

(No Model.)

2 Sheets—Sheet 1.

O. KLATTE.
ROLLS FOR CHAIN ROLLING MILLS.

No. 535,702.

Patented Mar. 12, 1895.

Fig. 1.

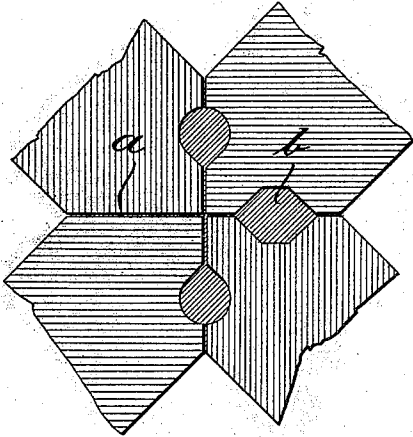


Fig. 3.

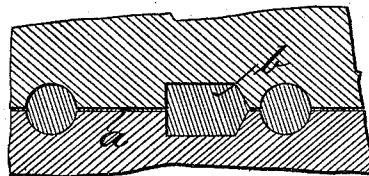


Fig. 2.

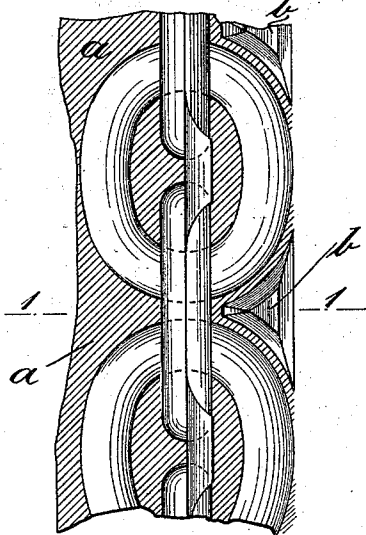


Fig. 4.

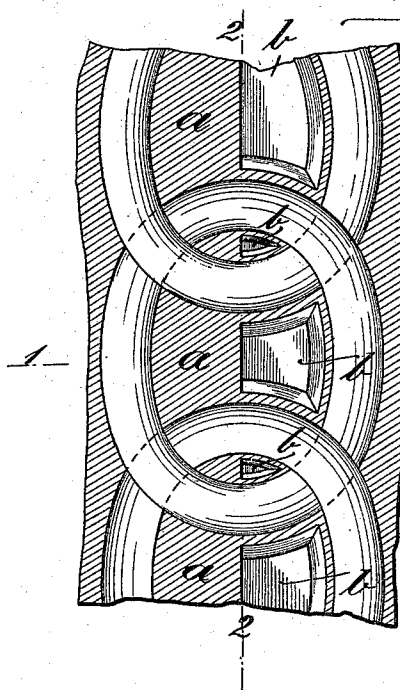
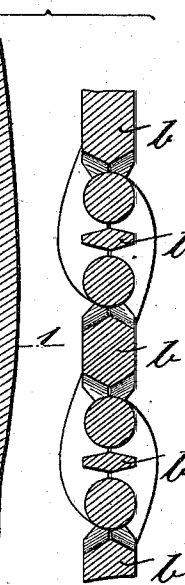


Fig. 5.



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By J. M. Boney
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Fig. 6.

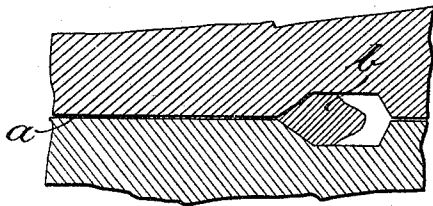


Fig. 7.

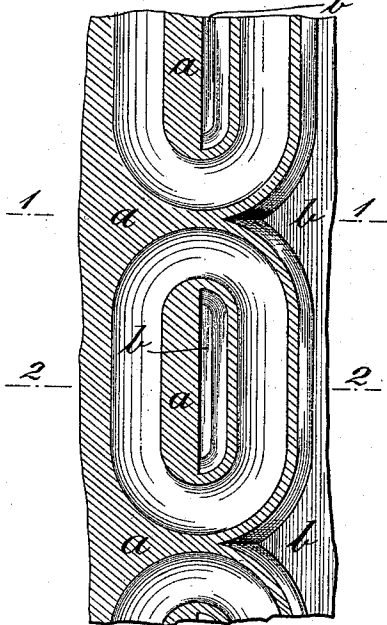
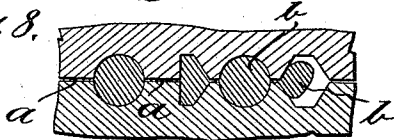


Fig. 8.



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UNITED STATES PATENT OFFICE.

OTTO KLATTE, OF NEUWIED, GERMANY.

ROLLS FOR CHAIN-ROLLING MILLS.

SPECIFICATION forming part of Letters Patent No. 535,702, dated March 12, 1895.

Application filed July 10, 1894. Serial No. 517,121. (No model.)

To all whom it may concern:

Be it known that I, OTTO KLATTE, a subject of the King of Prussia, residing at Neuwied-on-the-Rhine, Germany, have invented certain new and useful Improvements in Rolls for Chain-Rolling Mills, of which the following is a specification.

My invention relates to apparatus for producing chains and chain links from metallic bars.

In making chains or single chain links by shaping a metal bar in rolls having on their circumferential surfaces swage like depressions corresponding in shape to the exterior form of the chain or links, considerable difficulties have hitherto been experienced, owing to the fact that all the metal around the object being formed, has to be displaced, with the exception of a thin web or burr. The displacement of this surplus metal of the bar, necessitates heavy and sudden strains being put upon the machinery, so that altogether rolling chains or links in this manner is very heavy work. In addition to this the material under treatment is liable to get distorted because the free extension or elongation of the same during the re-formation is deterred by the projections occurring on the roll surfaces, and thus the quality of the manufactures easily gets deteriorated.

The above mentioned difficulties and disadvantages, experienced in rolling chains, are obviated by the present invention, which consists in providing compensating grooves, recesses or depressions on the raised surfaces of the rolls, *i. e.*, those surfaces of the shaping rolls which are allowed to stand and which form with their edges the boundaries of the depressions and serve to displace the surplus material of the bar under treatment, so that the said raised surfaces will only remain full along a narrow ledge following the exterior form of the depressions of the rolls. With rolls having compensating grooves or recesses of this kind only narrow ledges representing the outlines of the link forming depressions or "dies" will be forced into the metal under treatment, until the said surfaces or ledges almost meet therein. That metal which would otherwise have been displaced consequently enters the compensation recesses or grooves, as also that actually displaced surplus mate-

rial. Thus in chain bars or chain link bars made in rolls of the kind above described, the metal around the forms, which in the rolling process entered the compensation recesses or grooves, remains attached to the said forms by a very thin web, due to the unavoidable jumping of the rolls. This web can be easily removed mechanically and thus the chain proper or the chain links formed.

In order to make the present specification more easily intelligible reference is had to the accompanying drawings, which show the co-acting parts of rolls for making chains or single chain links. That part of the various figures at the left hand side of the center lines of the same shows rolls having no compensating grooves or recesses, while the right hand side of each figure illustrates the application of the said grooves or depressions to the rolls.

In the drawings, in which particularly the product as it leaves the rolls is illustrated, Figure 1 represents vertical sections of the outer parts of two pairs of rolls in operative relation to each other and sections of the metal portions as shaped by and inserted between said rolls, while Fig. 2 is a ground plan of such metal portions representing chain links forming a chain as well as the surplus metal as it leaves the rolls attached to said links. Figs. 3, 4 and 5 refer to a somewhat different form of chains, Fig. 3 being a section through a pair of rolls between which one of the chain links shown in Fig. 4 together with a body of surplus metal is represented in section, Fig. 4 being a ground plan of a chain with a body of surplus metal attached and Fig. 5 being a vertical section along line 2 2 in Fig. 4 looking toward the right. Figs. 6, 7 and 8 refer to the manufacture of isolated chain links, Fig. 6 being a vertical section along line 1, 1 in Fig. 7 and Fig. 8 such a section along line 2, 2 in said figure, which latter represents a ground plan of a series of isolated links with the waste metal attached thereto. Figs. 6 and 8 also show sections of portions of a pair of rolls adjoining the metal products.

Figs. 1 and 2 show the application of the invention to rolling machinery for rolling chain links, in which two pairs of rolls are employed having depressions on their surfaces, to form from a bar having a cross sec-

tion in the form of a cross or other suitable shape, a chain as far as possible in a finished condition and having its links all but separated from each other. The webs of the bar have about the same thickness of metal as the diameter of the metal of the links. Unless the auxiliary grooves or cavities hereinbefore described are provided, the whole of the metal of the bar not embodied in the links with the exception of the thin web *a* at the point of contact of the rolls, would have to be squeezed out. A section through the rolls along the line 1 1 in Fig. 2 is shown to the left of Fig. 1, while a similar section with the application of the auxiliary grooves would appear as at the right of the center line. In this case a comparatively small amount only of the metal is displaced entirely from between the rolls, the remainder forming additional solid bodies of metal *b b* in suitable cavities provided in the rolls, said bodies extending along the chain links and being connected with the same by thin webs of the metal as shown to the right of the center line of Fig. 2. This surplus metal will remain attached to the chain links by means of a very thin web and can be easily removed by mechanical means.

Figs. 3, 4 and 5 show a bar of uniform or varying section which is to be formed into a chain having flat lying, engaging links by means of a pair of rolls. Fig. 5 shows the work as accomplished by the application of the auxiliary groove or cavity to the rolls.

a, represents the surplus metal which has to be displaced by being reduced to the thickness of the web at present.

b b in Figs. 4 and 5 show the displacement of the surplus metal in the auxiliary grooves or cavities arranged according to the present invention.

b in Fig. 3 shows the filled cavity during the rolling process.

Figs. 6, 7 and 8 show a similar application of the invention. In this case a flat bar of metal is to be rolled into separate chain links. Fig. 6 is a section on line 1 1 in Fig. 7, and Fig. 8 is a section on line 2, 2 in Fig. 7. The arrangement and the letters of reference are the same as described with reference to the

preceding figures with the exception that the depression on the face of the roll which produces the outer body *b* is carried continuously round the roll.

I wish it to be understood that I do not confine myself in the present case to forming the auxiliary grooves to correspond exactly with the outline of the impressions of the rolls, reserving to myself the right of giving to the said auxiliary grooves, a form other than one corresponding to the depressions of the said rolls. For instance the same would serve exactly as well if made to some other form, so that they simultaneously roll a secondary product, from the surplus metal displaced in rolling the main product; or if the auxiliary cavities are large enough they may be divided up into smaller ones, part or all of which may be formed to shape secondary products from the surplus metal displaced.

I claim as my invention—

1. In a chain rolling mill the combination of two pairs of rolls arranged at right angles to each other, said rolls being provided with depressions on their circumferential surfaces having the exterior form of the chain, and with compensating grooves, depressions or cavities, which follow the outlines of the said chain forming depressions, for receiving the surplus and displaced material, substantially as described.

2. In a rolling mill the combination of a pair of rolls for rolling links, single or forming portions of a chain, said rolls being provided with depressions on their circumferential surfaces having the exterior form of surfaces of the links and with compensating grooves, depressions or cavities which follow the outlines of the said link surfaces forming depressions for receiving the surplus and displaced material substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

OTTO KLATTE.

Witnesses:

FR. SCHROEDER,
SOPHIE NAGEL.