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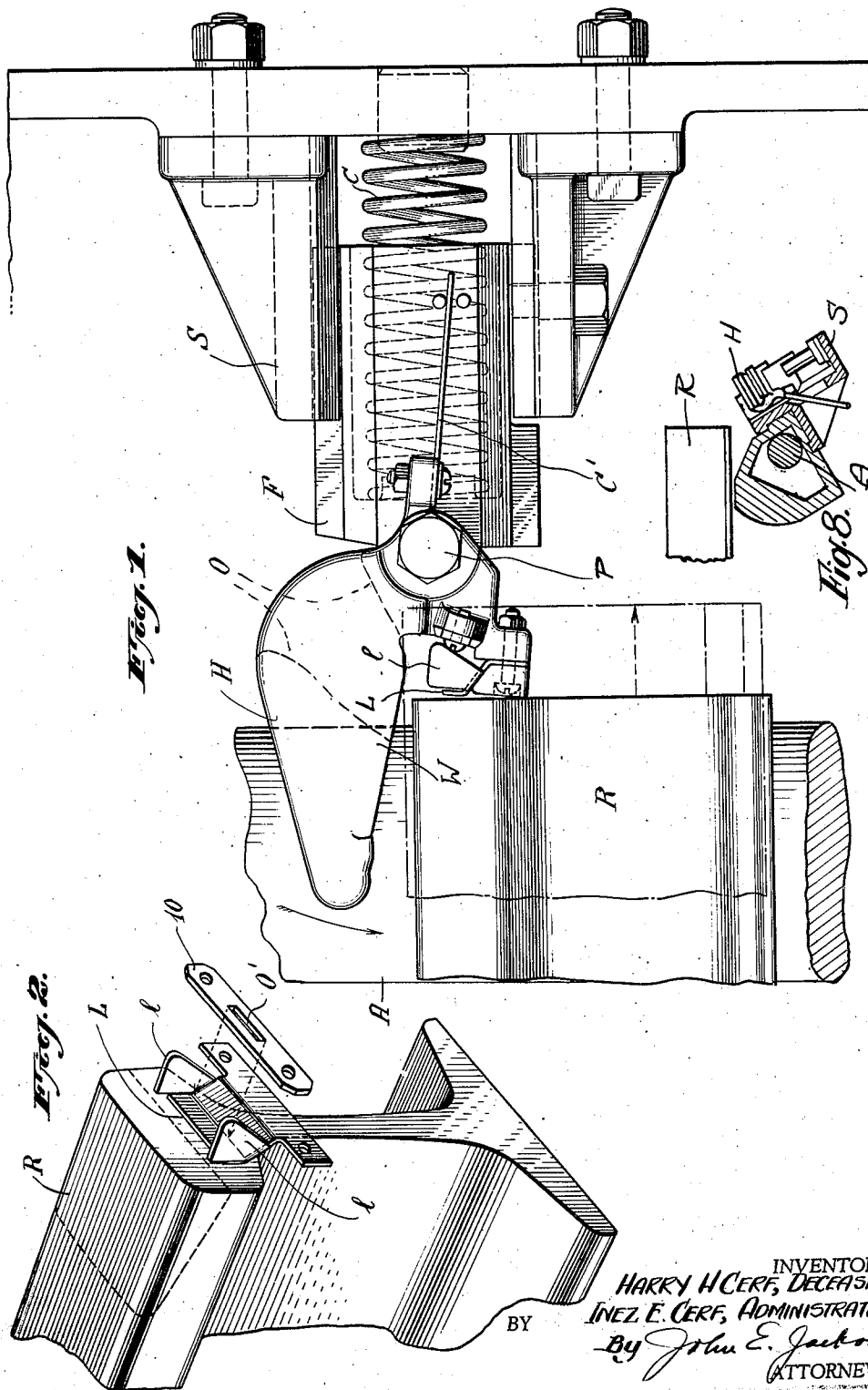
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2,222,362

RAIL END HARDENING HOOD

Filed Aug. 30, 1939

2 Sheets-Sheet 1



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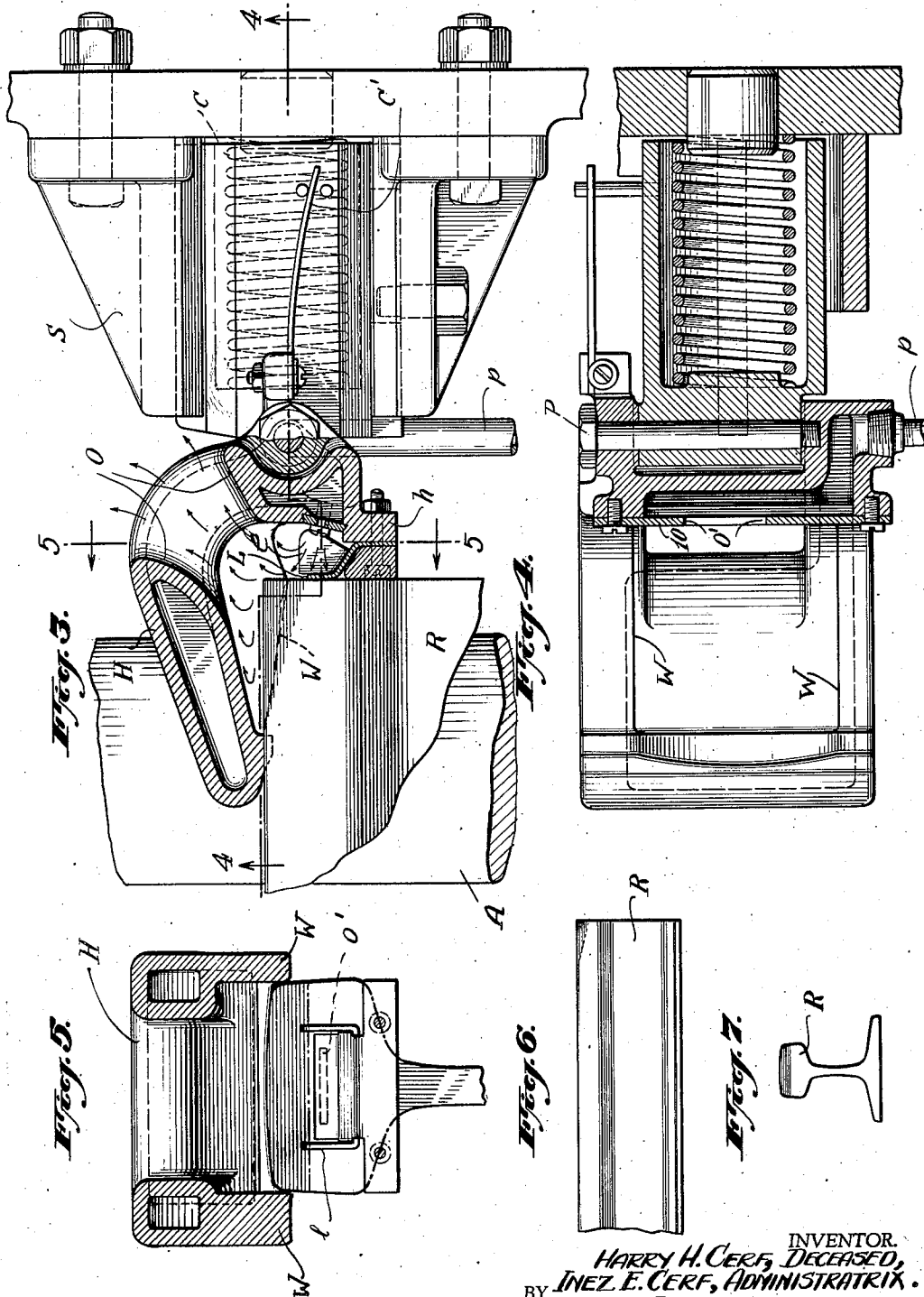
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2,222,362

RAIL END HARDENING HOOD

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5 Claims. (Cl. 266—2)

This invention relates to means for air cooling rail ends and more particularly to a hood means adapted to be positioned on the end of a rail to enclose a determined portion of the head of the rail inwardly from the end in such manner that the enclosed portion of the said head may be cooled and hardened by the application of air and similar fluid mediums under pressure thereto. Still more particularly the invention relates to a means effective to produce a cooling of the head of a rail at and adjacent the rail end in accordance with the rail treatment invention described and claimed in Brunner Patent No. 2,129,670.

The object of the invention is to provide a hood means for attachment to a rail end which is adapted to provide for the cooling and hardening of the head of the rail inwardly from the rail end to a determined degree by a fluid medium under pressure circulating through the hood in direct contact with the said rail. Another object is to provide a hood means for the air cooling of the head of a rail for a determined distance inwardly from the rail end. Other objects and advantages will be apparent as the invention is more fully hereinafter disclosed.

In accordance with these and other objects, there has been devised the hood means illustrated in the accompanying drawings of which the following is a full and complete description thereof:

In the drawings, Fig. 1 is a top plan view of the hood means of the present invention in one operative position; Fig. 2 is a perspective view illustrating one feature of the invention; Fig. 3 is a top plan view of the hood means in a second operative position; Fig. 4 is a section along plane 4—4 of Fig. 3; Fig. 5 is a section along plane 5—5 of Fig. 3; and Figs. 6 and 7 illustrate the nature and extent of hardening in the head of the rail induced through the use of the present invention. Fig. 8 is a view illustrating the means for actuating the hood means of the present invention into and out of engagement with a rail end.

In the manufacture of rails in accordance with the process of the above identified Brunner patent, the rails are permitted to cool after the final rolling operation to a temperature below the transformation temperature and are then reheated to a temperature approximating but above the upper critical temperature for a time interval adapted to induce substantial uniformity of temperature throughout the entire section of the rail and thereafter the rails are permitted to cool down to atmospheric temperatures, preferably at the rate normally obtained in freely moving air. During this final cooling operation, it is desirable to harden the head of the rail at and adjacent the ends of the rail for an extended distance inwardly from the rail end and downwardly from the upper surface of the rail head to a

greater degree than that obtainable by cooling in freely moving air. This hardening is obtainable by cooling this portion of the rail at a more accelerated rate than the normal rate applied to the remainder of the rail. The present invention provides the means for accomplishing this result.

In the usual practice of the Brunner process the rails are discharged periodically in groups endwise from an elongated furnace onto a roller table which operates to align the rails endwise. In association with the roller table there is provided a means to first bunch the end aligned rails together at one side of the table and to then move the rails into determined side spaced relation on the table. In such position the ends of the rails extend beyond the ends of the table and at each table end is provided a rotatable shaft on which is mounted a plurality of hoods in side spaced relation such that on rotating the shaft through a determined degree of rotation the said hoods will be brought into engagement with the heads of the rails at the rail end. After the hoods are so located in position on the rail head, air under pressure is supplied to the hood for a determined length of time effective to produce the extent and degree of hardening desired in the rail head at each end. The shaft carrying the plurality of hoods is then rotated reversely, bringing the hoods out of engagement with the rail end, and the rail is permitted to cool on the table or after moving off the table down to atmospheric temperature.

The present invention relates to the hood structure, per se, the associated means for moving the hood into and out of engagement with the rail end forming no part of the instant invention.

Referring to the drawings, Fig. 1 shows the position of the hood H at the moment of contact of the hood with the rail after having been rotated to this position by rotation of the supporting shaft A. On further rotation of the supporting shaft A the hood H is moved to the position shown in Fig. 3;

As shown in Fig. 3, on further rotation of the shaft A on which support S is mounted towards the rail R, the hook or heel (h) of the hood H engages the rail end and pivotally moves the hood H against the action of spring C' about the axis of pin P until the far end of the hood H is brought into engagement with the top of the rail head. In the arrangement shown rail R is lying on its side on the roller table support (not shown) and as a similar hood H is simultaneously engaging the opposite rail end the two said hoods effectively grip the rail therebetween and one acts against the other.

Hood H is a hollow member comprised of cast bronze or similar metal having a relatively high heat conductivity shaped somewhat like a rec-

tangular hook or cupped hand with depending side walls W—W adapted to engage the sides of the rail to restrain the escape of air along the sides of the rail and with an air venting opening O therein to permit the escape of air from the cupped interior of the hood while positioned on or about the rail end. The hood H is pivotally mounted on pin P carried on frame F' slidably mounted in support S and is maintained by the frame F' in the advanced position shown in Fig. 1 by coil spring C. Hood H is maintained in the pivotal position shown in Fig. 1 by spring strip member C'.

As the heel (h) of the hood (H) engages the rail end, spring leaf member (L) is brought into engagement with the rail end and forced tight against it through the action of the air blast, thus effectively sealing the heel (h) and the rail (R) at the point of contact preventing the escape of the air downward against the web of the rail. Spring leaf (L) is provided with side extensions 1—1 bent sidewise as indicated to prevent the escape of air on either side of the leaf member (L) and thus protecting adjacent rails. By means of the forward upper lip and the leaf member (L) the distribution of the air blast is effectively controlled and confined to that part of the rail end head which, experience has proved, should be hardened.

Air under pressure is supplied to the hollow interior of hood H by means of pipe p and escapes from the interior of the hood H into the area enclosed by the hood about the rail end through orifice plate 10 (Fig. 4) located in the heel (h) of the hood H. The opening O' in orifice plate 10 is preferably rectangular shaped and is located in a position relative to the rail end to direct a blast of air onto said rail end which will spread cross-sectionally the entire width of the rail head, substantially as indicated in Fig. 2. The area enclosed in dotted line on the rail head indicates the area which it is desired to cool rapidly by means of the air blast, the portion at the rail end desirably being of maximum hardness with the hardness of the remaining portions decreasing as the hardened area progresses inwardly and interiorly from the end of the rail.

The circulation of the air within the hollow interior of the hood effects a cooling of the hood with consequent cooling of the rail end enclosed thereby. Opening O in the hood H is preferably located in a position relative to the angle of impact of the air on the rail end so as to provide substantially free passage of the air blast there-through with only a minimum circulation of air inwardly along the rail head. This arrangement produces a graduated cooling rate inwardly from the rail end and inwardly from the top head surface.

From the above description and accompanying drawings it is believed apparent that the hood arrangement of the present invention may be widely modified without essential departure from the same and all such modifications are contemplated as may fall within the scope of the following claims:

What is claimed is:

1. A cooling hood for attachment to a rail end, said hood comprising a hollow rectangular shaped hook member pivotally supported at the hook end, spring tension means maintaining said hook member in one pivoted position, means to advance and retract the hood towards and away

from the rail end, a spring leaf member disposed on the hook end of said hook member to engage the rail end in full advanced position and to pivotally move the hook member to a position bringing the front end of the hook member into engagement with the top of the rail head, side leaf members on said leaf member to prevent the escape of air sideways over said leaf member, means to supply air under pressure to the interior of said hook member, an orifice located in a position to permit the said air to escape from the interior of said hook member and to impinge at an angle directly onto the butt of the rail end, and an air venting opening through said hook member to permit the air after striking said rail end to pass substantially unobstructedly into the atmosphere.

2. A cooling hood for attachment to a rail end, said hood comprising a hollow rectangular shaped hook member, a spring leaf member with side leaf members on the heel of said hook member, an air outlet opening in the heel of said hook member in a position relative to the enclosed rail end to direct air under pressure angularly towards the butt of said rail end, means to supply a pressure of air to the hollow interior of said hook member and an air venting opening through the hook member to permit the said air to escape substantially unobstructedly from the cupped interior of the said hood.

3. A cooling hood for rail ends comprising a hollow member shaped like a rectangular hook or cupped hand, the forward lip of said hollow member having a contour approximating that of the rail head to which it is to be attached, an air venting opening in the said hollow member to permit the escape of air from the cupped interior, and means to supply air under pressure through the heel of said hollow member onto the butt end of a rail head enclosed by the hollow member, and means to direct the flow of said air towards the said vent opening.

4. The cooling hood of claim 3, said last mentioned means comprising a spring leaf member secured to the heel of said hollow member and extending forwardly therefrom in a position to make spring engagement with the butt end of the rail head on the positioning of the hood thereon and side wing extensions on said spring leaf member extending towards the said vent opening.

5. A cooling hood for rail ends comprising a hollow member comprised of metal of relatively high heat conductivity and shaped somewhat like a rectangular hook or cupped hand, the forward lip of said member having a contour approximating that of the rail head on which it is to be located, an air venting opening through the said hollow member to permit the substantially vertical escape of air from the cupped interior of the member when positioned on a rail end, a spring leaf member on the heel of said hollow member and extending forwardly therefrom in a position to engage the rail end ahead of the said heel, side wing extensions on said spring leaf member extending towards the said hollow member and means to supply a pressure of air to the interior of said hollow member and through the heel of said hollow member against the butt end of the rail head enclosed by the cooling hood.

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