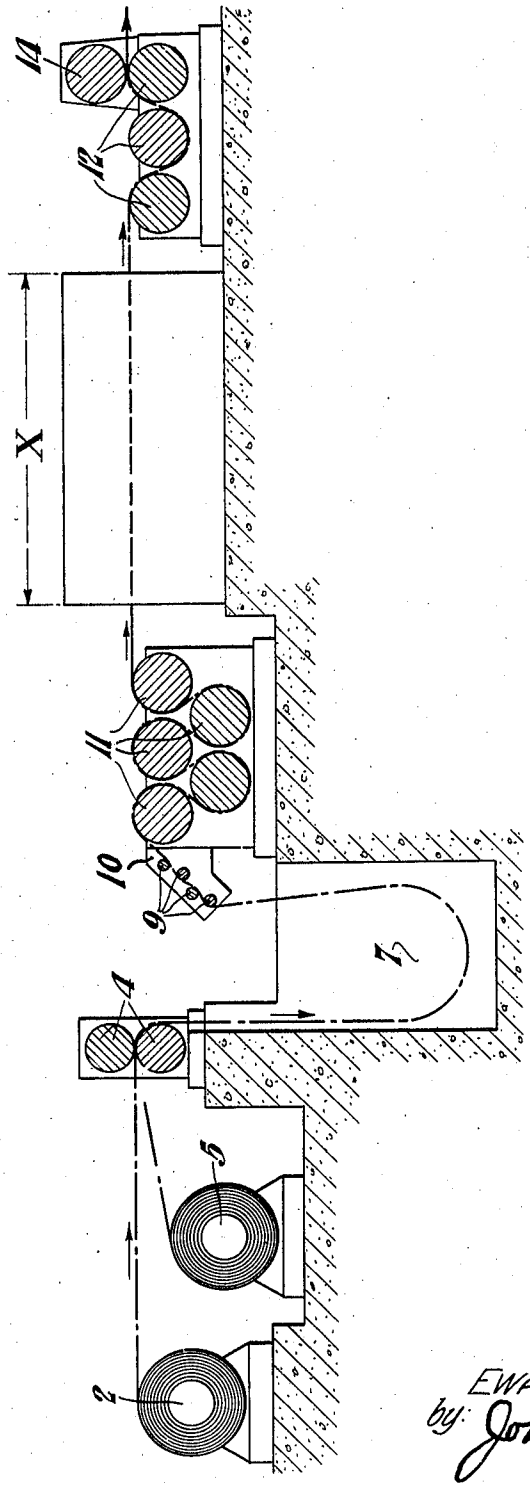
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APPARATUS FOR HANDLING STRIP METAL

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APPARATUS FOR HANDLING STRIP METAL

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1 Claim. (Cl. 271—2.3)

This invention relates to apparatus for handling strip metal and more particularly to those which operate on relatively wide thin-gage strip steel.

In the manufacture of wide thin-gage strip steel, difficulty is frequently experienced in handling the same, and this is particularly true when processing annealed, or annealed and "mechanically tempered," steel. By mechanically tempering is meant temper rolling, stretcher leveling, roller leveling, and similar operations. Mechanically tempered steel, while slightly harder and stiffer than the same steel in the "as annealed" condition, is quite soft when compared to the cold reduced steel prior to annealing; and is therefore more easily scratched and marred. In addition, such steel, when in the form of a wide, thin gaged strip is difficult to position and convey. This is true of continuous processing equipment of various types. The present invention is designed to overcome these difficulties.

The foregoing and other objects will be apparent after referring to the drawing, in which:

The single figure is a sectional elevation of the apparatus of the present invention.

Referring more particularly to the drawing, the numeral 2 designates a conventional uncoiling device which is disposed adjacent, and adapted to feed into, a pair of suitably driven pinch rolls 4. Adjacent the uncoiling device 2, but disposed at a lower elevation, is a corresponding uncoiling device 5 which is also adapted to feed into the pinch rolls 4. By such an arrangement, it is practical to feed strip from one of the uncoiling devices 2 and 5 through the pinch rolls 4 until the said coil is exhausted and then to attach the leading end of the coil on the other uncoiling device to the trailing end of the former, thus making for continuity.

Immediately adjacent the pinch rolls 4 is a looping pit generally designated at 7. This looping pit provides for an accumulation of strip in a substantially untensioned condition. That is to say, a freely swinging loop is provided which permits subsequent side-guiding. Immediately after the strip leaves the looping pit 7, it is directed upwardly and between a plurality of offset rolls 9 which transversely flex the strip and therefore have the effect of imparting some temporary stiffening characteristics in order that it may be laterally positioned. The offset rolls 9 are not driven and there is employed in combination therewith a pair of guide elements 10 which contact the edges of the strip, one of which appears in the background in the single figure of the drawing as a plate. According to this embodiment, a plate 10 is disposed at each end of the plurality of offset rolls 9, being suitably apertured to receive each of the individual rolls. These plates may, if desired, be provided with suitable adjusting devices (not shown) for accommodating strip of various widths. It will of course be readily understood by those skilled in the art that numerous forms of side guide devices may be employed in combination with the idler rolls 9; for example, rollers, or the like. Disposed adjacent the plurality of idler rolls 9 and into which the strip is directed therefrom, is a series of spaced-apart rolls 11 shown in the present instance as comprising five in number, the axes of three of which occupy a common horizontal plane, while the remaining two occupy a lower plane common to each other. These spaced-apart rolls 11 are of the same diameter, inter-connected in any suitable manner (not shown) for conjoint rotation, and are provided with a conventional drag mechanism (also not shown), the latter of which may, for example, be an electrical generator whose output can be regulated, or mechanical or hydraulic brake means which will serve to impart a retarding influence. The wrapping of the strip around the spaced-apart rolls 11 provides a "snubbing" effect, the degree of which is proportional to the total area of contact between the rolls and the strip. Due to the substantial contact area with the strip provided by the spaced-apart rolls 11, the desired retarding influence may be obtained without scratching or marring the strip. The effect of the adjacent portion of strip in the looping pit 7 provides for a small initial tension at a point immediately before it comes in contact with the idler rolls 9, and this small initial tension is enhanced by the said idler rolls. After the strip has been wrapped around the spaced-apart rolls 11, it is directed through the processing equipment which is generally designated at X, and which may take numerous forms, for example, a series of units for scrubbing, electroplating, and cleaning strip steel.

It is essential to the present invention that the strip S be dragged through the processing equipment X and that the spaced-apart rolls 11 provide back tension. Backwardly from the rolls 9 and lateral guides 10, looping pit 7 and from the pinch rolls 4 to the uncoiling devices 2 and 5, the strip is in substantially untensioned condition. In order to drag the strip S through the processing equipment X there is provided a

series of three spaced-apart rolls 12 whose axes occupy a common horizontal plane. These spaced-apart rolls 12 are, like the spaced-apart rolls 11, of the same diameter and suitably interconnected (not shown) for conjoint rotation. However, the spaced-apart rolls 12 are, unlike the spaced-apart rolls 11, driven in any suitable manner (not shown). The strip is wound around these rolls 12 in a manner similar to that of the spaced-apart rolls 11. In connection with the exit or last of the spaced-apart rolls 12 there is provided an idler roll 14 which maintains the strip in close contact therewith. In contrast to the spaced-apart rolls 11, the spaced-apart rolls 12 provide a cumulative tractive effect, the degree of which is dependent upon the area of contact between the rolls 12 and the strip. Therefore, the spaced-apart rolls 12 are made to pull the strip smoothly without scratching or marring the same.

Due to the pulling effect exerted by the spaced-apart rolls 12 the strip is moved entirely through the processing equipment X from the spaced-apart back tensioning rolls 11, with tension preserved throughout.

While I have shown and described a specific embodiment of the present invention, it will be seen that I do not wish to be limited exactly thereto, since various modifications may be made without departing from the scope of the invention, as defined by the following claim.

I claim:

Apparatus for handling annealed metallic strip, comprising means for moving the strip longitudinally, an accumulator for maintaining progressive portions of the strip in a loose and substantially untensioned state, a side guide for restraining the lateral deflection of the loose and substantially untensioned portion of the strip, a plurality of spaced-apart rolls through which the strip passes in contact with a substantial portion of the periphery of each roll, said rolls being power-driven for applying pulling forces to the strip at a point beyond the loose and substantially untensioned portion thereof, means for processing the strip, the processing means being disposed between the side guide and the spaced-apart power-driven rolls, and a plurality of spaced-apart rolls through which the strip passes in contact with a substantial portion of the periphery of each roll to apply back tension to the strip between the side guide and the processing means.

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