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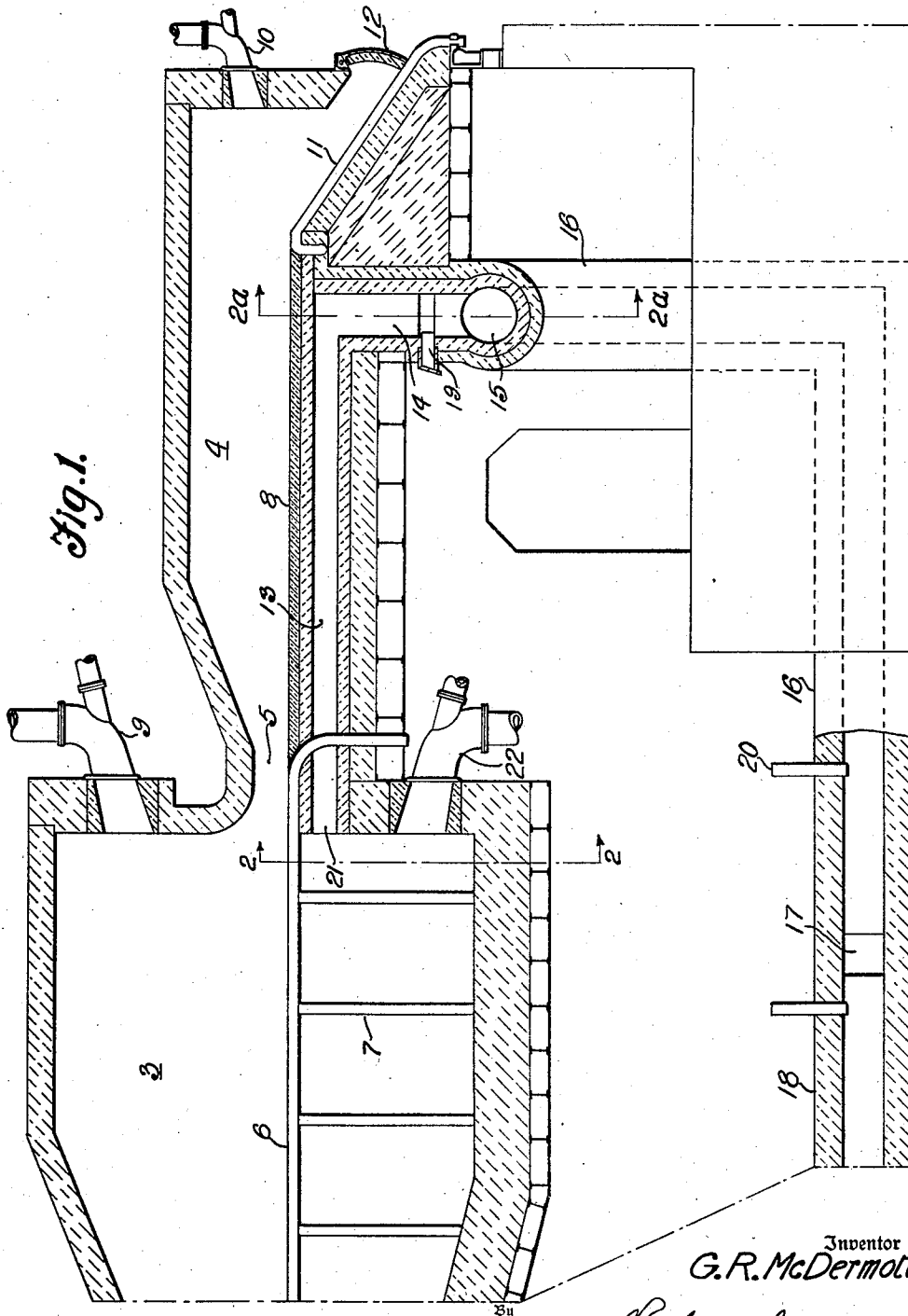
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2,180,089

FURNACE

Filed Oct. 7, 1938

2 Sheets-Sheet 1



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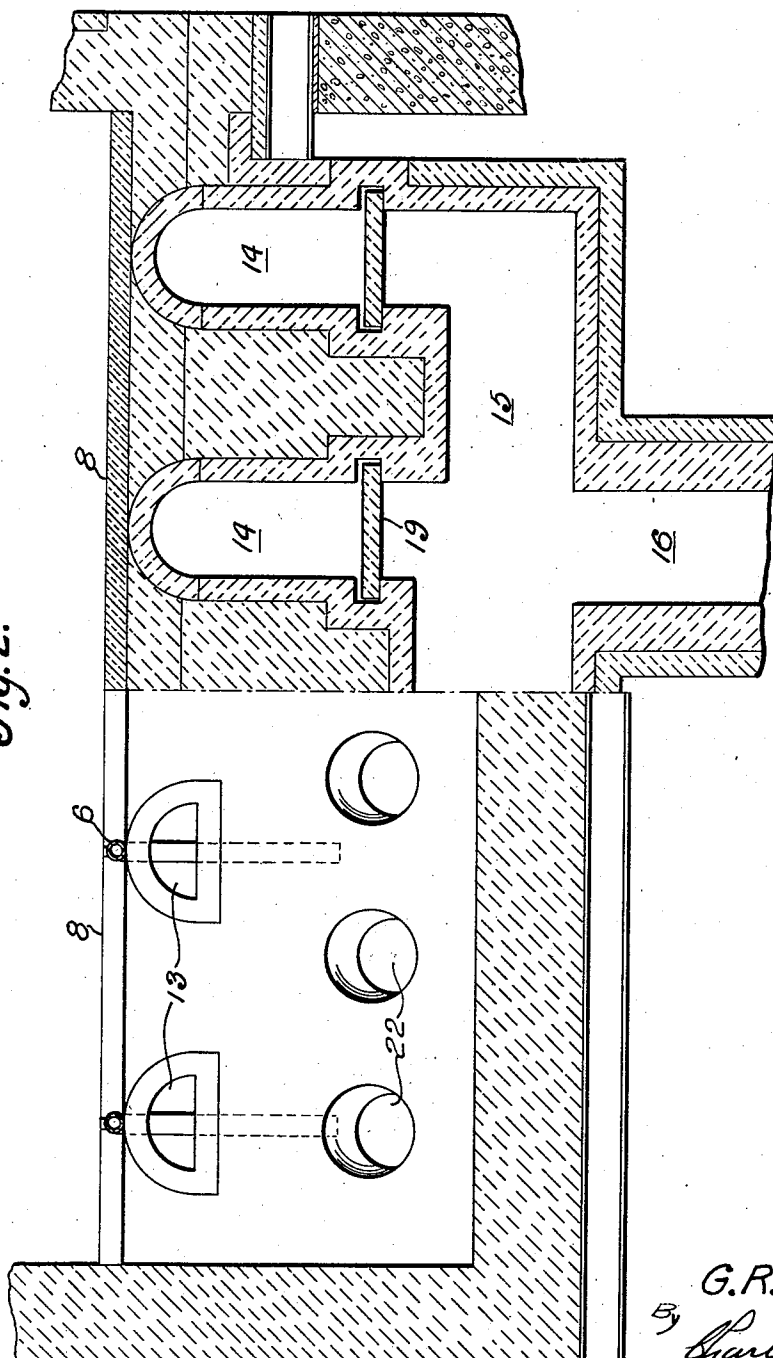
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Fig. 2.



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FURNACE

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5 Claims. (Cl. 263—6)

The present invention relates to improvements in industrial heating furnaces of the type embodying a track within the heating chamber whereon the work pieces are supported while being progressed or pushed toward the work-discharge end of the furnace. Furnaces of this type are commonly employed for heating billets, slabs, blooms and the like, preparatory to rolling. It is common practice in furnaces of this type to provide a soaking hearth whereon the work pieces are allowed to soak to equalize the temperature and to iron out the shadows or relatively cool spots resulting from the relatively cool rails of the aforesaid track. If the shadows are not thoroughly ironed out before the work piece is fed to the rolls, there is great danger of the rolls being broken and difficulty in making the gauge or size. The importance of removing the shadows on the work piece will therefore be readily appreciated.

The present invention aims to provide in the hearth itself as many longitudinally extending hot spots as there are rails in the track on which the work pieces travel to reach the hearth to the end that the shadows caused by the relatively cool rails may be rapidly ironed out as the piece moves along the hearth toward the work-discharge end of the furnace. Another object is to provide a simple and practical way for producing said hot spots. Other objects and novel features will more fully appear from the detail description taken in connection with the accompanying drawings wherein the preferred form of the invention is shown.

In the drawings,

Fig. 1 is a longitudinal sectional view of a portion of a furnace embodying the present invention, and

Fig. 2 is a vertical transverse sectional view of the furnace, the left-hand half of the view being taken on line 2—2 of Fig. 1 and the right-hand half being taken on line 2A—2A of Fig. 1.

In the drawings there is shown a furnace having a principal heating chamber 3 and a soaking chamber 4, the two chambers being in open communication by way of a relatively restricted passage 5 through which the work pieces pass from the heating chamber 3 to the soaking chamber 4. In furnaces of this type the work pieces are usually progressed through the principal heating chamber 3 on elevated tracks comprising water cooled rails or skids 6 supported from below on appropriate pedestals 7, the rails terminating at the front end of a soaking hearth 8 onto which the already heated work pieces are received for soaking, this soaking including the elimination

of the shadows or relatively cool spots on the work pieces where they have rested on the rails 6.

Heat is produced in the chamber 3 by appropriately located burners of which one set is indicated at 9. It is also customary to supply heat to the soaking chamber 4 as by burners 10. After the work pieces have remained on the hearth 8 for an appropriate length of time, they are pushed down the incline 11 to the discharge opening which is normally kept closed by an outwardly swingable door 12.

The furnace thus far described is more or less conventional in the art and constitutes, as it were, the environment where the present invention, presently to be described, has special utility.

As already indicated, it is one of the objects of the present invention to provide in the hearth 8 as many longitudinally extending hot spots as there are skid rails 6 to the end that the shadows or relatively cool spots in the work pieces where they have rested on the skid rails may be removed more quickly and uniformly than has heretofore been possible and the preferred means for accomplishing that result will now be described.

In accordance with the present invention, said hot spots are produced by embedding in the hearth 8 as many heating flues 13 as there are skid rails 6, the flues being arranged lengthwise of the hearth in the same vertical plane as the rails 6 with the result that said hot spots are in longitudinal alinement with the said rails. At the discharge end of each heating flue is a downcomer 14 which delivers to a transversely extending manifold 15 common to all of said flues, the manifold being connected by a conduit 16 to a source of draft 17 which will ordinarily be the same smoke stack as that to which waste gases from the furnace are delivered by a waste gas conduit 18 leading from a point not shown but usually from a recuperator. In each downcomer is a damper 19 and in the conduit 16 is a damper 20, the purpose of these dampers being to permit regulation of the draft in the heating flues 13.

Heating gases are drawn into the heating flues 13 at their inlet ends 21 from a source of supply provided by a plurality of burners 22 which fire into the main heating chamber from a level below said inlet ends 21, it being noted that said burners fire in a generally upward direction. The volume of heating gases drawn into the flues will, of course, depend on the setting of the dampers 19 and 20 as will be readily appreciated. By arranging the burners 22 to fire into the chamber 3 rather than directly into the flues 13, they also serve to provide heat in the lower portion

of the chamber 3 with resultant better heating of the work pieces approaching the hearth 8 as will be readily appreciated.

From the foregoing description it will be seen that the present invention provides a relatively simple way of positively supplying heat to the hearth to compensate for the cold spots on the steel passing from the tracks to the hearth. It is worthy of note that by providing special heating flues in the hearth not only is it assured that the steel will be uniformly heated before removal from the furnace, but the hearth need not be made as long as would ordinarily be the case in the absence of the heating flues. This saving in the length of hearth materially reduces the capital cost of the furnace itself. Moreover the heating flues also compensate for radiation losses through the bottom of the hearth. Other advantages of the present invention will readily appear to those skilled in the art. It is to be understood that various changes may be made in details of construction within the scope of the appended claims.

What I claim is:

1. In a furnace, the combination with a heating chamber having a hearth at one end thereof and a plurality of rails forming a track along which work pieces travel to reach said hearth, of means for producing a longitudinally extending hot spot in said hearth in line with said rails comprising a heating flue embedded in said hearth, one end of said flue opening into said chamber and the other end being operatively connected to a source of draft.
2. In a furnace, the combination with a heating chamber having a hearth at one end thereof and a plurality of rails forming a track along which work pieces travel to reach said hearth, of means for producing a longitudinally extending hot spot

in said hearth in line with said rails comprising a heating flue embedded in said hearth, and means for causing heating gases to flow through said flue in the same direction as the travel of the work pieces toward said hearth.

3. In a furnace, the combination of a heating chamber having a soaking hearth at one end thereof, means for delivering heated work pieces to said hearth comprising laterally spaced rails in said chamber, a plurality of burners firing into said chamber below said rails adjacent that end of the hearth which faces said rails, and means for utilizing some of the hot gases produced by said burners for producing longitudinally extending hot spots in said hearth.

4. In the combination specified in claim 3, the last-named means comprising flues extending through said hearth longitudinally thereof, and means for inducing said hot gases to flow through said flues.

5. In a furnace, the combination of a main heating chamber and a soaking chamber separated from each other by a relatively restricted passage through which work pieces may be passed from the main heating chamber to the soaking chamber, skid rails in the main heating chamber for supporting the work pieces during their progress therethrough, a hearth in said soaking chamber on which the work pieces rest after leaving said main heating chamber, a burner firing into said soaking chamber for heating said hearth, and longitudinally extending heating flues embedded in said hearth in longitudinal alinement with the skid rails for producing longitudinally extending hot spots in said hearth to compensate for the relatively cold spots on the work pieces where they have rested on the relatively cool skid rails.

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