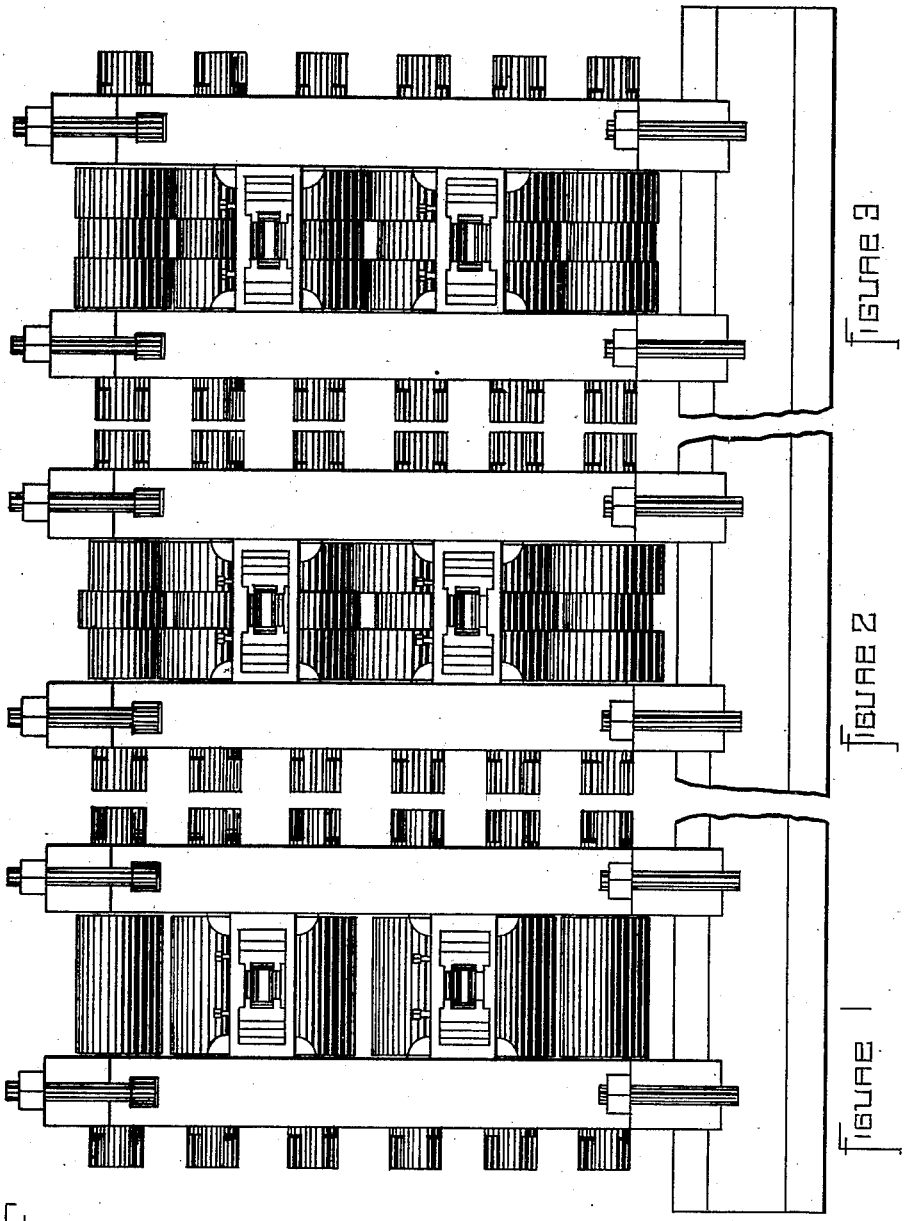
(No Model.) 2 Sheets—Sheet 1.

J. REESE.

MACHINERY FOR ROLLING METAL.

No. 267,018. Patented Nov. 7, 1882.



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(No Model.) 2 Sheets—Sheet 2.

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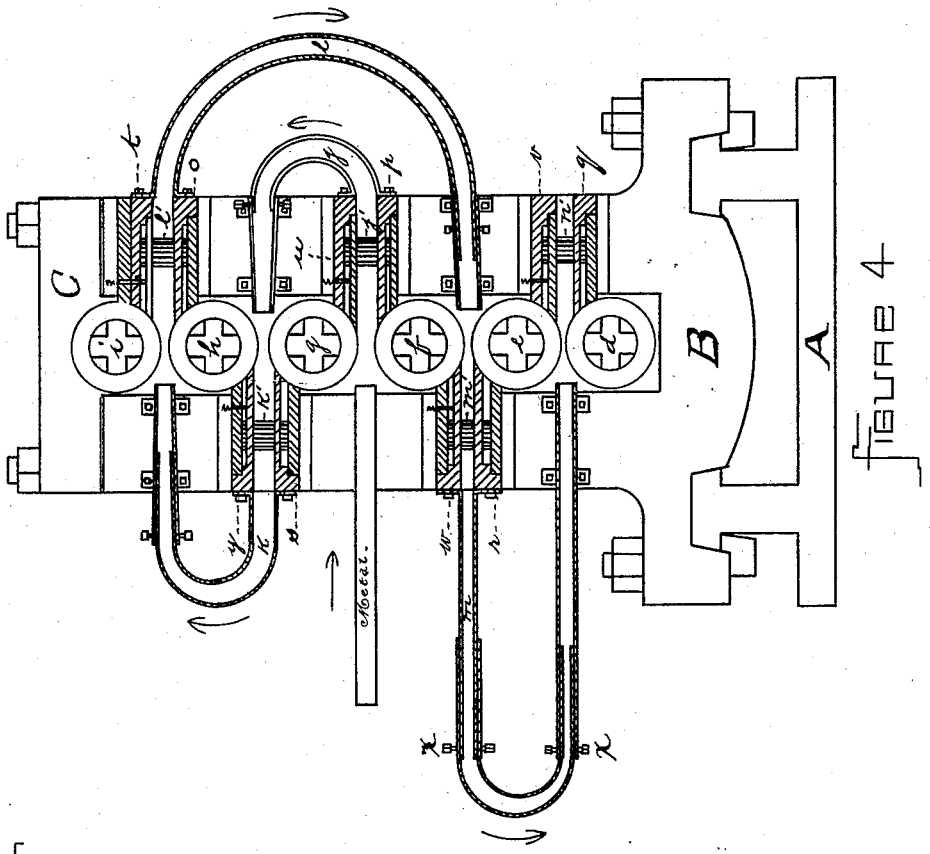

FIGURE 4

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JACOB REESE, OF PITTSBURG, PENNSYLVANIA.

MACHINERY FOR ROLLING METAL.

SPECIFICATION forming part of Letters Patent No. 267,018, dated November 7, 1882.

Application filed May 27, 1882. (No model.)

To all whom it may concern:

Be it known that I, JACOB REESE, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a certain new and useful Improvement in Machinery for Rolling Metals; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the drawings forming a part thereof.

I shall describe my improvement as designed for rolling hoop-iron or hoop-steel; but I do not wish to confine it to that branch of trade alone, as it may be used to advantage in rolling bands, skelp or pipe iron, bars, and other shapes.

Figure 1, Plate 1, shows a front elevation of my improved hoop-mill with plane-faced rolls. Fig. 2, Plate 1, shows a front elevation of my improved hoop-mill with tongue-and-grooved rolls. Fig. 3, Plate 1, shows a front elevation of my improved hoop-mill with box-grooved rolls. Fig. 4, Plate 2, shows an end view of Fig. 1 with one of the housings removed and the guides, guide-rollers, and guide-troughs in place.

Like letters refer to like parts where they occur.

My invention consists, first, in the use of four or more horizontal rolls, arranged in the same vertical plane, and provided with frictional vertical rolls, so related to each other that the metal, while being reduced in thickness by the horizontal rolls, is pushed through between the vertical rolls and the spread reduced, by the means of which I am enabled to use plane-faced rolls in the manufacture of hoops, bands, pipe-iron, and bars without the use of grooves, as shown in Fig. 1, and to use a series of tongue-and-groove rolls of the same width as shown in Fig. 2, or box-grooved rolls of the same width as shown in Fig. 3.

The second feature of my invention is the adjustable guide-troughs, so that the length of the trough may be adjusted to the length of the metal being rolled, in order that the forward end of the blank may enter the rolls at or near the instant the rear end will leave the other pass.

In the manufacture of hoop-iron as at present practiced in Pittsburg the billet is placed in grooved rolls, and when the blank has passed through it is caught by the workmen and put into another groove, and in this manner it is reduced four times, each succeeding groove being necessarily wider than the preceding one in order that the blank may readily enter. The blank is then put through a pair of plane-faced rolls, and is then allowed to cool a little, in order to raise a scale, when it is put through the bull-heads and finished. All of the five passes first mentioned are made in rolls operating in a horizontal line, the bull-heads being on a parallel line and about twenty-five feet from the others.

In the construction of my improved hoop-train I mount six plane-faced rolls of eight-inch diameter, and twelve-inch face in suitable housings, so that all of the rolls will be on the same vertical line, and on the delivery side of each pass I place two vertical rolls. Thus in a five-pass train I use two pairs of vertical rolls on one side and three pairs on the other side. The horizontal rolls may be driven, in the usual manner, by means of a six-high set of pinions. The vertical rolls are driven by the metal passing through them. The horizontal rolls are adjusted to their proper distance from each other in the usual manner. The vertical rolls may be attached to two spindles on each side and driven by belts from the top of the housing; but for light work, such as hoops, I prefer to use friction vertical rolls, as they will be driven by the blank passing through them. The blank, when it passes through the vertical rolls, enters the guide-trough, and is thereby led into the rolls designed for the next pass.

Fig. 4: A is the bed-plate. B is the housing. C is the top cap. *d e f g h i* are the rolls. *j k l m* are the guide-troughs. *j' k' l' m' n'* are the vertical rolls. *o p q r s* are the bottom guides. *t u v w y* are the top guides.

In the practice of my improvement for the manufacture of hoops the horizontal rolls are adjusted so as to reduce the thickness of the blank thirty per cent. (more or less) in area, according to the quality of the metal worked. The vertical rolls are adjusted to the width of hoops required, allowing for the usual spread in the bull-heads. The billets are then cut to equal lengths, heated, and placed, one at a time, between the rolls *f* and *g*. These rolls will reduce its thickness and increase its width. The blank is pushed between the vertical rolls

j' and through trough j, and between rolls g and h through vertical rolls k', trough k, and into rolls h and i. These rolls push it through vertical rolls l' and trough l into rolls e and f. The latter rolls push the blank through vertical rolls m', trough m, into rolls d and e, and these push it outward in a straight line through vertical rolls m'. The horizontal rolls are all provided with bottom guides, (marked respectively o p q r s,) and with top guides, (marked t u v w y.) The top guides are held in place by springs in the usual manner. In the rear of this train, and on a line with it, at about twenty-five feet, is placed the bull-heads, which are constructed in the usual manner. When the blank has passed out of rolls d and e it is permitted to cool a little, and is then passed through the bull-heads in a finished condition.

It will be noticed by looking at Fig. 4 that the guide-troughs are of varying lengths. They are so made because all of the rolls have the same surface speed, and as the velocity at which the blank moves is much greater coming out of one pass than that at which it enters the next pass it becomes necessary with this kind of a train to increase the length of the guide-troughs in proportion to the increased length of the blank at each pass, so that as soon as the front end of the blank enters the rolls the last end will have escaped from the other pair of rolls. In the first four passes the blank is pushed through the verticals until it leaves the horizontal rolls; but at that instant, the push ceasing, the blank would stop, but that the forward end has entered the other rolls, and by this means the rear end of the blank is drawn through the verticals. At the last pass the blank has become so long, and running out in a straight line, its momentum is so great that the rear end passes the vertical before the blank stops moving.

In ordinary practice the billets will be cut to a uniform weight; but in doing so the last one will weigh more or less than the standard, and by sorting the billets so as to have a day's work of the same weight the guide-troughs may be adjusted, as shown at x x, in trough m, by drawing the curved portion out or pushing it in. Each of the troughs may be made adjustable in this manner, so as to adapt them to the length of the blank passing through.

By using the vertical rolls the blank may be kept at the same width, so that a series of tongue-and-grooved rolls may be used, such as shown in Fig. 2, or box-grooved rolls, such as shown in Fig. 3; but where the vertical rolls are not used the metal is spread so in the act of rolling that it is not practical to enter it in succeeding grooves of the same width. Consequently it is essential in a train of rolls, such as shown in Figs. 1, 2, or 3, to have the vertical rolls so as to roll the edges in order that a certain width may be rolled with square edges in Fig. 1, and that the metal may be edge-rolled, so as to successively enter grooves of the same widths, as in Figs. 2 and 3, as it is not practical to get five passes out of six grooved rolls when each pass is on the same vertical plane, unless the grooves are all of the same width.

The advantages of my invention are—

First, by the use of the continuous universal train (shown in Figs. 1 and 3) I am enabled to make hoops, bands, or skelp-iron of any width, from one-half inch to six inches, on the same set of rolls by simply adjusting the vertical rolls to the required width, while in the present practice different grooves are required for each size; consequently the rolls must be changed.

Second, by the use of plane-faced rolls no fins are formed; hence better work can be produced.

Third, the work being automatically done, there will be a considerable saving of labor.

Fourth, the metal being continuously inclosed in the troughs, it will not lose so much heat by radiation, and consequently it will be more ductile, and will be finished at a higher temperature, and will scale more perfectly and make a cleaner hoop.

Having described my invention, what I claim, and wish to secure by Letters Patent, is—

1. A continuous universal train, which consists of a series of horizontal rolls mounted in suitable housings, all of the rolls arranged in the same vertical line, and provided with vertical edging-rolls and guiding-troughs, substantially as and for the purpose specified.

2. A continuous universal train, which consists of a series of horizontal rolls having grooves, or tongues and grooves, of uniform proportions, said rolls mounted in suitable housings and in vertical line, and provided with vertical edging-rolls and guiding-troughs, substantially as and for the purpose specified.

3. In a continuous train composed of several horizontal rolls vertically aligned to obtain two or more passes, the combination of the rolls for the first pass arranged centrally of the series to coact with each other and the next outer rolls of the series, substantially as and for the purpose specified.

4. The combination, with a continuous train of vertically-aligned rolls, of guide-troughs provided with an adjustable U-shaped connecting-section, substantially as and for the purpose specified.

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