No. 665,196. Patented Jan. 1, 1901.

G. ENGDALL.

FURNACE CHARGING MECHANISM.

(Application filed Jan. 27, 1900.)

(No Model.) 2 Sheets—Sheet 1.

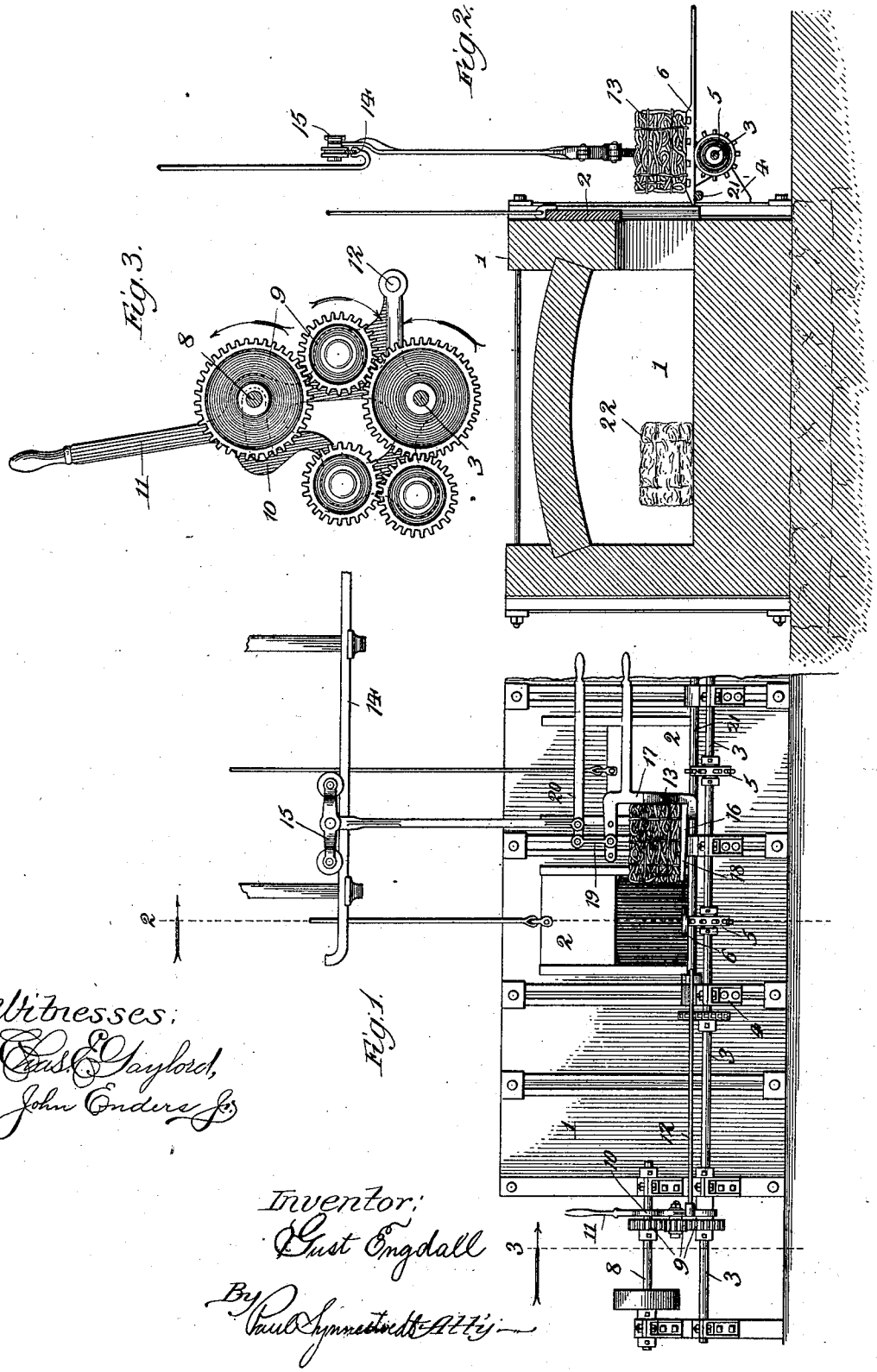

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Fig. 5.

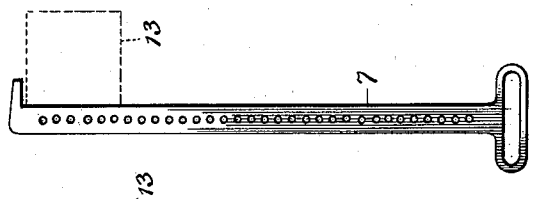


Fig. 4.

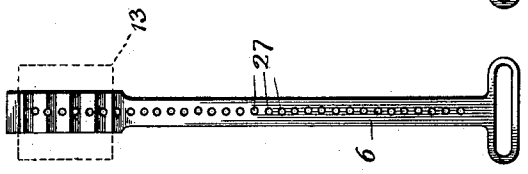


Fig. 9.

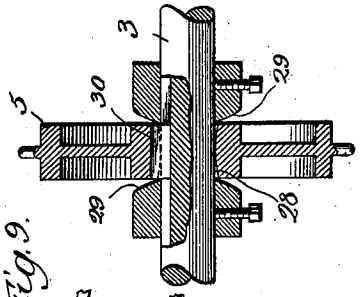


Fig. 8.

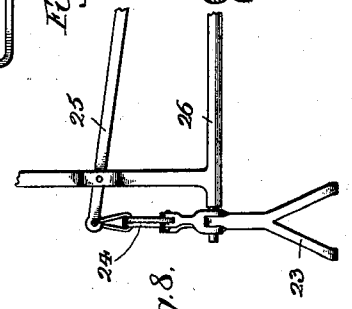


Fig. 10.

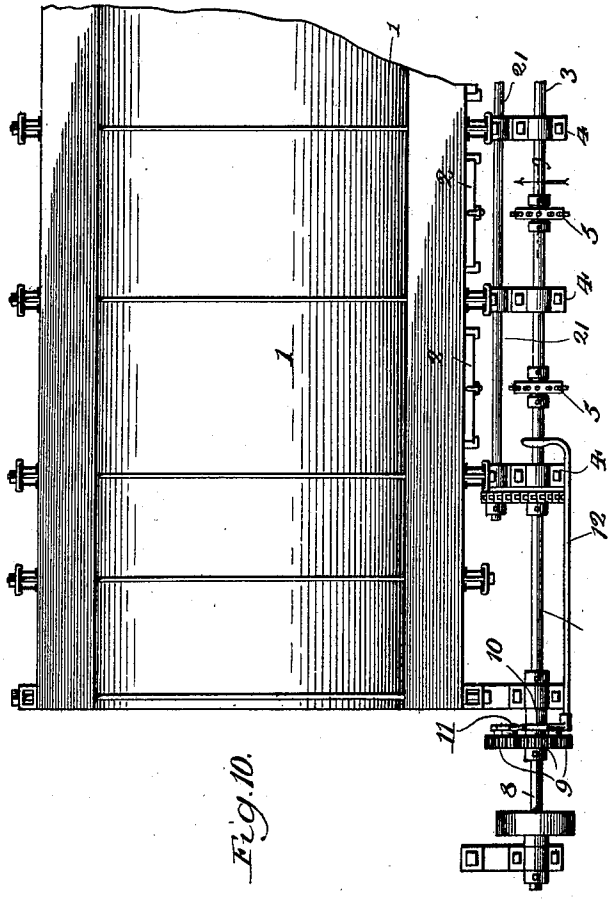


Fig. 7.

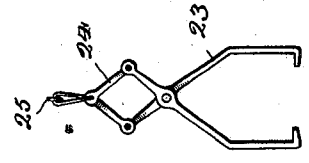
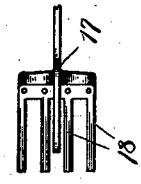


Fig. 6.



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UNITED STATES PATENT OFFICE.

GUST ENGDALL, OF CHICAGO, ILLINOIS.

FURNACE-CHARGING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 665,196, dated January 1, 1901.

Application filed January 27, 1900. Serial No. 3,062. (No model.)

To all whom it may concern:

Be it known that I, GUST ENGDALL, a citizen of the United States, and a resident of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Furnace-Charging Mechanism, of which the following, taken in connection with the accompanying drawings, is a specification.

The primary object of my invention is to provide means for charging a heating-furnace with material to be heated, such as piles of scrap-iron designed to be rolled or otherwise treated after heating, and to remove from said furnace the piles when they are ready for the working operation. Heretofore it has been common to charge such furnaces by placing the piles of iron to be heated upon a paddle or similar support and pushing them into the furnace through the door thereof by hand, and the piles have been after heating removed from the furnace in a similar way. This has involved great labor because of the excessive weight which has to be thus handled, the total amount in each pile sometimes being in excess of one or two thousand pounds.

In order to facilitate the operations described, I provide driving mechanism at the front of the furnace constructed to engage a paddle or like implement of peculiar construction controlled by the hand of the operator, which when it receives its load of scrap is advanced into the furnace to deposit the scrap therein without the expenditure of any material manual force on the part of the operator.

By the provision of suitable reversing mechanism I am enabled to cause the driving mechanism to operate in a backward direction, thus drawing the metal out of the furnace after it is properly heated.

The above, as well as such other objects as may hereinafter appear, I attain by means of a construction which I have illustrated in preferred form in the accompanying drawings, in which—

Figure 1 is a front elevation of a furnace embodying my invention. Fig. 2 is a sectional view thereof, showing the charging operation. Fig. 3 is a side view of the reversing mechanism employed for reversing the direction of movement of the driving mechanism. Fig. 4 shows the paddle or implement employed for holding the pile of scrap or metal while it is being pushed into the furnace. Fig. 5 shows the implement employed for pulling the metal out of the furnace. Fig. 6 is a plan view of the carrying mechanism shown in elevation in Fig. 1. Fig. 7 is a side elevation of a different form of carrier employed for use with very heavy piles of metal. Fig. 8 is an end view of the last-mentioned apparatus. Fig. 9 is a detail of the driving mechanism; and Fig. 10 is a partial plan view of the furnace, showing the driving mechanism and reversing-gear.

Referring now more particularly to Figs. 1, 2, and 10, it will be seen that in front of a heating-furnace 1, which is provided with doors 2 of usual construction, I arrange a driving-shaft 3, mounted in suitable bearings 4 and carrying opposite each door-opening a driving sprocket or wheel 5, designed to engage a paddle 6 or hook 7, used for placing the metal in the furnace or withdrawing it therefrom. The driving-shaft 3 is caused to rotate, by means of a counter-shaft 8, through the medium of a train of gears 9, mounted on a frame 10, (see Fig. 3,) and so arranged that by movement of either the lever 11 or the handle-rod 12 the direction of motion of the shaft 3 may be reversed, or by placing the frame 10 in the middle position the shaft 3 will remain at rest, the gears on both sides of the train being out of engagement with the gear on the counter-shaft 8.

As a means for carrying the piles of metal or scrap 13 from the places at which they are formed over to the front of the furnace I provide an overhead track 14, carrying a trolley-carrier 15, from which is suspended a holder 16, comprising the frame 17, and a plurality of horizontal or forked projections 18, (see Fig. 6,) upon which the metal rests. The frame 17, by means of the link 19, is suspended upon the lever 20, as shown in Fig 1, by means of which the pile of metal can be readily raised or lowered by the operator.

The operation of my invention is as follows: The scrap or pile of metal being placed upon the carrier 16 is transferred to the front of the furnace and laid down upon the paddle 6 in the position shown in Fig. 2, not directly over the wheel 5, but adjacent thereto,

the outer end of the paddle resting upon a rotating shaft 21, which is driven from the driving-shaft 3. The operator now holding the handle end of the paddle brings it into engagement with the sprockets on the wheel 5, which is rotating in a direction to drive the paddle inward into the furnace, the metal being carried along with the paddle and deposited inside the furnace in the position shown at 22, the paddle being then withdrawn preparatory to the insertion of another pile of metal. After all parts of the furnace have been charged the driving-shaft is thrown out of gear by means of the lever 11 or the handle 12 until the metal is properly heated, when by suitable movement of the driving mechanism the direction of rotation of the shaft 3 is reversed, as will be clearly evident by an examination of Fig. 3, and the metal piles are drawn out of the furnace by means of the hook device 7, (shown in Fig. 5,) the operation being similar to that just described in the loading or charging of the furnace.

Where very heavy piles of metal are to be handled, I sometimes prefer to use a carrier, such as that shown in Figs. 7 and 8, which comprises, essentially, a pair of tongs 23, carried on the suspension-links 24 and operated by the handles 25 and 26 in a manner which will be clear without further explanation.

In order to have the paddle 6 or hook 7 readily engage the sprocket 5, the said parts are made with a rack thereon, which may be placed, if desired, at one side or the other, but which I prefer to form by making the said parts with a series of holes or openings 27 of a size suitable to fit over the sprockets upon the wheel 5, and the wheel 5 I arrange upon the driving-shaft 3, as shown in Fig. 9, with the hub-opening thereof enlarged at both sides, as shown at 28, and held between a couple of round collars 29, designed to permit a rocking or angular movement of the wheel 5 upon the shaft. Although I have shown the wheel 5 as driven by means of a key 30, it is obvious that it could also be driven, if desired, by making the opening for the shaft square and squaring the shaft where it passes through the opening.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A paddle or equivalent for charging or withdrawing metal from a furnace provided with a rack, in combination with driving mechanism constructed to engage said rack for pushing said tool into or withdrawing it from the furnace, substantially as described.

2. The combination of a furnace, a paddle for charging the same, a driving-shaft in front of said furnace, a sprocket-wheel upon said shaft adjacent to and in front of said furnace, a rack upon said paddle adapted to engage said sprocket-wheel, and means for imparting motion to said driving-shaft, substantially as described.

3. The combination of a furnace, a paddle for charging the same, a driving-shaft in front of said furnace, a sprocket-wheel upon said shaft adjacent to and in front of said furnace, a rack upon said paddle adapted to engage said sprocket-wheel, means for imparting motion to said driving-shaft, and a rotating shaft driven from said driving-shaft to aid in carrying said paddle, substantially as described.

4. The combination of a furnace, a paddle for charging the same, a driving-shaft in front of said furnace, a sprocket-wheel upon said shaft adjacent to and in front of said furnace, a rack upon said paddle adapted to engage said sprocket-wheel, means for imparting motion to said driving-shaft, and means for reversing the direction of rotation of said driving-shaft, substantially as described.

5. The combination of a furnace, a paddle for charging the same, a driving-shaft in front of said furnace, a sprocket-wheel upon said shaft adjacent to and in front of said furnace, a rack upon said paddle adapted to engage said sprocket-wheel, means for imparting motion to said driving-shaft, a rotating shaft driven from said driving-shaft to aid in carrying said paddle, and means comprising a train of gears mounted upon a frame and movable in a direction to rotate the said driving-shaft in either direction, substantially as described.

6. The combination of a furnace, a paddle for charging the same, a driving-shaft in front of said furnace, a sprocket-wheel upon said shaft adjacent to and in front of said furnace, a rack upon said paddle adapted to engage said sprocket-wheel, means for imparting motion to said driving-shaft, a rotating shaft driven from said driving-shaft to aid in carrying said paddle, means comprising a train of gears mounted upon a frame and movable in a direction to rotate the said driving-shaft in either direction, and a handle-rod connected with said frame and passing in front of said furnace, substantially as described.

GUST ENGDALL.

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PAUL SYNNESTVEDT.