

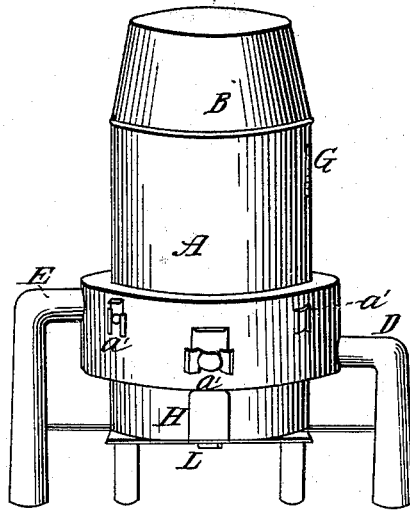
J. & T. INSULL.

Cupola Furnace.

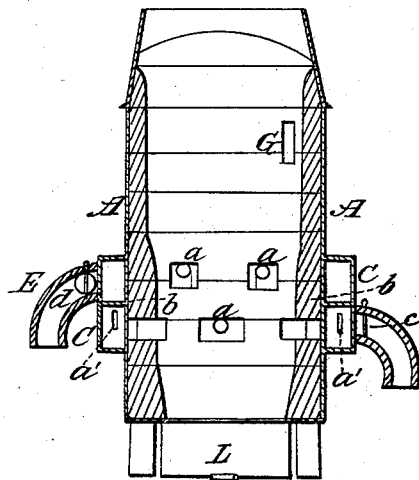
No. 54,552.

Patented May 8, 1866.

*Fig. 1.*



*Fig. 2.*



*Witnesses:*

*William Evans.*  
*P. Fitzgerald.*

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*manf.*

# UNITED STATES PATENT OFFICE.

JOHN INSULL AND THOMAS INSULL, OF NEW HAVEN, CONNECTICUT.

## IMPROVED CUPOLA-FURNACE.

Specification forming part of Letters Patent No. 54,552, dated May 8, 1866.

*To all whom it may concern:*

Be it known that we, JOHN INSULL and THOMAS INSULL, both of the city and county of New Haven, in the State of Connecticut, have invented a new and useful Improvement in Cupola-Furnaces; and we do hereby declare that the following is a full, clear, and exact description of the construction, character, and operation of the same, reference being had to the accompanying drawings, which make part of this specification, in which—

Figure 1 is a perspective view of the front of the furnace when complete and ready to be set on its foundation or pedestal, ready for putting in blast. Fig. 2 is a section of the same, cut vertically through the center, showing the relative positions of the tuyeres, the partition in the belt or hoop, the lining, and two blast pipes or tubes, &c.

Our improvement consists in the use of a hollow hoop or belt surrounding the main shell, in which we fit a partition, so that we can use the blast wholly in the lower portion, or wholly in the upper portion of the belt, or both together, as convenience may require; and in so fitting the lining that the lower portion of the furnace may be considerably less in diameter than that above it, for the saving of fuel and rendering the furnace more convenient to work in several respects.

We make the main shell A of the furnace of sheet-iron or any other suitable material, substantially of a cylindrical form to near the top, where we taper it, as at B, all as shown in Fig. 1 and indicated in Fig. 2, in which we make a suitable number of apertures for the tuyeres, as shown at *a a*, &c., 2, and one or more apertures or doors near the top, as indicated at G, Figs. 2 and 1, where the charges are to be passed in in the usual way; and at the bottom we also make an aperture or door, as H, Fig. 1, through which we draw or let out the charge of melted iron in the usual way; and we also make a slag-hole in the bottom, which may be closed by a hinged plate, as shown at L, Fig. 2, and indicated at L, Fig. 1, which may be secured in any suitable way.

We fit horizontally onto this main shell A,

near its lower end, a hollow belt or hoop, as seen at C, Fig. 1, and indicated in section at C C, Fig. 2. In this belt C we fit a partition which passes horizontally around the shell, and completely divides the belt C into two portions, which have no communication, as indicated at *b* and *b*, Fig. 2, and through this belt C we make apertures to correspond with those in the main shell, as indicated at *a' a'*, &c., Figs. 1 and 2.

In at least one of the apertures or tuyeres in each portion of the belt C—that is, below and above the partition *b* and *b*—we insert a blast pipe or tube, as shown at D in the lower, and E in the upper portion, in each of which we fit a valve, as shown at *c* and *d*, Fig. 2, so that either or both may be shut when necessary.

We line the shell A from bottom to top with fire-brick or any other suitable material, as indicated in section in Fig. 2, making the lining in the lower portion considerably thicker, as represented in Fig. 2, to lessen the diameter, and consequently the capacity, of the furnace in that part to save fuel, and also to make the furnace easier to manage and better for standing.

We set this furnace on a proper foundation, when, by attaching two or more blast pipes or tubes, as D and E, Figs. 1 and 2, and closing the other apertures or tuyeres, the furnace is ready for use or to be put in blast.

We kindle the fire in the usual way by blowing through the blast-pipe D, below the partition *b*, till the fire is blown up to the upper tuyeres, (during which time we close the valve *d* in the blast-pipe E,) and when the fire is blown up to the upper tuyere the valves *d* in the blast-pipe E should be opened—that is, turned to the position shown at *d*, Fig. 2, and another blast sent in through the pipe E, when the fire may be blown by the two blast-pipes D and E up to the desired height, and continued at pleasure; and when the fire is blown up sufficiently for that purpose, the charges of iron or ore, flux, coal, &c., may be inserted at the upper aperture, G, Fig. 2, in the proper order, quantity, and time, as is usual or as the judgment may dictate.

When we have a sufficient quantity of iron melted and all is ready, we tap the furnace at the lower aperture or door, H, Fig. 1, and draw off the charge in the usual way.

What we claim as our invention, and desire to secure by Letters Patent, is—

The hollow hoop or belt C C, with its partition *b b*, in combination with the blast-pipes D and E and their tuyeres, when the whole is

constructed, arranged, and fitted to operate substantially as herein described.

JOHN INSULL.

THOMAS <sup>his</sup> + INSULL.  
mark.

Witnesses:

R. FITZGERALD,  
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