

Oct. 6, 1931.

J. V. MAZURIE ET AL

1,826,360

SEAMLESS TUBE MILL

Filed April 18, 1930

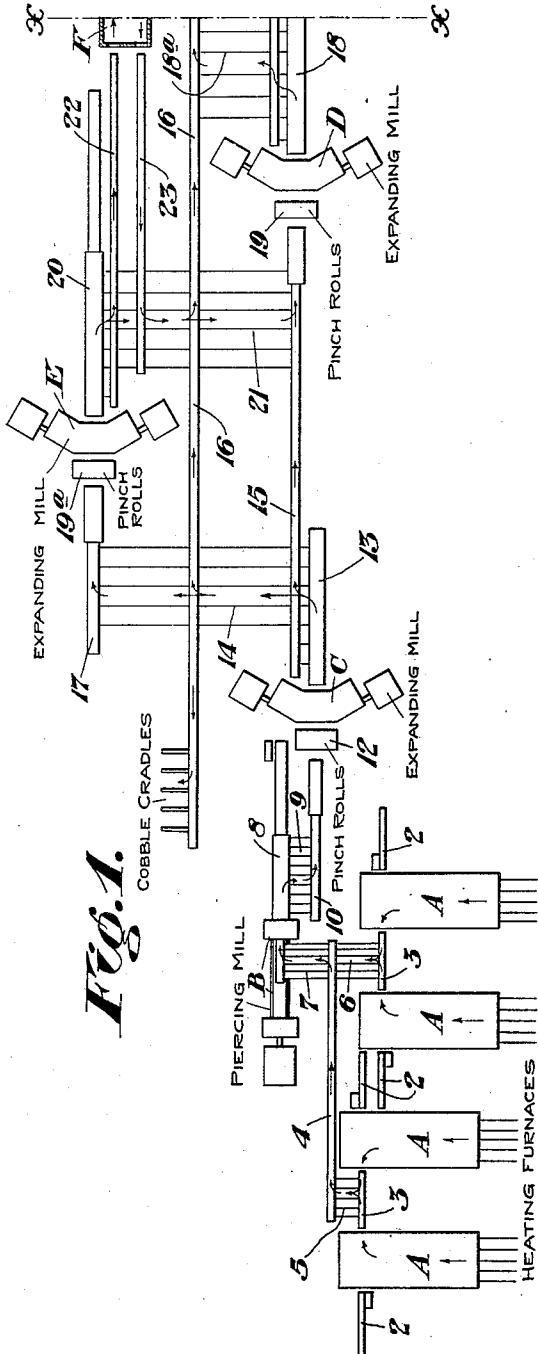


Fig. 1.

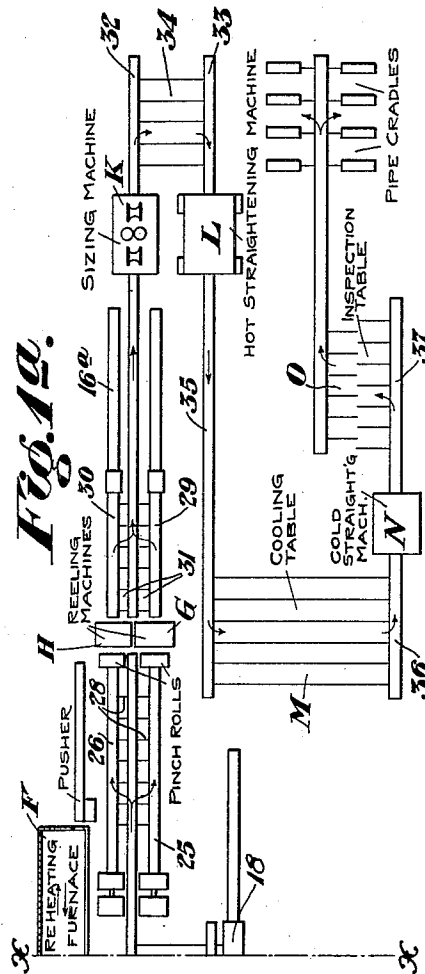


Fig. 1a.

Inventors:
JAMES V. MAZURIE and
THOMAS PATTERSON.
By: *Oliver & Rouben*
their Attorneys

UNITED STATES PATENT OFFICE

JAMES V. MAZURIE AND THOMAS PATTERSON, OF GARY, INDIANA, ASSIGNORS TO
NATIONAL TUBE COMPANY, A CORPORATION OF NEW JERSEY

SEAMLESS TUBE MILL

Application filed April 18, 1930. Serial No. 445,431.

This invention relates to the manufacture of seamless tubes and more particularly to a novel mill layout for the manufacture of seamless tubes and has for its object the provision of a novel mill layout in which the plug rolling mill is eliminated and in which provision is made for successively expanding the pierced blank.

Another object is to provide a compact layout so arranged that a minimum of cooling of the blank takes place between the several operations whereby at least three and, at times, four operations may be performed without reheating of the blank.

Another object is to provide a mill layout capable of carrying out various sequence of operations whereby it is more universal in operation than mills heretofore provided.

In the drawings:

Figure 1 is a diagrammatic plan of the entering end of a mill layout arranged in accordance with this invention.

Figure 1^a is a similar view of the finishing end of the mill layout and is a continuation of the layout of Figure 1 from the line X—X.

Referring more particularly to the drawings the letter A designates the blank heating furnaces which are arranged in pairs and are adapted to discharge the heated blanks through their side walls with the aid of fluid operated rams 2 into troughs 3.

The trough 3 which receives the heated blanks from the first two heating furnaces is connected to a conveyer trough 4 by a transfer table 5 and terminates in a transfer table 6 which leads and delivers into the feed trough 7 of a Mannesmann type piercing mill B. The trough 3 of the last two heating furnaces A is in direct communication with the transfer table 6.

The heated blanks are discharged from the heating furnaces one at a time and conveyed to the piercing mill B where they are pierced and delivered to the outlet trough 8 of the piercing mill. The outlet trough 8 is con-

nected by a transfer table 9 to the inlet or feed trough 10 of a disk-type expanding mill C. A pair of pinch-rolls 12 are provided on the entering side of the mill to facilitate the feed of the blank into the expanding mill C. The heated and pierced blanks pass through the expanding mill C and are discharged into an outlet or discharge trough 13.

All of the blanks to be worked in the mill layout of this invention will pass through the above sequence of operations. However, from this point, due to the novel arrangement, various methods of manufacture may be followed.

The trough 13 of the expanding mill C is adapted to discharge the expanded blank onto a transfer table 14 which is intersected by a conveyer trough 15 leading to an expanding mill D, a second trough 16 leading to the finishing mills to be described, and a third trough 17 forming the inlet to an expanding mill E. The expanding mills D and E are provided with feed-in pinch-rollers 19 and 19^a, respectively.

Due to the above arrangement of troughs intersecting the table 14, the once expanded blank may be passed to the expanding mills D or E or may be passed directly to the finishing mills.

The expanding mill D has an outlet or discharge trough 18 which is connected by a transfer table 18^a with the trough 16 leading to the finishing mills, and, therefore, all of the blanks after being expanded in the mill D pass directly to the finishing mills.

The expanding mill E is provided with the usual outlet trough 20 which delivers the blanks onto a transfer table 21 which is intersected by inlet and outlet conveyer troughs 22 and 23, respectively, leading to a reheating furnace F, by the trough 16 leading to the finishing mill, and by the inlet trough 15 leading to the expanding mill D.

Due to the arrangement of troughs intersecting the transfer table 21 the heated and

twice expanded blanks from the expanding mill E may be passed to the trough 16 and thence to the finishing mill, or they may be passed beyond the trough 16 to the trough 15 and thence through the expanding mill D for a third expanding operation, or they may be passed by the way of the troughs 22 and 23 through the reheating furnace F and thence to the trough 15 and through the expanding mill D for the third expanding operation.

It will thus be readily seen that the mill layout is so arranged that the three expanding mills C, E and D may be used for successive expanding operations on a single blank when desired, that the expanding mill C may be used alone when desired, or that the expanding mills D and E may both be used to give a second expanding operation to alternate blanks passing from the mill C. This layout speeds up the mill operation since the blanks are elongated in each expanding pass and, therefore, the expanding mill C is capable of expanding materially more blanks than the successive expanding mills D or E.

The finishing mill is of the usual type and consists of reeling machines G and H, a sizing machine K, a hot straightening machine L, a cooling table M, a cold straightening machine N, and inspection table O.

The reeling machines G and H are located on opposite sides of the trough 16 and have inlet troughs 25 and 26, respectively, connected to the trough 16 by transfer tables 28. Alternate tubes passing down the trough 16 are adapted to be passed through the reeling machines G and H, respectively. The time consumed in reeling the tubes, which are of considerable length, is such that two machines are necessary to handle the mill output. It will be understood that more reeling machines may be used if found necessary or desirable.

The reeled tubes pass from the machines G and H into their respective outlet or discharge troughs 29 and 30 which are connected to a continuation 16^a of the conveyor trough 16 by transfer tables 31, thence to the trough 16^a and through sizing machine K. The machine K discharges the sized tubes into a trough 32 which is connected to an inlet trough 33 of the hot straightening machine L by a transfer table 34. The sized tubes are thus transferred to the trough 33 and pass through the straightening machine L and are discharged into the outlet and conveyor trough 35 of the straightener which leads to and discharges the hot straightened tubes onto the cooling table M.

From the cooling table M the tubes pass into the inlet trough 36 of a cold straightening machine N and then pass through the cold straightening machine N into a discharge trough 37 which discharges the finally

cooled and straightened tubes onto the inspection table O.

The above described finishing operations are usual with seamless tubes and may be varied in accordance with the accepted mill practice and, therefore, it will be understood that we do not wish to be limited thereto.

While we have shown and described one specific embodiment of our invention it will be understood that we do not wish to be limited thereto as various modifications may be made without departing from the scope thereof, as defined in the appended claims.

We claim:

1. A seamless tube mill comprising in combination a plurality of blank heating furnaces, a piercing mill arranged in close proximity to said furnaces, conveying and transfer apparatus for conveying blanks from all of said furnaces to said piercing mill, an expanding mill located in advance of said piercing mill, means for transferring all of the pierced blanks from said piercing mill to said expanding mill, a second and third expanding mill arranged successively in advance of said first named expanding mill, at least said second named mill being out of line with said first named expanding mill, a reheating furnace located to receive the expanded blanks from said second named expanding mill when desired, and conveying and transfer apparatus arranged between said first, second and third named expanding mills and said second named expanding mill and said reheating furnace whereby expanded blanks from said first named mill may be passed through either said second or third named mill, or through said second and third named mills successively, or through said second named mill to said reheating furnace and thence to said third named mill, or may be passed by both of said second and third named mills at the will of the operator.

2. A seamless tube mill comprising in combination a plurality of blank heating furnaces, a piercing mill arranged in close proximity to said furnaces, conveying and transfer apparatus for conveying blanks from all of said furnaces to said piercing mill, an expanding mill located in advance of said piercing mill, means for transferring all of the pierced blanks from said piercing mill to said expanding mill, a second and third expanding mill arranged successively in advance of said first named expanding mill, at least said second named mill being out of line with said first named expanding mill, a reheating furnace located to receive the expanded blanks from said second named expanding mill when desired, and conveying and transfer apparatus arranged between said first, second and third named expanding mills and said second named expanding mill and said reheating furnace whereby expanded blanks from said first named mill

may be passed through either said second or third named mill, or through said second and third named mills successively, or through said second named mill to said reheating furnace and thence to said third named mill, or
5 may be passed by both of said second and third named mills at the will of the operator, and reeling, sizing and hot and cold straightening machines all arranged in advance of all
10 of said expanding mills and adapted to receive the expanded blanks after passing through any one or all of said expanding machines.

3. A seamless tube mill comprising in combination blank heating means, piercing means, an expanding mill, a second and third expanding mill arranged in advance of said first named expanding mill, a reheating furnace located to receive the expanded blanks
20 from said second named expanding mill when desired, and conveying and transfer apparatus arranged between said first, second and third named expanding mills and said second named expanding mill and said reheating furnace whereby expanded blanks
25 from said first named mill may be passed through either said second or third named mill, or through said second and third named mills successively, or through said second
30 named mill to said reheating furnace and thence to said third named mill or may be passed by both of said second and third named mills at the will of the operator.

4. In a seamless tube mill, an expanding
35 mill, a second and third expanding mill arranged in advance of said first named expanding mill, a reheating furnace located to receive the expanded blanks from said second named expanding mill when desired, and
40 conveying and transfer apparatus arranged between said first, second and third named expanding mills and said second named expanding mill and said reheating furnace whereby expanded blanks from said first
45 named mill may be passed through either said second or third named mill, or through said second and third named mills successively, or through said second named mill to
50 said reheating furnace and thence to said third named mill at the will of the operator.

In testimony whereof, we have hereunto set our hands.

JAMES V. MAZURIE.
THOMAS PATTERSON.

55

60

65