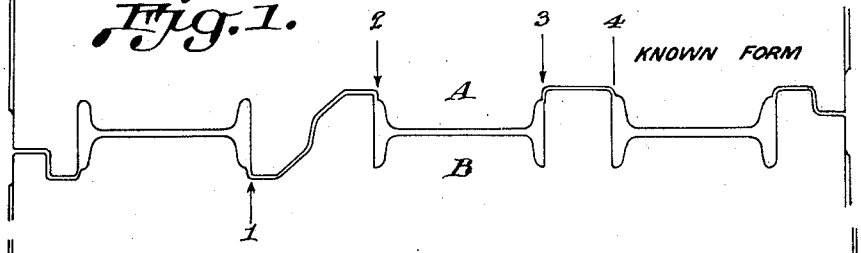
March 29, 1932. W. KÖHLER 1,851,848

ROLLING MILL ROLL

Filed June 27, 1929

Fig. 1.



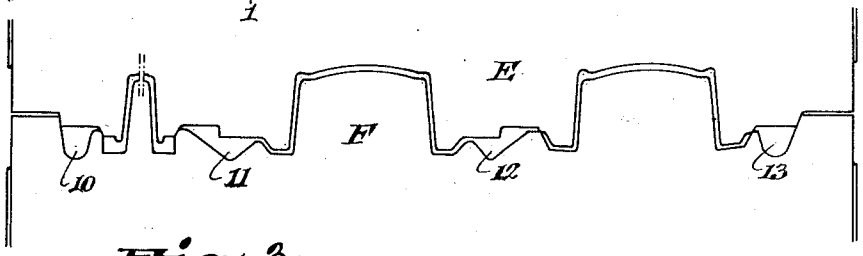
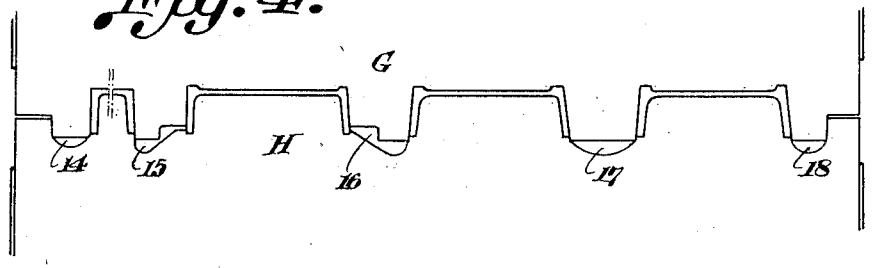


Fig. 3.

Fig. 4.



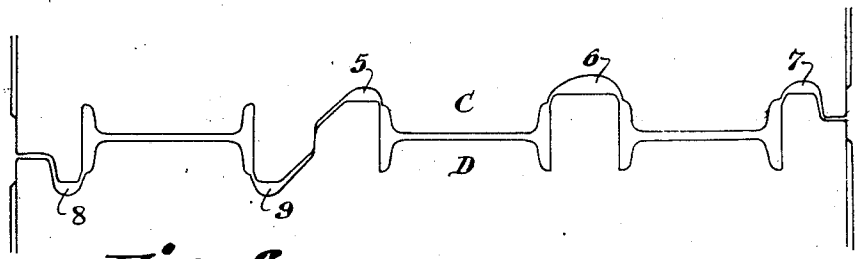


Fig. 2.

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UNITED STATES PATENT OFFICE

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ROLLING MILL ROLL

Application filed June 27, 1929, Serial No. 374,184, and in Germany July 25, 1928.

Sheet-piling sections or similar shapes provided with long flanges are rolled by means of rolls which, depending upon the sections to be manufactured, are provided with very deep cut grooves and, if necessary, with collars of very heavy dimensions. On account of the thermic tensions as well as the stresses to which the rolls are subjected in service, these widely differing diameters of a roll are very often liable to cause a fracture of the roll. These fractures in their turn cause heavy outlays for reconditioning as well as stoppage of the mill which brings in its train cessation of production.

It is the object of the present invention to provide a rolling mill roll of such a shape as to do away with fractures of rolls and the accompanying disadvantages to a large extent.

According to the invention this is being obtained by providing the collars adjoining the grooves in axial direction of the roll on their surfaces opposite the said grooves with channel like recesses of a depth at least as great as that of the deepest grooves. By this arrangement the thermic tensions and stresses will be balanced in a much more advantageous way than is the case with rolls of ordinary construction, so that the development of cracks at the corners of the grooves as well as the occurrence of fractures will be reduced to a large extent by the new roll design.

Preferably this new roll construction will be applied in connection with the most severely worn out two or three high mills.

Reference is made hereby to the accompanying drawings, wherein:

Fig. 1 illustrates the known formation of rolls for I beams.

Fig. 2 illustrates the formation of rolls for I beams according to the invention.

Fig. 3 illustrates the formation of rolls for rolling sheet piling according to the invention.

Fig. 4 illustrates the formation of rolls for rolling channel iron according to the invention.

In practice at the present time the rolls, used in rolling mills, fracture or become liable to fracture after a comparatively short period of usage. This is especially true of rolls used for rolling I-beams and similar sections. Rolls A and B, shown in Fig. 1, form passes for rolling I-beams and experience demonstrates that such rolls are soon rendered useless by the occurrence of fractures or fine cracks or more or less depth at the corners of square recesses which are also zones of increased temperature or accumulated heat. Certain of the points which are thus liable to fracture are illustrated at 1, 2, 3 and 4 in Fig. 1.

According to the invention, however, the life of such rolls may be doubled or tripled by providing the rolls at such points of fracture with specially shaped, well rounded recesses which are cut into the rolls to a depth greater than the depth of any of the recesses for the passes. Fig. 2 illustrates rolls C and D for rolling I-beams which are provided with recesses for the purpose stated. Roll C is provided with recesses 5, 6 and 7 while roll D is provided with recesses 8 and 9. Said recesses 5, 6, 7, 8 and 9 are specially shaped and well rounded, also being cut to a depth greater than the recesses for any of the passes.

The formation of rolls E and F for rolling sheet piling is shown in Fig. 3. Roll F is provided with recesses 10, 11, 12 and 13 which are deeper than any of the recesses for the passes, specially shaped and well rounded.

Rolls G and H, shown in Fig. 4, are especially adapted for rolling channel sections and roll H is provided with recesses 14, 15, 16, 17 and 18 according to the invention.

Superficially the rolls seem to be weakened by the cutting away of the additional metal, however, experience, and many tests have shown that this is not the case.

The known roll is unequally heated in various sections during rolling and this unequal heating is increased in the case of various passes depending on the length of the bar being rolled. Furthermore an equalization of the heat throughout the roll does not take place with the same rapidity with which heat is conducted from the various passes. As a result there is an accumulation of heat and increased temperature at certain portions of

the rolls adjacent the recessed square corners thereof.

The manner of providing the recesses according to the invention promotes the equalization of heat in and elasticity of the rolls. The recesses being well rounded do not provide starting points for fractures and being of the depth specified diminish the tendency to unequal heating of the rolls.

Having thus described my invention what I claim as new and desire to be secured by Letters Patent is:

A roll of the character described, having deep grooves for the passes of a rolling mill and provided at points of heat accumulation between the passes in the roll with well rounded recesses exceeding both the depth of said deep grooves and the depth normally provided for laterally closing said passes.

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