T. GIDLOW & J. ABBOTT.

Puddling and Balling Furnace.

No. 203,724. Patented May 14, 1878.

Fig. 1

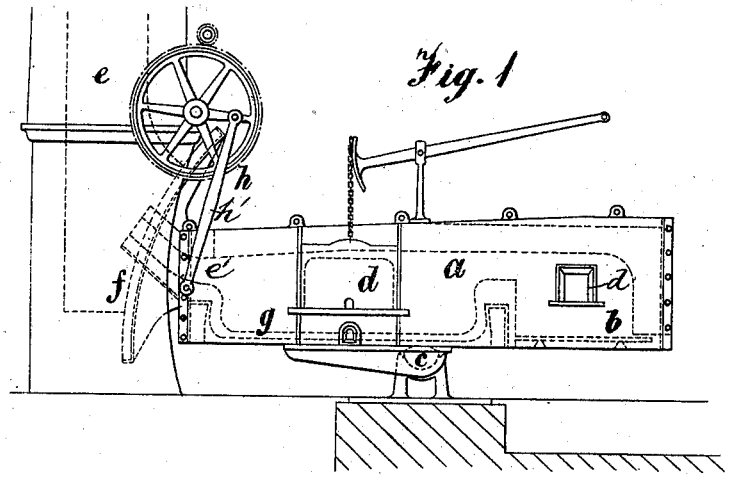


Fig. 2

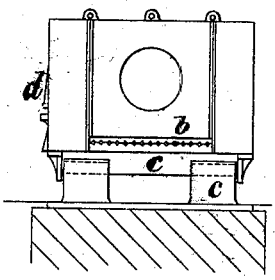


Fig. 3

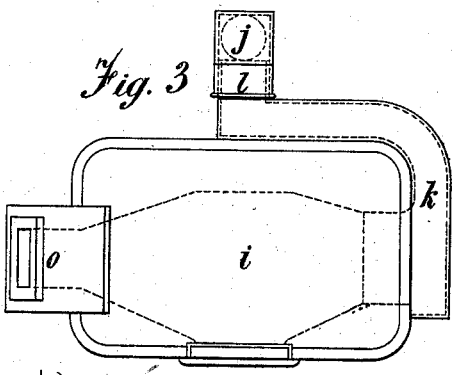


Fig. 4

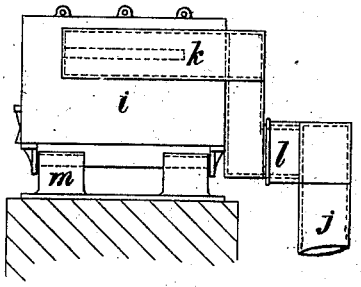


Fig. 5

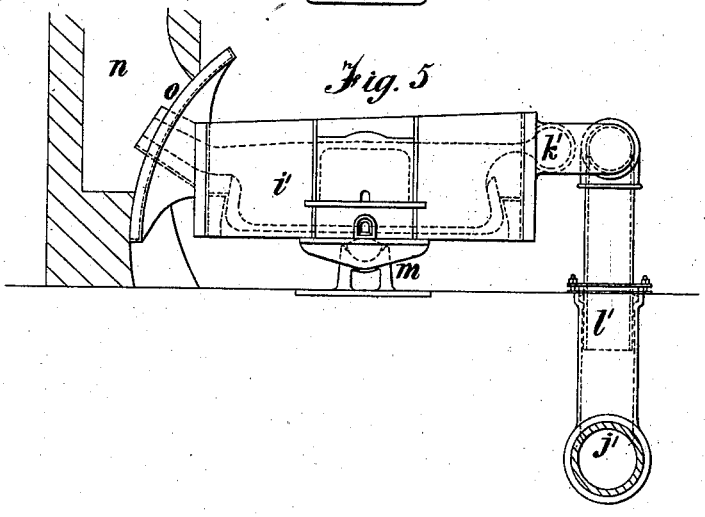
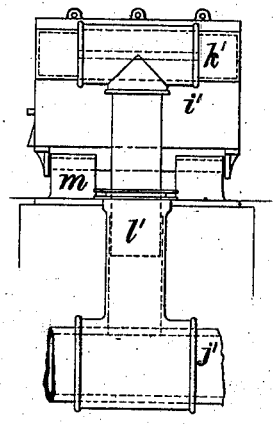


Fig. 6



Witnesses

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UNITED STATES PATENT OFFICE.

THOMAS GIDLOW, OF HOLLYWOOD, AND JAMES ABBOTT, OF INCE, ENGLAND.

IMPROVEMENT IN PUDDLING AND BALLING FURNACES.

Specification forming part of Letters Patent No. **203,724**, dated May 14, 1878; application filed September 20, 1877; patented in England May 24, 1877.

To all whom it may concern:

Be it known that we, THOMAS GIDLOW, of Hollywood, and JAMES ABBOTT, of Ince, both in the county of Lancaster, England, have invented a new and useful Improvement in Puddling and Balling Furnaces, for which English Patent No. 2018 of 1877 was granted, and which improvement is fully set forth in the following specification, reference being had to the accompanying drawings.

This invention has for its object to provide a furnace in which iron or steel shall be puddled and balled automatically and in an efficient manner without the aid of skilled workmen.

Heretofore attempts to construct furnaces in which iron and steel should be puddled and balled economically and automatically through the motion given to the molten metal by means of rocking or rotating hearths have not succeeded commercially on account of the difficulty of keeping the moving parts within the furnace subject to the action of the heated gases and products of combustion in working order.

In carrying our invention into practice, we proceed as follows: Under one modification we take a puddling and balling furnace and fire-grate of ordinary construction. We strengthen the bottom of such furnace by means of metal plates or girders, and we mount the said furnace at or about the center of its length on bearings, and we give a rocking, oscillating, or vibrating motion to such furnace from any suitable motive power. To provide a passage for the heated gases and products of combustion from the furnace to the chimney or flue, we employ a movable neck.

Figure 1 is a side elevation, and Fig. 2 an end view, of a furnace constructed as above described.

a is the hearth; *b*, fire-grate, separated from the hearth *a* by the bridge. Sides, ends, and roof of furnace may be of the usual construction. The said hearth and fire-grate, as well as the sides, ends, and roof, are supported and held together by a strong frame-work which passes under the bottom of the furnace, the whole of the said furnace being supported and free to rock or oscillate on the bearing *c*.

d' is the fire-door; *d*, furnace-door; *e'*, opening leading to the chimney *e*, through which the products of combustion and heated gases pass. *o* is a neck or connecting-piece, formed with a convex end piece, *f*, fitting into a concave recess in the chimney, so as to make a tight joint during the rocking or oscillating of the furnace. *h* is a spur-wheel, driven by any convenient power, and connected to the furnace by the rod *h'*, so as to give a vibrating motion thereto.

In practice the furnace is caused to give about five or six oscillations per minute; but the number of such oscillations will vary according to the quality of iron being treated, inferior pig generally requiring a less number of oscillations than pig of a better quality. We also find that the furnace works better and gives superior results, and more homogeneous iron is produced when one kind of pig only is treated at one time.

The great advantage obtained in the use of a furnace constructed as before described consists in the large quantity of pig that can be reduced at one time, and this on account of the undulating motion given by the oscillation of the furnace to the molten iron, so as to expose a large amount of surface to the action of the heated gases and products of combustion.

In practice the furnace is caused to oscillate as soon as the pig-iron in the hearth becomes about half melted, and the action is then continued until the reduction of such iron has been completed. When the iron has reached the pasty condition, a workman assists the balling of the iron by turning the same over by means of a rabble or like appliance inserted through the furnace-door, the motion of the furnace greatly assisting such balling process. When the balling is completed, the finished iron is removed and a charge of pig-iron is substituted.

We find that the melting of the pig-iron is greatly assisted if the furnace is allowed to stand in an inclined position with the said pig in the hearth on a higher level than the fire-grate.

It will be obvious that the arrangement of dampers, doors, bridges, and other parts may be greatly altered and modified under our invention.

Under a modification we substitute a pipe or pipes conveying a combustible gas or gases and air to the furnace for the fire-place before described. Figs. 3, 4, 5, and 6 illustrate this arrangement; *i i'*, furnace; *j j'*, stationary pipes from combustible gas or vapor reservoir; *k k'*, pipes through which the combustible gases or vapors enter the furnaces; *l l'*, joints connecting the pipes *k k'* with the pipes *j j'*. *l* is a rocking joint, and *l'* is a sliding joint; *m*, bearings; *n*, chimney; *o*, connection between chimney and furnace. The combustible gas or gases and air are ignited at *p*, where they enter the furnace and serve the same purpose as the heated gases and products of combustion from the fire-place described under Figs. 1 and 2.

Having now particularly described the nature of our invention, so that others will be enabled to carry our improvements into effect, we claim—

1. A puddling or balling furnace having a suitable combustion-chamber, the whole mounted on transverse bearings at or about the center of its length, and adapted to vibrate or oscillate, substantially as and for the purpose specified.

2. The within-described puddling or balling furnace, mounted or suspended on transverse bearings, so that it can rock or vibrate, and provided with a segmental or convex shield for forming a tight joint with the chimney during the vibration of the furnace, substantially as specified.

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Witnesses:
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