

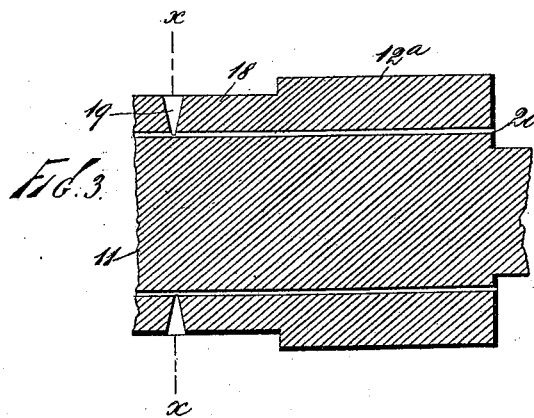
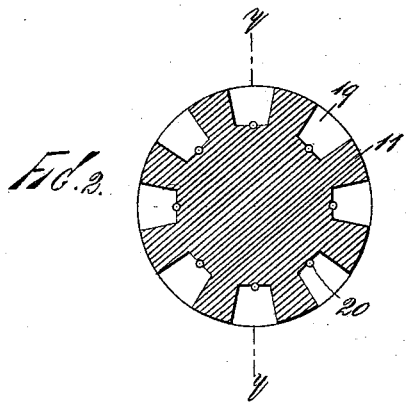
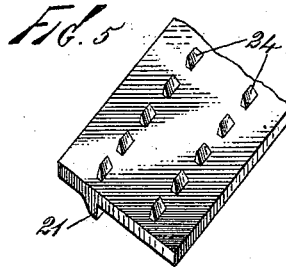
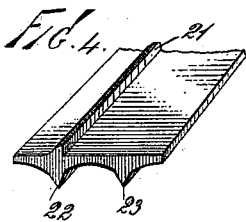
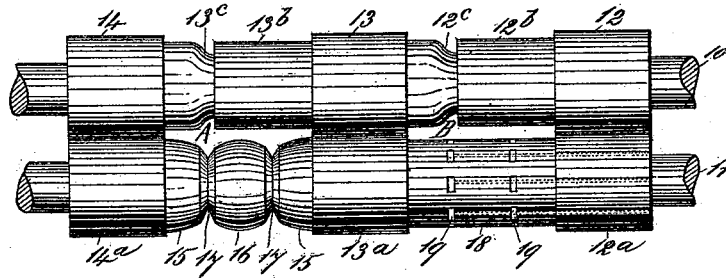
(No Model.)

J. CHURCHWARD.
ROLLS FOR ROLLING WEAR PLATES.

No. 496,337.

Patented Apr. 25, 1893.

Fig. 1.



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UNITED STATES PATENT OFFICE.

JAMES CHURCHWARD, OF BROOKLYN, NEW YORK.

ROLL FOR ROLLING WEAR-PLATES.

SPECIFICATION forming part of Letters Patent No. 496,337, dated April 25, 1893.

Application filed September 1, 1892. Serial No. 444,733. (No model.)

To all whom it may concern:

Be it known that I, JAMES CHURCHWARD, a subject of the Queen of England, and a resident of the city of Brooklyn, county of Kings, State of New York, have invented certain new and useful Improvements in Rolls for Rolling Wear-Plates, of which the following is a specification.

My invention relates to mills for rolling sheet metal and its object is to provide a mill of this character whereby railway wear plates may be readily and efficiently rolled to the proper thickness and formed upon their upper faces with ribs or shoulders to receive the side edges of the bases of the rails, and upon their lower faces with flanges or spurs both or either to engage the railway ties, to prevent the plates from spreading or creeping laterally or longitudinally; the plates being subsequently cut to suitable lengths and punched to receive spikes, both by any approved means.

The invention consists in the novel construction and arrangement of the rolls as hereinafter particularly described and claimed.

The accompanying drawings forming a part of this specification illustrate my invention, similar figures and letters of reference designating corresponding parts in the several views.

Figure 1 is a broken side elevation of the rolls embodying my invention. Fig. 2 is a transverse section of the lower or resistance roll, on the line $x-x$ in Fig. 3. Fig. 3 is a broken longitudinal section of the same, on the line $y-y$ in Fig. 2. Fig. 4 is a perspective view of the sheet of metal as it leaves the first pass of the rolls, and Fig. 5 is a broken inverted perspective view of the sheet of metal as it leaves the last pass of the rolls.

The rolls 10 and 11 are journaled in a suitable supporting frame in the usual manner, and are driven by any approved means and power. I have not shown the roll support nor the driving mechanism, as such do not constitute any part of my invention. The rolls have at their extremities and intermediate their length corresponding cylindrical bearing surfaces 12, 12^a, 13, 13^a, 14, and 14^a. The roll 10 at one end next the bearing surface 12 and near the other end thereof next the bearing surface 13 is reduced in diameter as shown at 12^b and 13^b; intervening the ends of which

reduced portions are formed grooves 12^c and 13^c such grooves having one side straight and the other side inclined and meeting the straight side as best shown in Fig. 1.

The roll 11 intervening the bearing surfaces 13^a and 14^a is reduced in diameter as shown at 15, such reduced portions emanating from the sides of said bearing surfaces and being convexed and tapering in direction of each other. Intervening the portion 15 and integral therewith the roll is formed in a somewhat spherical shape as shown at 16, that is, it has a convex face; and intervening the part 16 and the portions 15 are formed V-shaped grooves 17. This part of the roll 11 constitutes in connection with that part of the roll 10 immediately above it, the pass A of the rolls, the first pass to which the sheet of metal is introduced. Near the other end of the roll 11 is reduced in diameter between the bearing surfaces 12^a and 13^a as shown at 18 in Figs. 1 and 3 and at either side of the transverse center of such reduced portion are formed series of V-shaped chambers 19 encircling the roll, which chambers intersect at their inner ends longitudinally ranging channels 20 formed in the roll as best shown in Fig. 3 and also in Fig. 2, said channels opening to the outer air at the outer face of the roll 11.

The part of the roll 11 just described constitutes in connection with the part of the roll 10 immediately above it, the pass B of the rolls, the last pass to which the sheet of metal is introduced.

The sheet of metal from which the tie plates are to be evolved is first entered in pass A of the rolls from which it emerges in the form shown in Fig. 4 in which it will be seen that on the upper surface of the plate near one side is formed a rib or shoulder 21 the counterpart in shape of the groove 13^c in roll 10, such rib or shoulder when the plate is completed and in service being borne upon by the edge of the base of the rail. It will also be seen by reference to Fig. 4 that on the under side of the plate are formed V-shaped flanges 22 and 23, corresponding in shape to that of the grooves 17 in roll 11, the flange 22 being directly beneath the rib or shoulder 21 while the flange 23 is located near the other side edge of the plate, the two flanges being lo-

cated at equal distances from the side edges of the plate, as will be understood by reference to pass A of the rolls in Fig. 1. The metal sheet is next entered in pass B of the rolls, the rib or shoulder 21 registering with the groove 12° in roll 10, while the flanges 22 and 23 coincide with the line of direction of the chambers 19 in the roll 11. As the sheet proceeds through pass B, a portion of the flanges is pressed into the body of the sheet while other portions thereof are forced into the chambers 19 and are shaped in accordance with them, so that the sheet emerges from pass B provided instead of flanges with series of spurs 24 on its under side as shown in Fig. 5.

By providing the channels 20 in the roll 11 in pass B which channels as shown and described connect with the inner ends of the chambers 19 and are open to the outer air, the flanges 22 and 23 as the sheet goes through the pass retain their shape and any air or water that may be in the metal is directed into the chambers 19 and finds exit by the channels 20 to the open air. This is an important feature of my invention and secures a decided advantage over the rolling of plates of the character herein specified, as heretofore practiced. It has been found by repeated trials that in rolls where no such escape is afforded, the flanges will not retain their shape, but owing to the presence of water and air in the metal, a cushion is formed at the upper part of the chambers which form the spurs, which cushion reacts upon the metal and so presses upon the flange as to blunt and dull its edge and reduce the depth of the spurs.

Another feature of the invention which facilitates and assures the true and perfect formation of the spurs is, that the metal sheet as it leaves pass A is given a reduced thickness at the sides of the flanges 22 and 23. This reduction in thickness allows the metal to spread as the flanges are acted upon by the rolls, which does not occur where the sheet is of uniform thickness in relation to the flanges.

It will be understood that the sheet of metal after leaving pass B of the rolls, is cut to proper length and then properly punched to receive spikes, the means employed for the purpose being such as are commonly in use or any other preferred means which will ac-

complish the end desired. It will further be understood that I do not limit myself to the employment of the exact number of grooves shown in the rolls nor to the two series of chambers in the rolls, as one, two or more grooves and one, two or more series of chambers may be adopted, as the requirements of manufacture of the tie plates may dictate, without departing from the principle of my invention.

Having thus described my invention, I claim and desire to secure by Letters Patent—

1. In a rolling mill, the combination with a pair of rolls, the upper provided with one or more grooves in its periphery, said grooves having one side straight and the other side inclined, the lower roll being provided with one or more V shaped grooves, of a second pair of rolls, the upper one similar to the corresponding roll of the first pair, and the lower one formed with a series of V shaped chambers in its periphery, substantially as shown and described.

2. In a rolling mill, a roll formed with a series of V-shaped chambers in its periphery and longitudinal channels within the roll, leading from the inner end of said chambers to the exterior of the roll and to the outer air, substantially as shown and described and for the purpose specified.

3. In a rolling mill, the combination with a roll formed with one or more grooves in its periphery at either side of its center, said grooves having one side straight and the other side inclined, of a second roll formed in its periphery near one end with one or more V-shaped grooves, a convex rolling face intervening said grooves, and a tapering convex rolling face at either side of said grooves, and also formed in its periphery, near its other end, with a series of V-shaped chambers, and longitudinal channels within the roll leading from the inner ends of said chambers to the exterior of the roll and to the outer air, substantially as shown and described and for the purpose specified.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 22d day of August, 1892.

JAMES CHURCHWARD.

Witnesses:

PERCY T. GRIFFITH,
A. B. CHOBOT.