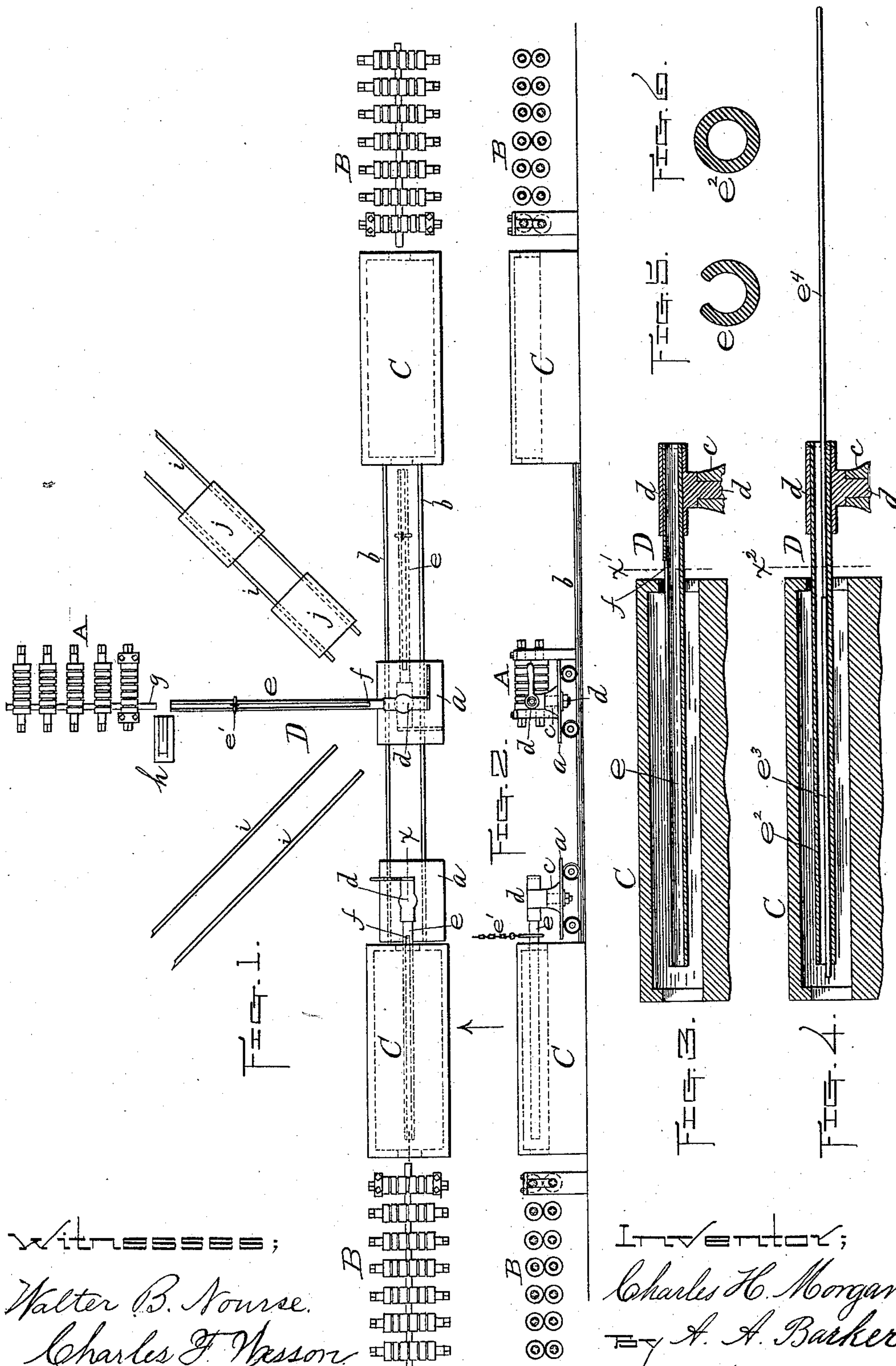


(No Model.)

C. H. MORGAN.
ROLLING MILL APPLIANCE.

No. 366,236.

Patented July 12, 1887.



Witnesses;

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UNITED STATES PATENT OFFICE.

CHARLES H. MORGAN, OF WORCESTER, MASSACHUSETTS.

ROLLING-MILL APPLIANCE.

SPECIFICATION forming part of Letters Patent No. 366,236, dated July 12, 1887.

Application filed December 4, 1886. Serial No. 230,642. (No model.)

To all whom it may concern:

Be it known that I, CHARLES H. MORGAN, of Worcester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Rolling-Mills; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and in which—

Figure 1 represents a skeleton plan view of so much of a rolling-mill and two ordinary heating-furnaces as is necessary to illustrate my improvements thereon. Fig. 2 is a front side view or elevation of the parts shown in Fig. 1, looking in the direction indicated by the arrow, same figure. Fig. 3 represents, upon an enlarged scale, a central vertical section taken on line x , Fig. 1. Fig. 4 represents, upon the same enlarged scale, a similar section showing a modification of my improvements, hereinafter more fully explained; and Figs. 5 and 6 represent, upon a still larger scale, cross-sections taken on lines $x' x^2$, Figs. 3 and 4, respectively.

My invention relates to rolling-mills, and the furnaces used in connection therewith for heating and rolling long bars or rods of metal, and more particularly to the means of transferring said heated metal bars from a primary train of rolls to a furnace or furnaces connected with one or more secondary trains. The object thereof is to effect said transfer in a convenient and expeditious manner, at the same time partially or wholly protecting the heated rods or bars from cooling and oxidation, as hereinafter specified; and it consists in combining with said trains of rolls and furnaces a conveying device adapted to receive the heated bar from the last set of a train of rolls, and to then be operated so as to transfer said bar to the furnace of a secondary train and deposit the same therein preparatory to further heating in said furnace, and subsequent reduction by said secondary train, as hereinafter more fully set forth.

To enable others skilled in the art to which my invention appertains to make and use the same, I will now proceed to describe it more in detail.

In the drawings, A represents a primary train of rolls; B B, secondary or auxiliary trains; C C, ordinary heating furnaces; and D, my device for conveying the heated metal bars

from the primary train to said furnaces to increase or maintain the heat thereof preparatory to further reduction by the supplementary trains. Said conveying device D is constructed, arranged, and operated in the following manner. (See Figs. 1, 2, 3, and 5 of the drawings.) A truck, a , is arranged to travel forward and back upon suitable tracks, $b b$, stretching between the furnaces C C, and said truck is provided with an upright supporting part or standard, c , in which is fitted to turn a swivel, d , having a horizontal opening, in which is arranged and fitted to turn one end of a long trough or slotted pipe, e . The outer end of said trough e extends nearly up to the end of the primary train, and also the inner ends of the furnaces when swung into line therewith, as hereinafter specified, and shown by full and dotted lines in Fig. 1.

The trough e may be swung from one position to another, and the truck a operated, as aforesaid, either by hand or any suitable power operatively connected therewith. As said propelling or actuating mechanism constitutes no part of my improvements, it will be unnecessary to illustrate or further describe the same to make clear the nature and purpose of said improvements. If desired, said slotted pipe or trough may be supported while being thus swung around from the rolls to the furnace by means of a chain, e' , having a ring at its lower end fitted to slide upon the pipe and suspended from a suitable swinging crane or other supporting mechanism. In practice said support is not essential, however, under ordinary circumstances, as my transferring device, which in effect serves the same purpose as a crane, is designed to be made sufficiently strong to carry its load without deflexure of the trough or tube, and with a smooth and easy movement.

The operation of transferring a bar from the primary train to one or the other of the furnaces is as follows: Assuming that the trough e is in line with the train, as indicated by full lines in Fig. 1, when the heated bar passes from said train, it enters the end of said trough and is deposited therein, the forward end of said bar, when thus deposited, coming nearly up to the point f , or inner end of said trough. The bar may be conducted from the last set of rolls of the primary train, so as to properly enter the end of the trough, by means of a suitable guide, g , combined with said set of

rolls, and, if desired, a suitable shearing device, *h*, may be interposed between said guide and trough at one side thereof, to trim off the end of the bar, if necessary or desirable, for any cause. After the bar has been deposited in the trough, as previously described, the latter is then swung by hand or other power into the position shown by dotted lines, Fig. 1, in line with one or the other of the furnaces C. It is then moved forward toward the furnace by causing the truck or tram-car *a* to travel in that direction, which operation causes the trough to be inserted in the furnace, as indicated at the left-hand side of Fig. 1. Having been thus inserted, it is at once inverted or turned half way around, so as to bring it bottom side up, by means of its handle *d'*, thereby discharging the bar into the furnace. The trough is now withdrawn by reversing the motion of the truck, and said trough swung into position to receive another bar from the primary train, when the foregoing operation is repeated, and so on for each successive bar to be transferred.

In practice I prefer to employ two furnaces, as shown, and alternate the transfer of the bars to first one and then the other, but do not limit myself thereto or to the employment of only two furnaces, as under some circumstances it might be desirable to combine a greater number with the primary train and a correspondingly-increased number of transferring-troughs in connection therewith. I also in practice prefer to use a circular trough, such as illustrated in Fig. 5; but, if desired, any equivalent thereof adapted to perform the same office may be employed in lieu thereof—as, for instance, a tight tube, *e*²—such as illustrated in Figs. 4 and 6—may be employed and the bar removed therefrom to discharge it into the furnace by inserting a rod, *e*⁴, into its outer end, as shown in Fig. 4. Then, while said rod is held stationary against the outer end of the bar, moving back the truck and tube, as in the former instance, and thus discharging said bar into the furnace. Although the latter method embraces advantages not possessed by the first, the slotted pipe or trough is preferable in practice, owing to the greater facility with which the rod or bar may be discharged therefrom, the principal advantage of the close tube being that said rod or bar is better protected thereby from the exterior atmosphere in the transferring operation. In effect it is substantially an equivalent of the trough, and I therefore reserve the right to use either construction as circumstances require.

In Fig. 1 I have represented the ends *i i* of tracks radiating to either side to any desired distance, upon which trucks or tram-cars *j* may be arranged for transferring the bars from the primary train of rolls, instead of to the furnaces, as hereinbefore described, if desired, said bars being deposited from the trough *e* upon said trucks in like manner to discharging them into the furnaces.

Those skilled in the art to which my invention appertains will readily perceive the advantages derived from the practical application thereof. The bars being quickly transferred from the train of rolls to the furnaces, and also being partially or wholly protected from the atmosphere during said transit, as hereinbefore described, are cooled only in a slight degree, thus requiring less heating thereof for further reduction, and in consequence increasing the production and at the same time effecting an economy of fuel and labor.

Another important feature of my invention is the partial or entire protection of the bars from oxidation during the aforesaid transferring operation, owing to their being inclosed within the trough or tube, as hereinbefore specified, and shown in the drawings, the oxidizing effects being greater or less according to which construction is adopted in practice.

As is well known, much oxidation takes place when a bar of iron or steel cools down from a red heat in the atmosphere when unprotected. Oxidation also takes place in heating the cold bars up to a red heat. This oxidation, as will be obviously seen, is in a large measure arrested or prevented when said bars are conveyed directly from the rolls to the furnace, as proposed.

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

1. In a rolling-mill, a transferring device comprising in combination a trough or tube or the equivalent thereof mounted on a socketed and swiveled support, the latter in turn mounted on a truck or tram-car arranged to travel to and from a furnace, and a supplementary train of rolls, whereby metal rods or bars may be conveyed from a primary train of rolls to said furnace, substantially as and for the purposes set forth.

2. In a rolling-mill, a trough or its equivalent fitted to turn in a socketed and swiveled support, and provided with means for turning the same, in combination with said slotted and swiveled support, and a truck or tram-car adapted to carry the trough and its socketed and swiveled support, also arranged to travel to and from a furnace, and a supplementary train of rolls, whereby metal rods or bars may be conveyed from a primary train of rolls to said furnace, substantially as and for the purposes set forth.

3. A rod or bar transferring device mounted as a crane upon a truck or tram-car arranged to travel to and from a furnace, and comprising in combination a trough or its equivalent supported and fitted to turn in a socketed and swiveled part mounted and fitted to turn in a bearing on said truck or tram-car, whereby said rods or bars may be transferred from a train of rolls and deposited within said furnace, substantially as shown and specified.

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