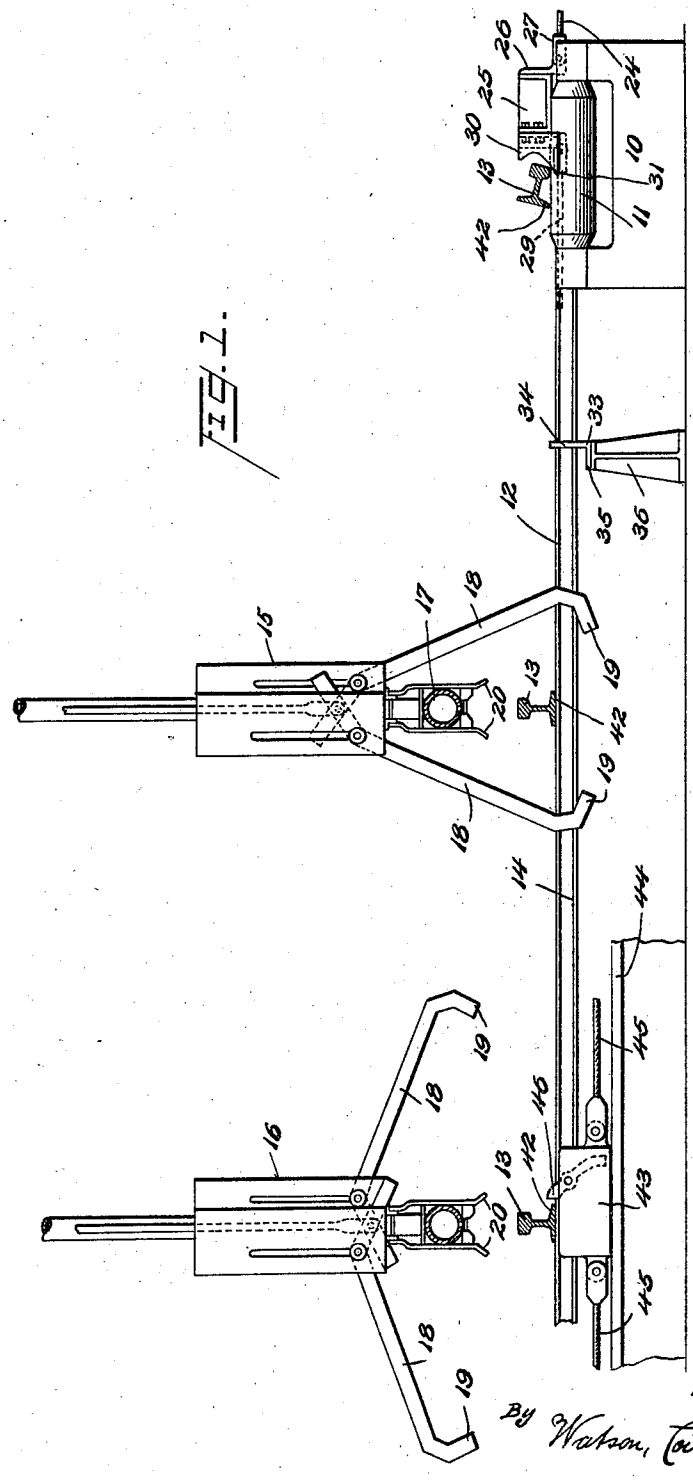
Oct. 16, 1923. 1,471,250

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APPARATUS FOR HANDLING AND TREATING RAILS

Filed March 21, 1921 2 Sheets-Sheet 1

FIG. 1.



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APPARATUS FOR HANDLING AND TREATING RAILS

Filed March 21, 1921 2 Sheets-Sheet 2

FIG. 2.

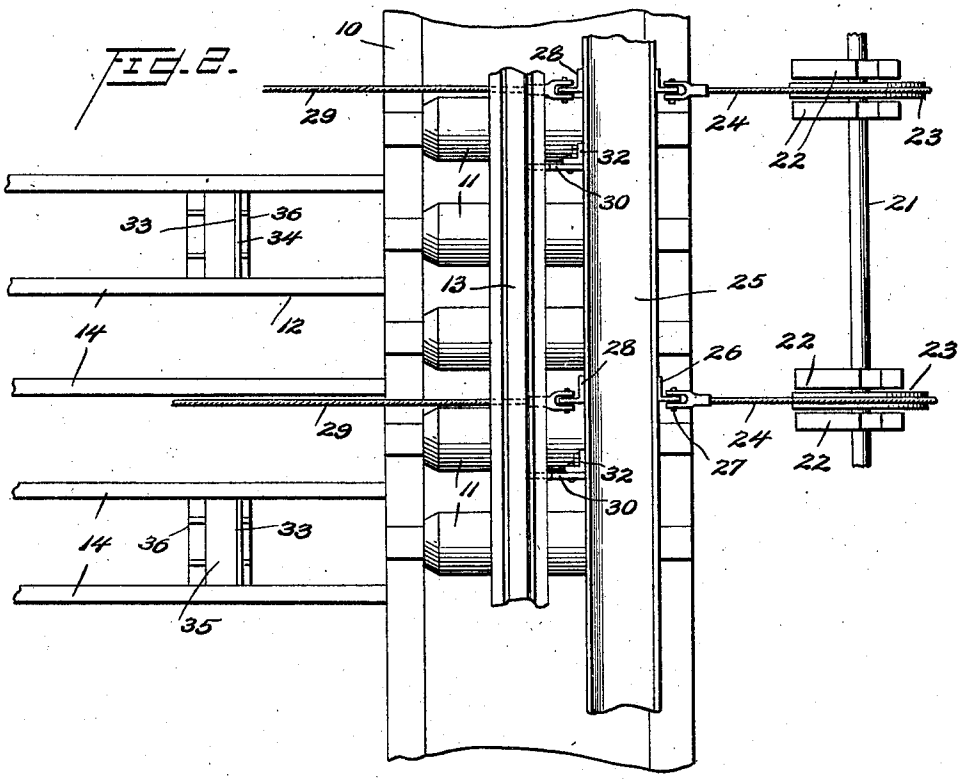
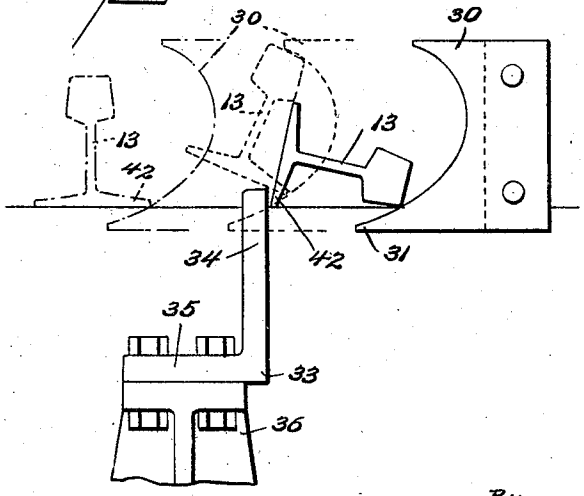


FIG. 3.



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Patented Oct. 16, 1923. 1,471,250

UNITED STATES PATENT OFFICE.

EDWARD F. ENTWISLE, FRANK E. HOWELLS, AND LESTER L. LEACH, OF STEELTON, PENNSYLVANIA, ASSIGNORS TO BETHLEHEM STEEL COMPANY, OF BETHLEHEM, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

APPARATUS FOR HANDLING AND TREATING RAILS.

Application filed March 21, 1921. Serial No. 454,236.

To all whom it may concern:

Be it known that we, EDWARD F. ENTWISLE, FRANK E. HOWELLS, and LESTER L. LEACH, citizens of the United States, and residing at Steelton, Dauphin County, State of Pennsylvania, have invented certain new and useful Improvements in Apparatus for Handling and Treating Rails, of which the following is a specification.

This invention relates to means for easily, efficiently, rapidly and without obstruction, handling and treating by the Sandberg process set forth in Patent No. 1,178,352, April 4, 1916, hot rails leaving the rolls of the mill where they are given their final form. As is well known, the hot rails leaving the rolls are usually carried to a hot bed by a roller line on which they lie in succession longitudinally on their sides. The present invention resides in the means for removing in succession each rail as it comes to position opposite the hot bed, from the roller line to the hot bed, for automatically turning it on its longitudinal axis from its side position to an upright position, and moving it laterally over the hot bed to position below an apparatus for treating it by the Sandberg process, lifting it from the hot bed to position for treatment in said apparatus out of the path of other rails and dragging mechanism on the hot bed, lowering it after treatment to the hot bed, and then moving it over the hot bed in the opposite direction from the roller line out of the way of incoming rails to be treated. It contemplates the use of any number of treating devices desired or found necessary in disposing of the rails as they are supplied by the roller line, since the arrangement is such that while a rail is being treated in one apparatus by the Sandberg process, another rail may be moved under that apparatus to or from another treating apparatus. The novel features of the invention will more fully appear from the following description and claims, taken with the drawings.

In the drawings:

Figure 1 is a side view of an apparatus embodying our invention.

Figure 2 is a plan view of the apparatus partly broken away; and

Figure 3 is an enlarged diagrammatic illustration of the means and operation in tilting and turning the rail.

As shown in Figures 1 and 2, a roller line 10, made up of spaced parallel cylindrical rollers 11, operates as a conveyor to bring rails from the rolls to the hot bed 12 arranged closely adjacent thereto at one side, and preferably at a slightly lower level, the adjacent ends of the rollers being slightly conical to facilitate the removal of the rails laterally from the roller line to the hot bed. The rail 13 normally lies on the rollers on its side, as illustrated in Figures 1 and 2. The hot bed 12 is made up of parallel steel rails 14 spaced apart and carried by suitable supports as is well known. Arranged above the hot bed 12 there is a series of devices identical in structure and operation for subjecting the hot rails along their upper wear surfaces to a regulated cooling treatment to give to the metal certain desirable characteristics in accordance with the process set forth in the Sandberg patent, two of such devices, marked 15 and 16, being shown for purposes of illustration. The specific construction of these devices forms no part of the present invention except as a part of the combination, but is covered by an application filed by Edward F. Entwisle and Frank E. Howells, Feb. 4, 1921, Serial No. 442,531, and therefore a general statement of their construction and operation will be sufficient for a full understanding of the present invention.

Referring to the apparatus marked 15, it will be noted that it includes a pipe 17 for a gaseous cooling fluid having discharge perforations or openings along its under surface, and that it is mounted a material distance above the hot bed 12 and substantially parallel thereto, leaving sufficient open unobstructed space below it for the passage of rails and their dragging equipment over the hot bed. The pipe 17 and the operating parts are, furthermore, preferably parallel to the roller line so that a rail may be moved laterally from that line to a point beneath the apparatus. Each treating apparatus, furthermore, includes a series of longitudinally spaced lifting arms 18 projecting alternately on opposite sides, as illustrated on apparatus 16, from a point

above pipe 17 having facing hooked ends 19 and adapted to swing downward and inward towards each other on pivots above said pipe 17, to engage a rail lying on the hot bed 12, and to then rise, lifting the rail to position between guides 20 immediately below the pipe 17. In apparatus 15, the arms 18 are shown turned only part way downwardly and inwardly to grip the rail with their hooked ends 19 passing underneath the surface of the hot bed 12 between rails 14 at spaced points to engage laterally any rail lying on the hot bed between those points. It will be understood that in operation the arms continue to turn towards each other until they are substantially vertical, close against the rail on opposite sides, with their hooked ends underneath, and that they then rise, carrying the rail up to the treating apparatus and holding it there during the period of treatment. When the treatment is finished they descend, depositing the treated and finished rail on the hot bed and then swing to the position illustrated in apparatus 16, out of the way.

The specific construction and arrangement of mechanism by which the rails brought to the proper position by the roller line are moved laterally from it to the hot bed and there turned on their longitudinal axis to bring them into upright position with their working faces uppermost, forms the subject matter of an application for patent filed by Frank E. Howells and Lester L. Leach, March 21, 1921, Serial Number 454,110 and therefore no claim is here made to it per se, but only as a part of the combination. However, in order that its structure and operation and cooperative relation to the other elements of the combination may be clear, its features of construction and operation will here be explained.

The mechanism for moving the hot rails in succession from the roller line 10 over the hot bed and to position below a selected treating apparatus embodies, in the particular form of the invention illustrated, a shaft 21 mounted to turn in bearings in the fixed supports 22 on the outer side of the roller line and parallel thereto, and having secured thereto at intervals grooved wheels or rolls 23, around which pass the cables 24 which are preferably made of wire. Any known and suitable means is used for driving the shaft and grooved rolls in either direction to the extent desired in operating the cable. A drag bar 25 of known form is mounted above the surface of the roller line 10 longitudinally thereof at its outer side next to shaft 21, and is provided on its outer side with brackets 26 secured thereto and extending downwardly therefrom slightly below the surface of the roller line and hot bed, and they are there secured to the ends of cables 24 by suitable means such as a socket and pivot pin 27. The drag bar 25 has on its other side opposite the brackets 26 similar brackets 28 extending slightly below the surface of the roller line and hot bed, and cables 29 are secured to them and extend at right angles to the drag bar along the hot bed slightly below the surface, and constitute in effect continuations of cables 24. The cables and brackets are of course arranged between rollers of the roller line 10 and between rails 14 of the hot bed. Secured to the drag bar 25 at intervals on the side facing the hot bed there are projecting brackets 30 having outer rail engaging surfaces curved on a vertical plane from a point 31 below the surface of the hot bed, inwardly towards the drag bar, and upwardly and then forwardly at the top on a gradually increasing curve. These brackets may be in the form of vertical plates secured at their rear straight edges to drag bar 25 by angle bars 32. The lower portions of these curved brackets normally engage the lower edge of the top part of the rail 13 lying on the roller line, and when the drag bar and these brackets are moved laterally by the action of the cables across the roller line and along the hot bed, the contact of the brackets with the rail causes it to slide laterally over the surface without turning on its longitudinal axis from its side position. In order to turn the rail on its longitudinal axis and bring it into upright position with its wearing surface uppermost, ready to be lifted to position in the treating apparatus, stops 33 are placed at intervals in a line across the hot bed between and parallel to the roller line and the treating apparatus. These stops may be in the form of short angle bars having a vertical flange 34 extending transversely of the line of movement of the rails and projecting slightly above the surface of the hot bed in the path of the rails, and a horizontal flange 35 bolted to a fixed support 36 as shown in Figure 3. The cooperative action of these fixed stops and the curved brackets 30 in turning the rail from side position to upright position is shown in Figure 3 diagrammatically. As here shown, when the drag bar and brackets have moved the rail 13 far enough to bring its lower flanged edge 42 in contact with the projecting edge 34 of the stop 33 that edge of the rail will cease to move forward, and further forward movement of brackets 30 will cause the opposite edge of the rail in contact with its inclined surface to slide or ride up that surface, turning the rail on its longitudinal axis by a rolling motion over the stop 34, one intermediate position of the parts during this action being shown in dotted lines in Figure 3. This figure also shows the position of the parts in dotted lines

after the rolling action is completed and the rail is in upright position beyond the stops, ready to be moved to position below the treating apparatus. In the present invention the cables 29 extend along the hot bed beyond the point where the rails are turned and underneath each of the treating devices mounted above it so as to carry the drag bar and the rail engaged by it to position for treatment in the particular device selected. It will be seen, therefore, that this rolling action bringing the rail to upright position takes place automatically as it is being moved by one continuous operation to the point on the hot bed desired. As heretofore indicated, the operator has control of the dragging mechanism and therefore after the rail has been turned to upright position he allows it to proceed until it reaches a position beneath a treating apparatus which at the moment is idle, and then reverses the mechanism, causing the drag bar to leave the rail there and move back to the roller line to get another rail to be delivered to another treating apparatus ready to receive it.

The rails which have been treated and deposited on the hot bed are removed laterally over the surface of the hot bed on the side opposite to the roller line as rapidly as they are deposited, so that they will not be in the way of incoming rails. To this end there are several members 43, called buggies, located between the skids on the hot bed and movable on tracks 44 from beneath the treating devices to the side opposite the roller line, and they are moved in unison through cables 45 by known controllable operating means (not shown). A pawl 46 is mounted in each member, or buggy, the latter being disposed in a line transverse to the line of movement, so that the pawls engage the rail at different points longitudinally and give to it side motion, and these pawls normally project slightly above the surface of the hot bed with their operative ends facing in the opposite direction from the roller line, and are yieldingly supported in the projecting position but are provided with inclined rear upper surfaces adapted to be depressed below the surface by contact with and movement under a rail lying on the hot bed. It will be understood that when a treated rail has been deposited on the hot bed, the members, or buggies, 43 are caused to move to a position slightly beyond it, the pawls 46 being depressed in passing but resuming their normal projecting operative position immediately thereafter, and the members or buggies are caused to make a reverse movement along the hot bed, dragging the rail through the action of the pawls along the hot bed out of the way on the side opposite the roller line.

The treatment of rails by the Sandberg process requires some time, but the construction and arrangement above indicated makes it possible to give all the time necessary to each rail without interference or obstruction to handling all of the rails in succession as fast as they are delivered by the roller line, since during treatment each rail is out of the way, and any number of treating devices necessary may be in operation at one time.

While we have illustrated and described one particular embodiment of our invention, it will be understood that in its broader aspects the invention is not limited to the specific means shown, covering the various movements and actions described producing the results stated.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. In an apparatus for handling rails, the combination with a rail conveyor, of a laterally extending support or hot bed for rails at one side of said conveyor, a device for treating rails above said hot bed, means for moving by one continuous action a rail laterally from said conveyor to said support or hot bed and along said hot bed to a position below said device, means for raising said rail from said support for treatment in said device and for depositing it on said support after treatment, and means for moving said deposited rail over said support out of the path of rails being moved from the conveyor over the hot bed.

2. In an apparatus for handling rails, the combination with a rail conveyor, of a laterally extending support or hot bed for rails at one side of said conveyor, a plurality of devices for treating rails mounted at different distances from said conveyor above said hot bed, means for moving rails laterally from said conveyor to and over said hot bed to selected positions under said treating devices, means for raising for treatment a rail below any treating device out of the path of other rails on the hot bed and for depositing it after treatment on the hot bed, and means for moving said deposited rail over the hot bed out of the path of rails being moved from the conveyor.

3. In an apparatus for handling rails, the combination with a rail conveyor, of a laterally extending support or hot bed for rails at one side of said conveyor, a device for treating rails above said hot bed, means for moving by one continuous action, a rail laterally from said conveyor to said support or hot bed and along said hot bed to a position below said device and for automatically turning it from a side position to an upright position by and during such movement, means for raising said rail from said support for treatment in said device and for depositing it on said support after treatment, and means for moving said de-

posited rail over said support out of the path of rails being moved from the conveyor over the hot bed.

4. In an apparatus for handling rails, the combination with a rail conveyor, of a laterally extending support or hot bed for rails at one side of said conveyor, a plurality of devices for treating rails mounted at different distances from said conveyor above said hot bed, means for moving rails laterally from said conveyor to and over said hot bed to selected positions under said treating devices and for automatically turning said rail from a side position to an upright position by and during its movement, means for raising for treatment a rail below any treating device out of the path of other rails on the hot bed and for depositing it after treatment on the hot bed and means for moving each deposited rail over the hot bed out of the path of rails being moved from the conveyor.

5. In an apparatus for handling hot rails from the rolls, the combination with a rail conveyor on which the rails normally lie on their sides and move endwise, of a laterally extending support or hot bed for said rails at one side of said conveyor, of a rail cooling and treating device above said hot bed including means for lifting a rail from said hot bed below it, means moving across said conveyor and along said hot bed having parts projecting above their surfaces to engage the outer side of said rail on the conveyor and move it laterally therefrom over the hot bed to position under said treating apparatus, means for reciprocating said moving means in its path of movement and for controlling the extent of movement, and automatic means for turning said rail on its longitudinal axis into upright position by and during its movement over the hot bed before reaching said apparatus.

6. In an apparatus for handling hot rails from the rolls, the combination with a rail conveyor on which the rails normally lie on their sides and move endwise, of a laterally extending support or hot bed for said rails at one side of said conveyor, a plurality of rail cooling and treating devices mounted above said hot bed at different distances from a section of the conveyor, each including means for lifting a rail from the hot bed for treatment out of the path of other rails on the hot bed and for then depositing it on the hot bed, means for moving a rail from said conveyor over said hot bed to a position below any selected treating device and for automatically turning it on its longitudinal axis to upright position by and during said movement and means for moving treated rails deposited on the hot bed over the hot bed out of the path of rails moving thereon from the conveyor.

7. In an apparatus for handling hot rails from the rolls, the combination with a rail conveyor on which the rails normally lie on their sides and move endwise, of a laterally extending support or hot bed for said rails at one side of said conveyor, of a plurality of rail cooling and treating devices spaced apart and mounted above said hot bed parallel to said conveyor with clear spaces beneath for the movement of rails, each including means for lifting a rail from said hot bed below it, means moving across said conveyor and along said hot bed having parts projecting above their surfaces to engage the outer side of said rail on the conveyor and move it laterally therefrom over the hot bed to position under said treating apparatus, means for reciprocating said moving means in its path of movement and for controlling the extent of movement, and automatic means for turning said rail on its longitudinal axis into upright position by and during its movement over the hot bed before reaching said apparatus, means adapted to reciprocate along said hot bed from points below said treating devices in the opposite direction from said conveyor and to automatically engage rails deposited on said hot bed after treatment, and move them over the hot bed out of the way of incoming rails to be treated, and means for operating and controlling said last mentioned reciprocating means.

In testimony whereof we hereunto affix our signatures.

EDWARD F. ENTWISLE.
FRANK E. HOWELLS.
LESTER L. LEACH.