# A. PEVY.

## Cupola Furnace.

No. 50,623. Patented Oct. 24, 1865.

Fig. 1.

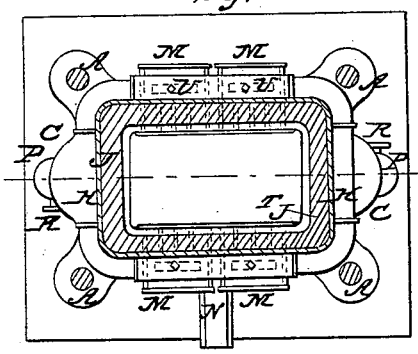


Fig. 4.

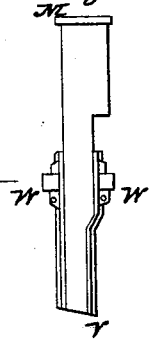


Fig 5

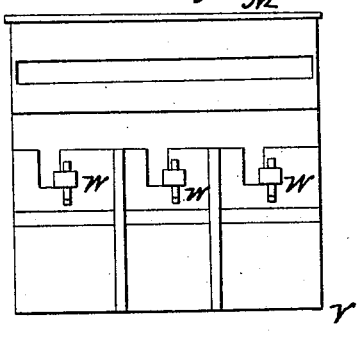


Fig. 2.

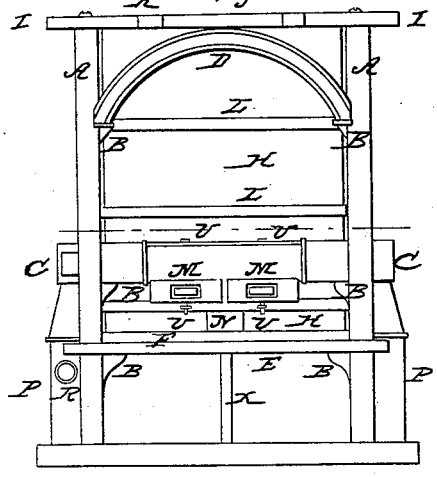
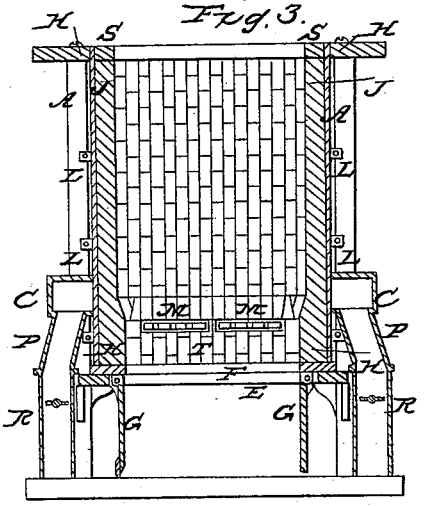


Fig. 3.



Witnesses:
J. M. Reigart
John C. Parker

Inventor:
Abel Pevy
by his Atty S. Franklin Reigart

# UNITED STATES PATENT OFFICE.

ABIEL PEVEY, OF LOWELL, MASSACHUSETTS.

## IMPROVED CUPOLA-FURNACE.

Specification forming part of Letters Patent No. **50,623**, dated October 24, 1865.

*To all whom it may concern:*

Be it known that I, ABIEL PEVEY, of Lowell, in the county of Middlesex and State of Massachusetts, have invented an Improved Cupola for Melting Iron; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making part of this specification—

Figure 1 being a horizontal section of the furnace in a plane indicated by the line *x x*, Fig. 2; Fig. 2, a side or front elevation thereof; Fig. 3, a longitudinal vertical section of the same in a plane indicated by the line *y y*, Fig. 1; Fig. 4, a side-edge view of one of the tuyeres; Fig. 5, a top view of the same.

Like letters designate corresponding parts in all of the figures.

The purpose of my invention is to produce a cupola-furnace of any required capacity, and to supply a blast or air thereto equally, evenly, and sufficiently to all parts of the iron, so as to melt the most iron with the least coal and in the shortest time, and produce a uniform quality of iron to the end of the "heat." To obtain these ends it is necessary that no portion of the interior of the furnace should be beyond the reach of the free circulation of the blast, so that the width of the interior of the furnace in practice can hardly exceed two feet, as experience teaches. With such a width, and tuyeres on both sides, the center of the furnace is only one foot from the mouth of a tuyere on each side. Hence, with ordinary constructions, a limit to the capacity of the furnace is quickly reached, and no furnace much exceeding the transverse dimensions above mentioned can be used to advantage. Again, to produce these results in a sure and perfect manner, the blast must be distributed to all parts of the mass in the furnace evenly and uniformly by a corresponding arrangement of tuyeres. Besides a uniform distribution of the blast, it is also necessary to the same ends that the blast shall have equal strength at all points.

The nature of my invention to effect these purposes consists in extending the furnace lengthwise, with straight parallel sides, or nearly so, to any length required for a given capacity, keeping the width within such dimensions as to enable the center to be thoroughly reached by the blast; and in applying the blast, evenly balanced at both ends, along both sides the entire length of the furnace, or so as to distribute it uniformly and equally through the entire length thereof, but not at the ends of the furnace, which are plane surfaces at right angles to the sides.

The stock J is supported by a suitable frame, A, of cast-iron, provided with bracket-supports B B B, on which base-plates E F, the wind-chest C, and arched braces D D, which strengthen the top of the cupola, respectively rest. The bottom plate, F, directly supports the stock and its iron casing H, which is made of separate sections or staves bolted to a rim or flange of the plate. The casing is hooped with adjustable iron bands L L, and the whole stock is bound at the top by a cap-plate, I. The stock and casing are supported at the sides by cross-bars of iron, with sustaining-ledges over the apertures for the reception of the tuyeres M M, which are attached to the under side of the wind-chest C each by a single screw-bolt, U, passing down through both and secured by a nut. Thus each tuyere is readily removable separately for repairing or replacement, when necessary. These tuyeres are arranged along the whole length at each side of the furnace, so as to reach close to each end, leaving only just enough space to be supplied by the equal expansion and spread of the blast. Each tuyere has, say, three or four air-passages extending inward perpendicularly to the inner sides of the furnace, thus distributing the blast evenly in each, and directing it straight inward. Its upper plate is made removable and adjustable, so as to allow it to be set farther inward than the rest of the tuyere, and thus prevent the iron from flowing into the tuyere, and, being more exposed to intense heat than the rest of the tuyere, it can thus be removed and replaced at pleasure, the other parts remaining good much longer. These plates are secured by clamp-hooks and wedges W W, Figs. 4 and 5, or by an equivalent device. There is a separate plate for each division of the tuyere. The bottom plates may be also adjustable and removable in like manner.

The tuyeres have glass or mica windows in their outer ends, as shown in Fig. 2, so that the state of melting in the furnace may be viewed at any time.

This construction and arrangement of the

tuyeres enable the sides of the furnace to be extended to any length, so as to produce the largest capacity required, while the inside width thereof remains uniform, generally not exceeding twenty-four inches. The ends are square across, only rounded a little at the corners, for convenience, and no blast is introduced through them, since entering at right angles to the wind entering through the side tuyeres such end blast would interfere with the even distribution of the blast by its cross-currents.

To complete the structure for the indefinite extension of the sides of the furnace and the even distribution of the blast the air is supplied to the wind-chest C (which goes around the entire furnace) through two pipes, P P, each provided with a valve, by which the quantity and force of air through both may be equalized and balanced.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. A cupola having parallel sides and plane ends, the sides being extended to the length required for any desired capacity of furnace, and the blast being distributed uniformly along their whole length, but not at the ends, substantially as and for the purpose herein specified.

2. Supplying the air to the wind-chest of the tuyeres, through a pipe at each end of the furnace, each provided with a valve, so as to insure thereby a balanced and uniform blast through all the tuyeres, for the purpose herein set forth.

3. The construction and arrangement of the tuyeres, substantially as and for the purposes herein specified.

ABIEL PEVEY.

Witnesses:
C. L. ANDERSON,
WM. H. HARD.