No. 689,008. Patented Dec. 17, 1901.

G. W. LA VOO.

ROLLS FOR WELDING RINGS.

(Application filed Feb. 23, 1901.)

(No Model.)

Fig. 1

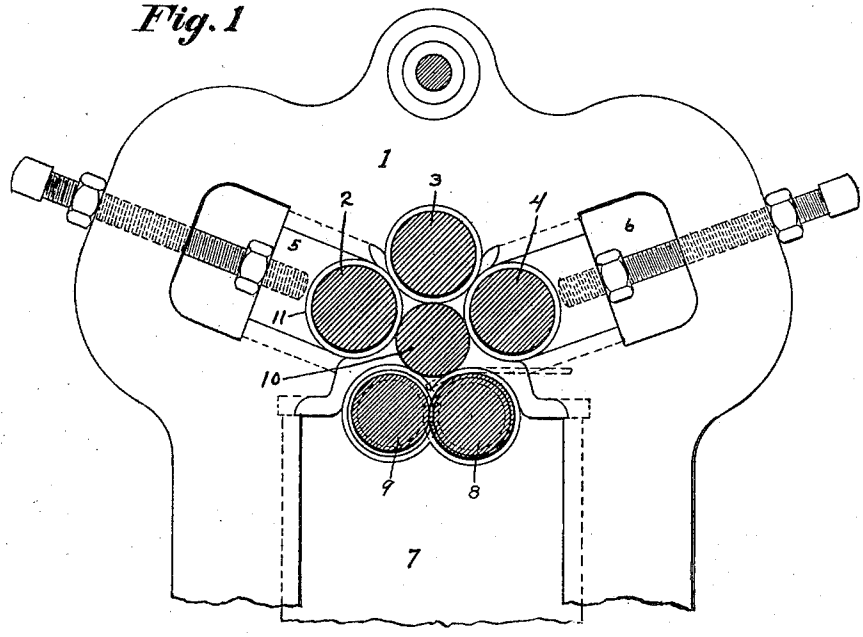


Fig. 2

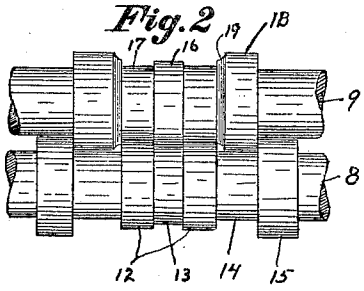


Fig. 4

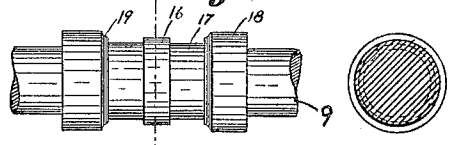
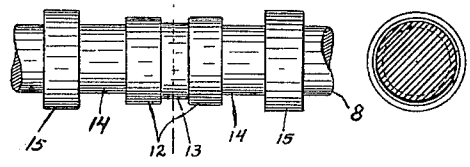


Fig. 3



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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

GEORGE W. LA VOO, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO NATIONAL TUBE COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

ROLLS FOR WELDING RINGS.

SPECIFICATION forming part of Letters Patent No. 689,008, dated December 17, 1901.

Application filed February 23, 1901. Serial No. 48,456. (No model.)

To all whom it may concern:

Be it known that I, GEORGE W. LA VOO, a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Rolls for Welding Rings; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to apparatus for the manufacture of rings and like articles—such as ordinary metal rings, bands, pipe-couplings, thread-protectors, &c.—its object being to provide a suitable set of welding-rolls for this purpose which will insure the wrapping of the blank to be welded around the central mandrel and prevent the sticking of the same and which will also insure the entering of the blank between the rolls and mandrel without such great shock or strain as is incident to the ordinary construction of welding-rolls. The usual machine for this purpose has a cluster of rolls around a central mandrel, the rolls all being provided with end flanges which bear against the mandrel, and the blank is fed in between two of the rolls and wrapped around the mandrel and welded by the contact of the rolls. Such rolls as heretofore constructed have been provided with working faces, which were unbroken for the entire width of the coupling to be formed, so that the first or entering roll reduced the entire width of the blank against the mandrel, thereby subjecting the apparatus to a considerable shock and strain and rendering the blank liable to stick at this point. Furthermore, with such rolls it was necessary to place a concave-faced guide between the roll over which the heated blank was first fed and the next roll to prevent the blank winding around the roll over which it is fed, and in some cases it was found that the blank would stick between the mandrel and this concave-faced guide, in which case the blank had to be withdrawn and reheated.

The object of the present invention is to overcome these difficulties, do away with the concave-faced guide, and insure the wrapping of the blank around the mandrel and also to overcome the severe shock and strain due to the entrance of the blank between the mandrel and the first roll and diminish the liability of the blank to stick at this point.

To these ends the invention comprises, generally stated, the employment in such a cluster of rolls of an entering roll and one adjacent thereto provided with working faces composed of annular interlocking sections, so that the space between said rolls is reduced to a minimum, thereby obviating the tendency of the end of the blank to bend down and stick between these two rolls without the necessity of the concave-faced guide before referred to, and so that the first or entering roll contacts with only a portion of the width of the blank being entered between the same and the mandrel, thereby reducing the amount of metal which is reduced between said roll and mandrel and preventing to a considerable extent the severe shock and strain to which the apparatus is subjected and also preventing liability of the blank sticking at this point. Furthermore, by leaving a portion of the width of the blank uncontacted by the working face of the first roll I diminish to a considerable extent the liability of the blank adhering to the face of said roll and being carried down into the space between the same and the next adjacent roll and insure the blank being wrapped around the mandrel.

In the accompanying drawings, Figure 1 is a cross-section of a rolling-mill, illustrating the invention. Fig. 2 is a top plan view of the entering roll and the one adjacent thereto. Fig. 3 is a detail view of the entering roll, and Fig. 4 a similar view of the roll adjacent thereto.

The apparatus embodying the invention is preferably provided with a set of five rolls mounted in a suitable housing 1 of the usual construction, employed with a cluster of rolls for the welding of rings, pipe-couplings, &c. Mounted in this housing are the upper rolls 2, 3, and 4, which in the welding operation are usually held stationary, the roll 3 being mounted in fixed bearings in the housing, while the rolls 2 and 4 are mounted in adjustable bearings 5 and 6, so that they can be brought to proper relative position with the other rolls in the cluster. Below the said rolls is the sliding bearing 7, which has mounted in

its upper end the rolls 8 and 9, so forming the five rolls of the cluster. Fitting within the several rolls is a mandrel 10, which is inserted within the cluster before the blank is fed to the rolls and is withdrawn by hand after the welding operation is completed. The rolls 2, 3, and 4 are provided with the end flanges 11, which, as shown, bear upon the mandrel 10 and serve to center the same and prevent the sidewise flow of the metal. These said rolls have their working faces continuous and unbroken between the end flanges 11. So far the apparatus described is that which is ordinarily used. The rolls 8 and 9, on the contrary, have their working faces made up of one or more annular sections or rings, which sections or rings of the two rolls interlock, so as to reduce the triangular space between said rolls and the mandrel 10. As shown in Figs. 2, 3, and 4, the roll 8 is provided with two annular rings 12, which form the working surface of said roll, between which is the annular groove or depression 13, and on either side of which is an annular groove or depression 14, beyond which grooves or depressions are the end flanges 15, which correspond to the end flanges 11 of the rolls 2, 3, and 4 and which bear against the mandrel 10 to center and support the same. The roll 9 is provided with a central annular ring or section 16, which forms the working face of this roll and which projects into the annular groove or depression 13 of the roll 8. On either side of the annular ring 14 are the annular grooves or depressions 17, which receive the annular rings or sections 12 of the roll 8, and beyond these grooves or depressions are the end flanges 18, which project within the annular grooves or depressions 14 in the roll 8 and which contact with the mandrel to center and support the same. The inner sides of the flanges 18 are cut away, as at 19, to form the proper curved end faces on the pipe-coupling or other ring being formed.

In the use of the apparatus the rolls 8 and 9 are held in close contact with the several rings of the rolls, projecting into the several annular grooves or depressions in the opposite roll, as shown in Fig. 2, the working face of the roll 8 being composed of the rings 12 and 13, while the working face of the roll 9 is composed of the ring 16 and the portions 19 on the flanges 18. By this arrangement the two rolls fit very closely together, thereby reducing the triangular space between said rolls and the mandrel 10, as will be readily understood, thereby doing away with the usual concave-faced guide, which is used to prevent the end of the blanks curving down and sticking between the rolls 8 and 9. On entering the end of the blank between the roll 8 and the mandrel it is reduced between the mandrel and the sections 12 of the surface of roll 8, so that the entire width of the blank is not reduced in the first instance and the apparatus is not subjected to the severe strain and shock which occurs in the old form of apparatus. Furthermore, the central portion of the blank is not reduced between the mandrel and this roll, and therefore the usual effect of the roll to curve the end of the blank to conform thereto is resisted by this central unreduced portion, which has a tendency to remain straight, and therefore diminishes the liability of the end of the blank being drawn down between the rolls 8 and 9 and sticking therein, but, on the contrary, insures the proper bending and wrapping of the blank around the mandrel. The flanges 11 on the rolls 2, 3, and 4, and the flanges 15 and 18 on the rolls 8 and 9, respectively, center the mandrel and hold it in proper place and insure the proper welding of the blank around the mandrel. In the welding operation the rolls 9, 2, 3, and 4 will of course finish the ends or side edges of the blank, the working faces 12 only of the roll 8 contacting with the outer face of the blank and said roll not serving to finish the end or the side edges thereof. After the welding of the blank around the mandrel the sliding bearing 7 is lowered and the mandrel withdrawn, the blank slipped therefrom, and the operation repeated as desired.

The precise arrangement of the annular sections 12, 16, and 19 is not essential in my invention. For instance, instead of having the first roll provided with two annular sections it may be provided with only one or with any other desired number, and the roll 9 will be provided with a coöperating number of sections.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a mill for forming rings or like articles, the combination of a central mandrel and a cluster of rolls around the same, two of said rolls having working faces composed of interlocking annular sections to reduce the space between said rolls and the mandrel and to successively reduce the metal between the same and the mandrel.

2. In a mill for forming rings or like articles, the combination of a central mandrel and a series of rolls around the same, the entering roll and the roll adjacent thereto having working faces composed of interlocking annular sections to reduce the space between said rolls and to successively reduce the entire width of the blank between said rolls and the mandrel.

3. In a mill for forming rings or like articles, the combination of a central mandrel and a cluster of rolls around the same, two of said rolls having working faces composed of interlocking annular sections to reduce the space between said rolls and the mandrel and to successively reduce the entire width of the blank between the rolls and the mandrel, said rolls having beyond said working faces interlocking annular flanges extending out to and bearing on the mandrel.

4. In a mill for forming rings or like articles, the combination of a central mandrel and a cluster of rolls around the same, two

of said rolls having working faces composed of interlocking annular sections to reduce the space between said rolls and the mandrel and to successively reduce the entire width of the blank between said rolls and the mandrel, one of said rolls having beyond its working faces annular depressions to receive the flanges of the adjacent roll, and having beyond said depressions flanges extending out to and bearing on the mandrel.

In testimony whereof I, the said GEORGE W. LA VOO, have hereunto set my hand.

GEORGE W. LA VOO.

Witnesses:
ROBERT C. TOTTEN,
F. W. WINTER.