(No Model.)

F. H. DANIELS.

APPARATUS FOR CHARGING BILLETS OR BARS INTO HEATING FURNACES.

No. 385,251. Patented June 26, 1888.

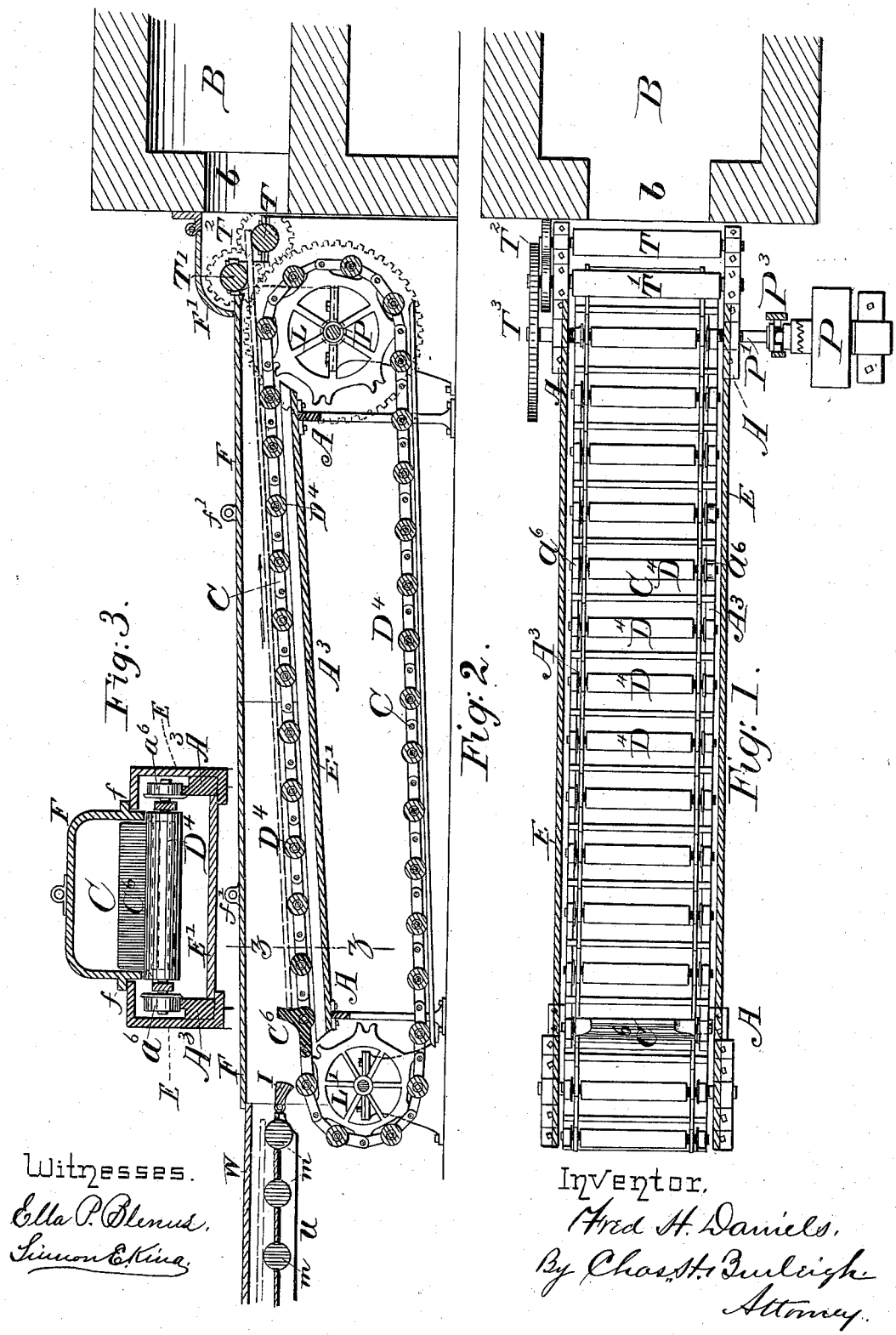


Fig. 3.

Fig. 2.

Fig. 1.

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APPARATUS FOR CHARGING BILLETS OR BARS INTO HEATING-FURNACES.

SPECIFICATION forming part of Letters Patent No. 385,251, dated June 26, 1888.

Application filed December 23, 1887. Serial No. 258,801. (No model.)

To all whom it may concern:

Be it known that I, FRED H. DANIELS, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Apparatus for Charging Billets or Bars into Heating-Furnaces, &c., of which the following, together with the accompanying drawings, is a specification sufficiently full, clear, and exact to enable persons skilled in the art to which this invention appertains to make and use the same.

The objects of my present invention are, first, to provide mechanism for receiving metal bars or billets as they are delivered from a rolling-mill or other source of supply, and to charge them into a heating-furnace automatically by the action of a traveling carrier provided with means for engaging and advancing the bars delivered thereto; second, to provide in a charging apparatus an endless-belt carrier disposed entirely outside of the furnace and operating with a continuous forward revoluble action, adapted for advancing the billets at intervals, and for allowing the billets to remain at normally-backward position until the interval for action arrives; third, to provide an automatic charging mechanism with a hood or cover for inclosing the bars or billets while being charged to protect them from the cooling and oxidizing effect of the atmosphere; fourth, to provide an automatic charging apparatus having a movable carrier and a stationary hood or covering; fifth, to provide a charging apparatus having a traveling belt or chain carrier composed of a series of loosely-revoluble rollers, the journal supports or bearings of which are linked together, and upon which rollers the product to be charged is received and supported; sixth, to provide an apparatus for delivering and charging billets or bars in a furnace or rolling-mill plant, having means for the automatic delivery of the bars upon a movable carrier and for supporting and advancing the same, facilities for guiding the bars, and means for operating the carrier mechanism, whereby the apparatus is capable of continuous automatic action in the handling or charging of hot rolling-mill product. These objects I attain by mechanism the nature, construction, and operation of which are illustrated in the drawings and explained in the following description, the particular subject-matter claimed being hereinafter definitely specified.

In the drawings, Figure 1 is a plan view of my improved charging apparatus, the side casings and furnace being shown in horizontal section and the delivering-way omitted. Fig. 2 is a longitudinal vertical section of my charging apparatus, including but a portion of the delivering-way and furnace. Fig. 3 is a transverse vertical section at line *z z*, Fig. 1.

In my improved charging apparatus I employ as a carrier a long endless chain or belt, C, disposed externally of but adjacent to the front of the furnace B and in line with the opening or doorway *b*. Said carrier-belt, with its accompanying mechanism, is supported by a suitable frame, A, and at the outer end of the charging-way I arrange a feeder or delivery-way, U, whereby billets or bars can be delivered thereon in heated condition, or directly as they come from the forming-rolls of a billet-rolling mill, or from any other source of supply, automatically or without handling by a personal attendant. The charging-belt is preferably made of a series of bars and rollers, D^4, supported by bearings at their respective ends, which are hinged or linked together to form an endless chain, which is carried by sprocket-wheels L L′, as indicated. The roller-axles are provided with truck-rolls a^6, that run on side bars or tracks, A^3, along the supporting-frame, which tracks guide the belt or carrier C in a straight line and prevent it from sagging.

The rollers D^4 are arranged to turn loose on their axles, and the outer end of the charging-way is preferably arranged somewhat lower than the end near the furnace, so that a bar, when placed upon said rollers, will by its own weight have a tendency to settle backward toward the outer end of the charger.

The shaft P′ of the sprocket-wheels L is provided with a driving-pulley, P, or other suitable means for applying thereto motive power for operating the mechanism. A clutch, P^3, is preferably arranged in connection with the shaft P′ and pulley P, for conveniently throwing the mechanism into and out of action. The carrier-belt C may be operated by continuous or intermittent movement, as preferred.

At one or more intervals in the carrier-chain

is provided a bar with an upwardly-projecting flange; or an abutment or barrier, C^6, is substituted in place of the roller, which barrier extends above the level of the tops of the rollers to a sufficient distance for engaging the rear end of the billet or billets when lying upon the rollers, to project them forward into the furnace as the chain or endless carrier moves in that direction.

Guide-rolls T T′ are arranged adjacent to the furnace-door *b*, as indicated, between which rolls the billet is passed on its way into the furnace. The roll T′ is arranged somewhat farther back from the furnace than the roll T. The roll T supports the billet from beneath, so that it will clear the furnace bottom, while the roll T′ runs above the billet and prevents the rear end thereof from tilting up or rising from the carrier when the forward end has entered the furnace to an extent that would give preponderance forward to the roll T. The rolls T and T′ are preferably connected by the gears T^2, and are driven by suitable gears, T^3, from the sprocket-wheel shaft P′.

The sides of the charger are incased or boxed in, as at E E, and a floor or casing, E′, is arranged beneath the upper portion of the carrier-belt. A cover or hood, F, is arranged over the carrier C, for inclosing the same and protecting the billets or bars from the oxidizing effects of the atmosphere, and for maintaining the inherent heat of the metal while the billets are in the charging apparatus. The hood or covering F is preferably made in sections and supported on the lower casing at *f*, so that it can be conveniently removed from the apparatus when desired, for allowing access to the carrier-belt, loops *f′* being provided thereon, into which to attach lifting devices for raising the hood.

A hinged hood, F′, is arranged over the rolls T T′ and fixed to the furnace or other suitable support, which hood can be turned back for access to the rolls. The feature of a stationary inclosing-hood for covering and protecting the product, in combination with a movable carrier for advancing the billets, may be employed with beneficial results in charging apparatus wherein the carrier is of other construction than that herein shown—as, for instance, with a carrier such as described in my application for Letters Patent, Serial No. 254,783.

U indicates a feeder, roller-bed, or delivering-way, on which the billets are run from a billet-forming mill and delivered onto the charging-way or endless carrier C. Said delivering-way comprises a series of rolls, *m*, which can be geared and operated in any convenient manner to impart a forward longitudinal movement to the bar or product supported thereon, so as to project it forward onto the charging-belt C. A hinged guard, I, at the end of the delivery-way serves to prevent the bars sliding back from the carrier C when the barrier C^6 is making its forward circuit, and said guard is lifted by the barrier as it passes the position thereof, lifting therewith any bar that may be partially delivered at such time and allowing the barrier C^6 to pass under it.

The delivery-way U is preferably inclosed by a cover or hood, W, as indicated. The roller-bed U may be of any required length, according to the requirements of the rolling-mill plant wherein it is employed. If in any instance it is preferred, the charging apparatus can be employed without the delivering-way U, the billets or product being placed on the belt C by hand or by other means.

The operation of my improved charging apparatus is as follows: The carrier or belt C being in motion in the direction indicated by the arrow, the billets or product are projected forward from the delivery-way U beneath the covering F and fall upon the rollers D^4, said rollers being free to run loose, and the belt being inclined permits the billet to run back or settle down the incline until the rear end thereof takes bearing against the guard I, (or barrier C^6,) where it remains normally at backward position until the interval of action arrives. The barrier C^6 as it advances with the forward movement of the carrier-belt is brought up beneath the guard I, lifting the latter from the ends of the billets, when said barrier engages the rear end of the billet, carrying it forward between the rolls T T′ and shooting it into the furnace as the belt advances. While said barrier C^6 is making its return along the lower half of the belt-revolution another billet or series of billets may be delivered or placed upon the carrier-belt, to be in turn engaged and projected forward as the barrier C^6 again comes to the upper side and moves forward with the carrier-belt.

If a greater length of time is required for loading on the billets than that due to the regular and continuous revolution of the chain or belt C, the barrier C^6 may be brought to its rearward position, and the movement of the belt then stopped for a short period of time, the motion given to the carrier-belt being intermittent instead of continuous. The momentum imparted to the billet by the forward movement of the mechanism is sufficient to throw it from the end of the carrier into the furnace and deposit it at the proper position beyond the rolls T T′ and furnace-door.

My improved apparatus can be employed for charging billets singly or in groups of two or more billets placed side by side on the carrier.

I am aware that a charging apparatus has heretofore been patented in which an endless belt is employed for imparting a backward and forward movement to a trundle-bed on which blooms are charged into a furnace; but such belt is not arranged for continuous revolution and is not provided with a series of loosely-revoluble rolls for supporting the product; neither is it combined with mechanism for guiding the product into the furnace, nor generally constructed for operating in a manner similar to the operation of my im-

proved charging apparatus hereinbefore described.

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

1. In billet-charging apparatus, the combination of an endless-belt carrier, whereon the billets are received and supported, having a barrier for projecting the billets forward into the heating-furnace, with belt supporting and actuating wheels, and an operating-shaft, whereby said carrier is propelled by constant forward movement, substantially as set forth.

2. The endless-belt carrier having a series of loosely-revoluble rollers and an abutment or barrier for engaging and advancing the billets, respectively supported by bearings that are linked together as a chain, substantially as and for the purpose set forth.

3. The combination, with a heating-furnace, of a billet-charging mechanism consisting of an endless traveling belt or carrier for projecting forward the billets, guide-rolls for directing the billet into the mouth of the furnace, and means for operating said belt, substantially as set forth.

4. In a billet-charging apparatus, the combination of an endless-belt carrier composed of series of bearers or rollers linked together, whereon the billets or bars are supported, and a transverse barrier or flange for engaging and advancing the billets, guiding-rolls, as T T′, disposed to direct the billet into the door of the furnace and sustain it elevated from the furnace-bottom, and means for imparting motion to said endless-belt carrier and guide-rolls, substantially as and for the purpose set forth.

5. In a billet charging apparatus, an endless-belt carrier or charging-way consisting of a roller-belt provided with a barrier or flange for engaging and advancing the billets into the furnace, in combination with a feeder or delivering-way, whereby the billets are delivered onto said carrier, and means for imparting motion to said carrier-belt, for the purpose set forth.

6. In an apparatus for charging billets and bars into heating-furnaces, a hood or cover that incloses the billet or product upon the carrier during the charging operation, for the purpose set forth.

7. In an apparatus for charging billets or bars into a heating-furnace, the combination of a movable carrier, by which the billets are advanced into the furnace, and a stationary hood or cover inclosing said billets while on said carrier, for the purpose set forth.

8. An apparatus for charging billets or bars into a heating-furnace, having a movable carrier, by which the billets or bars are propelled forward, a stationary inclosing-case or boxed frame along the charging-way, and a removable hood for covering said carrier and protecting the product, substantially as set forth.

9. In an apparatus for charging billets or bars, a revoluble endless-belt carrier, by which the billets are propelled forward, in combination with guiding-rolls for directing the billets into the furnace, a feeder or delivery-way, whereby the billets or bars are delivered to said carrier, and an inclosing hood or casing, substantially as and for the purpose set forth.

10. The combination, with the delivery-bed and the endless-belt carrier having the barrier C^6, for engaging the product, of an automatically-movable guard disposed at the junction of said delivery-bed and carrier, for the purpose set forth.

11. In an apparatus for delivering and charging billets or bars into heating-furnaces, an inclosed passage through which the billet is delivered for inclosing the product while being delivered upon said carrier, in combination with a charging-carrier provided with a hood or cover for maintaining the heat of the product during the charging operation.

Witness my hand this 20th day of December, A. D. 1887.

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Witnesses:

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