No. 639,745. Patented Dec. 26, 1899.

D. H. LENTZ.

CHARGING MACHINE.

(Application filed Jan. 6, 1899.)

(No Model.) 2 Sheets--Sheet 1.

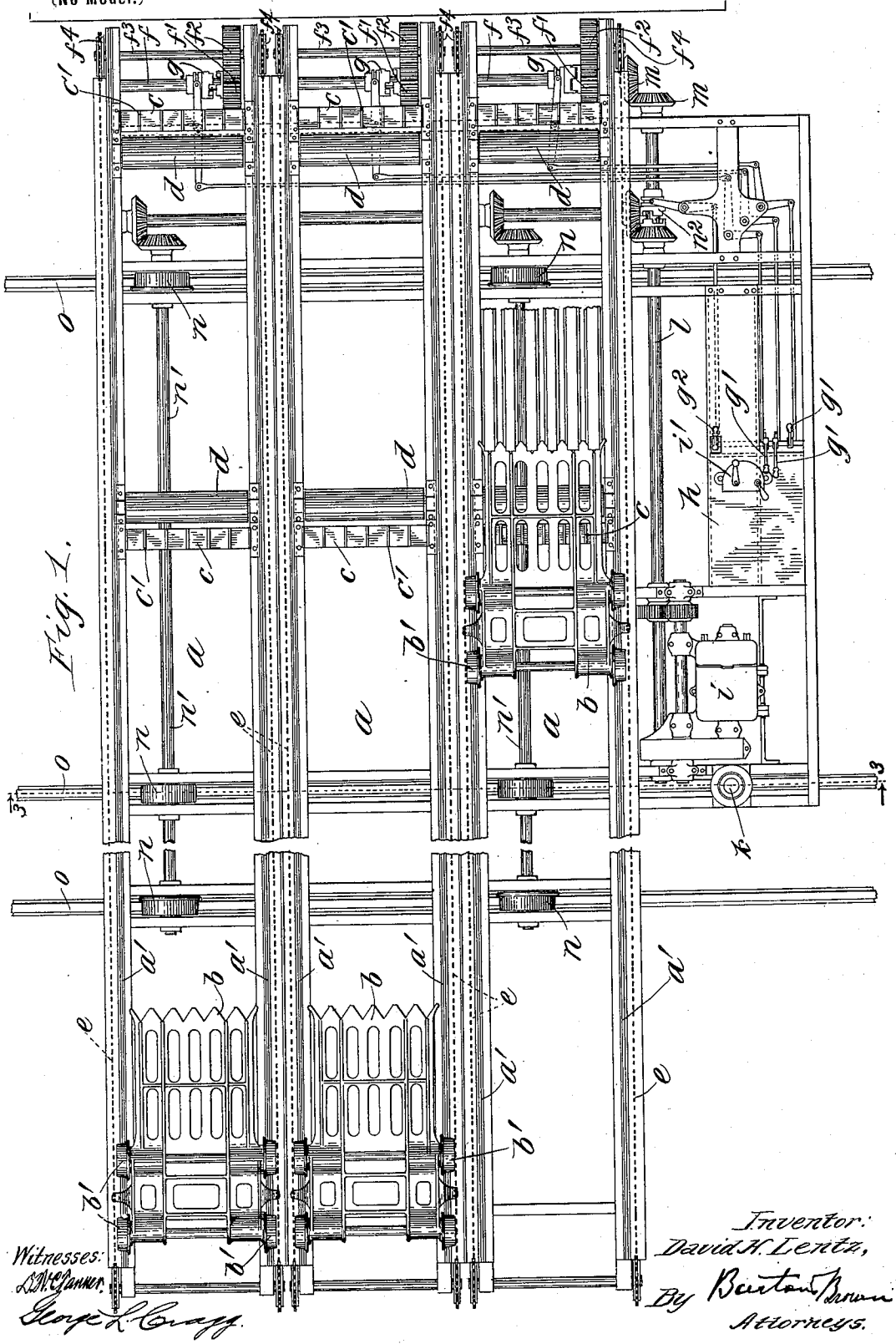


Fig. 1.

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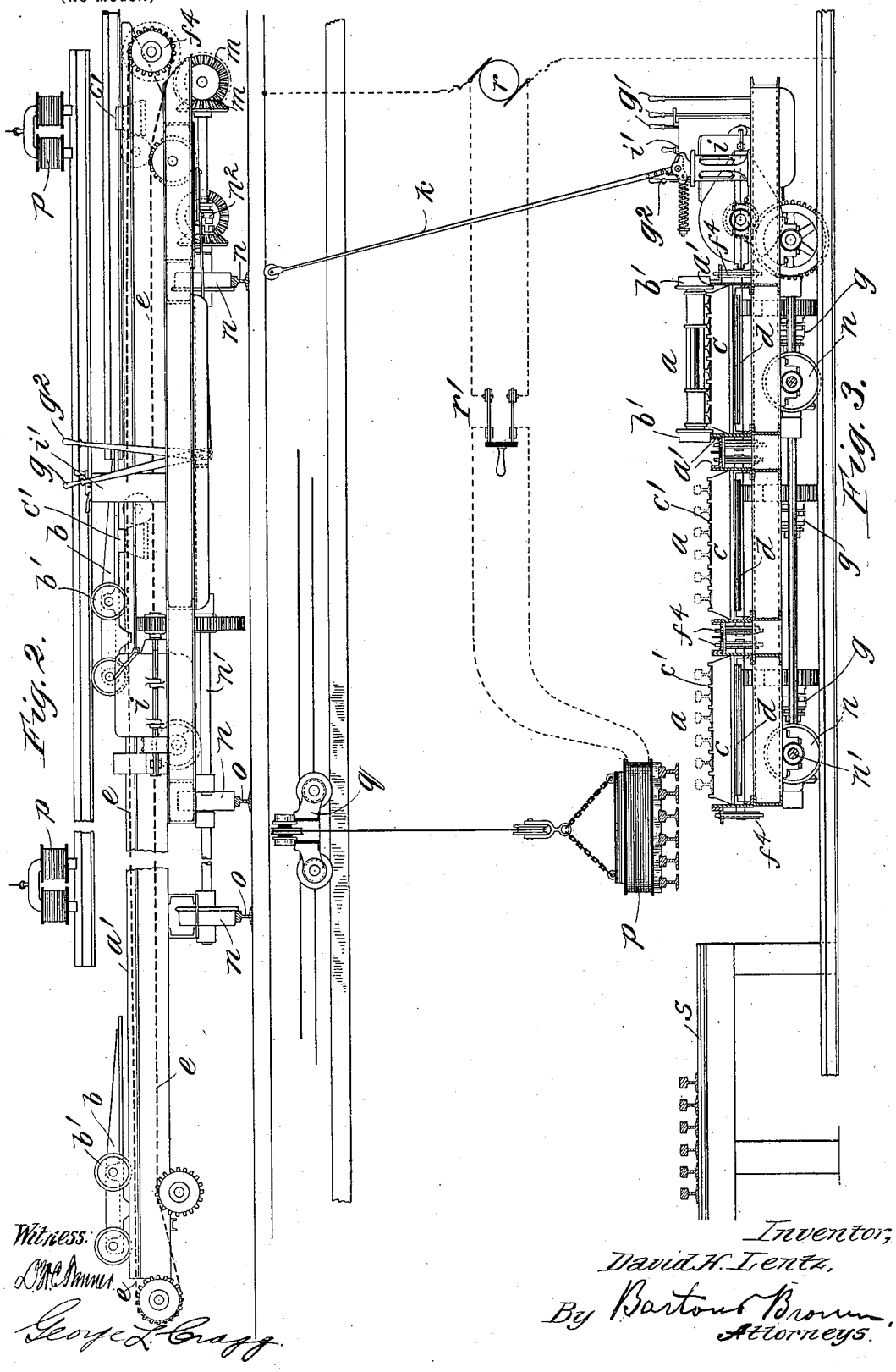


Fig. 2.

Fig. 3.

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UNITED STATES PATENT OFFICE.

DAVID H. LENTZ, OF JOLIET, ILLINOIS, ASSIGNOR TO THE McKENNA STEEL WORKING COMPANY, OF MILWAUKEE, WISCONSIN.

CHARGING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 639,745, dated December 26, 1899.

Application filed January 6, 1899. Serial No. 701,381. (No model.)

To all whom it may concern:

Be it known that I, DAVID H. LENTZ, a citizen of the United States, residing at Joliet, in the county of Will and State of Illinois, have invented a certain new and useful Improvement in Charging-Machines, (Case No. 7,) of which the following is a full, clear, concise, and exact description.

My invention relates to a charging-machine, and more particularly to a machine for charging railway-rails or other objects of similar character into a furnace. A machine for this purpose is required, for instance, in a rolling-mill plant which rerolls or renews old steel rails. The rails which come to the mill for renewal are unloaded from the cars onto piles and from these piles are transferred to the charging-machine, which in turn pushes them into the furnace, wherein they may be heated in preparation for the rerolling process. I will therefore describe my invention as applied to a machine adapted for this specific purpose.

A machine heretofore employed for charging old rails into a furnace consisted of a table upon which the rails to be charged were placed lying upon their sides—that is, each rail rested upon the edges of its head and flange. A long narrow guideway was provided at the side of the table, and endless conveying-chains carried the rails one by one to the edge of the table and dropped them into the guideway in an upright position—that is, resting upon the bottom of the flange. A pusher was adapted to travel to and fro in this guideway and to engage each rail as it was thrown into the guideway and push it into the furnace. Necessarily after each rail was charged the machine had to be moved a fraction of the distance across the front of the furnace in order to bring the end of the guideway opposite a clear space in position for charging the next rail. While this machine was fairly satisfactory in its operation, it left many things to be desired. For instance, it was lacking in speed—a large number of rails could not be charged into the furnace as quickly as might be desired. Furthermore, when a rail is charged the doors of the furnace must of course be opened, and as the rails were pushed in one by one this frequent opening of the furnace-doors caused the loss of much valuable heat. Again, the rails had to be arranged in a very particular manner upon the table of the charging-machine, and no adequate means were provided for quickly loading the table with a number of rails.

This invention has for its object to provide an improved charging-machine analogous in some respects to the old one, but capable of handling the rails much more quickly, requiring less manipulation, and capable of charging a number of rails into the furnace at once, so that the doors do not frequently have to be opened.

My invention further contemplates improved means for loading the rails upon the charging-machine and various other details, which will hereinafter be more particularly set forth.

In accordance with my invention the table of the charging-machine is adapted to be placed opposite that portion of the furnace into which the rails are to be charged, and pushers are arranged to travel to and fro along this table and charge the rails directly from the table into the furnace without the necessity of transferring them one by one to a special guideway for this purpose. The table is preferably divided into sections—say three—each of which is adapted to receive a given number of rails—for instance, half a dozen—and the machine may be provided with three pushers—one for each section—each of which pushers is adapted to engage and charge at one time the entire number of rails which may be accommodated in the section with which such pusher is associated. Means are provided whereby any one of the pushers may be actuated independently of the rest. The whole machine may be mounted upon wheels and arranged to travel along tracks across the front of the furnace, and motor mechanism may be connected to such wheels, whereby the machine may be moved as desired and adjusted opposite any particular part of the furnace into which the rails are to be charged. An overhead traveling carrier is preferably provided in connection with the charging-machine for loading rails upon the table of such machine. This traveling carrier may be in the nature of a traveling crane, and the grapple which it carries for

picking up rails preferably consists of one or more powerful electromagnets, whose pole-pieces may be formed to engage the same number of rails which is accommodated by one of the sections of the charging-machine table—that is to say, in the special case assumed the overhead traveling carrier would have a capacity of six rails, which rails would be held by such carrier in the same relations to one another that they would necessarily have when properly arranged upon a section of the charging-machine table. This overhead carrier may be arranged to travel transversely over the charging-machine and out into the yard of the mill, where it may pick up its load of the predetermined number of rails and transport them all together to a point immediately above an empty section of the charging-machine table and then lower them until they come to rest upon the table. Thereupon the electromagnetic grapple may be de-energized and the traveling carrier sent out again for another load of rails.

It will be evident that the ideas above set forth may be taken advantage of in various ways and embodied in machines differing widely as to their particular construction. I have illustrated in the accompanying drawings a charging-machine which may be taken as typical of the class to which my invention may be applied, and the more striking characteristics of such machine, which constitute my invention, will now be set forth by directly referring to the drawings.

Figure 1 is a plan view of the charging-machine, one of the pushers being shown as in the act of charging six rails into the furnace, the rails, however, being broken away, so that those parts of the machine lying underneath may not be obscured. Fig. 2 is a side elevation of the same. Fig. 3 is a transverse sectional view on line 3 3 of Fig. 1, this view also serving to indicate the manner in which the overhead traveling carrier above referred to is employed to load rails upon the table of the charging-machine.

Similar letters of reference are used to designate the same parts wherever they are shown.

The framework of the machine is constructed to form a table and is divided into three sections $a\,a\,a$, each of which is provided with tracks $a'\,a'$ along its sides. Each section has associated therewith a pusher b, mounted upon wheels $b'\,b'$ to travel to and fro along the tracks of that section. Each section is of a size to accommodate six rails resting in an upright position, which rails may be maintained parallel in proper alinement and at suitable distances apart by guiding-blocks $c\,c$, having lugs $c'\,c'$, which project upward between the rails as they lie upon the table. Each section is provided with a number of rollers $d\,d$, located at intervals along its top, which rollers are adapted directly to sustain the weight of the rails which may be placed upon that section. These rollers, of course, are for the purpose of reducing the friction when the rails are charged. Each of the pushers $b\,b$ is preferably provided with a number of notches at its forward end, corresponding to the number of rails which is accommodated by the section along which such pusher travels—that is to say, in the machine illustrated each pusher is provided with six notches, adapted to engage the six rails of its section. To effect the travel of the pushers to and fro along their respective sections, I provide a pair of endless chains $e\,e$, one of which chains may be stretched along either side of a section, passing over sprocket-wheels at the ends thereof. This arrangement will be understood at a glance by reference to Figs. 1 and 2.

At the forward end of the charging-machine—that is, at the end next the furnace—a driving-shaft f is illustrated, having gear-wheels $f'\,f'\,f'$ loosely mounted thereon, which gear-wheels mesh with corresponding gear-wheels $f^2\,f^2\,f^2$, associated one with each section. Each of the gears $f^2\,f^2$ is rigidly mounted upon a shaft f^3, at the ends of which are provided sprocket-wheels $f^4\,f^4$. These sprocket-wheels engage and drive the pair of endless chains which is associated with the same section and to which the pusher is fastened. There are therefore three shafts $f^3\,f^3\,f^3$ at the forward end of the machine, one associated with each section of the table and each so connected with the pusher of its section that a rotation of the shaft in either direction will cause the pusher to travel backward or forward, according to the direction of such rotation. Clutch mechanism g may be associated with each of the gear-wheels f' upon the driving-shaft f, and either of the clutches may be actuated at will by the operator, who stands upon a platform h, three levers $g'\,g'\,g'$ being provided upon the platform for this purpose, connected one with each of said clutches.

An electric motor i furnishes power for the charging-machine, such motor deriving its current from an overhead trolley-wire by means of the well-known trolley contact device k. Power is transmitted from the motor to the driving-shaft f by means of an intermediate driving-shaft l, geared thereto through intermeshing bevel gear-wheels $m\,m$.

The means for controlling the motor i may consist of the well-known series-parallel controller i', such as that illustrated, mounted upon the platform h conveniently near the three levers $g'\,g'\,g'$. The operator therefore may stop, start, or reverse the direction of rotation of the motor, so that, it will be clear, he can by manipulating the controller and the three levers cause either of the pushers to perform its excursion to and fro along its section to charge the rails lying in such section into the furnace. In Figs. 1 and 2 one of the pushers is shown in the act of charging six rails, as described.

The machine is mounted upon wheels $n\,n$,

arranged to travel along tracks *o o*, which extend transversely across the front of the furnace. A portion of the furnace is indicated in Fig. 1 at the extreme right of the sheet in juxtaposition with the end of the charging-machine. The wheels *n n* are mounted upon shafts *n' n'*, which are connected by intermediate shafting and bevel-gearing with the main driving-shaft *l*, and a clutch n^2 is provided for throwing the shafts *n' n'* in or out of gear with such main driving-shaft, the clutch being connected with and operated by a lever g^2 at the operator's platform. The operator therefore by manipulation of the controller and the lever g^2 may cause the whole machine to travel in either direction along the tracks *o o* for the purpose of adjusting the machine with relation to the furnace in order to bring any section opposite any desired part of the furnace-opening.

The device for loading rails upon the table of the charging-machine is indicated in Figs. 2 and 3, wherein powerful electromagnets *p p* are shown suspended from the traveling carrier *q*. The pole-pieces of the magnets are of a width sufficient to accommodate six rails and are preferably notched, as illustrated more clearly in Fig. 3, to hold the rails more securely in the desired positions. In Fig. 3 a source of electric current *r* is shown diagrammatically connected with the magnet *p* through a switch *r'* and also connected with the trolley-wire and ground.

I have found it convenient to provide a loading-table *s* at a point accessible to the traveling carrier, upon which loading-table the rails which are brought to the mill for renewal may be placed and arranged in positions from which they may easily be picked up by the traveling carrier.

The operation of the whole arrangement may be briefly described as follows: Six of the rails which are intended to be renewed are arranged upon the loading-table in the proper positions, whereupon the traveling carrier is brought to a point above such loading-table and the magnetic grapples are let down until the pole-pieces of the magnets rest upon the heads of the six rails, whereupon the magnets may be energized by closing the switch *r'*. The grapples, carrying with them the six rails, may now be raised through the agency of the cables by which they are suspended, and the traveling carrier then may be caused to move along its overhead tracks until the six rails are brought into position immediately above one of the sections of the charging-machine. The grapples and rails may now be lowered until the latter rest upon the rollers *d d* in the required positions—that is, separated from one another by the lugs *c' c'* of the guides *c*—whereupon the magnets may be deënergized and the traveling carrier moved away. The operator, standing upon the platform *h*, may now manipulate the controller and the lever g^2 until the charging-machine is moved into the proper position with relation to the opening in the furnace—that is, until the section whereon the rails have been placed is opposite a clear space in the furnace. Thereupon by manipulating that one of the levers *g'* which is associated with that section the pusher *b* of such section may be caused to move forward, engaging the six rails and pushing them longitudinally off the table and into the furnace. The pusher then may be retracted until it occupies a position at the extreme rear of the charging-machine, after which this section may once more receive its load of rails to be charged, and the operation above described may be repeated.

Having now described the preferred embodiment of my invention, I claim as new, and desire to secure by Letters Patent, together with such modifications as may be made by the exercise of mere mechanical skill, the following:

1. In a rail-charging machine, the combination with a table adapted to support a plurality of rails, of a plurality of transverse blocks *c c*, fixedly secured in place upon said table each block being provided with a plurality of lugs *c' c'* disposed longitudinally of the table and projecting above the top surface of the block, a plurality of guiding-spaces being afforded upon each block by the said lugs for the rails, the lugs upon the transverse blocks serving to maintain the rails parallel, a friction-roller *d* placed substantially parallel with each transverse block *c*, and located near the same, the periphery of the said roller projecting slightly above the top surface of the block, whereby the weight of the rails is removed from the blocks to permit the rails to be moved longitudinally of the table with but little friction, pushing mechanism adapted to travel along said table in the direction of its length, said pushing mechanism being adapted to engage a plurality of rails and means for causing said pushing mechanism to perform its excursions along said table, substantially as described.

2. In a rail-charging machine, the combination with the laterally-movable table, of mechanism for effecting the lateral movement of the table, a plurality of pushers capable of travel longitudinally of the table independently of each other, means for effecting the independent travel of the pushers, each pusher being adapted to move a plurality of rails longitudinally of the table into a furnace, and means for maintaining the rails of each set parallel as they are being moved longitudinally of the table, the whole operating substantially as herein shown and described.

In witness whereof I hereunto subscribe my name this 31st day of December, A. D. 1898.

DAVID H. LENTZ.

Witnesses:
DE WITT C. TANNER,
GEORGE L. CRAGG.