Sept. 30, 1930. F. C. BIGGERT, JR 1,776,775

METHOD AND APPARATUS FOR TENSIONING MATERIAL

Filed April 21, 1927

Fig. 1

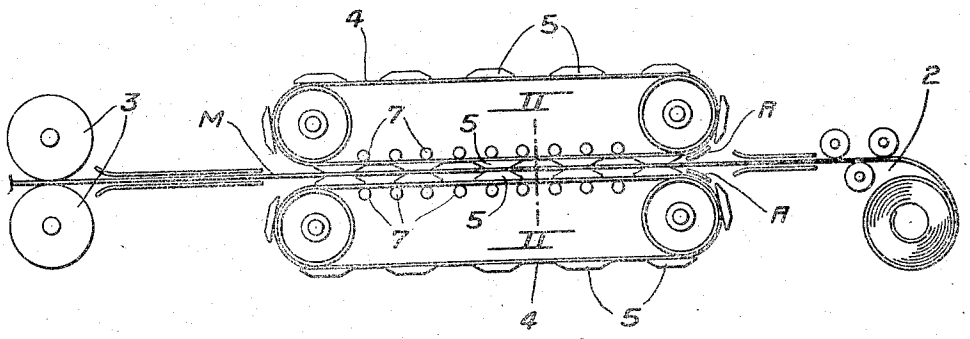


Fig. 2

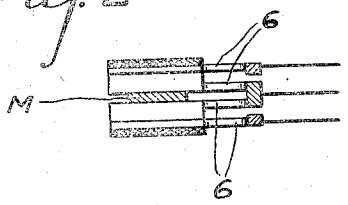
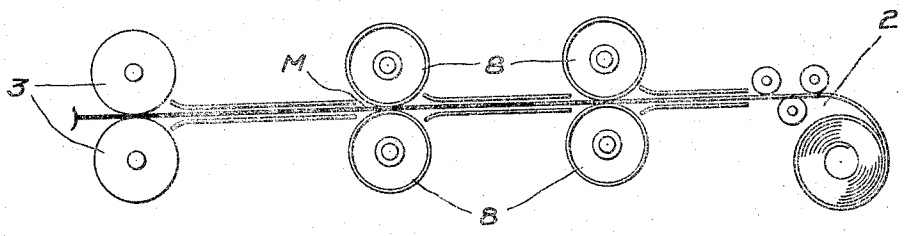


Fig. 3



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UNITED STATES PATENT OFFICE

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METHOD AND APPARATUS FOR TENSIONING MATERIAL

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The present invention relates broadly to the art of metal working, and more particularly to means for effectively feeding metal under conditions in which it is necessary to exert a considerable tension thereon without marring the surface in any way.

In order to produce a perfectly flat strip, it is necessary to exert tension on the material on the delivery side of the mill. Such tension has heretofore been accomplished by the use of a tension coiler acting directly on the material as it leaves the mill. Such a tension coiler, while effectively exerting tension and thereby producing the desired flattening action, is objectionable for the reason that coiling finished material under tension invariably mars the same and thereby offsets, to at least a considerable extent, the advantages obtained by the tensioning operation.

In accordance with the present invention, I provide improved means for tensioning the material on the delivery side of the mill to produce a flat strip, irrespective of the final disposition of the material.

In case it is desired to coil the flattened material as it leaves the tensioning means, the coiling may be accomplished without any tension, thereby obviating the objectionable marring which has heretofore occurred.

In the accompanying drawings, there are shown for purposes of illustration only two different embodiments of the present invention, the illustration being largely diagrammatic, inasmuch as the details of construction, the arrangement of parts and the operation thereof may be varied within wide limits without departing from either the spirit of the invention or the scope of the broader claims.

In the drawings:

Figure 1 is a diagrammatic side elevational view of one embodiment of the invention;

Figure 2 is a detail sectional view on the line II—II of Figure 1; and

Figure 3 is a view similar to Figure 1, illustrating still another embodiment of the invention.

In the accompanying drawings I have illustrated the invention in combination with the coiling mechanism 2, although such coiling mechanism is not essential to the carrying out of the present invention and merely represents one means of disposing of properly flattened material. The material M as it leaves the last stand on rolls 3 of a rolling mill and while still engaged by such rolls, passes to a tensioning means capable of acting thereon magnetically to produce the desired tensioning and flattening of the material without scratching the same.

In the form of the invention shown in Figure 1, this means comprises a pair of endless flexible carriers 4 of similar construction located directly opposite each other on opposite sides of the material M. Each of the carriers 4 is provided with a series of magnets 5, which magnets are adapted to engage the material on opposite sides thereof and travel therewith while so engaged, as indicated clearly in Figure 1, and effectively hold the same against slippage. While the magnets may be energized continuously, if desired, I have found that the operation is facilitated if they are de-energized at a station A in their travel. At approximately this time, they have completed their feeding movement and are preparing to leave the material. Such an operation may be easily accomplished by providing brush contacts 6, for supplying the current to the magnets, which brush contacts are so located that the magnets pass out of engagement therewith at or before the station A is reached.

The endless carriers may be supported in any desired manner, should such a construction be deemed necessary, by means of rolls 7 or the like, although the action of the magnets themselves is such as to tend to maintain the carriers in the proper plane.

In Figure 3 there is illustrated a slightly modified embodiment of the invention, in which the endless carriers are replaced by magnetic rolls 8 of any desired construction, each pair of rolls serving both in the capacity of pinch rolls and feeding rolls, whereby material within the magnetic zone

of the rolls is effectively prevented from slipping relatively thereto.

By the use of magnetic feeding means of the general character herein disclosed, it is possible to exert a greater tension on the material without fear of injury thereto, and without possibility of marring or otherwise distorting the surface.

The advantages of the invention arise from the provision of such a magnetic feeding means in conditions under which tension is desirable, and particularly with highly finished surfaces.

In this manner it is possible to exert sufficient tension on the material leaving the mill to properly flatten the same and thereby improve the quality thereof. After having been tensioned and flattened in this manner, the material may be fed to any desired point of use or disposition, such as the coiler 2 herein illustrated.

I claim:

1. The combination with a mill including a stand of rolls, of tension producing means in cooperative relation thereto, comprising means for gripping and exerting a pull on the material between the rolls and the tensioning means, and magnetic means included in the tension producing means for augmenting the pull of the gripping means.

2. The combination of a strip mill including a stand of rolls, of tension producing means in cooperative relation thereto, comprising means for gripping the opposite sides of the strip and exerting a pull on the portion of the strip between the rolls and the tensioning means, and magnetic means included in the tension producing means for augmenting the pull of the gripping means.

3. The combination with a mill including a stand of rolls, of tension producing means in cooperative relation thereto, comprising means for gripping the material at a plurality of points spaced longitudinally thereof and exerting a pull on the material between the rolls and the tensioning means, and magnetic means included in the tension producing means for augmenting the pull of the gripping means.

4. The combination with a mill including a stand of rolls, of tension producing means in cooperative relation thereto, comprising means for gripping the material at a plurality of points spaced longitudinally thereof while traveling therewith and exerting a pull on the material between the rolls and the tensioning means, and magnetic means included in the tension producing means for augmenting the pull of the gripping means.

5. The method of tensioning material delivered from a roll pass, comprising gripping and continuously pulling the material as it is delivered from the roll pass and augmenting the pulling by magnetism to prevent slippage, whereby the gripping force required to exert the desired pull is reduced and thus avoid the danger of marring the material by the gripping force.

6. The method of tensioning material delivered from a roll pass, comprising gripping the material at a plurality of points along the material and continuously pulling the material as it is delivered from the roll pass, and augmenting pulling by magnetism to prevent slippage, whereby the gripping force required to exert the desired pull is reduced and thus avoid the danger of marring the material by the gripping force.

In testimony whereof I have hereunto set my hand.

FLORENCE C. BIGGERT, JR.