

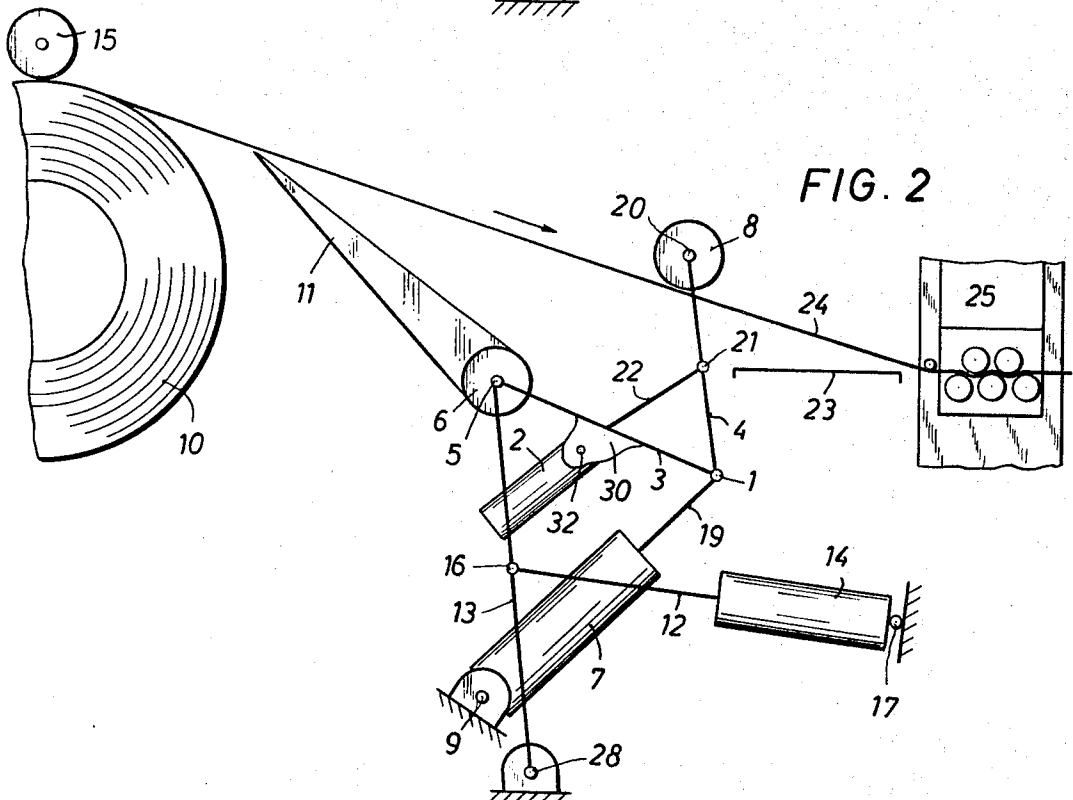
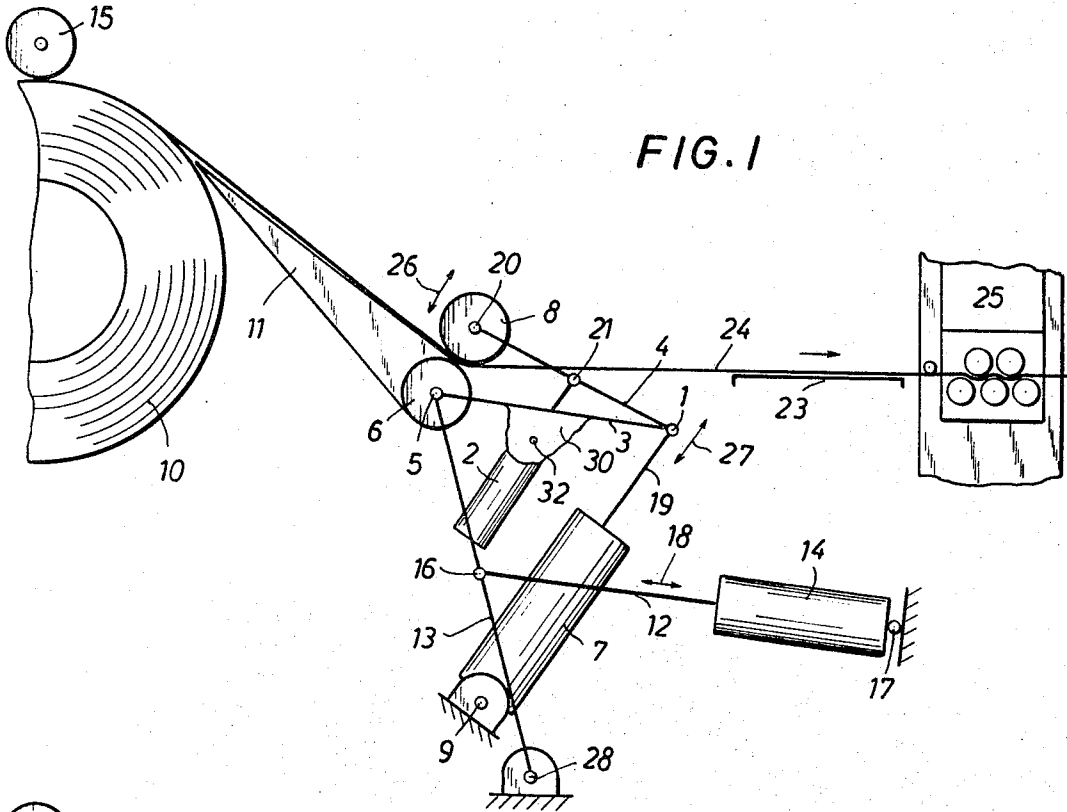
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UNCOILER DEVICE

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UNCOILER DEVICE

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5 Claims. (Cl. 242—78.6)

This invention relates in general to strip material coil-
 ing and uncoiling devices, and in particular to a new and
 useful device for taking up, removing the coiling curva-
 ture and feeding off strip material from a coil thereof.

The present invention is particularly applicable to the
 unwinding of metallic strip material from a coil, and in
 particular to the unwinding of rolled sheet metal strip.

It has been found that when sheet metal strips are
 wound into a coil, particularly when they are wound
 cold, there is a tendency for the coil to spring open with
 great force but still retain the winding curvature. The
 drawn off strip then remains curved in the winding direc-
 tion, and this is also true even when they are wound when
 they are hot. It is very important, therefore, that the strip
 beginning be taken up safely and automatically and in
 addition it is necessary that a straightening effect be ap-
 plied to the metal sheet by the take-up device in order to
 eliminate a strip curvature as it is being unwound. It is
 usual in the operation of such unwinding devices that the
 strip material is fed to further machine operations such
 as, for example, a straightening machine. In order to prop-
 erly feed the material into such machine, however, it is
 necessary that the coiling curvature be removed.

It has been known to send the coils to reeling-off sta-
 tions and to store them there at a location at which they
 may be unwound and driven. As the drives for the coils
 it was known to use an auxiliary drivable roller which may
 be pressed against the periphery of the coil. In addition
 it is known to use a device for the uptake preparation
 and passing on of the strip which is beginning to be un-
 wound from the coil, and in such machinery it was usual to
 run the strip onto a wedge and between two rollers whose
 mutual spacing and distance from the coil was adjustable.
 With such a machine, however, the upper roller alone was
 pressed against the coil and the straightening effect was
 obtained in the strip section between the upper and the
 lower roller. This resulted in a complicated construction
 of the upper roller and in addition a special elastic support
 of the parts to be moved against the coil was necessary.
 In accordance with the invention these difficulties are
 eliminated and at the same time the overall device is
 simpler and cheaper than known heretofore. The invention
 includes two rollers between which the strip material is
 guided and which are adjustably mounted on a linkage.
 The linkage is such that the upper roller may roll off on
 the lower roller in a plurality of different positions of
 height and location when the strip to be unwound is pres-
 ent between them.

Accordingly it is an object of the invention to provide
 an improved device for the taking up of coiled strip or
 sheet material from a roll thereof and for adjustably en-
 gaging the strip material so that it may be straightened
 as it is fed to a further device such as a straightening
 machine.

A further object of the invention is to provide a device
 for the taking up and unwinding of strip material from a
 coil thereof which includes a linkage mechanism for ad-
 justably positioning upper and lower rollers between which
 the coil strip material may be fed and for moving the rol-
 lers so that they are oriented in respect to each other in a
 desirable manner for feeding the strip material therebe-
 tween.

A further object of the invention is to provide a device
 for receiving, preparing and passing on a strip material
 from a coil which includes two adjustably mounted rollers
 between which the coil is to be fed and a wedge member
 over which the sheet material is to be directed with means
 for adjusting the position of the parts for receiving the
 coiled strip material.

A further object of the invention is to provide a device
 for facilitating the unwinding of coiled strip material
 which is simple in design, rugged in construction and eco-
 nomical to manufacture.

The various features of novelty which characterize the
 invention are pointed out with particularity in the claims
 annexed to and forming a part of this specification. For a
 better understanding of the invention, its operating ad-
 vantages and specific objects attained by its use, reference
 should be had to the accompanying drawings and descrip-
 tive matter in which there is illustrated and described a
 preferred embodiment of the invention.

In the drawings:

FIG. 1 is a somewhat schematic side elevational view
 of a strip material unwinding device constructed in ac-
 cordance with the invention; and

FIG. 2 is a view similar to FIG. 1 but indicating the
 parts in an advanced position.

Referring to the drawings in particular, the invention
 embodied therein is shown in association with the un-
 winding of strip material which is wound into a coil 10,
 which coil is rotatably mounted. The coil 10 is arranged
 for being driven by an auxiliary roller 15 which is pressed
 against its periphery and which itself is driven, for ex-
 ample, by an electric motor (not shown). The auxiliary
 roller 15 is pressed against the periphery of the coiled strip
 material which is being unwound and it prevents the
 springing open of the turns of the coil when the bindings
 originally holding the coil together have been untied.

In accordance with the invention there is provided a
 device for facilitating the unwinding of a strip material
 from the coil 10 which includes a roller 6 having a shaft
 5 which is rotatably mounted. The shaft 5 is rotatably
 supported at each end in bearings which rest at the end of
 a pair of post elements 13, 13, only one of which is indi-
 cated in the drawings. The post elements 13 are pivotally
 mounted at their lower ends in bearings 28 which are
 mounted on the floor or other support. Intermediate the
 length of at least one of the posts 13, there engages at
 16 a piston rod 12 of a double acting hydraulic cylinder
 14. The opposite end of the cylinder 14 is pivotally
 mounted at 17 on a fixed support such as a wall element.

All of the other parts of the device to be described are
 indirectly or directly connected to the shaft 5. By suitable
 control means connected to the cylinder 14 the rod 12 is
 shifted in either direction as indicated by arrows 18 for
 the purpose of pivoting the post member 13 about its
 pivotal mounting 28 with all of the remaining mechanism
 toward or away from the coil 10. Affixed to the shaft 5
 is a relatively long and wide wedge member 11 which is
 mounted on and substantially coextensive in width with
 the roller 6. A pair of lever arms 3, 3 (one being shown)
 is secured to respective ends of the shaft 5 and are piv-
 otally connected at their outer ends at the location of
 pivot or axle 1 to a reciprocating piston rod member 19
 which, in turn, is secured to a piston (not shown) which
 is slidable in a pressure cylinder 7. The pressure cylinder
 7 is advantageously hydraulic or pneumatic and is piv-
 otally mounted at 9 on a bracket secured to the floor or
 other support.

A further pair of lever arms 4, 4 are secured at one of
 their ends to shaft 20 of a roller 8 and pivotally con-
 nected at their inner ends to the reciprocating piston
 rod 19 at the location 1. At least one of the lever arms

4 is connected pivotally to a reciprocating rod member 22 at the location of the pivot or axle 21. The rod member 22 is secured to a piston (not shown) which is reciprocable in a pressure cylinder 2. The cylinder 2 is pivotally carried by one of the lever arms 3, 3 on a pivot bracket 30 for pivoting about axis 32. The cylinder 2 is movable with the arm 3. Movement of the piston rod 22 to shift the pivot point 21 will adjust the position of the roller 8 in accordance with the arrows indicated at 26.

In the vicinity of the spool 10 there is arranged a stationary guide table 23 over which the strip 24 which is drawn off from the coil 10 is directed. The material is guided over the table 23 and into a straightening machine 25.

When a strip beginning is to be unwound from a coil 10, the unwinding device is located at first at a location away from the coil, that is, with rollers 6 and 8 moved to a spaced location therefrom as indicated in FIG. 2. The strip material is then directed under the roller 8 as indicated and into the straightening machine 25. To move the parts into the position indicated in FIG. 1, the post parts 13 are pivoted counterclockwise by means of the hydraulic cylinder 13. Control means are provided to move the piston rod 19 of the hydraulic cylinder 7 to cause the entire unit to be pivoted about the axis 5 in a clockwise manner or counterclockwise manner, as indicated by the arrows 27. When pivoting in a clockwise manner, the wedge 11 rises from the position indicated in FIG. 1 to the position indicated in FIG. 2. The roller 8 is lifted off the roller 6 when the piston rod 22 of the pneumatic cylinder 2 is extended. When this is done, the lever arm 4 is pivoted about the shaft 1 to assume the position indicated in FIG. 2.

The parts are moved from the position indicated in FIG. 2 to the position indicated in FIG. 1 by moving the piston rod 12 toward the coil 10 to cause pivoting of the post 13 about the pivot 28 until the extreme edge of the wedge member 11 applies against the coil. The vertical position of the edge of the wedge can be corrected by the hydraulic cylinder 7 by pivoting the wedge 11 by the rotation of the shaft 5 due to the rotation of the lever arm 3 thereabout. The wedge 11 is preferably made at least as wide as the strip 24. The driving roller 15 pressed against the coil from above will be rotated until the strip beginning slides over the cutting edge of the wedge 11 and along the surface thereof. The strip will not lie flat and smooth but will be arched upward as it was coiled previously. When the strip beginning has gone a short distance beyond the straight connecting line of the axis centers of the rollers 6 and 8, the coil 10 is stopped so that the movement of the strip beginning ceases. The roller 8 is then lowered by retracting the piston rod 22 via the cylinder down onto the roller 6 and clamps the strip beginning.

By means of the hydraulic cylinder 14 the entire device is then moved again to the extent that the edge of the wedge 11 cannot come into contact with the coil anymore even when the wedge is pivoted downward counterclockwise. With the removal of the device from the coil which is effected by the pivoting of the post parts 13, the strip is drawn off from the coil 10 by an additional distance without losing its camber. Then the whole system which is pivotal about the axis 5 is rotated by controls (not shown) for the pneumatic cylinder 7 about the axis 5 counterclockwise. The roller 8 is thus rolled off a corresponding distance on the periphery of the roller 6 in the direction of the coil and the strip is pressed downward a little at this point. When this occurs the strip is allowed to run on by driving the roller 6. In such case, both the roller 6 and the auxiliary roller 15 may contribute to the further drive but this is not necessary. If the roller 15 is still permitted to run but the roller 6 draws off the strip faster than the drive of

the auxiliary roller, this may be taken into account by a freewheeling arrangement at the auxiliary roller 15.

By this straightening effect it is achieved that the strip runs out approximately straight and no longer curved. The strip runs between the rollers 6 and 8 in the direction of a guide table 23. By readjustment of the system pivotal about the axis 5 by means of the hydraulic cylinder 7, the direction of the moving strip beginning can be selected so that it reaches the guide table correctly. When the strip beginning then enters the machine, for example the straightening machine 25 which itself exerts a sufficient traction on the strip, the device according to the invention can be taken out of operation. This is done by moving the roller 8 upwardly again to the position indicated in FIG. 2 by actuating rod 22 through cylinder 2. The lower roller 6 is then no longer touched by the strip because it will lie in a location lower than the tension cross of the strip 24 between the coil 10 and the machine 25.

The drive units comprising the fluid cylinders 2, 7 and 14 may be of any fluid pressure type such as pneumatic. The drive units described as pneumatic cylinders may be replaced by hydraulic cylinders and vice versa. Instead of the cylinder-piston drives, there may be provided at least in part spindle drives operated by electric motor, as for example in the place of the hydraulic drive 7, 19.

While a specific embodiment of the invention has been shown and described in detail to illustrate the application of the inventive principles, it will be understood that the invention may be embodied otherwise without departing from such principles.

What is claimed is:

1. A device for facilitating the unwinding of coiled sheet material such as sheet metal, comprising a first shaft, a first roller mounted on said first shaft for rotation therewith, first means for rotatably supporting said first shaft comprising a post member pivotally mounted at its one end, a wedge member secured to said shaft and projecting beyond the surface of said first roller, a second shaft, a second roller secured to said second shaft for rotation therewith, said second roller adapted to be positioned to overlie said first roller and to bear downwardly against the sheet material as it is unwound from a coil, second means rotatably supporting said second shaft including a lever member, means linking said second means for rotatably supporting said second shaft to said first means for rotatably supporting said first shaft, and means connected to said first and second rotatable support means for said first and second shafts for shifting said first and second shafts relatively toward and away from each other for directing a coil of sheet material directed beneath said second roller downwardly into engagement with said first roller and to shift said first and second rollers toward and away from a coil of strip material and for shifting said wedge member to engage below the sheet material and guide it off the coil thereof.

2. A device for facilitating the unwinding of coiled sheet material such as sheet metal, comprising a first shaft, a first roller mounted on said first shaft for rotation therewith, first means for rotatably supporting said first shaft comprising a post member pivotally mounted at its one end, a second shaft, a second roller secured to said second shaft for rotation therewith, said second roller adapted to be positioned to overlie said first roller and to bear downwardly against the sheet material as it is unwound from a coil, second means rotatably supporting said second shaft including a lever member, means linking said second means for rotatably supporting said second shaft to said first means for rotatably supporting said first shaft including a connecting lever connected at its one end to said first shaft and connected at its opposite end to said lever member, means connected to said first and second rotatable support means for said first and second shafts for shifting said first and second shafts relatively toward and away from each other for directing a coil of sheet

material directed beneath said second roller downwardly into engagement with said first roller and to shift said first and second rollers toward and away from a coil of strip material, said means including first fluid pressure cylinder and piston means connected to said post member to pivot said post member with said shaft toward and away from said coil, second fluid piston and cylinder means connected to said lever to pivot said lever for shifting said second shaft toward and away from said first shaft, and third fluid piston and cylinder means connected to said lever to shift said lever for varying the angle of inclusion between said first and second shaft, said first and second support means permitting said first and second rollers to engage, the second roller causing the bending of the sheet material downwardly onto the first roller as it is fed between said rollers.

3. A device for facilitating the unwinding of coiled sheet material such as sheet metal, comprising a first shaft, a first roller mounted on said first shaft for rotation therewith, first means for rotatably supporting said first shaft comprising a post member pivotally mounted at its one end, a wedge member secured to said shaft and projecting beyond the surface of said first roller, a second shaft, a second roller secured to said second shaft for rotation therewith, said second roller adapted to be positioned to overlie said first roller and to bear downwardly against the sheet material as it is unwound from a coil, second means rotatably supporting said second shaft including a lever member, means linking said second means for rotatably supporting said second shaft to said first means for rotatably supporting said first shaft including a connecting lever connected at its one end to said shaft and connected at its opposite end to said lever, means connected to said first and second rotatable support means for said first and second shaft for shifting said first and second shafts relatively toward and away from each other for directing a coil of sheet material directed beneath said second roller downwardly into engagement with said first roller and to shift said first and second rollers toward and away from a coil of strip material, said means including fluid pressure cylinder and piston means connected to said post to pivot said post with said shaft toward and away from said coil, second fluid piston and cylinder means connected to said lever to pivot said lever for shifting said second shaft toward and away from said first shaft, and third fluid piston and cylinder means connected to said lever to shift said lever for varying the angle of inclusion between said first and second shaft, said first and second support means permitting said first and second rollers to engage, the second roller causing the bending of the sheet material downwardly onto the first roller as it is fed between said rollers.

4. A device for facilitating the unwinding of coiled sheet material such as sheet metal from a coil and to a straightening machine, comprising a first shaft, a first roller mounted on said first shaft for rotation therewith, first means for rotatably supporting said first shaft comprising a post member pivotally mounted at its one end, a wedge member secured to said shaft and projecting beyond the surface of said first roller, a second shaft, a second roller

secured to said second shaft for rotation therewith, said second roller adapted to be positioned to overlie said first roller and to bear downwardly against the sheet material as it is unwound from a coil, second means rotatably supporting said second shaft including a lever member, means linking said second means for rotatably supporting said second shaft to said first means for rotatably supporting said first shaft, means connected to said first and second rotatable support means for said first and second shafts for shifting said first and second shafts relatively toward and away from each other for directing a coil of sheet material directed beneath said second roller downwardly into engagement with said first roller and to shift said first and second rollers toward and away from a coil of strip material and for locating said wedge member at the coil and below the material being fed from the coil, said means including fluid pressure cylinder and piston means connected to said post member to pivot said post member with said shaft toward and away from said coil, said first and second support means permitting said first and second rollers to engage, the second roller causing the bending of the sheet material downwardly onto the first roller as it is fed between said rollers.

5. A device for facilitating the unwinding of coiled sheet material such as sheet metal, comprising a first shaft, a first roller mounted on said first shaft for rotation therewith, first means for rotatably supporting said first shaft, a second shaft, a second roller secured to said second shaft for rotation therewith, said second roller adapted to be positioned to overlie said first roller and to roll over the surface thereof to bear downwardly against the sheet material as it is unwound from a coil, second means rotatably supporting said second shaft, means linking said second means for rotatably supporting said second shaft to said first means for rotatably supporting said first shaft, and means connected to said first and second rotatable support means for said first and second shafts for shifting said first and second shafts relatively toward and away from each other and to shift said second roller to move it around the periphery of the first roller in close proximity thereto for directing a coil of sheet material directed beneath said second roller downwardly into engagement with said first roller and to coil it around the surface thereof in order to remove the coiling curvature of the coil of sheet material and to shift said first and second rollers toward and away from the coil of strip material.

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