July 11, 1939. J. JOHNSTON 2,166,056

APPARATUS FOR COOLING RAILS

Original Filed Aug. 21, 1930 2 Sheets-Sheet 1

Fig. 1.

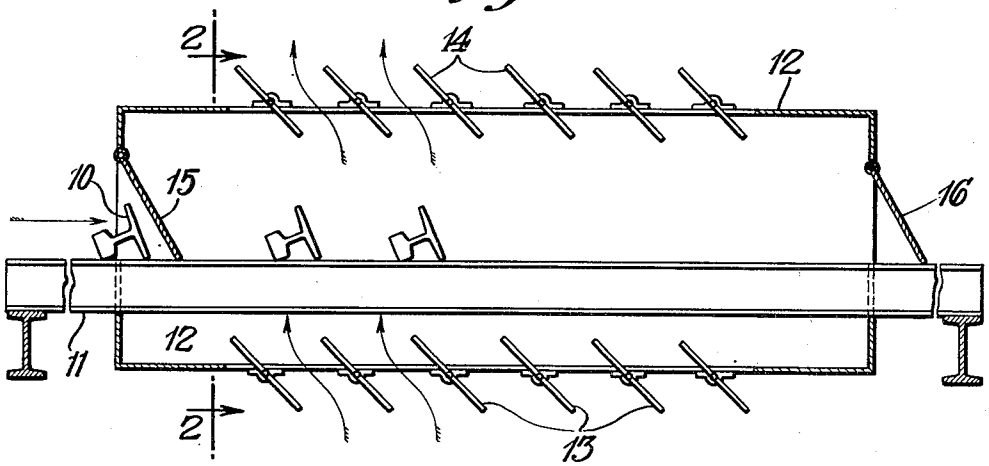
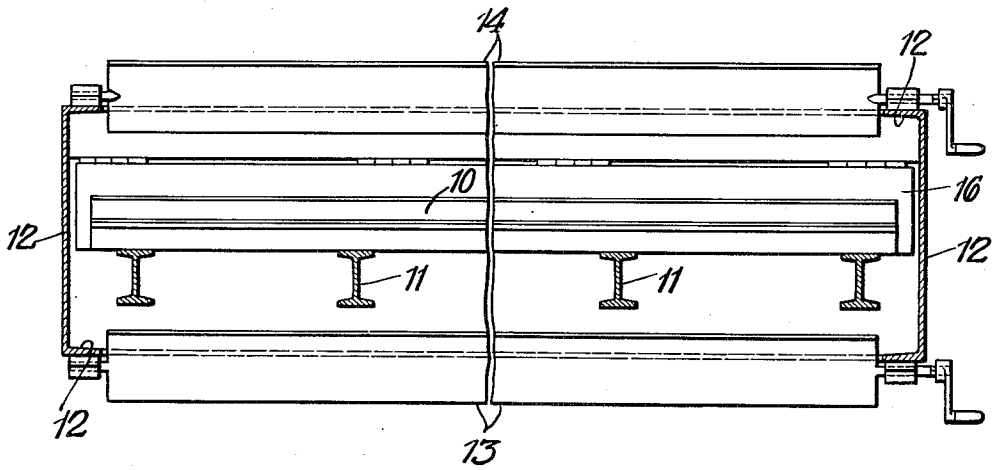


Fig. 2.



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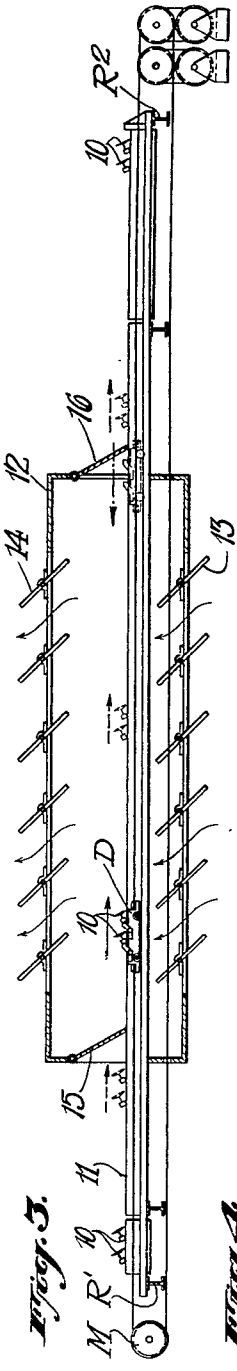


Fig. 3.

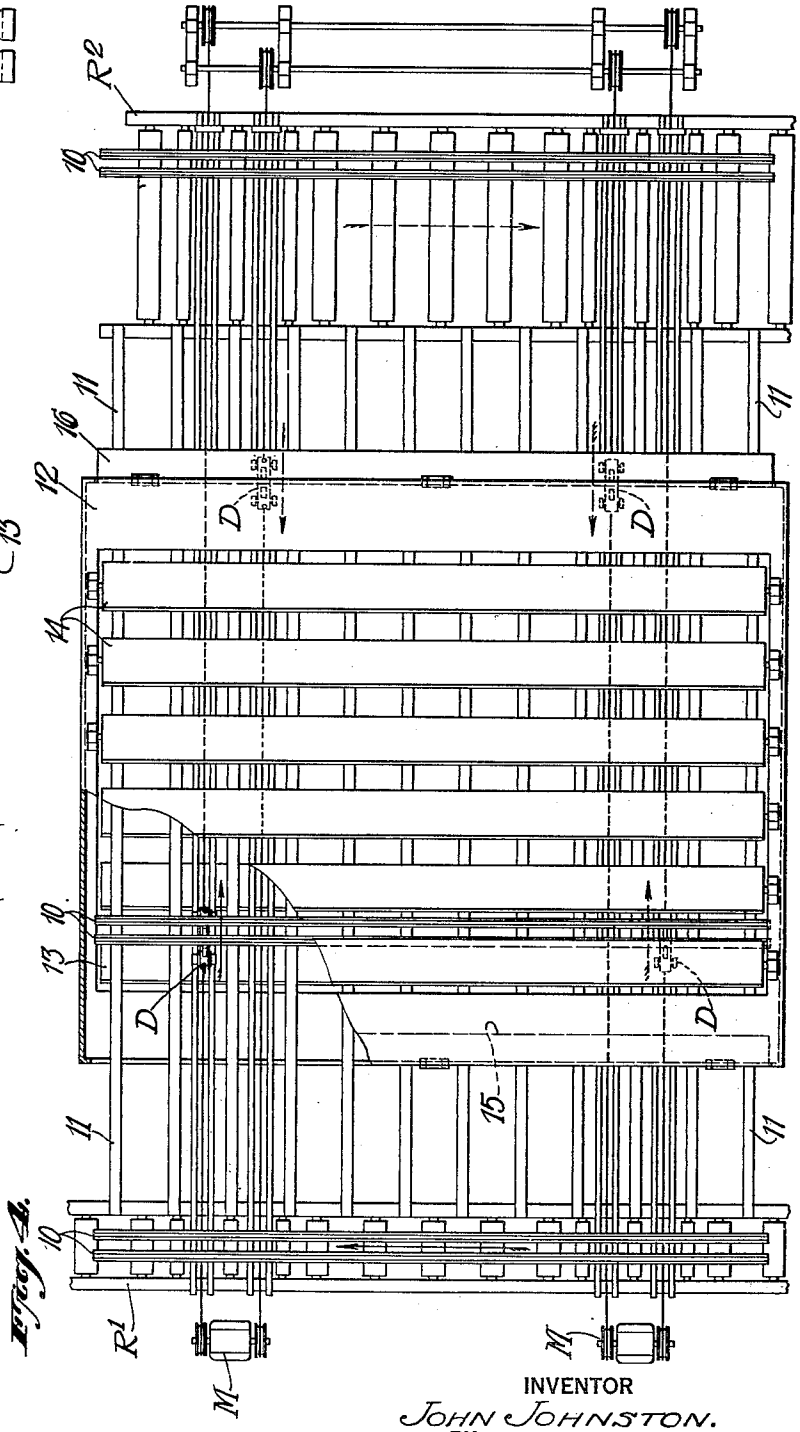


Fig. 4.

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UNITED STATES PATENT OFFICE

2,166,056

APPARATUS FOR COOLING RAILS

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Original application August 21, 1930, Serial No. 476,868. Divided and this application February 10, 1937, Serial No. 125,144

10 Claims. (Cl. 80—42)

This invention relates to rail treatment apparatus and more particularly to means for regulating the rate of cooling of railroad rails on the hot bed. This application is a divisional application of my prior filed application Serial No. 476,868 filed August 21, 1930.

In the cooling of railroad rails from the rolling temperature down to atmospheric temperature it is customary to dispose the rail upon what is known in the art as a hot bed. This hot bed comprises substantially a plurality of horizontal supporting beams supported in spaced relation above the floor level providing a plurality of points of support along the length of a rail disposed thereon. Heretofore while the hot bed has been enclosed within a building no means has been provided associated with and in combination with the hot bed to regulate the rate of cooling of the rail as it lay on the hot bed.

In my above identified application I have described and claimed a method for cooling rails which briefly comprises allowing the rail to cool at the normal rate on the hot bed until the transformation temperature is attained and then enclosing the rail to retard the rate of cooling to such an extent that the temperatures throughout the section of the rail are equalized at a temperature approximating the transformation temperature and through a range of temperatures just below the transformation temperature and thereafter the rail may be allowed to cool down to atmospheric temperatures at the normal rate or at a rapid or even an enhanced rate of cooling.

The object of this method invention is to relieve those internal stresses and strains induced interiorly in the rail by reason of the transformation of austenite into ferrite. This is accomplished by equalizing the temperatures throughout the section of the rail during transformation and over a time interval after transformation while the rail is still sufficiently plastic to permit the said stresses to be dissipated. Once relieved these stresses do not reappear during subsequent cooling, although new stresses incident to temperature differentials between inside and outside during subsequent cooling may appear. These stresses may or may not be of sufficient magnitude to be deleterious during the subsequent service life of the rail. If deleterious the magnitude may be reduced by retarding the cooling of the rail to the point where the temperature differential between inside and outside are not sufficient to introduce a deleterious magnitude of such stresses.

However, in the practice of this said method invention, it is essential that some means be provided whereby temperature equalization may be effected in the rail without removing the rail from the hot bed, as the rail is relatively soft and plastic at the temperature of transformation and cannot readily be handled without distorting the same from its desired final shape.

I therefore proposed in my parent application a novel cover apparatus for association with the hot bed in which cover adjustable louver means are provided to regulate the rate of air flow upwardly past a rail enclosed by the cover, thereby to regulate the rate of heat loss from the exterior of the rail to the extent necessary to permit the rail temperature to equalize throughout its section by conduction of heat from the interior of the rail. In the preferred specific embodiment of this invention, as indicated in my first filed application, the cover is adapted to cover a plurality of rails at a time and is fixedly positioned on the hot bed at a point intermediate the front and rear ends of the hot bed, and the rails disposed on the front end of the hot bed are allowed to cool normally to the transformation temperature and are then moved along the rail skids under the cover wherein the rate of cooling is retarded to the extent desired. After equalization of temperatures has been obtained under the cover the rails are moved out of the cover onto the rear end of the hot bed and are either allowed to cool normally thereon down to atmospheric temperatures or are controlled cooled in any desired manner as the case may be.

The various features of my apparatus invention are illustrated in the accompanying drawings, in which—

Fig. 1 is a longitudinal vertical section, and Fig. 2 is a transverse vertical section of an apparatus embodying a preferred form of my invention.

Fig. 3 is a side elevational view and Fig. 4 is a top plan view of a rail treating apparatus improved in accordance with the present invention.

Referring to the drawings, the rails 10 are placed on and transversely of beams 11 which constitute the hot bed, and are moved progressively along the hot bed from one end to the other as indicated by the arrow in Fig. 1 by any suitable means heretofore common in the art, such as for example, traveling dogs D energized by motor means M. In the arrangement shown in Figs. 3 and 4, the rails 10 are carried to a posi-

tion opposite hot bed 11 by roller line R1 and are moved onto hot bed 11 by dogs D substantially as indicated in the drawings. This particular means including roller line R1, traveling dogs D and motor M together with discharge roller line R2 is common to the art per se. While the rails are on the hot bed they are cooled by currents of air, set up by convection or otherwise, which rise upwardly between and about the rails. The rate of cooling is determined primarily or very largely by the rate of movement of these air currents. When the temperature of the surface of the rails drops to about 700° C. (1300° F.) or somewhat lower, dogs D move rails 10 until they enter a closed chamber 12 having louvers 13 and 14 in its lower and upper walls to control and limit the upward passage of air about the rails in the chamber. These lower and upper walls are in relatively close proximity to the hot bed providing a relatively dead air space for the rails covered by the chamber. Flaps 15 and 16 may be provided at the rail entrance and exit openings of the chamber.

The position or angle of the louvers 13 and 14 may be individually regulated to cool the rails to any rate, within limits, in the critical temperature range and immediately subsequent to it. The rails are then moved by dogs D until they pass under the flap 16 to the outer atmosphere, whereupon the usual more rapid cooling takes place. The rate of cooling of the rails after the retarded cooling in the chamber 12 has been completed may even be increased to compensate for the relatively longer time and greater space required for the period of retarded cooling.

It will be understood, however, that other apparatus may be used in the carrying on of the method of cooling in my invention and that various modifications of the form of the apparatus may be made.

What I claim is:

1. In combination, a hot bed and a rail protective cover, the top and bottom portions of said cover having a length approximating the width of said hot bed and a width adapting the cover to enclose a plurality of rails from the atmosphere but only a portion of the hot bed intermediate the front and rear ends thereof, the said top and bottom of said cover being provided with means to regulate the flow of air upwardly through the cover and past the rails enclosed thereby.

2. In combination, a hot bed and a rail protective cover, the top and bottom of said cover extending across the hot bed and covering but a portion of the length of the hot bed intermediate the ends thereof, the said top and bottom being provided with means cooperating to regulate the rate of air flow vertically upward through the said cover past the rails enclosed thereby.

3. In combination, a hot bed and a rail protective cover therefor, the top and bottom of said cover extending respectively above and below the rail supporting members of the hot bed, and across the width of the hot bed but covering only a portion of the length thereof intermediate the ends of the hot bed, and adjustable louver means in the top and bottom of the said cover to regulate the rate of air flow through the said cover upwardly and about the rails covered thereby.

4. In combination, a hot bed and a rail protective cover, the said cover extending across the hot bed and covering but a portion of the length of the hot bed intermediate the ends thereof both above and below the rail supporting platform of the said hot bed, and adjustable louver means in the opposite upper and lower walls of said cover to permit the regulation of the rate of air flow through the cover and upwardly past rails enclosed thereby.

5. In a rail treatment apparatus, a hot bed and a rail protective cover the top and bottom of said cover extending across the width of the hot bed and over an intermediate portion of the length of the hot bed, the said cover being adapted to enclose a plurality of rails from the atmosphere and to provide a relatively dead air space for the rails covered thereby, the top and bottom of the said cover being provided with adjustable air inlet and outlet openings to regulate the rate of air flow vertically upward through the cover past rails enclosed within the said cover.

6. In a rail treatment apparatus, a hot bed and a rail protective cover extending above and below the rail supporting members of said hot bed across the width of the hot bed and but a portion of the length of the hot bed, the top of the cover being in relatively close proximity to the top of the hot bed to provide a relatively dead air space for the rails covered thereby, the top and bottom of said cover being provided with adjustable louver means at air inlet and outlet openings to regulate the rate of air flow vertically upward through the cover and past rails enclosed by the said cover.

7. A hot bed for cooling rails, said bed having a front and a rear section each adapted to permit substantially free circulation of air over and about the rails located thereon and an intermediate section provided with an enclosure restricting the air circulation about rails located thereunder to a substantially vertical flow upwardly past the said rails.

8. In the combination of claim 7, means to regulate the rate of flow of said vertical flow of air.

9. In the combination of claim 7, adjustable louver means in the top and bottom of said enclosure to control the rate of flow of air upwardly past the said rails.

10. In the combination of claim 7, means to advance rails from the front section of the said bed into and under the said enclosure and out of said enclosure onto the rear section of the hot bed.

JOHN JOHNSTON.