off the overflow of water. The fire-chamber and door-frames have been used with water pipes to cool the adjacent parts, but in that case no provision is made for ascertaining whether the flow of water be continuous, and when obstructions occur the steam generated in the pipes explodes and damages the furnace, as experience has demonstrated. In our arrangement the water-jacket is open above, and the height and condition of the water can be observed, so that the obstruction can be removed and a temporary supply of water poured in above to prevent the overheating and injury of the plates. In this arrangement the bricks of the fire-chamber and furnace are so much protected that a single course (instead of double as usual) will last five times longer than the usual double course, making a great saving in material, labor, and economy of space, as the inner capacity of the furnace is increased by the diminution of the lining. The furnace-plates are set in a shoe at the bottom, and binder-rods are used above. The furnace-plates will last a long time, and not require renewing at intervals of from four to eight weeks, as is commonly the case, and the advantage to the men can hardly be over-estimated, as they are not exposed to any heat which comes through the stopper hole, and are able to continue work in the hottest weather. The hollow frames shown in fig. 5 can be used with either single or double intervening plates, and these double frames may be placed in furnaces already constructed, as the frames are frequently being torn down and renewed, and but little more expense is incurred by putting in these plates in the place of the ordinary frame-plates removed. In the drawings—

A is the heating-chamber; B, the fire-chamber; C, the stack-hole; D, the stack. The furnace-plates shown in figs. 1, 2, and 4, are all hollow, and contain water to preserve them from injury, as has been alluded to. Their adjacent edges, as shown in fig. 4, are drawn closely together by the hollow bolts and nuts, permitting the inter-flow of water from one to another. The water may be introduced at the pipe E, and conducted from thence around the furnace and fire-chamber to the pipe F, or it may be introduced in any other convenient way. The

fire-bridge G and the bridge H of the iron chamber are also made hollow, and supplied with water through pipes I J. We do not claim these hollow water-backs and bridges as new, nor do we claim water-doors.

Great loss is experienced in rebuilding brick stacks, and our improvement will prove a great economy in this respect, for the water-jacket or hollow stack walls will last a long time, and the door K at the base affords a means of reaching the interior at any time to remove clinkers and ashes without picking a hole in the bricks as is commonly practised. L is the induction and M the eduction for the water in the hollow stack. In fig. 5 is shown an arrangement in which only those furnace-plates containing door-frames are made double to contain water, the intervening plates being single. Furnaces constructed in other ways may, when being built over, have the hollow door-frame attached at but little additional expense, and with great advantage in point of durability. The separate supply to each hollow plate is by means of the pipe N and its branches, and the surplus is conducted off by the pipes O. The hollow doors are supplied with water from the double-furnace plate, and the discharge is by means of the pipes R R.

Having described our invention, what we claim as new therein, and desire to secure by Letters Patent, is—

1. The double-furnace plates for containing a body of water to preserve them and moderate the external heat, preventing the wear of bricks, and the breaking of the plates by expansion or contraction, substantially as and for the purpose described.
2. The stack constructed in whole or in part of water-plates, substantially and for the purpose described.
3. The door at the base of the stack for the purpose of allowing the heater or puddler to take out the cinder and other refuse instead of destroying the brick as is now the case, substantially as and for the purpose described.
4. The water-plates in the stack-hole frame, working door-frames, and fire-plate, either or all, substantially as and for the purpose described.

To the above specification of our improvement we have signed our hands this 20th day of March, 1867.

M. S. RIDGWAY,
CHRISTOPHER LEWIS.

Witnesses:

O. KNIGHT,
G. A. MORRISON.