A. L. JOHNSON.

MEANS FOR ROUGHENING BARS.

APPLICATION FILED MAR. 6, 1916.

1,270,836.

Patented July 2, 1918.

Fig. 1.

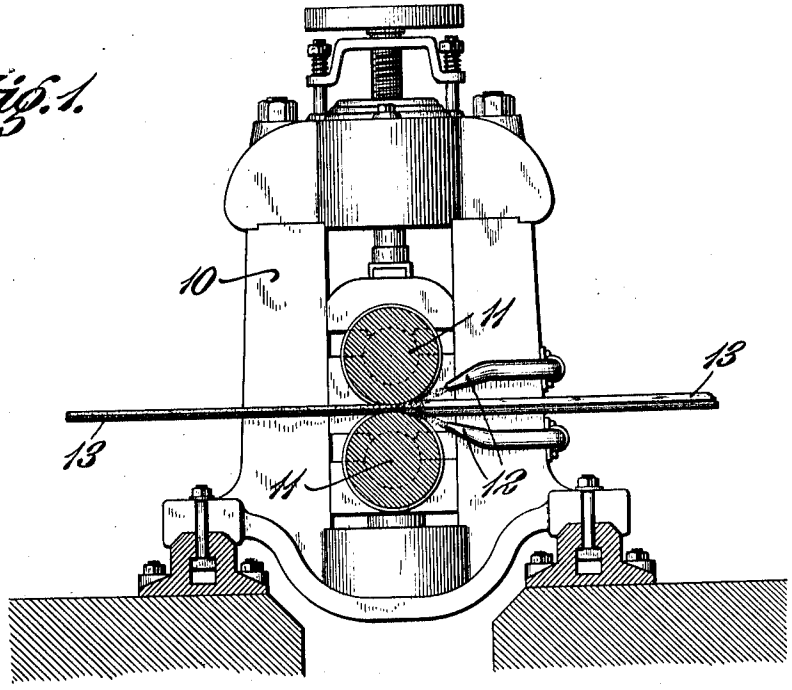
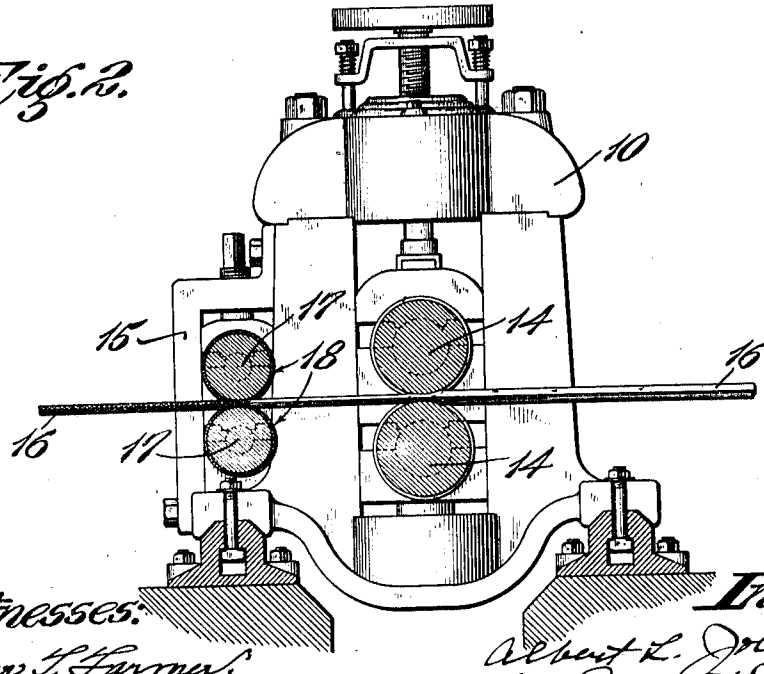


Fig. 2.



Witnesses:
Edgar T. Farmer.
A. W. Holcombe

Inventor:
Albert L. Johnson,
by Cornell & Cornell,
his Attys.

UNITED STATES PATENT OFFICE.

ALBERT L. JOHNSON, OF HAMBURG, NEW YORK.

MEANS FOR ROUGHENING BARS.

1,270,836. Specification of Letters Patent. Patented July 2, 1918.

Application filed March 6, 1916. Serial No. 82,318.

To all whom it may concern:

Be it known that I, ALBERT L. JOHNSON, a citizen of the United States, and a resident of Hamburg, county of Erie, and State of New York, have invented a new and useful Improvement in Means for Roughening Bars, of which the following is a specification.

The invention relates to rolling mills for rolling bars for reinforcing concrete, and particularly to means for producing a roughened surface on such bars.

The object of the present invention is to produce a reinforcing bar whose surface is roughened or pitted with a multiplicity of small elevations or depressions arranged close together so as to afford a maximum bonding efficiency with the concrete regardless of the angularity of the sides of the elevations or depressions and without materially affecting the cross-sectional area of the bar. To this end, it consists in the process and in the apparatus hereinafter described and claimed.

In the accompanying drawing, wherein like symbols refer to like parts wherever they occur,

Figure 1 is a cross-sectional view of a rolling mill illustrating a bar passing through the finishing rolls while being subjected to a blast of sand;

Fig. 2 is a cross-sectional view of a rolling mill having a pair of nurling rolls arranged to roughen the surface of a bar emerging from the last pass of the finishing rolls of the rolling mill.

Bars for reinforcing concrete are a rolling mill product; and in order to be practicable, a reinforcing bar must be of a design capable of manufacture by rolling.

At the present time, there are two general types of reinforcing bars, namely, first, plain bars whose surfaces have not been specially modified to adapt them for coöperation with concrete, and second, bars whose sides have been provided with shoulders intended to interlock mechanically with the concrete. Apparatus for producing bars provided with shoulders as heretofore constructed has been found to wear very rapidly, and has required frequent renewal of the rolls. Thus the cost of such bars has been greater than that of plain bars. The present invention seeks to provide a means of making reinforcing bars of maximum bonding efficiency with a minimum wear upon the rolls and consequent low cost.

An ordinary rolling mill comprises a frame-work upon which are mounted coacting rolls. Bars of square section are usually rolled on the diagonal; that is to say, the surfaces of the rolls of the mill are provided with matched triangular grooves extending circumferentially around the rolls, the sides of the groove of one of said rolls forming two sides of the square bar, and the sides of the groove of the other roll forming the other two sides of the square bar.

For the manufacture of roughened bars in rolling mills as heretofore constructed, the grooves in the rolls would have to be pitted or roughened, and on account of the great pressure of the rolls and the high temperature to which they are exposed, a pattern embodying numerous small projections or depressions close together would wear away or become substantially obliterated very quickly in practice and would require such very frequent re-cutting or renewing of the rolls as to be impracticable.

The present invention contemplates the use of a rolling mill provided with means for continuously and automatically cutting or renewing such pits or indentations during the operation of rolling.

In the apparatus illustrated in Fig. 1, an ordinary rolling mill comprising a pair of housings 10 in which are journaled top and bottom rolls 11, is provided with two sand blast nozzles 12, which are bolted to the side of one of the housings 11. The extremities of the nozzles 12 are in alinement with the grooves in the rolls through which the bar 13 makes its final pass, and on the side from which the bar approaches. The nozzles 12 are supplied through pipes from a convenient source with compressed air and sand, and are arranged to deliver a blast of sand toward the rolls on all sides of the bar. In consequence of this arrangement, the sand or other hard granular material is delivered between the bar and the respective rolls so as to pass through the rolls with the bar. In this way, the sand or other hard granular material is forced partly into the bar and partly into the rolls; and thus the sand serves to form small pits or indentations in the rolls as well as in the bar. Where no sand intervenes between the bar and an un-

pitted portion of the roll, the surface of the finished bar is plain or smooth; and where no sand intervenes between the surface of the bar and a pit of the roll, a small projection is formed on the surface of the bar. The particles of sand or other granular material thus serve not only to pit the bar but also to form in the rolls the pits which in turn form projections on the bar. The pits first formed in the rolls become more or less obliterated with the wearing of the rolls; but, on the other hand, the rolls are being continuously pitted so long as the sand or other granular material is fed between the rolls and the bar. In other words, the operation of pitting or cutting the rolls to produce small projections on the bar is continuous and automatic. While the process has been described with reference to the production of a square bar, it is obviously applicable to bars of other sections.

The apparatus illustrated in Fig. 2 embodies a modification of my invention. In this modification, the rolls 14 of the mill are of the ordinary type. Mounted in a pair of frames 15 attached to the mill housings opposite the last pass through the rolls thereof, so as to receive the bar 16 as it emerges from said last pass, are a pair of rolls 17 specially provided for roughening the surface of the bar. These roughening rolls are preferably made of hardened tool steel, and they have grooves 18 therein similar to the grooves of the last pass of the forming rolls 14, except that the surfaces of the grooves of the roughening rolls are knurled or otherwise roughened with a multiplicity of small shallow indentations or elevations. The function of these last mentioned rolls is simply to mark or impress on the bars the pattern provided on their grooves; and as such impression does not require nearly so great pressure as that of the forming rolls, these markings or roughening rolls are not subject to nearly so much wear. Obviously, the roughening rolls 17 may be adapted and arranged to roughen portions only of the bar. For instance, by having plain or unmarked circumferential bands on the surface of the grooves 18 of the roughening rolls, longitudinal strips of plain or unroughened surface are left on the bar. Likewise, by having a portion of the periphery of the grooves plain or unroughened, the bar will have areas of roughened surface spaced apart longitudinally by areas of plain or unroughened surface.

My invention admits of considerable modification from the apparatus and process described above without departing from my claims.

I claim the following as my invention:

1. The improvement in apparatus for producing rolled metal which comprises cooperating roughened rolls and means for maintaining the roughened surfaces of the rolls throughout the rolling operation.

2. The improvement in rolling mills which comprises means for continuously indenting the rolls during the passage of the product through them.

3. The improvement in rolling mills which comprises means for continuously indenting the rolls and the product during the passage of the product through the rolls.

4. The improvement in rolling mills which consists in a sand blast apparatus arranged at the entering side of the rolls for delivering sand or the like between the rolls and the entering product.

5. The improvement in the process of rolling which consists in continuously indenting the final rolls of the mill during the operation of rolling.

6. The process of rolling reinforcing bars which consists in passing the bar through a suitable rolling mill and simultaneously indenting the finishing rolls of said mill.

7. The improvement in the process of rolling reinforcing bars which consists in delivering sand or the like between the finishing rolls and the bar on the entering side of said rolls.

Signed at Buffalo, N. Y., this 29th day of February, 1916.

ALBERT L. JOHNSON.