ABSTRACT OF THE DISCLOSURE

In the present apparatus the coil of metal stock is supported for rotation and a power unit is provided and which may have frictional contact with the coil for rotating the coil during the initial stages of the stripping and straightening operations. The stock material after passing through a straightening machine is directed upwardly into an overhead arc and then downwardly on the other side and into contact with an arrangement of platforms which bend the stock material opposite to the curvature of the material when it formed part of the coil.

An auxiliary frame extends forwardly of the supports 11 and 12, the frame including the horizontal parallel bars 24 and the upright vertical bars 25. The horizontal and vertical bars are joined to each other by the transverse frame element 26 and the horizontal bars are each secured to a support at 27.

For uncoupling or unwinding the coil 28 of metal stock the same is supported for rotation by the coil supporting arms 30 which in combination with the central drum 31 provides journaling means for supporting the heavy coil 28 for rotation on a horizontal axis. The coil supporting and journaling structure is basically disclosed in the patent to Wig, 2,678,175 granted May 11, 1954, and entitled, Spindle Reel With Toggle Arms. The drive motor as shown for the spindle reel in the patent is employed by the present invention to drive the coil at a rate which is somewhat less than the rate at which the stock is being fed to the straightening machine. Thus a slight tension is maintained on the stock as the coil unwinds.

The heavy coil of metal stock is initially deposited on a carrier generally indicated by the numeral 32 and which includes a frame journaling the car wheels 33 adapted to ride on the rails 34. The table 35 for supporting the coil is suitably actuated by rack and pinion means 36 in a vertical direction so that the coil can be elevated and placed on the coil supporting reel. A coil loading reel of the character herein described and disclosed is shown in the Littell Patent 2,634,091 granted Apr. 7, 1963.

In order to facilitate the placement of the coil on the reel, the arms 30 are retracted and then expanded so that the arms are thereby located within the center opening of the reel and in firm and secure contact with the inside convolutions of the coil. The friction power unit 37 is now placed in contact with the periphery of the coil and the bands holding the coil in a tightly wound condition can be cut. The friction power unit is of the caterpillar type being carried by the pivoted lever structure 38 which depends from the pivot axis 40. The motor 41 for driving the endless flexible belt 42 of the unit is conveniently carried by the lever 38 and through a speed reducing mechanism and additional drive elements the wheels 43 are rotated to in turn impart movement to the endless belt 42. The friction drive mechanism for the coil is moved into and out of contact with the coil by means of the power cylinder 44 which is pivotally anchored at 45 to the bottom plate 13 and at its upper end the piston rod of the cylinder is pivoted at 46 to the lever structure 38.
As shown in FIGURE 1, the friction power unit 37 is in contact with the outer convolution of the coil and as the coil is rotated by the friction power unit the leading edge of the coil comes in contact with the stripper arms 47 which are pivoted at 48 to the framework of the housing. To facilitate the stripping operation the arms 47 carry at their free end an arrangement of three rollers 50. The rollers extend transversely of the coil and they serve to deflect the leading edge of the stock material upwardly and outwardly towards the straightening machine identified in its entirety by the numeral 51. The arms 47 are suitably actuated to and from operative and inoperative positions by the power cylinder 52.

The structure 51 essentially consists of a plurality of straightening rollers 54 and which may be adjusted bodily for straightening purposes in the conventional manner. As shown in the drawing a row of four rollers has a row of three rollers in opposed relation thereto and the rollers are driven in unison, being connected by gearing, by the motor 55, the drive belt 56 and by the driven pulley 57. The straightening rollers are preceded by the feed rollers 58 which initially engage the leading portion of the stock material and feed the same to the straightening rollers 54. The power cylinder 60 is suitably energized for adjusting the feed rollers 58 and which are spaced a distance to facilitate the initial threading of the stock material. However, after the stock material has entered the straightening rollers the bite of the feed rollers 58 can be adjusted to suit operating conditions.

Exit rollers 61 are also provided and the bite of these rollers can be adjusted by operation of the power cylinder 62. From the exit rollers the stock material is fed through the arcuate passage 23 formed by the spaced frame members 21 and 22. The utility of the spaced frame elements and the arcuate passage 23 formed by the same is to receive the stock material from the straightening rolls and direct the material to the opposite side of the apparatus. At the exit end of the passage the stock is directed downwardly onto the pivotally supported platform 66 and then onto the platform 67 which is also pivotally supported. However, the platform 66 is pivoted at 68 to depend downwardly whereas platform 67 is pivoted at 70 to extend rearwardly approximately horizontally. Here also, the platforms have a width substantially equal to that of the stock material and it will be noted that the platform 66 has an apron 71 which terminates some distance short of the free end of the platform 66 and that the free end of the stock material lies in the platform 66 and as shown in the drawings the former is in contact at all times with the tie rod 72. Accordingly, the tie rod functions to support the free end of the platform 67 and said tie rod is located at the end of the platform 66 to thus assist in joining the levers which help to form the platform 66. The power cylinder 78 oscillates both platforms to and from their positions as shown in FIGURES 1 and 2. At 73 the cylinder is pivotally anchored to the base 13 and the piston rod of the cylinder is pivotally secured at 74 to the platform 66 and which location is close to the tie rod 72.

The stock material forms a loop between the platforms 66 and 67 and as a result of said loop the material is bent in a direction which is opposite to the curvature of the coil. As a safety device to control the size of the loop the invention provides a roller 75 which is journaled for rotation at the depending free ends of the rods 76. The rods are in turn pivotally supported by the framework on the same pivot axis 68 as the platform 66. A start and stop switch 77 is associated with the pivot axis and said switch is actuated to open when the roller 75 is in its extreme down position. FIGURE 1. With the opening of the switch 77 the motor which drives the coil is stopped and also the feeding of the stock material is discontinued. However, during operation feeding of the material to other apparatus continues and presently the roller will be elevated to again start the motor driving the coil and the feeding of the material to the straightening rolls.

In the event that the loop should materially increase or decrease to a minimum, the operator can speed up or slow down the rotation and the feeding action of the rolls 58 and 61 by the rheostat 80 having the handle or knob 81 which is rotatable for adjusting the rheostat. The knob 81 is conveniently located on the upright member 11 of the framework so as to be easily accessible to the operator. Also, a backbreaker 82 is provided for initially bending the stock material into the loop form as shown in FIGURE 2 and which functions to assure that a loop will continue to exist. The backbreaker 82 is pivoted to the framework at 83 and the lock 84 when operative prevents pivoting of the backbreaker.

As shown in FIGURE 1 the outer convolution of the coil 28 has been stripped by the stripper arm 47 and the same is being directed by the rollers 50 toward the feed rollers 58 for feeding to the straightening machine 51. During this stripping operation the friction power unit 37 is in contact with the coil and the motor 41 will be operative so as to cause the power unit to impart a rotational movement to the coil in a counterclockwise direction. After the stock material has passed through the straightening machine it is directed by the arcuate members 21 and 22 over the top of the apparatus and in a downward direction toward the platform 66. This platform together with platform 67 will produce a bend in the material and as a result of said bend the material is directed outwardly over the roller at the journalling point 70 for presentation to other apparatus.

The feeding action of the apparatus is shown in FIGURE 2 wherein it will be observed that the friction drive unit 37 has been withdrawn from the coil and that the roller 47 of the straightening machine 51 has been withdrawn. Accordingly, the feeding rollers 58 and 61 and the rollers of the straightening machine 51 are withdrawing the stock material at the desired rate from the coil and which is being rotated by the drive motor of the spindle reel device at a somewhat slower rate sufficient to maintain a slight tension on the stock material. This is desirable since it prevents the free and excessive unwinding of the stock material of the coil and an expansion of the coil.

The size of the loop formed by the angular relation of the platforms 66 and 67 is largely controlled by the loop control roller 75 of platform 67 and in turn the size of the loop is dependent on the roll 75. However, the rotative action of the coil and the feeding action of the feed rolls can be adjusted by the operator by means of the notch 81 which controls the rheostat 80. The backbreaker 82 is normally free to pivot at 83. However, when it is desired to render the same operative, the lock 84 is manipulated and as a result the backbreaker is prevented from pivoting in a clockwise direction. Should the stock material contact the backbreaker when the same is in a locked position the element will assist in the formation of the desired loop which is thereafter largely controlled as to size by the loop control roller 75.

The invention is not to be limited to or by details of construction of the particular embodiment thereof illustrated by the drawings as various other forms of the device will, of course, be apparent to those skilled in the art without departing from the spirit of the invention or the scope of the claims.

What is claimed is:

1. In apparatus of the character described, the combination with a spindle reel for supporting a coil of stock material for rotation, of straightening rollers located adjacent the coil for straightening the material as the same unwinds from the coil, means forming part of the frame of the apparatus for receiving the material from the straightening rollers and for directing the same over the top of the apparatus to the opposite side, and an-
arrangement of pivotally supported platforms at said opposite side of the apparatus and with which the stock material is caused to contact for directing the material forwardly in a substantially horizontal manner, said platforms having an angular relation with each other such as to deform the material received from the means which directs the same over the top of the apparatus so as to bend the material into an arc which is opposite to the curvature of the material when it formed part of the coil.

2. In apparatus of the character described, the combination with a spindle reel, of a coil of stock material supported by the spindle reel for rotation, means for initially stripping the leading edge of the outer convolution from the coil including a stripper arm pivotally supported by the frame of the apparatus, an arrangement of rollers carried by the free end of the stripper arm, a power cylinder for oscillating the arm to locate the rollers in an operative or in an inoperative position with respect to the coil, a friction driving unit pivotally suspended from the frame of the apparatus and adapted for oscillation into and out of contact with the coil, and a plurality of straightening rollers located adjacent the coil for straightening the stock material as the same unwinds from the coil, the said rollers being so arranged as to direct the leading edge of the stock material stripped from the coil towards the said straightening rollers.

3. In apparatus of the character described by claim 2, additionally including means forming part of the frame of the apparatus for receiving the material from the straightening rollers and for directing the same over the top of the apparatus to the opposite side, and pivotally supported platforms at said opposite side of the apparatus for directing the stock material received from said means forwardly in a substantially horizontal manner.

References Cited

UNITED STATES PATENTS

1,953,092 4/1934 Yoder 242—78.7
2,288,786 7/1942 Carroll 72—183 X
2,757,880 8/1956 De La Motte 242—78.7
2,525,254 10/1950 Appleby 242—78.8
3,010,672 11/1961 Coell 242—78.8
3,343,393 9/1967 Groll 72—183

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