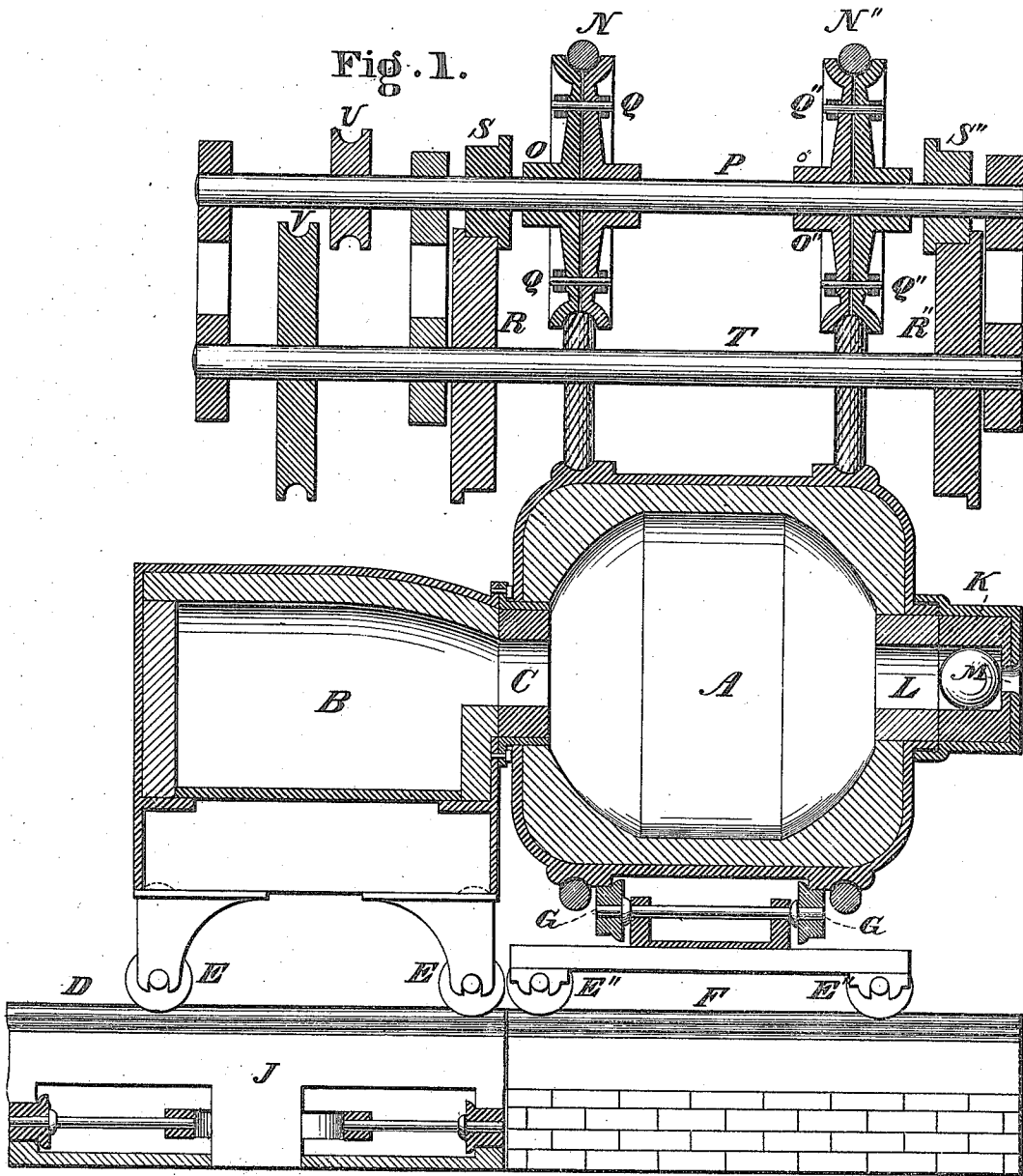


L. S. GOODRICH.

Revolving Puddling-Furnaces.

No. 134,268.

Patented Dec. 24, 1872.



Witnesses.

L. S. Goodrich
W. C. Hillman

Inventor.

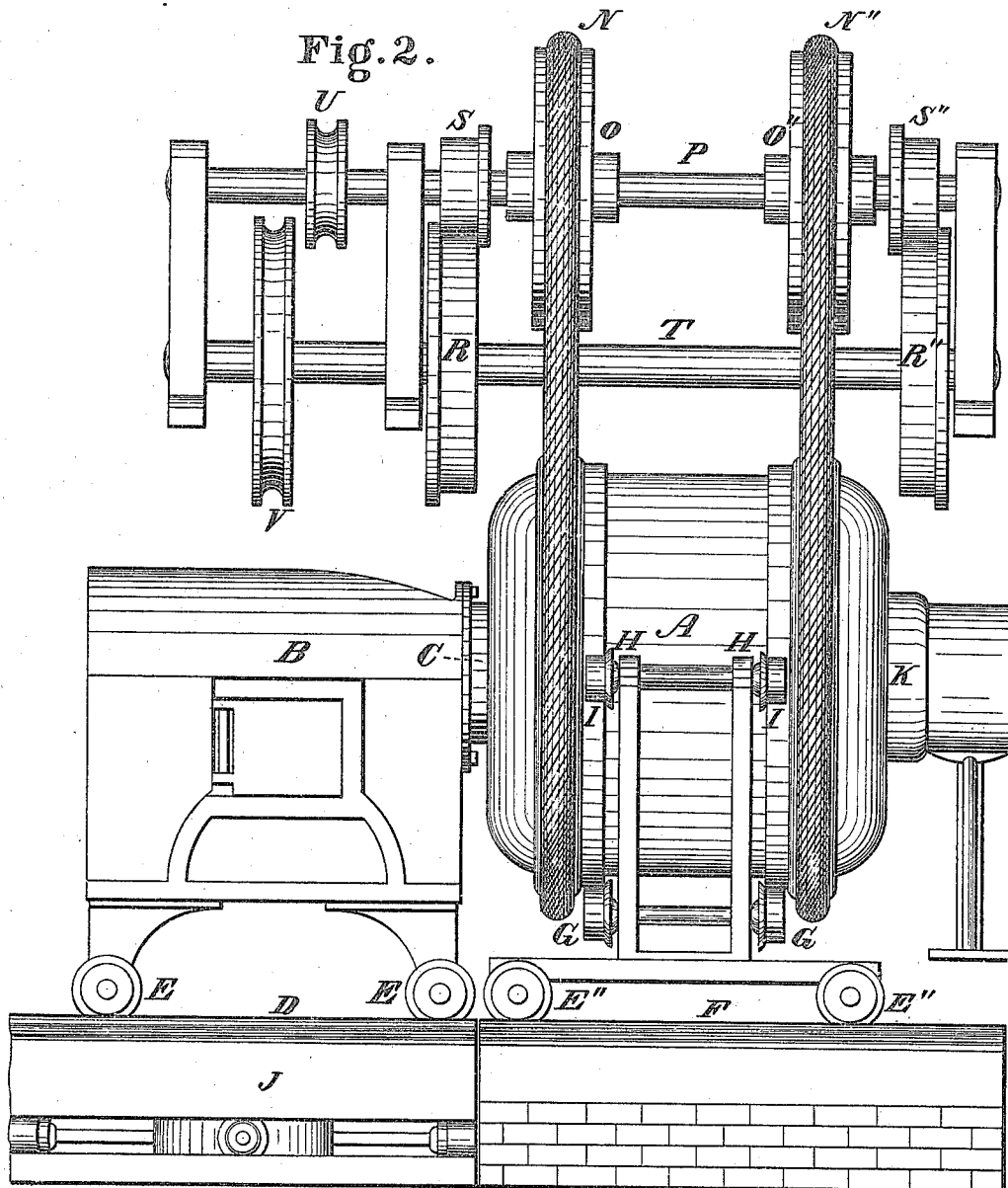
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Fig. 3.

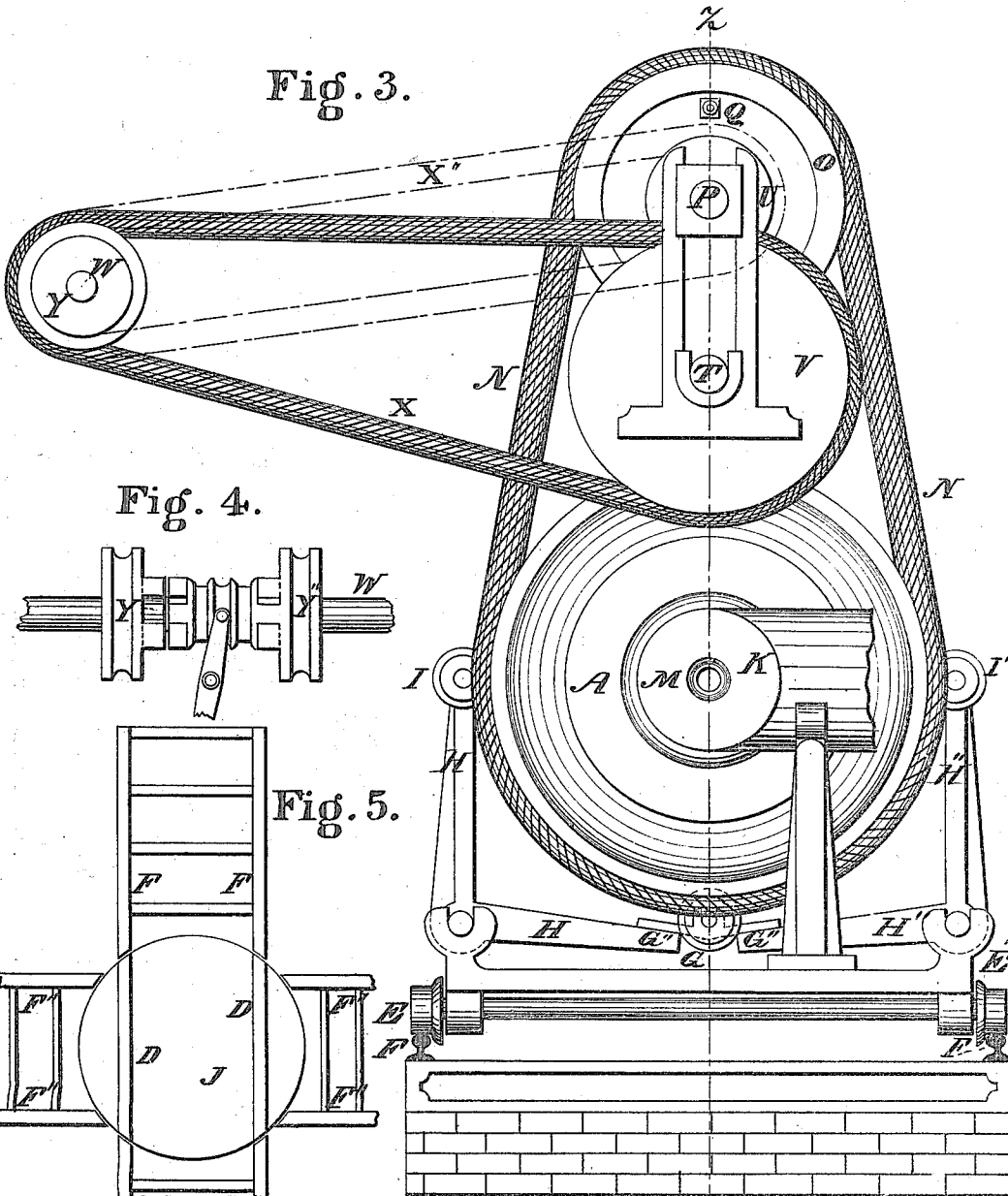


Fig. 4.

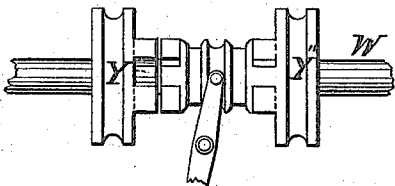
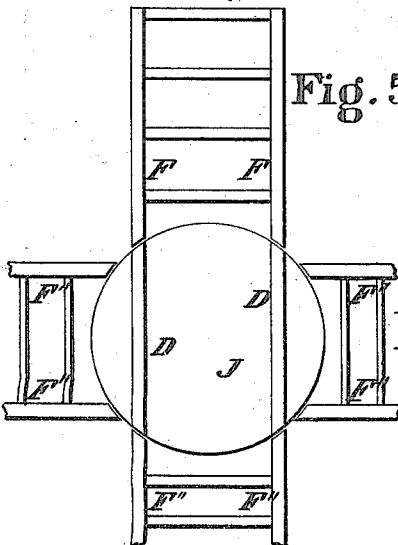


Fig. 5.



Witnesses.

J. Hillman
C. E. Hillman

Inventor.

Leven S. Goodrich

UNITED STATES PATENT OFFICE.

LEVEN S. GOODRICH, OF WAVERLY, TENNESSEE.

IMPROVEMENT IN REVOLVING PUDDLING-FURNACES.

Specification forming part of Letters Patent No. 134,268, dated December 24, 1872.

To all whom it may concern:

Be it known that I, LEVEN S. GOODRICH, of Waverly, in the county of Humphreys and State of Tennessee, have invented certain new and useful Improvements in Puddling-Furnaces, of which the following is a specification:

Nature and Object.

My invention relates more particularly to that class of furnaces known as the revolving puddling-furnaces, hereafter described. The object of my invention is to overcome the chief difficulties now manifested in operating the revolving puddling-furnace; and, in order to describe my invention more thoroughly, that its novelty and usefulness may be observed, and to render the general description less complex, I will proceed to describe the revolving puddling-furnace and the difficulties of operating the same.

The fire-box is stationary, the heat and flame from which enter the center of the puddling-furnace through a cylindrical flue, which the said puddling-furnace revolves around, forming a telescopic joint. A similar flue is attached to the opposite end of the furnace to conduct off the spent heat and flame to the chimney, through which, also, the puddling-furnace is charged and discharged. Now, this first-mentioned flue meets with frequent injury, both from excessive heat in contact therewith, and fragments of broken cinders, &c., which find their way between the outside of said flue and the inside of the opening through which it passes. This, of course, grinds away the surfaces exposed, and also creates much friction.

The only practical way of overcoming this difficulty is to make either the puddling-furnace or the fire-box portable, that the said flue and passage may be separated, when the obstacle may be cleared away and the apparatus readjusted with but little trouble and delay. The said flue should also be adjustable, to be easily removed in case of necessity. Another difficulty is manifested in revolving the puddling-furnace, as it is found necessary to rotate the same in opposite directions. The present mode is by the use of gearing in connection with an annular gear formed on the center of said furnace. The furnace revolves

on friction-rollers, located near the bottom, in such a manner that said furnace is prevented from shifting a great distance by its own gravity, though vibration or unsteady motion manifest itself to a great degree, which is seriously felt in the telescopic joint above mentioned, besides the disagreeable noise in consequence of the gearing, which suffers from rapid wear.

The final difficulty of operating the revolving puddling-furnace is, first, that, in consequence of the stationary manner in which it is constructed, no practical means is afforded for the replacement of injured parts or general repairs; second, that it must be charged and discharged while the heat and flame are raging through from the fire-box, which adds to the discomfort of the operator.

Having thus pointed out the difficulties to overcome in order to supply a manageable puddling-furnace, I will begin with a general description of my invention with reference to the accompanying drawing, in which—

Figure 1 represents a vertical section through the line *z z* on Fig. 3. Fig. 2 is a front elevation of the same. Fig. 3 represents an end view from the right. Fig. 4 is the counter-shaft and its attachments. Fig. 5 is a plan of the bed or track upon which the wheels of my puddling and fire furnace rest.

General Description.

A is the revolving puddling-furnace which receives its heat from the flame issuing from the fire-box B through the flue C, which is a flanged ring, lined with a suitable non-conductor adjusted upon the outer casing of the fire-box. The fire-box is mounted on wheels, and is, consequently, portable. Its movement in the opposite direction from A causes the ring or flue C to follow accordingly, disconnecting the same from A, leaving a large open space, through which said furnace A may be charged or discharged at pleasure while no fire is in connection therewith; and at the same time the heat therein contained by former operations is conveyed in an opposite direction from the operator by the draft of the chimney, in connection with the other end of said furnace. In order, however, to carry out this important design I construct directly underneath said fire-box a turn-table, J, upon which the tracks D D' are placed to correspond with

the wheels E. Said tracks D communicate with the tracks F and F' by the proper rotation of said turn-table. By this means the fire-box, after being drawn out of connection with the puddling-furnace, may be disposed of with but little trouble or labor, and as readily readjusted, and, in case it has been withdrawn for the purpose of repairs, another fire-box may be substituted in its stead. The puddling-furnace is also mounted on wheels E', which fit the same track, and can be easily transported to any part of the works for repairs, while its place may be occupied by another furnace with no change of fire-box if the same is in good order. By this means a few extra puddling and fire furnaces are only necessary to avoid a delay for repairs in the largest works. K is a stationary connection between the flue L and the chimney, provided with a sight-hole, M, through which the working of charge in A may be observed. N N' are wire or other cables, which give partial support to the puddling-furnace and revolve the same from motion and support derived from grooved pulleys O O', upon which they rest. Said grooved pulleys are each composed of two halves, one of which is fastened to shaft P, and the other half made adjustable by bolts Q Q', so constructed for the purpose of slackening off the cables when it is necessary to move the furnace A; by removing the bolts Q the said pulleys part in the center—the cables fall as low as the shaft P. S S, are friction-rollers attached to shaft P, corresponding with friction-rollers R R attached to shaft T, which is provided with suitable bearings to sustain the weight of shafts P and T and all their connections. U is a grooved pulley attached to shaft P. V is a grooved pulley attached to shaft T, from which an endless cable, X, connects with another grooved pulley, Y, situated on shaft W, which is provided with another grooved pulley, Y', which is provided with an endless cable connecting with pulley U. Pulleys Y Y' freely revolve on shaft W; connected, however, alternately by means of a clutch or friction-pulley attached to said shaft by a key on which it reciprocates. By the use of this device the furnace A is revolved in opposite directions while shaft W is turning in one direction, thus

avoiding the use of a cross belt or cable. G G are friction-wheels situated directly under the furnace A, and receive a portion of its weight, which is conveyed to the angle-shaped connection H by the bearing G', upon which said wheels G rest. The top of H is provided with the wheels I I', which are brought up against the sides of A by its own weight resting upon the other extremity of H, which is provided with a fulcrum, as shown in Fig. 3, upon which it oscillates. This device insures a perfect adjustment of the furnace, which is provided with an annular track to fit between the flanges of the wheels G and I. Therefore, the said furnace will revolve true and steady.

I do not claim, broadly, a revolving puddling or desulphurizing furnace, such being well known; but

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

1. The portable fire box or grate, as herein described, for the purpose of supplying heat and flame to a revolving or other furnace, as above set forth.

2. The revolving furnace for puddling or other purposes when made portable, as above set forth.

3. The turn-table J and tracks F F, in combination with the portable furnace B, substantially as and for the purposes above set forth.

4. The pulleys O O constructed in two parts, substantially as and for the purpose specified.

5. The combination of grooved pulleys V V and Y Y' and shaft W, as and for the purposes above set forth.

6. The combination of the portable fire-box B, furnace A and its flue C with the turn-table J, tracks F F, cables N N, grooved wheels O O, shaft P, friction-rollers R R and shaft T, friction-wheels G G and I I, angle arms H H, grooved pulleys V V and Y Y', and shaft W, all arranged substantially as and for the purposes above set forth.

LEVEN S. GOODRICH.

Witnesses:

J. G. WINN,
C. E. HILLMAN.