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APPARATUS FOR HANDLING ELONGATED MATERIAL

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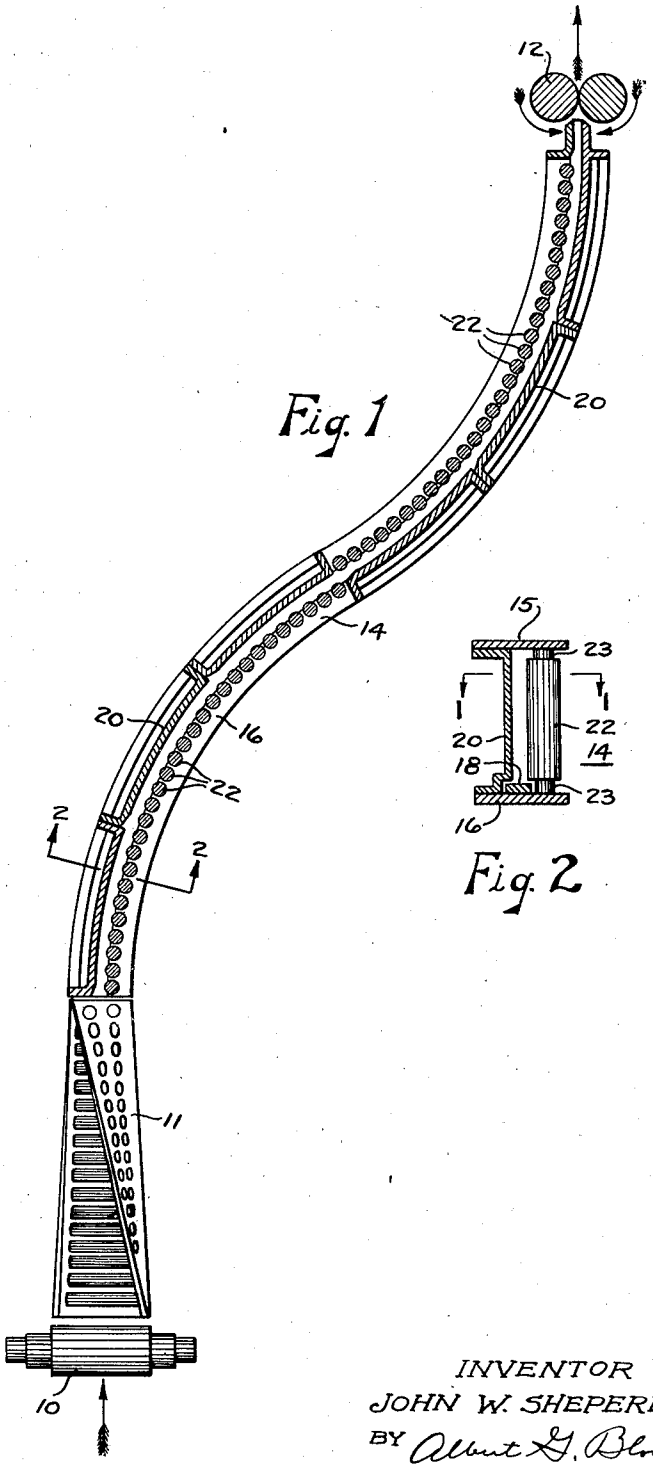


Fig. 1

Fig. 2

INVENTOR
JOHN W. SHEPERDSON
BY Albert G. Blodgett
ATTORNEY

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APPARATUS FOR HANDLING ELONGATED MATERIAL

John W. Sheperdson, Worcester, Mass., assignor to Morgan Construction Company, Worcester, Mass., a corporation of Massachusetts

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7 Claims. (Cl. 271—2.1)

This invention relates to apparatus for handling elongated material, and more particularly to apparatus for moving such material longitudinally along a curvilinear path while supporting the material from beneath.

In the metal rolling art it is sometimes desirable to guide the stock, as it issues from a rolling mill, to some other apparatus located out of alinement with the mill. This requires a curved guideway, and when the stock is relatively wide and thin it necessitates an upright positioning of the stock in order that it may bend freely in a horizontal plane to conform with the guideway. It is also necessary to employ stock forwarding means, such as pinch rolls, located at the outlet of the guideway and arranged to apply at least a slight tension to the stock passing through the guideway, so that there will be no accumulation of stock in the guideway and the stock will be completely withdrawn from the guideway after the tail end of the stock has left the rolling mill.

Certain difficulties have been encountered heretofore in the operation of apparatus of this general type. In some cases the front end of the stock has failed to travel properly throughout the entire length of the guideway, and cobbles have resulted. In other cases the stock has been scratched so badly during its travel through the guideway as to render it useless as a commercial product.

It is accordingly one object of the invention to overcome these difficulties and to provide apparatus which will move elongated material along a curvilinear path without danger of cobbles or scratching the stock.

It is a further object of the invention to provide apparatus of a rugged, dependable and relatively inexpensive construction for moving elongated material along a curvilinear path.

With these and other objects in view, as will be apparent to those skilled in the art, the invention resides in the combination of parts set forth in the specification and covered by the claims appended hereto.

Referring to the drawing illustrating one embodiment of the invention and in which like reference numerals indicate like parts,

Fig. 1 is a sectional plan view of apparatus for handling elongated material, the section being taken on the line 1—1 of Fig. 2; and

Fig. 2 is an enlarged section on the line 2—2 of Fig. 1.

The embodiment illustrated comprises a stand of horizontal rolls 10 which may form the finishing stand of a continuous mill for rolling elongated metal stock. In the case of so-called "strip" metal, the stock is produced with a substantially uniform thickness throughout its width, and with a width many times greater than its thickness. Since stock of this character will not bend readily in its own plane, it is necessary to twist the strip into an upright position before it can be directed along a horizontally curved path. For this purpose there is shown a roller twist trough 11 of well-known construction located at the delivery side of the rolls 10, this trough being arranged to twist the stock, as it issues from the rolling mill, from a horizontal plane into a vertical plane.

Stock forwarding mechanism 12 is located some distance beyond the twist trough 11 and in a position laterally offset therefrom. This mechanism preferably comprises a pair of upright pinch rolls driven in any suitable and well-known manner and arranged to apply a slight tension to the stock after it has been gripped between them.

Between the twist trough 11 and the pinch rolls 12 there is provided a guideway 14 arranged to direct the stock along a curvilinear path. The shape of this path will usually vary with each installation, being dependent upon the relative locations of the other mechanisms. In the embodiment illustrated the guideway serves to direct the stock along an S-shaped path or reverse bend leading to the pinch rolls.

The guideway 14 comprises an upper horizontal plate 15 and a lower horizontal plate 16 spaced therebeneath. A strip 18 of suitable wear-resisting material is mounted on the lower plate 16 to engage and support the lower edge of the stock as it slides along the guideway. Lateral supporting means is provided for both sides of the stock, and the supporting means at the outer or convex side of the stock is of a different construction from that at the inner or concave side of the stock. At the outer side of each curve there is provided a series of upright flanged plates 20, secured to the plates 15 and 16, and presenting toward the stock a smooth stationary concave surface over which the front end of the stock will slide readily without danger of cobbles. At the inner side of each curve there is provided an arcuate row of upright cylindrical idler rollers 22 mounted in suitable bearings 23 carried by the plates 15 and 16. These rollers provide antifriction surfaces over which the stock may be drawn under tension by the pinch rolls 12 without danger of scratching the stock.

In the operation of the invention the stock will issue from the finishing rolls 10 and pass through the twist trough 11, which will twist the stock through an angle of 90 degrees into a vertical plane. The stock will then enter the guideway 14, and until the front end of the stock reaches the pinch rolls 12 the stock will be pushed along by the action of the rolls 10 and hence will be in a state of slight compression longitudinally. Under these circumstances the front end of the stock will slide smoothly in contact with the plates 20 at the outer side of each curve, and there will be no danger of its becoming caught between two of the idler rollers 22. As soon as the stock has been gripped by the pinch rolls 12 they will apply a slight tension to the stock, and because of this tension the stock will move laterally into contact with the idler rollers 22 at the inner side of each curve. These rollers will be rotated by the action of the stock passing over them, so that scratching of the stock will be avoided. There will also be a substantial saving in power consumption.

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

1. Apparatus for handling elongated material comprising means to deliver the stock longitudinally, stock forwarding means remote from the delivery means, and a curved guideway for the stock between the delivery means and the forwarding means, the guideway including means providing a smooth stationary stock-guiding surface at the outer side of the curve and a row of idler rollers at the inner side of the curve.

2. Apparatus for handling elongated material comprising means to deliver the stock longitudinally, stock forwarding means remote from the delivery means and laterally offset therefrom, and a guideway for the stock between the delivery means and the forwarding means, the guideway having a plurality of curves therein and including means providing a smooth stationary stock-guiding surface at the outer side of each curve and a row of idler rollers at the inner side of each curve.

3. Apparatus for handling elongated material comprising means to deliver the stock longitudinally, stock forwarding means remote from the delivery means and laterally offset therefrom, and a substantially horizontal guideway for the stock between the delivery means and the forwarding means, the guideway having a plurality of curves therein and including means providing a smooth stationary upright stock-guiding surface at the outer side of each curve and a row of upright idler rollers at the inner side of each curve.

4. Apparatus for handling elongated material comprising a guideway having a curve therein, means to deliver the stock longitudinally to the guideway, and stock forwarding means arranged to receive the stock from the guideway and to apply a slight tension to the stock in the guideway, the guideway including means providing a smooth stationary surface at the outer side of the curve to guide the front end of the stock and a row of idler rollers at the inner side of the curve to support the stock after tension has been applied thereto.

5. Apparatus for handling elongated material comprising a guideway having a curve therein, a pair of rolls arranged to deliver the stock longitudinally to the guideway, and a pair of pinch rolls arranged to receive the stock from the guideway and to apply a slight tension to the stock in the guideway, the guideway including means providing a smooth stationary surface at the outer side of the curve to guide the front end of the stock and a row of idler rollers at the inner side of the curve to support the stock after tension has been applied thereto.

6. Apparatus for handling elongated strip material having a width greater than its thickness comprising a substantially horizontal guideway having a curve therein, means to deliver the stock longitudinally to the guideway in an upright position, and stock forwarding means arranged to receive the stock from the guideway and to apply a slight tension to the stock in the guideway, the guideway including means providing a smooth stationary upright surface at the outer side of the curve to guide the front end of the stock and a row of upright cylindrical idler rollers at the inner side of the curve to support the stock after tension has been applied thereto.

7. Apparatus for handling elongated strip material having a width greater than its thickness comprising a pair of horizontal rolls arranged to deliver the stock longitudinally in a horizontal position, a twist trough arranged to receive the stock from the rolls and twist it into an upright position, a substantially horizontal guideway arranged to receive the stock from the twist trough and having a curve therein, and a pair of vertical pinch rolls arranged to receive the stock from the guideway and to apply a slight tension to the stock in the guideway, the guideway including means providing a smooth stationary upright surface at the outer side of the curve to guide the front end of the stock and a row of upright cylindrical idler rollers at the inner side of the curve to support the stock after tension has been applied thereto.

JOHN W. SHEPERDSON.