Feb. 14, 1967 J. F. R. JONES 3,304,070

WATER COOLED SKID RAILS

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Fig. 1.

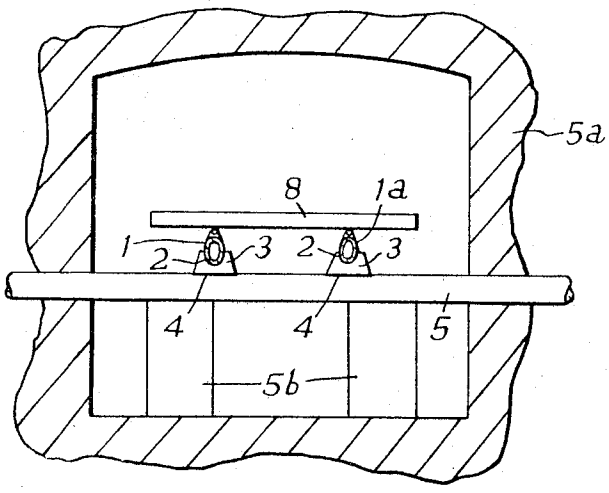


Fig. 2.

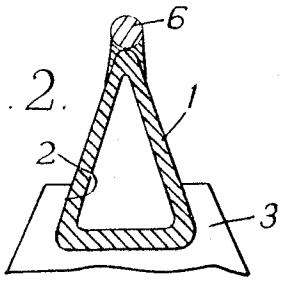
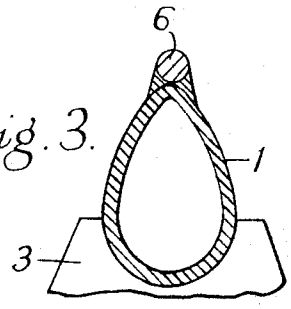


Fig. 3.



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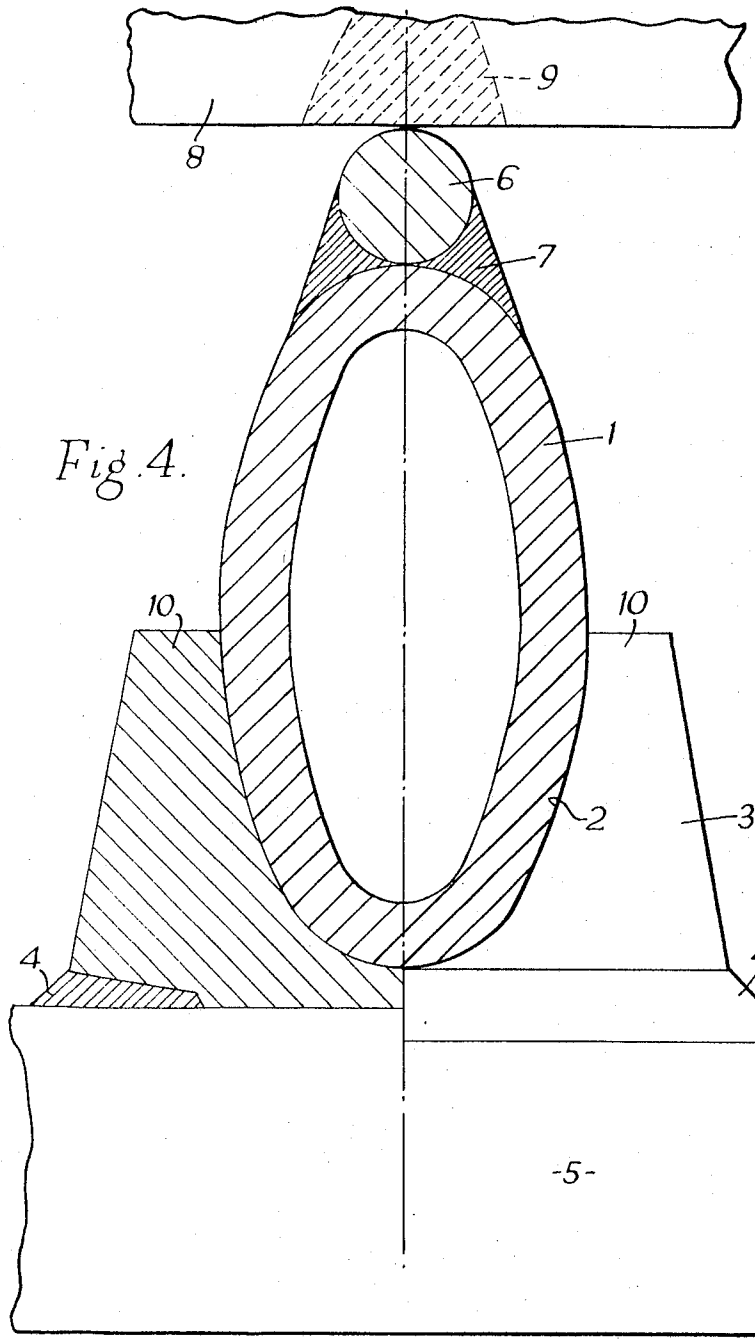


Fig. 4.

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WATER COOLED SKID RAILS

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Claims priority, application Great Britain, Oct. 28, 1960, 37,204/60
2 Claims. (Cl. 263—6)

This invention relates to water cooled skid rails for furnaces and particularly, although not exclusively, to such skid rails for continuous furnaces used for the heat treatment of steel slabs to be fed to a rolling mill.

Continuous furnaces are frequently underfired in their heating sections and the slabs pass transversely through these sections on a pair of longitudinally extending water cooled skid rails which are supported by transverse rails in turn carried at the upper ends of pillars from the furnace floor. It has long been common practice to use tubular skid rails of circular cross-sectional shape through which the cooling water is pumped and in order to reduce wear on the rails a rubbing strip has been provided on the upper surface thereof.

This arrangement has been satisfactory so long as it has not been desired to increase the handling capacity beyond certain limits but when any such increase is required it has been necessary to increase the heating capacity of the furnace at the expense of the length of time that the slabs are soaked over a brick hearth towards the output end of the furnace. It is then found that a portion of each slab above and to each side of each skid rail is masked by the skid rail from heat radiated from the lower part of the furnace and these portions thereof receive a different heat treatment from the remainder of the slabs. When the treated slabs are subsequently rolled into strip form these portions are reduced to a thickness greater than the remainder of the slabs over a considerable strip length and when the strip is used for example in a subsequent pressing operation this variation in thickness can cause difficulties.

It is therefore an object of the present invention to provide an improved water cooled skid rail for a furnace and particularly although not exclusively for an underfired continuous furnace which enables greater uniformity of heat treatment of slabs supported thereby to be achieved.

According to the present invention there is provided a water cooled furnace skid rail of tubular form and having such a transverse cross-sectional shape that its vertical axial length is greater than its horizontal axial length measured at the mid point of its height. Preferably the skid rail is oval in transverse cross-section and is supported by a saddle welded to supporting rails extending transversely of the furnace, the saddle serving to resist turning movement of the skid rail about its longitudinal axis.

Several embodiments of the invention will now be described by way of example with reference to the accompanying drawings in which:

FIG. 1 shows diagrammatically in transverse section part of a continuous furnace structure,

FIG. 2 shows a modified skid rail,

FIG. 3 shows another form of skid rail, and

FIG. 4 shows to a larger scale part of the furnace structure with a skid rail in transverse section.

Referring to FIGS. 1 and 4 of the accompanying drawings a pair of oval skid rails **1** and **1***a* having their major axes disposed vertically and respectively supported in part oval slots **2** formed in saddles **3** of sheet material welded at **4** to a support rail **5**.

The support rail **5** extends transversely across the interior of a furnace **5***a* supported on pillars **5***b* from the floor thereof.

At the upper end of each skid rail a rubbing strip **6** of circular cross-sectional shape is welded at **7** to support a slab **8** passing through the furnace. Although the rubbing strip **6** has been shown of circular cross-sectional shape it will be appreciated that it can be rectangular or any other desired shape.

It has been found that the oval cross-sectional shape of the skid rails reduces the masking effect provided by the skid rail to radiation from the lower part of the furnace to the slab **8** so that the portion indicated by the dotted lines **9** in the slab **8** which is subjected to a different heat treatment from the remainder of the slab is considerably reduced compared with the use of skid rails having a circular cross-sectional shape.

In passing the slabs through the furnace the skid rail structure is subjected to considerable vibrational forces and it is essential to ensure that the turning moment about the longitudinal axis of each skid rail is resisted. However, the support provided by the saddle **3** is sufficient for this purpose and has the additional advantage that the skid rails are not permanently secured to the support rail **5** and may therefore readily be removed therefrom. In use the upper corners **10** of the saddles **3** will become burned away but these saddles may be replaced when necessary. It will here be appreciated that the rails **5** may be hollow and water cooled.

Although the skid rail has been described as of oval cross-sectional shape it will be appreciated that improved uniformity of heat treatment of the slabs **8** can be achieved by using skid rails having any cross-sectional shape such that their vertical axis is of greater length than their horizontal axis measured at the mid point of their height. FIG. 2 shows a skid rail which is triangular in cross-sectional shape and in this case the saddle **3** is formed with a re-entrant slot **2** to ensure that the rail is held against turning moment about its longitudinal axis. The saddle **3** may be formed in one piece and threaded on the end of the skid rail or alternatively may be formed in two parts and bolted together (not shown). FIG. 3 of the drawing shows a skid rail of pear-shape configuration. It will be appreciated that the re-entered arrangement of the saddle **3** of FIG. 2 could be used with the construction of FIG. 3 or FIG. 1.

It may be possible to fabricate skid rails according to the invention by welding but it is preferred that they should be rolled from seamless steel tubes having an initially circular cross-sectional shape.

I claim:

1. A water cooled furnace skid rail comprising a tube having such a transverse cross-sectional shape that its vertical height is greater than its horizontal width measured at the mid point of its height, a plurality of supporting rails extending at spaced apart locations transversely of and below said skid rail, support means welded to the support rails to project upwardly therefrom, upwardly facing slots in the support means, and said skid rail being disposed in the slots so that turning movement of the skid rail about its longitudinal axis is prevented.

2. A skid rail according to claim 1 in which the maximum width of the slot in each support means occurs below its upper open end.

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