Nov. 11, 1941. G. G. BEARD ET AL 2,262,160

BELT WRAPPER FOR STRIP MATERIAL

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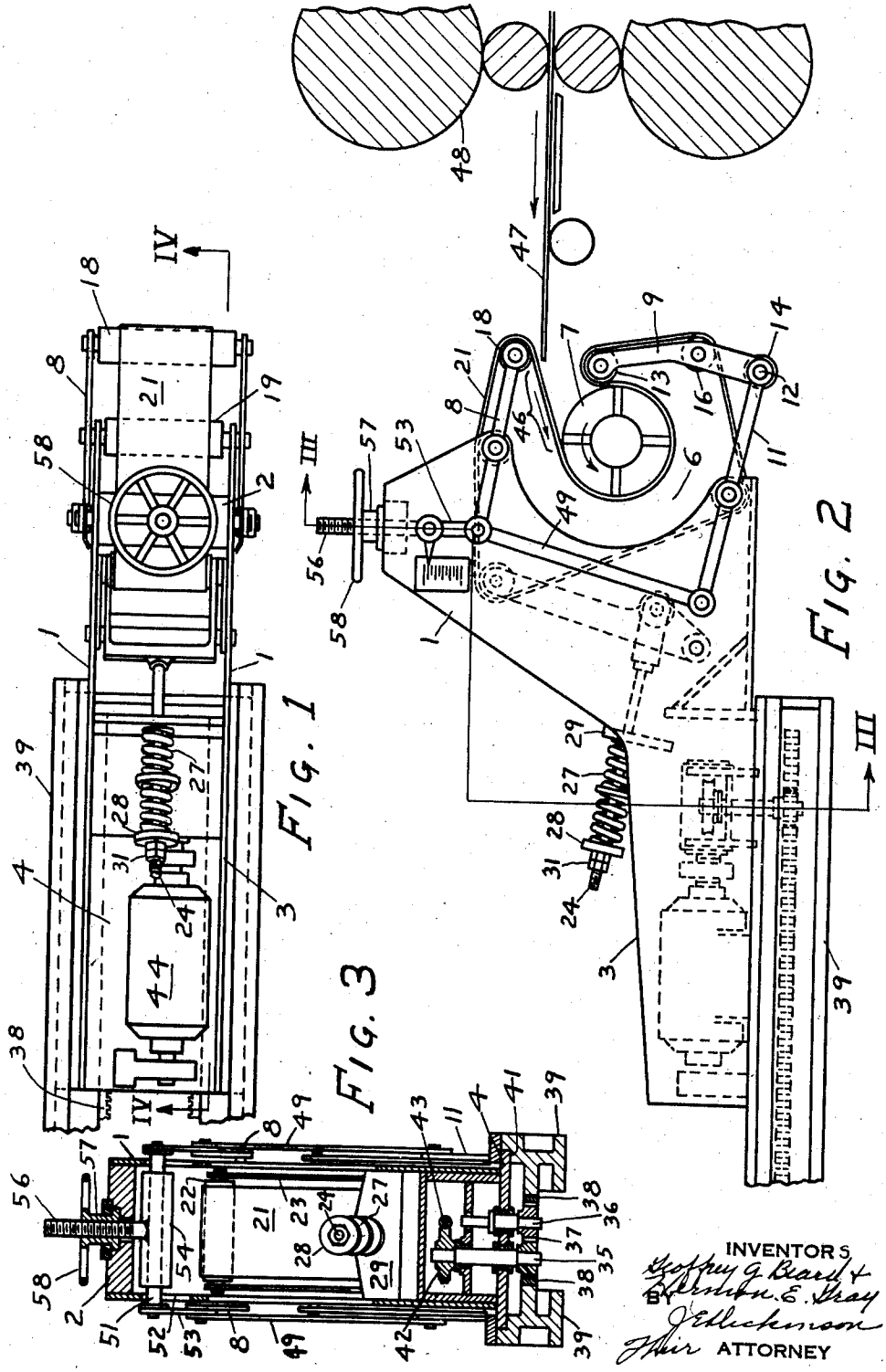


FIG. 1

FIG. 2

FIG. 3

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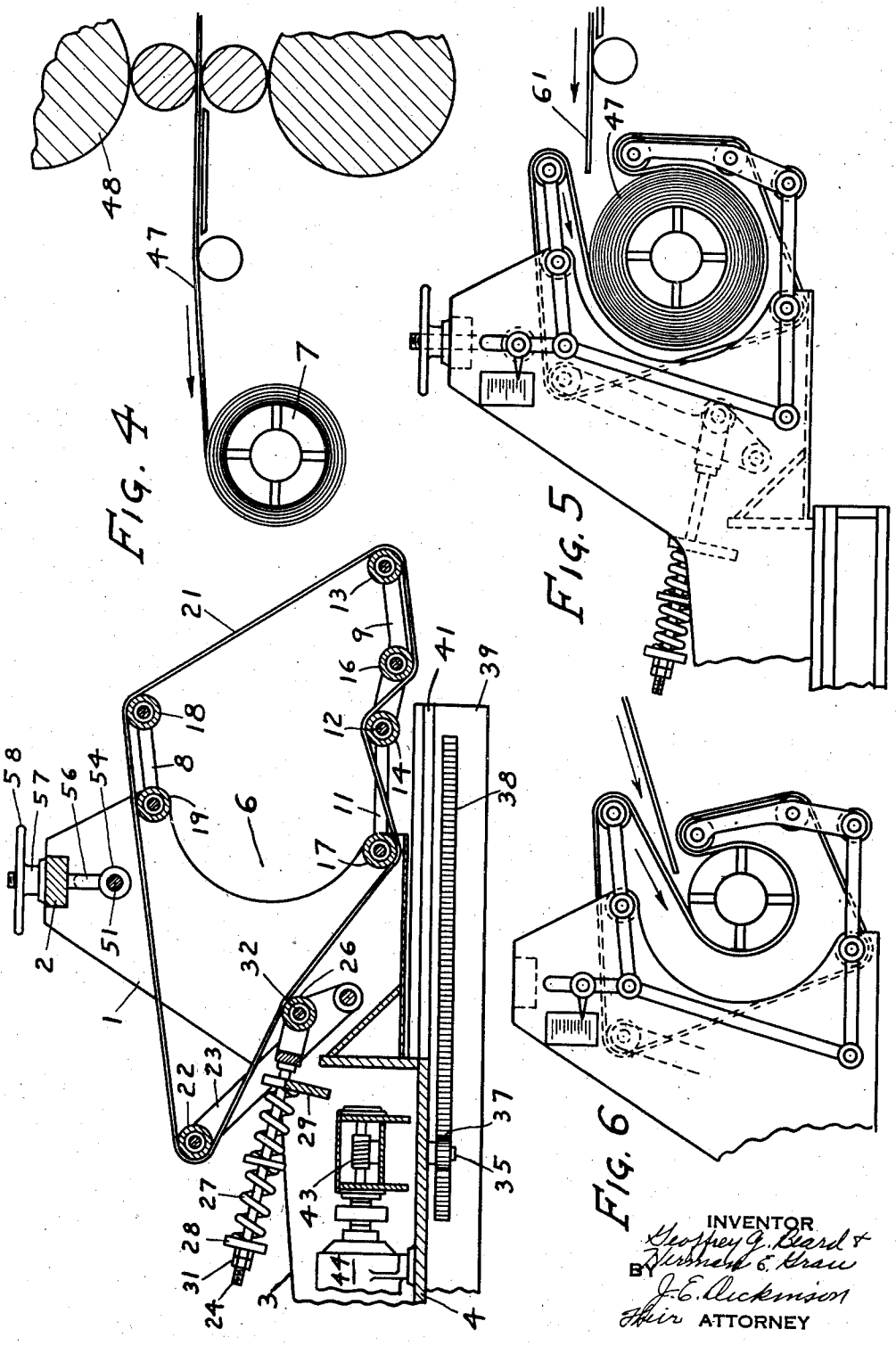


FIG. 4

FIG. 5

FIG. 6

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BELT WRAPPER FOR STRIP MATERIAL

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8 Claims. (Cl. 242—78)

This invention relates to belt wrappers for strip material.

Belt wrappers are used for the purpose of intercepting the leading end of oncoming traveling strip material and guiding it around a winding drum until the frictional engagement between drum and strip is sufficient to permit the belt wrapper to be removed from the reel. Heretofore, a given belt wrapper for metal strip could be used satisfactorily only with winding drums having a certain diameter. The use of a drum having a materially smaller diameter increases the angle between the oncoming leading end of the strip and the portion of the belt that deflects it into engagement with the drum, thereby increasing the impact of the strip against the belt and the danger of the end of the strip cutting or otherwise damaging the belt at the point where it first strikes it. Also, the more directly the strip strikes the belt, the greater the danger of the strip buckling and not being properly guided around the reel. On the other hand, if a materially larger drum is used, it is often difficult to enter the strip between belt and drum. Another disadvantage of prior belt wrappers is that this same change in angle between strip and deflecting portion of the belt occurs when the direction in which the strip is fed to the drum is changed.

Hence, any time it was desired to wind strip on a drum of materially different diameter or on a coil of strip already formed on the drum, or when the direction of travel of the oncoming strip was changed, the whole belt wrapper had to be exchanged for a different one which was designed for taking care of the new conditions.

It is among the objects of this invention to provide a belt wrapper which can be used satisfactorily with winding drums of various diameters, which is adjustable to give the desired angle between the leading end of the strip and the deflecting portion of the belt under various conditions, in which such adjustments can be quickly and easily made by manipulation of a single adjustment member, and which is easily moved into and out of operative position.

The preferred embodiment of the invention is illustrated in the accompanying drawings in which Fig. 1 is a plan view of our belt wrapper; Fig. 2 is a side view thereof in operative position; Fig. 3 is a vertical section taken on the line III—III of Fig. 2; Fig. 4 is a vertical section taken on the line IV—IV of Fig. 1, through the belt wrapper in inoperative position and with its adjustment changed for receiving a larger reel; Fig. 5 is a fragmentary view similar to Fig. 2 showing the belt wrapper about to wind a second strip on a previously formed coil; and Fig. 6 is a fragmentary view of the wrapper adjusted for receiving strip from a different angle.

Referring to Figs. 1 to 4 of the drawings, a pair of spaced upright parallel side frame plates 1 are rigidly connected at the top by a cross member 2, and are provided with lower rearward extensions 3 joined at the bottom by a base plate 4. The side plates are provided at the front with arcuate recesses 6 (Figs. 2 and 4) for receiving an independently supported winding drum 7.

Projecting forwardly from each side frame above and below its recess 6 is an upper arm 8 and a lower arm. Each of the lower arms is formed from a front section 9 and a rear section 11 pivotally connected together at 12 on a horizontal axis. The lower pair of arms rotatably carry a roller 13 at their outer ends, another roller 14 at pivot point 12, and an intermediate roller 16 between these two rollers. A fourth roller 17 is mounted in the side plates below recesses 6. The front ends of the upper pair of arms 8 carry a roller 18, and a roller 19 is mounted in the side plates behind it.

As shown in Fig. 4, the rollers carry an endless belt 21 that is held taut at all times by a rear roller 22 rotatably supported by the upper ends of a pair of levers 23 pivotally mounted at their lower ends in the side frame plates. These levers are biased rearwardly by a rod 24 pivotally connected at its front end to the levers at 26, and having its rear portion encircled by coil springs 27 compressed between a large washer 28 on its rear end and a cross head 29 connected to the side plates. The washer is adjusted along the rod to vary the pressure on the springs by means of nuts 31 threaded on the end of the rod. A roller 32 is journaled between the levers at their point of connection to the rod. The belt passes around the outside of all rollers except rollers 14 and 32. Roller 32 keeps the belt away from the cross head 29 when the levers are swung back, as shown in Fig. 4, and roller 14 holds the belt in a position that facilitates the swinging upwardly of lower arm front sections 9 to the operative position shown in Fig. 2.

To move the side frames into and out of operative position, a pair of parallel vertical shafts 35 and 36 (Fig. 3) are journaled in the base plate 4 and are provided at their lower ends with meshing pinions 37 that in turn mesh with spaced racks 38 mounted in parallel track mem-

bers 39. The upper portions of these track members are provided with guideways 41 in which the laterally projecting edges of the base plate are slidably disposed. The upper end of vertical shaft 35 is provided with a worm gear 42 that is rotated by a worm 43 driven by an electric motor 44 mounted on the base plate.

When the side frames are driven ahead on the track members by this motor from the position shown in Fig. 4 to that shown in Fig. 2, the vertical portion of the belt between the upper and lower rollers 18 and 13 engages the winding drum 7. As the side frames continue to move forward, the drum-engaging portion of the belt swings the front ends of the front sections 9 of the lower arms upwardly and rearwardly so that the belt is wrapped over halfway around the drum as shown in Fig. 2. At the same time the portion 46 of the belt between the upper roller 18 and the drum is inclined downwardly and rearwardly toward the latter. The length of belt required to form such a loop around the drum is provided by rear tension roller 22 that is pulled forward by the belt against the resistance of the coil springs 27.

It is a feature of this invention that the angle between the leading end of the oncoming strip 47 being delivered by a rolling mill 48 or any other appropriate apparatus, and the portion 46 of the belt that deflects the strip against the drum can be adjusted so that the end of the strip will not strike the belt so directly as to be likely to cut it or cause the strip to buckle. Accordingly, the central portions of the upper arms 8 and the central portions of the rear sections 11 of the lower arms are pivotally connected to the side frames on horizontal axes coinciding with the axes of upper and lower rollers 19 and 17, respectively. As shown in Fig. 2, the rear ends of each pair of upper and lower arms are pivotally connected by a rigid link 49 so that when the upper pair of arms is tilted the lower pair will be simultaneously tilted by these links.

For tilting or adjusting the arms a cylindrical rod 51 is disposed transversely of the side frame plates and projects through vertical slots 52 therein above the upper ends of the links 49, as shown in Fig. 3. The ends of this rod are pivotally connected to the rear ends of the upper pair of arms 8 by means of short vertical links 53. To adjust the rod vertically, a sleeve 54 is rotatably mounted thereon and is rigidly connected to the lower end of a non-rotatable vertical screw 56. This screw is threadably received by a nut 57 mounted in rotatable, but axially stationary, position in the upper cross member 2. The nut is turned by a hand wheel 58. When the screw is raised, the front ends of all the roller-carrying arms are lowered, and when the screw is moved downwardly by the nut the front ends of the arms are raised.

Fig. 2 shows our belt wrapper in operative position just as it is deflecting the front end of oncoming strip material downwardly into engagement with the winding drum. As soon as the strip strikes the drum, which is being rotated in a counterclockwise direction of course, it will be carried around the drum against which it will be tightly held by the belt. After a few convolutions the belt wrapper can be backed away from the drum to the position shown in Fig. 4.

In preparation for a second or subsequent coil of strip around the first or preceding coil on the drum, hand wheel 58 is turned to lower the rear ends of the upper and lower arms and thereby swing their front ends upwardly (Fig. 4). The belt wrapper is then moved forward again to the position shown in Fig. 5 in which a second strip 61 is shown entering the throat formed by the belt and the preceding coil. It will be observed that had the upper roller 18 not been raised subsequent to the first wrapping operation, it would have interfered with the wrapping of the second strip 61. On the other hand, if roller 18 had been in its Fig. 5 position at the time the first strip 47 was to be wrapped, the angle between belt portion 46 and the strip would have been so great that the end of the strip might have damaged the belt when it first struck it.

In case the strip is being fed from another direction, such as from a higher point, the roller position of Fig. 2 might obstruct it. This can be avoided, as shown in Fig. 6, by raising the outer rollers in the same manner as in Fig. 5, thereby lifting upper roller 18 out of the path of the strip.

With drums that are wider than the belt, two or more belts side by side may be used by mounting two or more of these belt wrappers in parallel relation.

It will thus be seen that with a belt wrapper constructed in accordance with this invention winding drums of various diameters may be used, strip can be wound on previously formed coils, and the direction of feed of the strip to the drum may be changed without affecting the belt wrapper or the wrapping operation. The adjustments that make all of this possible are readily obtained by merely turning a hand wheel by which the forward upper and lower belt-carrying rollers are simultaneously adjusted vertically.

According to the provisions of the patent statutes, we have explained the principle and construction of our invention and have illustrated and described what we now consider to represent its best embodiments. However, we desire to have it understood that, within the scope of the appended claims, the invention may be practiced otherwise than as specifically illustrated and described.

We claim:

1. A belt wrapper comprising vertically spaced horizontal rollers, an endless belt carried by said rollers and having a portion between them adapted to partially encircle a winding drum, the portion of the belt leading to the drum from the adjacent roller being adapted to guide the front end of oncoming metal strip into contact with the drum, arms carrying the rollers and pivoted for movement in vertical planes, a link pivotally connected at its ends to the upper and lower arms, and means for tilting one of the arms on its pivot, whereby said link simultaneously tilts the other arm and the rollers are thereby moved vertically in unison.

2. A belt wrapper comprising vertically spaced horizontal rollers, an endless belt carried by said rollers and having a portion between them adapted to partially encircle a winding drum, the portion of the belt leading to the drum from the adjacent roller being adapted to guide the front end of oncoming metal strip into contact with the drum, arms carrying the rollers and pivoted for movement in vertical planes, a link pivotally connected at its ends to the upper and lower arms, and screw means for tilting one of the arms on its pivot, whereby said link simultaneously tilts the other arm and the rollers are thereby moved vertically in unison.

3. A belt wrapper comprising a pair of laterally spaced side frames, an upper and a lower forwardly extending arm pivoted to each side frame for movement in vertical planes, a roller carried by each upper and lower pair of arms, rigid means pivotally connecting said pairs of arms, means for tilting one pair of arms vertically whereby said rigid means simultaneously tilts the other pair, and an endless belt carried by the rollers and having a portion between them adapted to partially encircle a winding drum.

4. A belt wrapper comprising a supporting frame, forwardly and rearwardly disposed vertically spaced horizontal rollers, an endless belt carried by said rollers and having a portion between the foremost rollers adapted to partially encircle a winding drum, the portion of the belt leading to the drum from one of the foremost rollers being adapted to guide the front end of oncoming metal strip into contact with the drum, arms carrying the foremost rollers and pivoted in said supporting frame for movement in vertical planes, an intermediate roller around which the belt travels, means for moving said supporting frame into and out of engaging relation with a winding drum, spring biased means for urging said intermediate roller away from said foremost vertically spaced rollers to thereby hold the belt taut and move said foremost rollers away from each other when said frame is moved away from its drum-engaging position, and means for tilting the arms on their pivots to adjust said foremost vertically spaced rollers vertically.

5. A belt wrapper comprising a pair of laterally spaced side frames, an upper and a lower forwardly extending arm pivoted to each side frame for movement in vertical planes, a roller carried by each upper and lower pair of arms, rigid means pivotally connecting said pairs of arms, means for tilting one pair of arms vertically whereby said rigid means simultaneously tilts the other pair, and an endless belt carried by the rollers and having a portion between them adapted to partially encircle a winding drum, the front portion of each lower arm being pivoted on a horizontal axis to its rear portion.

6. A belt wrapper comprising a pair of laterally spaced side frames, a track supporting the side frames, means carried by the side frames for moving them along said track, an upper and a lower forwardly extending arm pivoted to each side frame for movement in vertical planes, a roller carried by each upper and lower pair of arms, rigid means pivotally connecting said pairs of arms, means for tilting one pair of arms vertically whereby said rigid means simultaneously tilts the other pair, and an endless belt carried by the rollers and having a portion between them adapted to partially encircle a winding drum.

7. A belt wrapper comprising a pair of laterally spaced side frames, an upper and a lower forwardly extending arm pivoted to each side frame for movement in vertical planes, a roller carried by each upper and lower pair of arms, rigid means pivotally connecting said pairs of arms, said side frames being provided with substantially vertical slots adjacent the upper pair of arms, a tie member extending through said slots and connected to the upper arms, means for adjusting said tie member vertically to swing said arms vertically, and an endless belt carried by the rollers and having a portion between them adapted to partially encircle a winding drum.

8. Apparatus for use with a reel comprising spaced parallel supporting frames, a pair of arms pivotally supported therebetween, a plurality of spaced parallel rollers journaled in said arms, a link connecting said pairs of pivoted arms at one end, a separate arm pivotally connected to the frames at one end, a roller the axis of which is parallel to said plurality of rollers journaled at the extreme end of said arm, a spring-biased rod connected to said arm adjacent the pivot point, a continuous belt restrained to pass over all of said rollers and means connected to one of the pair of inter-connected pivotally supported arms for simultaneously adjusting said pair of arms in the same direction.

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