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J. B. TYTUS

PROCESS IN ROLLING HOT METAL

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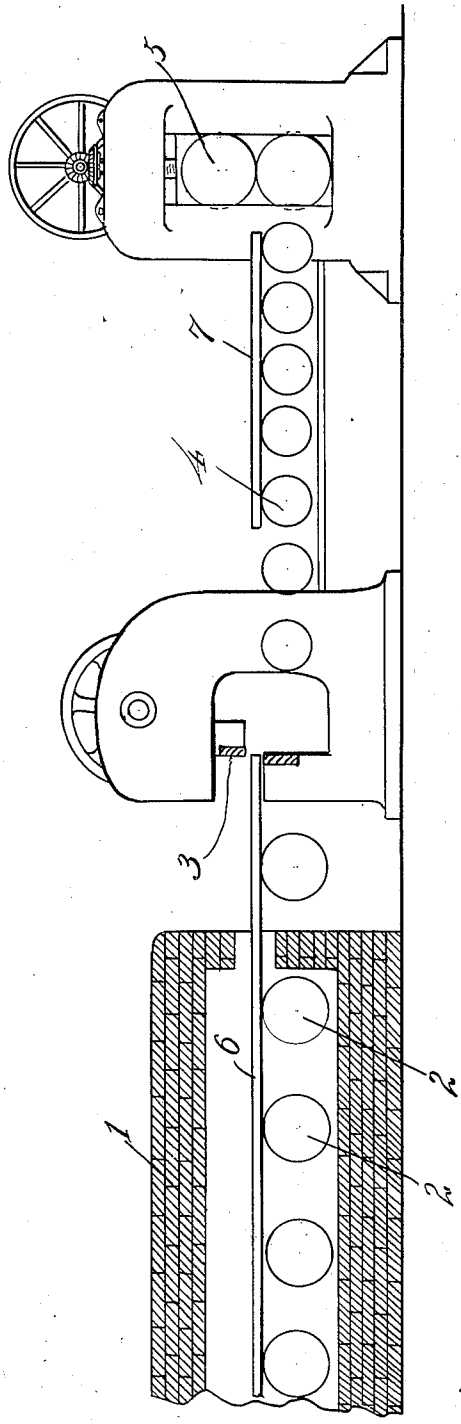

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JOHN B. TYTUS, OF MIDDLETOWN, OHIO, ASSIGNOR TO THE AMERICAN ROLLING MILL COMPANY, OF MIDDLETOWN, OHIO, A CORPORATION OF OHIO.

PROCESS IN ROLLING HOT METAL.

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To all whom it may concern:

Be it known that I, JOHN B. TYTUS, a citizen of the United States, and a resident of Middletown, in the county of Butler and State of Ohio, have invented a certain new and useful Process in Rolling Hot Metal, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing, forming part of this specification.

My invention relates to the rolling of hot metal, and more particularly to the operation of heating, cutting, and rolling, as the same takes place in the reduction of thick pieces to thinner pieces in a continuous manner.

In connection with a process devised by me for the reduction of ingots to slabs, plates and (or) sheets, I have arranged that from the time the hot ingot starts through the mill, there will be no stoppage of the metal until it has been reduced to a dimension desired.

As a part of my process, which I term a continuous process, it is necessary that a long thick piece be cut into short lengths and rolled out, to a thinner long piece again, and the operation of cutting and rolling repeated in the same manner until the final reduction has taken place. Also it is necessary in most instances to form a piece of several thicknesses in the final stages of reduction, so that the mills have a proper draft, and bite on the piece.

It is also necessary to control the temperature of the piece, and to effect by one setting of each mill, so far as possible a like reduction on all metal pieces cut from a long piece that pass through it. Thus the heat of the piece, which is a prime factor in the reduction action of any mill, must be uniform throughout any one job, so that this uniform action of the mills may be provided.

To this end it is my object to provide a furnace which is so controlled as to preserve the temperature of the piece so that as it emerges from the furnace, its temperature will be uniform throughout its length.

Stating my objective then more specifically, it is to pass through a furnace, shear and roll, in such a way as to deliver to each mill, a piece which has a like temperature to all other pieces in any one run, and to do this with a minimum expense in equipment.

I have shown in the drawings, a mechanism, in diagrammatic form, which can be employed to advantage in my process and I will now proceed to describe my invention by reference to this mechanism, and to detail my process, the invention of which I will state in the claims that follow.

The figure is a diagrammatic side elevation showing a furnace, a shears, and a pair of rolls of a hot mill.

The furnace has a casing 1 of insulating material, and within the furnace are a number of widely interspaced driven rolls 2. At the outlet of the furnace is a shears 3, and beyond the shears is a table 4, over which the sheared piece passes to the stand of rolls of the hot mill 5. I have shown the long piece at 6 and the short piece at 7.

It should be noted that the mechanism for handling short pieces in a continuous furnace as now practiced is expensive, and the cost of upkeep high. The heat is naturally intense, and even in a roller furnace the rollers wear out and give way often enough to figure largely in the upkeep expense of a rolling mill plant.

The piece which I send through the furnace, as is indicated in the drawing, is a long one. This length permits of a wide spacing of the driven rolls in the furnace without danger of the piece falling down between rolls. In the ordinary continuous furnace, the rolls are very close together, or else some cumbersome carriage is used to transport the pieces, or else the pieces are set in at one end and pushed out of the other.

In the use of my furnace, my particular effort is to so feed the piece and to so control the temperature in the furnace that as the piece emerges length by length it will be of a uniform temperature.

The operation immediately following the heating is the cutting of the long piece 6 into the short pieces 7, which are next to be reduced. This is done by a shears, as indicated on the diagram, which may be either a flying shears, or may be a fixed shears which acts to stop the movement of the piece when cutting.

The portions of the piece as they emerge

from the furnace, are cut off by the shears, and as the distance of movement of each portion is always the same, and the time of cutting is practically the same, the resultant piece is always of the same temperature. This is particularly true when the temperature maintained in the furnace is the same as that desired for the piece.

The piece then passes along to the stand of rolls, and is reduced again, with the same operation repeated for as many times as it is necessary to effect a reduction.

If it is necessary to match up several pieces to get the desired reduction in the mill that follows the shears, the matching is done before the piece goes into the furnace, by preference. The long piece is thus maintained, for furnace economy and uniform heating of the piece.

Where matching is done after cutting into lengths by the shears, then the last piece to be added to the pack, after matching will be the hottest, and a truly uniform action cannot be had on all members of the pack. This is avoided by my process. My method of matching, i. e. to match the long pieces, has another advantage, namely, that the aligning of the forward and rear edges of each ultimate pack is not necessary, since the ends of the long shears in cutting through the pack, gives truly aligned edges automatically. Thus with suitable side guides, I avoid considerable time in matching, and get a more uniform pack, in a better matched condition, than if each of the pieces forming the ultimate pack were matched after being cut.

Having thus described one method of accomplishing my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. A process of rolling plates and sheets which consists in passing long pieces, resulting from a preceding stage of roll reduction, through a furnace, cutting said pieces into short lengths, as it emerges from the furnace, and then passing the short lengths successively through a subsequent stage of roll reduction, whereby a rapid succession of uniformly heated short pieces may be provided for said subsequent stage of reduction.

2. A process of rolling plates and sheets which consists in passing a long piece resulting from a preceding stage of roll reduction into a furnace, moving said piece through the furnace, and as the piece emerges from the other side of the furnace cutting off short sections therefrom, and as each section is cut off, passing said section to a subsequent stage of roll reduction, whereby a rapid succession of pieces all having substantially the same temperature, will be provided to said subsequent reduction stage.

3. A process of rolling sheets which consists in passing a long piece, said piece consisting of a plurality of pieces resultant from a previous stage of roll reduction, laid one on top of the other, through a furnace, cutting said composite piece into short lengths as it emerges from the furnace, and as each short length is cut, passing it to a subsequent stage of roll reduction, where uniformly heated packs are provided to said subsequent stage of reduction.

JOHN B. TYTUS.