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W. L. MERRILL
METHOD OF MAKING STEEL RAILS

Filed June 14, 1923

Fig. 1.

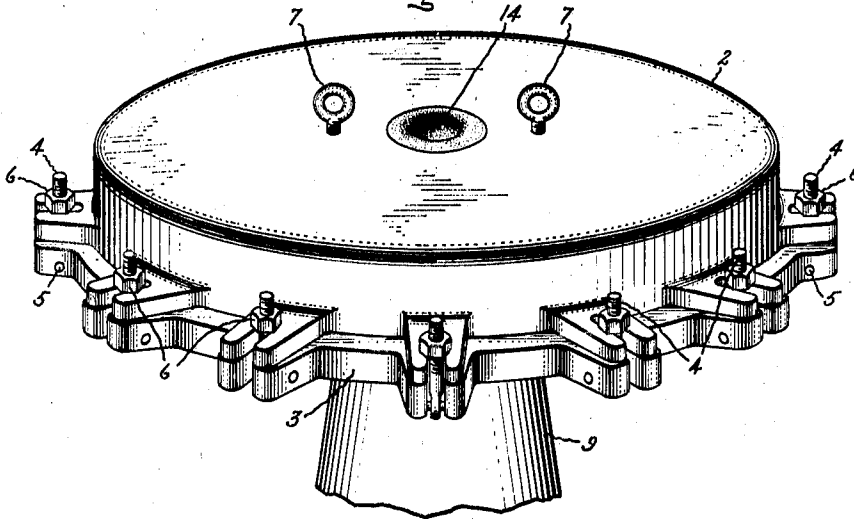


Fig. 2.

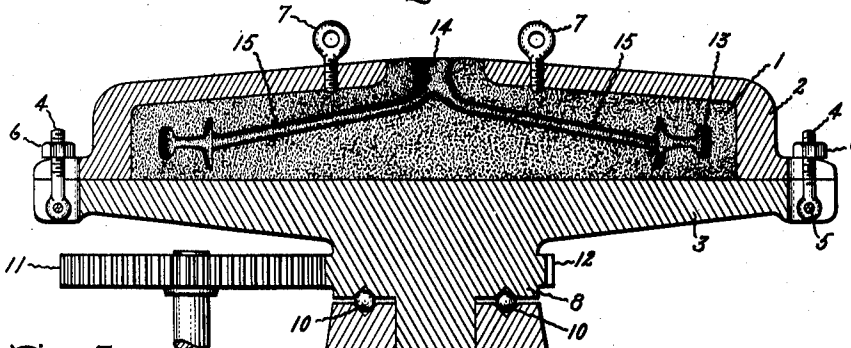
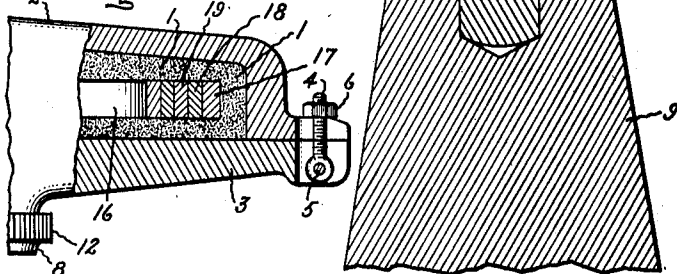


Fig. 3.



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UNITED STATES PATENT OFFICE.

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METHOD OF MAKING STEEL RAILS.

Application filed June 14, 1923. Serial No. 645,448.

To all whom it may concern:

Be it known that I, WILBUR L. MERRILL, a citizen of the United States, residing at Schenectady, in the county of Schenectady, State of New York, have invented certain new and useful Improvements in Methods of Making Steel Rails, of which the following is a specification.

The present invention relates to the manufacture of elongated steel objects which I shall hereinafter designate as rails.

When rails for transportation purposes are produced by rolling an ordinary cast ingot of steel a relatively large portion is cut off from each end of the ingot so as to make sure there are no cavities or pipes remaining in the metal. The great accident hazard of defective rails makes it imperative to use the utmost care to secure sound metal. My invention is equally applicable to the production of elongated objects for other purposes.

In accordance with my invention the homogeneity and strength of steel rails is increased by casting centrifugally a ring of steel, preferably having the general contour of the rail for which it is to be rolled, which then is cut open, straightened and worked into desired form and diameter.

Round objects, such as wheels for example, have been cast centrifugally heretofore but as far as I am aware centrifugal casting has not been used heretofore conjointly with a subsequent straightening and working operation such as rolling.

The accompanying drawing illustrates apparatus suitable for carrying out my invention; Fig. 1 is an external perspective view and Fig. 2 is a vertical section of a centrifugal casting machine and Fig. 3 is a vertical section of an apparatus illustrating a modification.

The apparatus which is shown for illustrative purposes only, comprises a baked sand mold 1 contained in a metal frame consisting of two separable members 2, 3 held together by a number of bolts 4, which are secured to the lower member 3 by hinges 5 and are held fast by nuts 6. Ring bolts 7 may be provided for handling the container and mold as shown in Fig. 2.

The mold member 3 is provided with a base 8 which rests upon a pedestal 9, ball bearings 10 or other suitable means being provided to permit rotation. Power is con-

veyed by a gear wheel 11 engaging with gear teeth 12 upon the exterior surface of the base 8.

The peripheral mold cavity 13, which preferably has the general shape of a rail, communicates with the central inlet passage 14 by the sprues 15. When the mold has been brought up to speed, molten steel is introduced into the mold through the inlet 14 preferably at a slow rate and the metal flows to the peripheral mold cavity, the heavier metal being separated from the lighter slag and the gases, thus insuring a sound casting. If desired, a hardening agent, such for example, as powdered manganese may be introduced into that portion of the metal which first flows into the mold so as to render the upper wearing surface harder than the other portions of the rail.

When the metal has cooled the mold is opened, the ring-shaped casting is removed, cut open, and rolled hot in the well understood manner. Ordinarily only a few passes are required to straighten the metal and to reduce it to the required diameter and shape.

The described process insures a strong, homogeneous rail without the wastage where heretofore was inevitable when producing rails from columnar ingots.

It is not a necessary part of my invention to cast a rail or other elongated object in the approximate final shape. In Fig. 3 I have shown a part sectional view of an apparatus suitable for casting centrifugally successive measured quantities of metal each charge acting as a backing for the succeeding charge. These concentric rings are separable upon cooling. The rotatable mold 1 shown in this figure contains a disc-shaped cavity 16, in which is cast first a ring 17. When this has solidified a second ring 18 is cast against the ring 17 as a mold, this process being repeated with a third ring 19 and so on, as many times as desired. The mold then is opened, the multiple ring is cut open and separated into its elements. This process is shown illustratively as applied to a sand mold but is not limited thereto. The rings thus cast may be rolled or otherwise worked mechanically.

What I claim as new and desire to secure by Letters Patent of the United States, is:—

1. The process of making elongated objects which consists in centrifugally casting a

ring of metal having the general contour desired in the finished object, opening and straightening said ring and finishing to desired form.

- 5 2. The process of making rails which consists in centrifugally casting a ring of steel having the general contour desired in the finished rail opening said ring and rolling said casting to straighten and finish the same.

- 10 3. The process of making elongated metal

objects which consists in centrifugally casting a plurality of concentric metal rings in succession, each ring cast acting as a backing for the next ring, opening and separating said rings and straightening the component parts. 15

In witness whereof I have hereunto set my hand this 13th day of June, 1923.

WILBUR L. MERRILL.