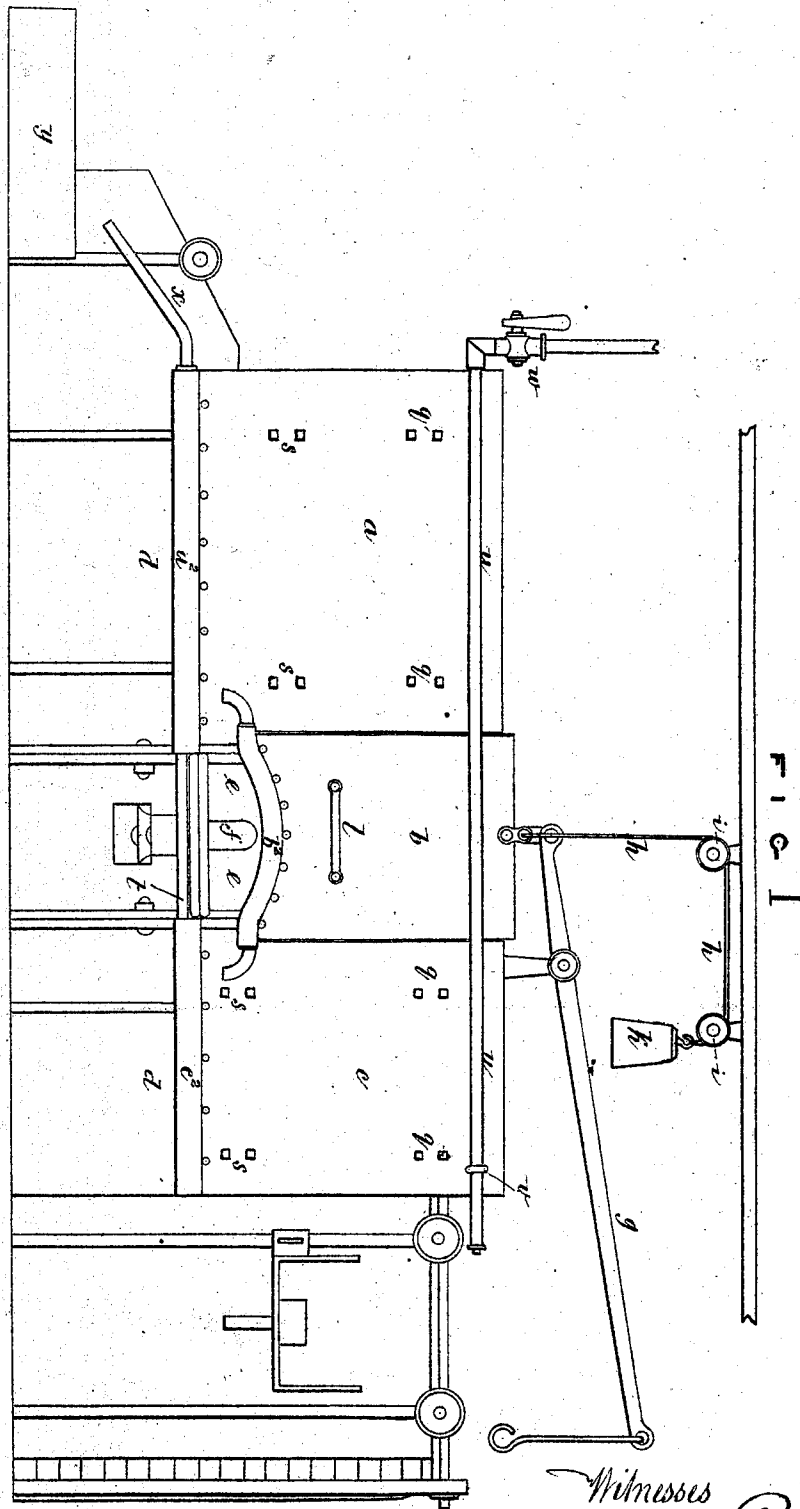


A. POLLOK.
Improvement in Puddling and other Furnaces.
No. 119,182. Patented Sep. 19, 1871.



Administrator

A. Pollok

Witnesses
Mauller & Co.
C.B. Nottingham

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 Improvement in Puddling and other Furnaces.
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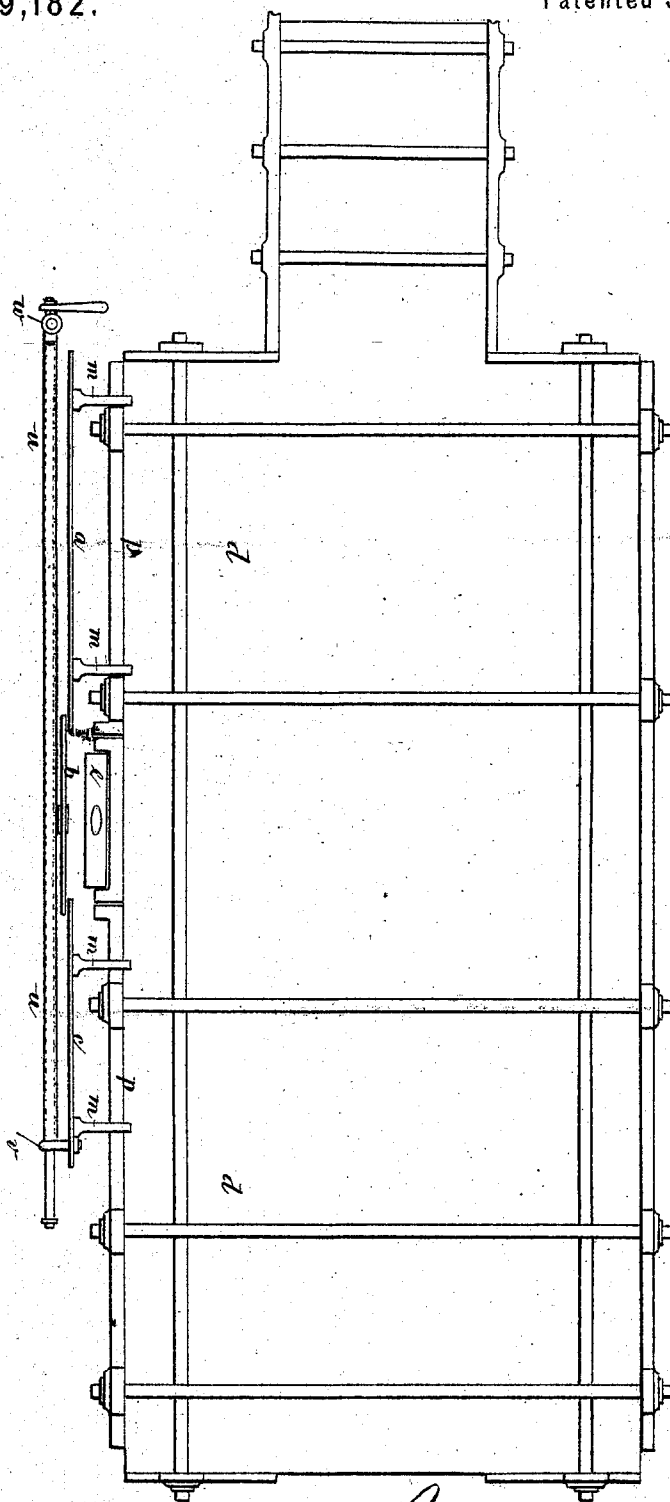


FIG. II

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 Ch. B. Nottingham.*

Improvement in Puddling and other Furnaces.

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FIG III

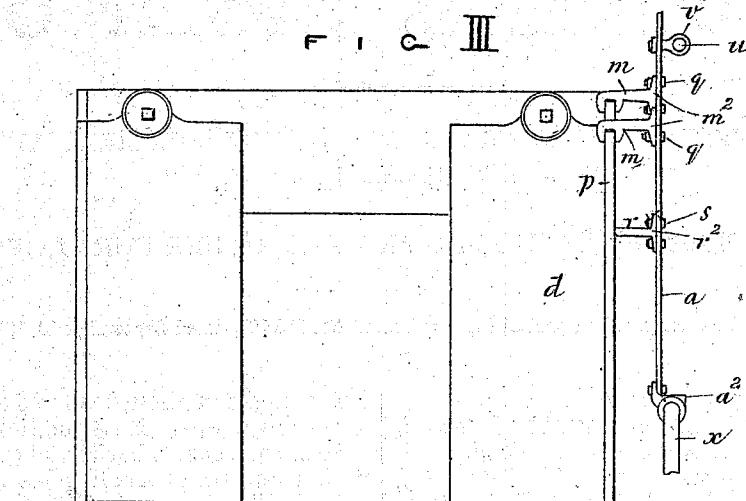


FIG IV

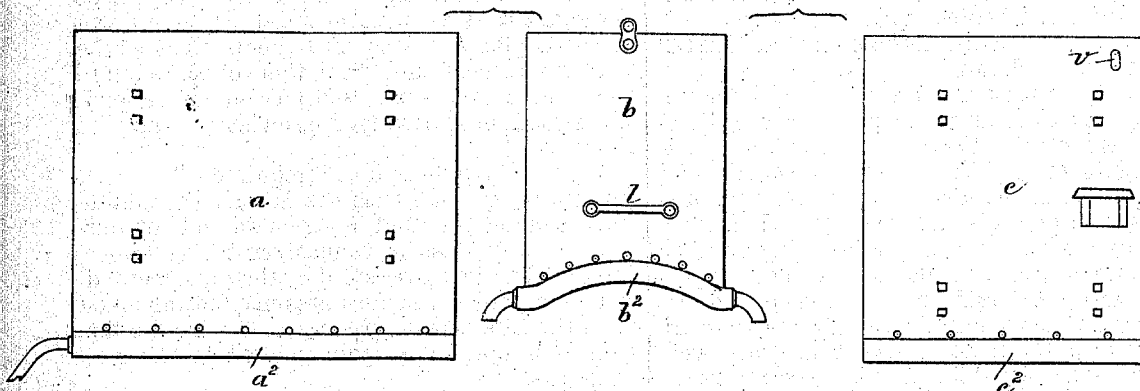


FIG V

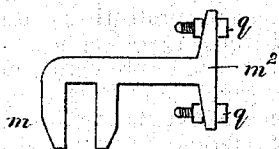


FIG VI

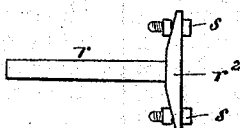


FIG VII



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Witnesses,

Marshall Bailey
C. B. Nottingham

UNITED STATES PATENT OFFICE.

ANTHONY POLLOK, OF WASHINGTON, DISTRICT OF COLUMBIA, ADMINISTRATOR
OF JAMES RUSSELL, DECEASED.

IMPROVEMENT IN PUDDLING AND OTHER FURNACES.

Specification forming part of Letters Patent No. 119,182, dated September 19, 1871.

To all whom it may concern:

Be it known that JAMES RUSSELL, deceased, late of Forest Vale Iron Works, Cinderford, near Newnham, in the county of Gloucester, England, during his lifetime invented or discovered new and useful improvements in or additions to puddling-furnaces, heating-furnaces, balling-furnaces, and other furnaces used in the manufacture of iron and steel and other materials, which improvements or additions may also be applied to the furnaces of stationary and marine-boilers and other heated surfaces.

The nature of the invention of the said JAMES RUSSELL is as follows:

The said invention consists of the improvements in or additions to the said furnaces hereinafter described; the object of the said improvements or additions being to screen and protect the puddler or workman from the distressing heat of the said furnaces to which he is ordinarily exposed during the puddling or other operation performed in the said furnaces.

I will describe the said invention as applied to a puddling-furnace. Parallel to and at a short distance from the front of the furnace three vertical screens are supported, two of the said screens covering the front of the furnace on either side the puddling-door, and the third screen nearly covering the said door, the hole in the said door through which the puddler's rabble passes being left exposed. Each screen is made, by preference, of a plate or slab of cast or wrought-iron. The edges of the middle screen or plate project over the inner edges of the side screens or plates, and the said middle screen is supported by a chain passing over pulleys and provided with a counterbalance weight. The side plates or screens are supported in front of the furnace by being hooked or otherwise fastened thereto. The heat radiated from the furnace at that side at which the puddler stands during the puddling operation is received upon and absorbed by the screens or plates described, and the said puddler is thus protected from the distressing heat of the said furnace.

The protecting plates or screens are kept cool by the following arrangement: At the bottom edge of each plate and at the outer side thereof a trough is fixed, the trough of the middle plate or screen being situated above, and its ends projecting over the troughs of the side plates or screens.

The troughs of the side plates are connected together by a pipe. Near the top and outside the plates or screens is a horizontal water-pipe, pierced with a number of small holes a short distance apart. This water-pipe is supplied with water under pressure, a stop-cock regulating the passage of the water. The water from the said pipe is projected in the form of a series of small jets onto the outer side of the screens or protecting plates of the furnace and runs down the said plates in a continuous stream, and thereby keeps the said plates cool. The water running down the said plates passes into the troughs at the bottoms thereof, and from thence escapes into the bosh or water-box used for cooling the puddler's tools, or is conveyed elsewhere, as may be required.

When the puddling-door is required to be raised for removing a ball from the furnace the middle plate or screen is lifted by its chain and counterbalance weight so as to uncover the said door, the said door being replaced by the same method. When required, the side plates may be unhooked from the side of the furnace, and when the furnace is in operation again hooked to the said furnace.

Having explained the nature of the said invention, I will proceed to describe, with reference to the accompanying drawing, the manner in which the same is to be performed.

Figure 1 represents in front elevation, Fig. 2 in plan, and Fig. 3 in end elevation a puddling-furnace, to which screens or protecting plates according to the said invention are applied. Fig. 4 represents the said screens or protecting plates detached from the furnace; and Figs. 5, 6, and 7 are details of the same, as hereinafter described.

The same letters of reference indicate the same parts in the several figures of the drawing.

a b c are three screens or protecting plates, supported parallel to and at a short distance from the front of the furnace *d*. The screens or plates *a c* cover the front of the furnace on either side the puddling-door *e*, while the other and middle screen or plate *b* nearly covers the said puddling-door *e*, the hole *f* in the said door, through which the puddler's rabble passes, being left exposed.

The screens or protecting plates *a b c* are represented in Fig. 1 in the relative positions which they occupy when the furnace is ready for work. The puddling-door *e* is raised by the lever *g* in

the ordinary way. The edges of the middle screen *b* project over the inner edges of the side screens or plates *a c*, as best seen in the plan in Fig. 2. The middle screen *b* is supported by a chain, *h*, passed over the pulleys *i i*, the said chain having at its end a counterbalance weight, *k*. By depressing the screen or plate *b* by means of the handle *l* the said screen can be brought to the proper position for the working of the furnace, and by raising the said screen by the handle *l* it may be placed out of the way for the purpose of opening the puddling-door *e* to remove a ball from the furnace. Each of the side plates *a c* is fastened and supported in its place by the two hooks *m m*, near its top. One of these hooks is represented on a larger scale in Fig. 5. The fastening-hooks *m* engage with the top edges of the ordinary furnace-plates *p p* in the manner best seen in the end elevation, Fig. 3. The screens or plates *a c* are fastened to the hooks *m* by means of screw-bolts and nuts *q* passed through the said screens or plates and the flanges *m²* of the said hooks, the flat faces of the flanges abutting against the inner sides of the screen-plates *a c* in the manner represented in Figs. 2 and 3. The vertical position of the screen-plates *a c* is adjusted by the distance-bolts *r* near the bottoms of the said screen-plates. One of these distance-bolts is represented on a larger scale in Fig. 6. The stems of the bolts *r* are inserted and fixed in the furnace-plates *p p*, and the screen-plates are fastened to the flanges or heads *r²* of the said bolts *r* by screw-bolts and nuts *s*. Each of the screen-plates *a b c* is provided at bottom and on its outer side with a trough marked, respectively, *a² b² c²*, the said troughs being riveted or bolted to the said plates. An end elevation of one of these troughs is represented on a larger scale, detached, in Fig. 7. The ends of the trough *b²* of the middle screen *b* project over the troughs *a² c²* of the outer or side screens *a c*. The troughs *a² c²* are connected together by the pipe *t*. The screens or protecting plates *a b c* are kept cool during the use of the furnace by the horizontal water-pipe *u* at the top and outside the said screens or plates. The pipe *u* is supplied with water under pressure, and is supported at one end by the eye or bracket *v* and at the other end by the supply-pipe. The passage of the water is regulated by the stop-cock *w*. That part of the water-pipe *u* which is presented to the screens or plates *a b c* is pierced with a number of small holes, through which holes a series of small jets of water are projected onto the outer sides of the screens or protecting plates, the said water running down the said plates in a continuous stream. The water passes from the screens into the troughs *a² b² c²*, and from thence is conveyed by the pipe *x* into the bosh or water-box *y*, used for cooling the puddler's tools. The same quantity of water usually supplied to the ordinary bosh or water-

box for cooling the puddler's tools is sufficient for keeping cool the protecting screens or plates.

When the furnace is in use, the heat radiated therefrom at that side at which the puddler stands is received upon and absorbed by the screens or plates *a b c* and the puddler thus protected from the heat of the furnace, the said screens or protecting plates being kept cool by the jets of water projected upon them from the water-pipe *u*. The same set of screens or protecting plates may be used for several puddling-furnaces.

When it is required to remove the screen-plates from the furnace, for applying them to another furnace or for other purpose, it is only necessary to detach the middle screen *b* from its chain *h* and unhook the plates *a c* from their bearings on the top of the ordinary furnace-plates *p p*. If, however, the hooks in use at one furnace are not suited to the shape or position of another furnace to which the screen-plates are to be applied, it is then necessary to remove the screw-bolts of the fastening-hooks *m* and distance-bolts *r* of the side plates or screens *a c* and substitute for them hooks and distance-bolts proper for the purpose.

The invention is not limited to the number, position, or means of fixing and supporting the screens or protecting plates of the furnace; nor to making the middle screen or plate capable of a vertical sliding motion, as the said middle screen or plate may have a lateral motion given to it to remove it from the front of the puddling-door when access to the furnace is required.

In applying the said invention to balling-furnaces and other furnaces used in the manufacture of iron and steel and other materials, and to boiler-furnaces and other heated surfaces, the arrangement or combination of parts described and represented is adopted, such changes of detail only being made as will fit the said parts to the particular furnace to which they are to be applied.

Having now described the nature of the said invention and the manner in which the same is to be performed, I wish it understood that I do not limit myself to the precise details herein described and illustrated, as the same may be varied without departing from the nature of the said invention; but

I claim, as the invention of the said JAMES RUSSELL, the improvements in or additions to puddling-furnaces, heating-furnaces, balling-furnaces, and other furnaces and heated surfaces hereinbefore described and illustrated in the accompanying drawing, that is to say—

The combination, with the said furnaces, of one or more vertical screens or protecting plates, cooled by means of spray or jets of water, substantially in the manner described and illustrated.

ANTHONY POLLOK, [L. S.]

Witnesses:

Administrator.

M. BAILEY,

C. B. NOTTINGHAM.

(64.)