Feb. 14, 1956 A. J. BERDIS 2,734,551

APPARATUS FOR PREVENTION OF COIL BREAKS

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FIG. 1.

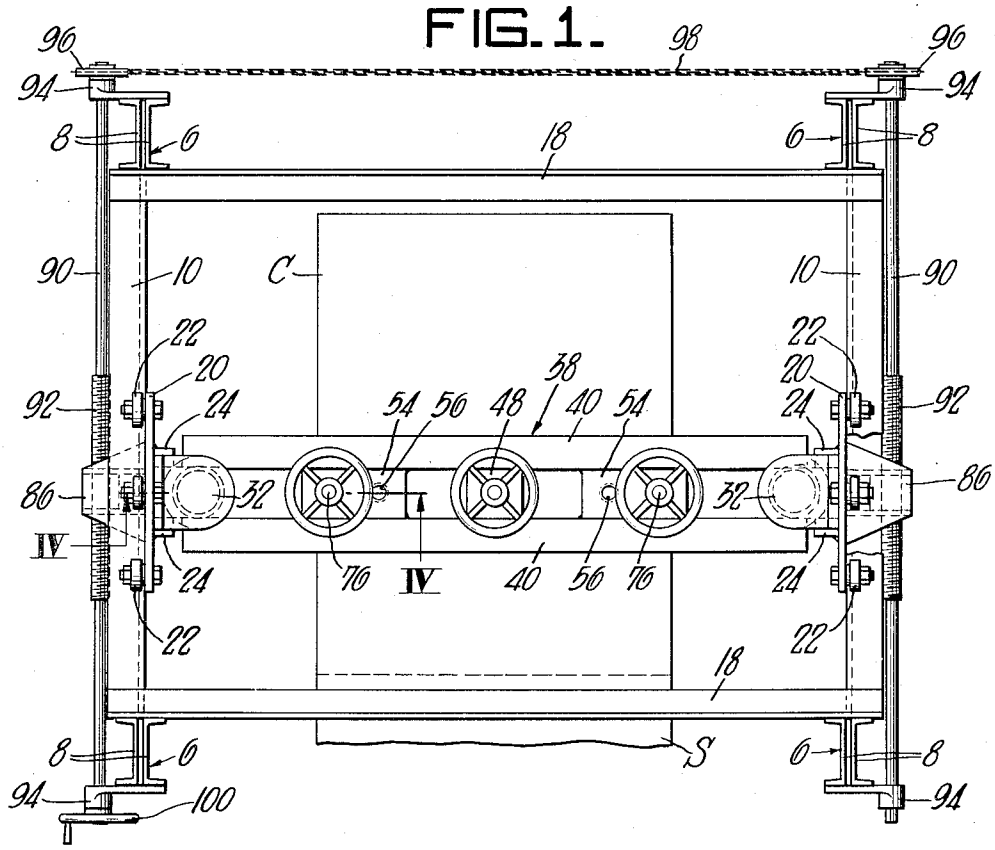


FIG. 4.

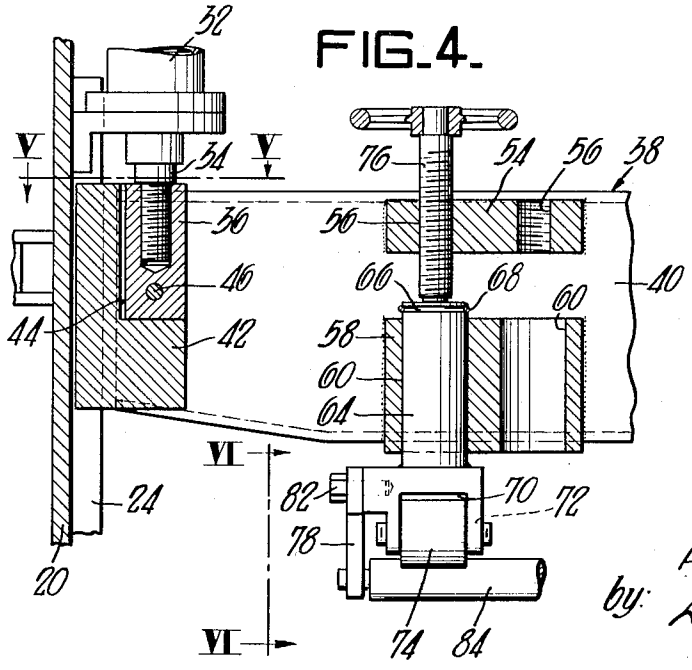
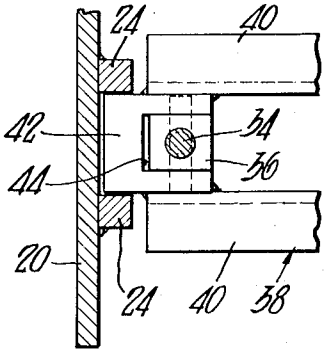


FIG. 5.



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APPARATUS FOR PREVENTION OF COIL BREAKS

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FIG. 2.

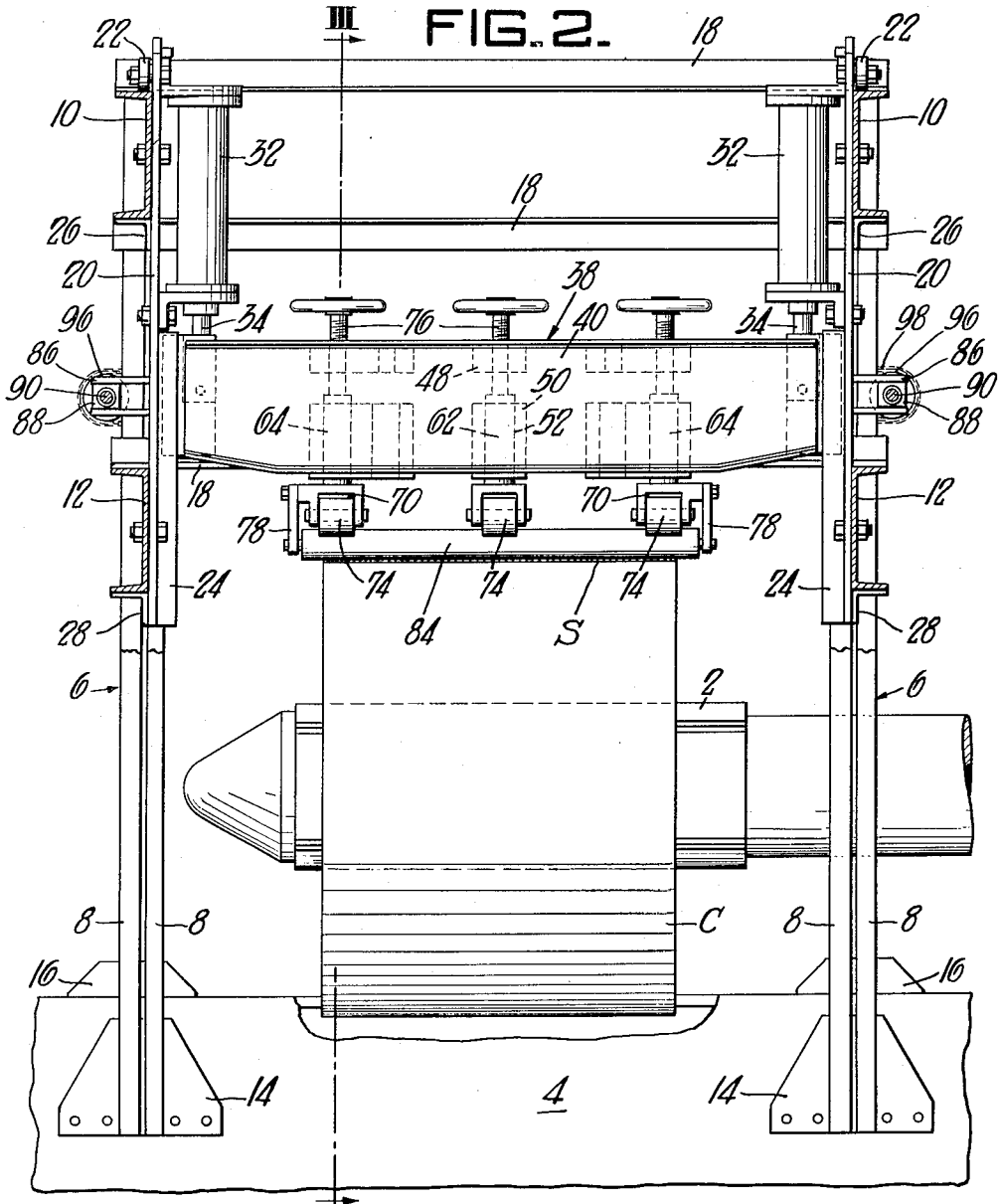
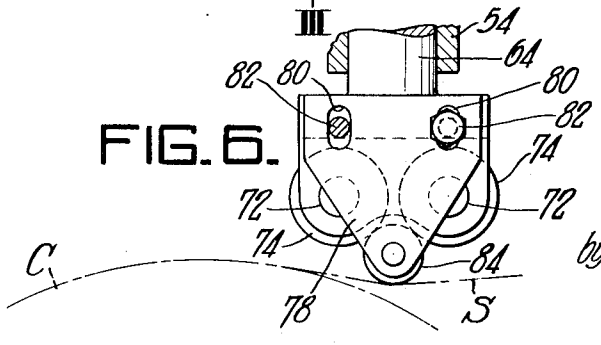


FIG. 6.



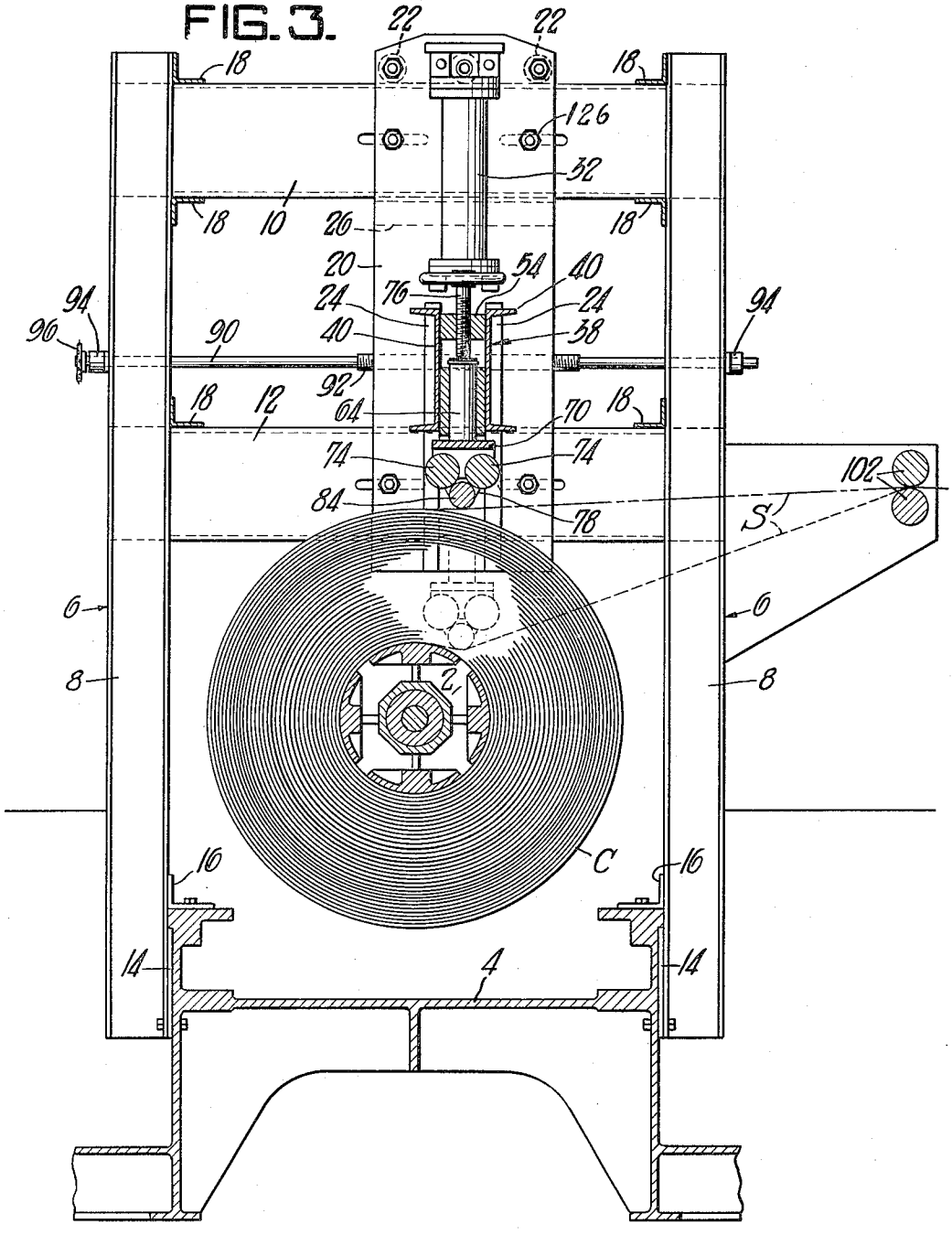
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APPARATUS FOR PREVENTION OF COIL BREAKS

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FIG. 3.



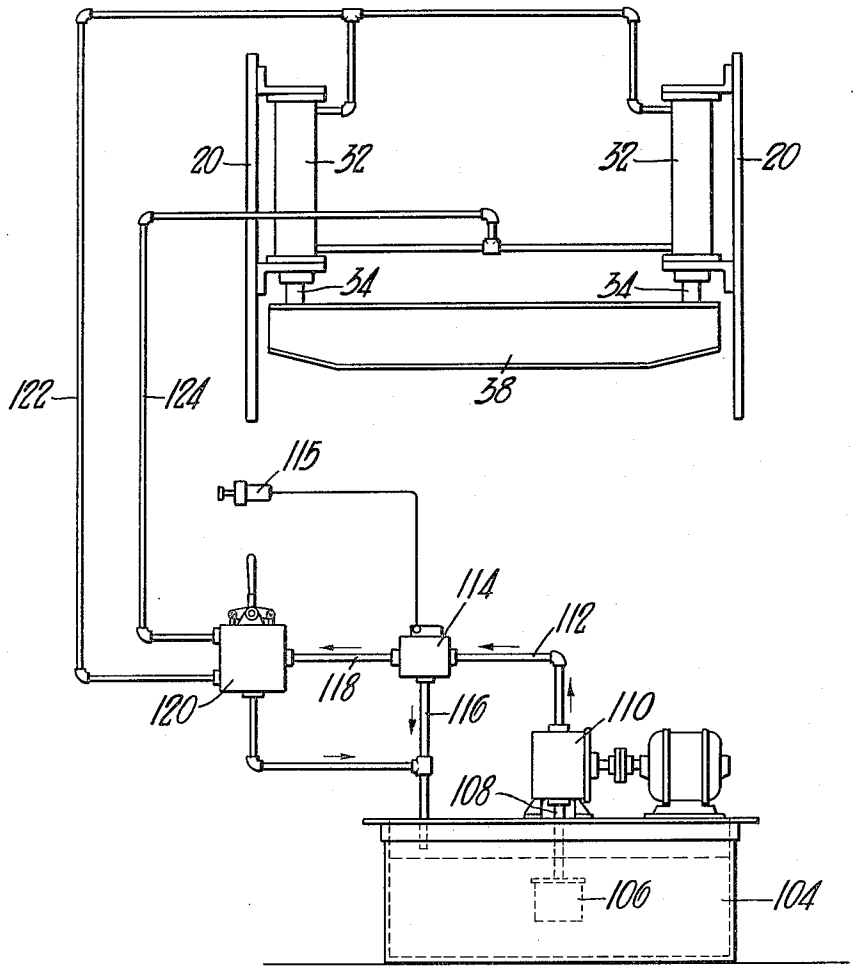
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APPARATUS FOR PREVENTION OF COIL BREAKS

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FIG. 7.



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APPARATUS FOR PREVENTION OF COIL BREAKS

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Application July 13, 1950, Serial No. 173,558

9 Claims. (Cl. 153—54)

This invention relates to apparatus for the prevention of coil breaks in the uncoiling of steel strip, particularly cold rolled strip prior to its entry into a temper mill. It is well known that coil breaks may be prevented by cold working the strip as it is uncoiled, this generally being accomplished by flexing the strip around a roll in a direction to reverse the curvature resulting from the coiling.

Apparatus now available for prevention of coil breaks has various disadvantages. I have found that the location of the roll for best performance should be varied according to the gage, shape and temper of the strip being unwound. The strip normally varies somewhat in cross section and for most efficient processing, I have found that the work roll should be deformed in a vertical plane and that the deformation should vary in accordance with the cross section of the strip.

It is therefore an object of my invention to provide apparatus for preventing coil breaks which is readily adjustable to provide for variations in the gage, shape and temper of the strip being unwound.

Another object is to provide such apparatus which can be readily installed in existing cone or mandrel type uncoilers.

These and other objects will be more apparent after referring to the following description and attached drawings, in which:

Figure 1 is a top plan view of my device;

Figure 2 is a front elevation thereof;

Figure 3 is a view, partly in section, taken on the line III—III of Figure 2;

Figure 4 is a sectional view taken on the line IV—IV of Figure 1;

Figure 5 is a view taken on the line V—V of Figure 4;

Figure 6 is a view taken on the line VI—VI of Figure 4; and

Figure 7 is a schematic diagram showing the hydraulic system for operating the device.

Referring more particularly to the drawings, the reference numeral 2 indicates the arbor of an uncoiler for rotatably supporting a coil C of cold-rolled strip S. The uncoiler may be a cone or expanding mandrel type. Fastened to the base 4 of the uncoiler is a pair of spaced apart vertical supports 6. Each of the supports consists of two pairs of channels 8 arranged back to back and connected by horizontal channels 10 and 12. The flanges of the channels 10 and 12 are cut from the ends thereof with the web portion of the channels 10 and 12 being inserted between the channels 8. A gusset plate 14 is fastened to the bottom of each pair of channels 8 for attaching the supports 6 to the base 4. An angle 16 is also attached to each pair of channels 8 a short distance from the bottom thereof for further attachment to the base 4. The supports 6 are arranged on opposite sides of the uncoiler and are connected by means of a plurality of angles 18.

A mounting plate 20 is provided adjacent each support 6. Each mounting plate has three rotatable rollers

22 mounted on the top thereof. The rollers are received on the top flange of the channel 10. A pair of spaced apart bars 24 are welded to the bottom of the plate 20 on the side opposite the rollers 22. Guide angles 26 and 28 are fastened to the plate 20 on the side opposite the bars 24 and are arranged to slide on the flanges of channels 10 and 12, respectively. An hydraulic cylinder 32 is mounted on the plate 20 on the same side as the bars 24. A piston rod 34 extends from the cylinder 32 and is threaded into a thrust block 36. A backing bar 38 extends between the plates 20 with its ends being fastened to the thrust blocks 36. The backing bar 38 consists of two spaced apart channels 40 arranged back to back in spaced apart relationship. A member 42 is located at each end of the backing bar 38 between the channels 40 and is welded thereto. Each member 42 is recessed at 44 to receive the thrust block 36 which is fastened thereto by means of a pin 46. Each member 42 is slidably received in the space between the bars 24 as best shown in Figure 5. A nut 48 having a vertical threaded hole therethrough is fastened between the channels 40 at the center line thereof. Directly beneath the nut 48 is a bushing 50 having an opening 52 aligned with the threaded opening in the nut 48. A nut 54 is welded to the channels 40 on each side of the center line and has two threaded openings 56 therein. A bushing 58 having two openings 60 therein is located directly beneath the nut 54 with the holes 60 in alignment with the threaded holes 56. A back up roller holder 62 is slidably mounted in the opening 52 and a somewhat similar back up roller holder 64 is slidably mounted in one of the openings 60 in each of the bushings 58. Each of the back up roller holders has a groove 66 therein for receiving a snap ring 68 which limits its downward travel. The bottoms of the back up roller holders are bifurcated at 70. The bifurcations have a pair of aligned openings 72 therein for receiving back up rollers 74. An adjusting screw 76 is threaded through the openings in the nuts 48 and 54 with its lower end bearing against its associated back up roller holder. Fastened to the outboard side of each of the back up roller holders 64 is a work roll support 78. As best shown in Figure 6, each support 78 is provided with a slotted opening 80 for receiving a cap screw 82 which is screwed into a tapped opening in the back up roller holder 64. A work roll 84 is rotatably received in the support 78.

A bracket 86 is welded to the back of each of the plates 20 and has a nut 88 secured thereto. A shaft 90 having a screw thread 92 thereon is threaded through the nut 88 on the outboard side of each of the supports 6 and has its ends supported in a bracket 94 fastened to the vertical channels 8. A sprocket 96 is fastened to one end of each of the shafts 90, the sprockets being connected by means of a chain 98. A hand wheel 100 is fastened to one of the shafts 90 on the end opposite the sprocket 96.

A pair of driven pinch rolls 102 is provided adjacent the exit end of the uncoiler for receiving the strip S prior to its entry into the temper mill.

The hydraulic system for providing fluid to the cylinders 32 is shown in Figure 7. The system includes an oil reservoir 104 having a strainer 106 therein. A pipe 108 leads from the strainer 106 to a motor driven pump 110. A delivery pipe 112 from pump 110 leads to a relief valve 114. A remote control 115 may be provided for controlling the maximum pressure for the relief valve 114. A drain line 116 leads from the valve 114 back to the tank 104. A line 118 leads from the relief valve 114 to a four-way hand operated hydraulic valve 120. Two lines 122 and 124 lead from the valve 120 to the hydraulic cylinders 32, the line 122 delivering fluid to the top of the cylinders while the lines 124 deliver fluid to the bottom of the cylinders.

The operation of the device is as follows:

The handle of the valve 120 is turned to supply fluid to the bottom of the cylinders 32, thus raising the backing bar 38. A coil of strip S is then placed on the arbor 2 and threaded through the pinch rolls 102 to the temper mill. The pressure in the cylinders 32 is reversed by turning the handle of the valve 120 to supply fluid to the top of the cylinders 32, thus forcing the work roll 84 against the surface of the strip S. The work roll 84 is adjusted horizontally to the point of best performance by turning the hand wheel 100 and is locked in position by tightening bolts 126 inserted through holes in the mounting plates 20 and channel 10. The position of the work roll is preferably such that it bears on the strip S a short distance from where it leaves the coil with the strip being bent slightly out of a normal tangent. It will be seen that only a small portion of the strip is in contact with the roll 84. The work roll 84 may be deformed by applying pressure to the back up rolls 74 by means of the adjusting screws 76. The pressure on the breaker roll 84 is varied as the coil diameter decreases, the roll finally reaching the position shown in broken lines in Figure 3. After the coil is unwound the roll 84 is again raised by means of the cylinder 32 and the device is ready to receive another coil.

While one embodiment of my invention has been shown and described it will be apparent that other adaptations and modifications may be made without departing from the scope of the following claims.

I claim:

1. Apparatus for uncoiling strip comprising an arbor constructed to engage the inner periphery of a coil of strip, means for pulling the strip from the coil, a work roll arranged with its axis substantially parallel to the axis of the arbor and arranged to bear against the strip a short distance from where it leaves the coil, said strip being unsupported between the coil and work roll, a support for said work roll, means for moving said support in the direction of movement of the strip, and means on said support for moving said work roll from a point adjacent the outer periphery of a full coil toward said arbor during the uncoiling of the strip.

2. Apparatus for uncoiling strip according to claim 1 having a plurality of back up rolls spaced apart along the length of the work roll, and means for individually moving said back up rolls toward said work roll.

3. Apparatus for uncoiling strip comprising an arbor constructed to engage the inner periphery of a coil of strip, means for pulling the strip from the coil, a work roll arranged with its axis substantially parallel to the axis of the arbor and arranged to bear against the strip a short distance from where it leaves the coil, said strip being unsupported between the coil and work roll, a support for said work roll, a mounting for said support, means for supporting said mounting for horizontal movement in a plane perpendicular to the axis of the arbor, and means on said support for moving said work roll from a point adjacent the outer periphery of a full coil toward said arbor during the uncoiling of the strip.

4. Apparatus for uncoiling strip according to claim 3 having a plurality of back up rolls on said work roll support spaced apart along the length of the work roll, and means for individually moving said back up rolls toward said work roll.

5. Apparatus for uncoiling strip comprising an arbor for supporting a coil of strip, means for pulling the strip from the coil, a mounting plate at each end of the arbor, means for supporting said mounting plates for horizontal movement in a plane perpendicular to the axis of the arbor, a vertically movable backing bar extending between said plates and supported thereby, means on said plates for vertically moving said backing bar, and a work roll supported by said backing bar.

6. Apparatus for uncoiling strip comprising an arbor

for supporting a coil of strip, means for pulling the strip from the coil, a mounting plate at each end of the arbor, means for supporting said mounting plates for horizontal movement in a plane perpendicular to the axis of the arbor, a vertically movable backing bar extending between said plates and supported thereby, means on said plates for vertically moving said backing bar, a plurality of back up roller holders supported by said backing bar and spaced along the length thereof, back up rollers mounted on the lower end of said holders, means for individually moving said holders vertically with respect to said backing bar, and a work roll supported by the outer back up roller holders adapted to contact said strip being pulled from said coil.

7. Apparatus for uncoiling strip comprising an arbor for supporting a coil of strip, means for pulling the strip from the coil, a mounting plate at each end of the arbor, means for supporting said mounting plates for horizontal movement in a plane perpendicular to the axis of the arbor, a vertical hydraulic cylinder mounted on each mounting plate on the inboard side thereof, a piston rod extending downwardly from each of said cylinders, a vertically movable backing bar extending between said plates with its ends fastened to said piston rods, a work roll supported by said backing bar, and means for supplying fluid to the top and bottom of said cylinders.

8. Apparatus for uncoiling strip comprising an arbor for supporting a coil of strip, means for pulling the strip from the coil, a mounting plate at each end of the arbor, means for supporting said mounting plates for horizontal movement in a plane perpendicular to the axis of the arbor, a vertical hydraulic cylinder mounted on each mounting plate on the inboard side thereof, a piston rod extending downwardly from each of said cylinders, a vertically movable backing bar extending between said plates with its ends fastened to said piston rods, a plurality of back up roller holders supported by said backing bar spaced along the length thereof, back up rollers mounted on the lower end of said holders, means for individually moving said holders vertically with respect to said backing bar, a work roll supported by the outer back up roller holders and adapted to contact said strip being pulled from said coil, and means for supplying fluid to the top and bottom of said cylinders.

9. Apparatus for uncoiling strip comprising a horizontal arbor constructed to engage the inner periphery of a coil of strip, a work roll above said arbor arranged with its axis substantially parallel to the axis of the arbor and arranged to bear against the strip a short distance from where it leaves the coil, said strip being unsupported between the coil and work roll, means for pulling the strip from said coil beneath said work roll, said work roll being located between said last named means and a vertical plane through the axis of said arbor, a support for said work roll, means for moving said support in the direction of movement of the strip, and means on said support for moving said work roll from a point adjacent the outer periphery of a full coil toward said arbor during the uncoiling of the strip.

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