Aug. 29, 1944. F. J. WOOD 2,357,157

BELT WRAPPER

Filed April 17, 1942 4 Sheets-Sheet 1

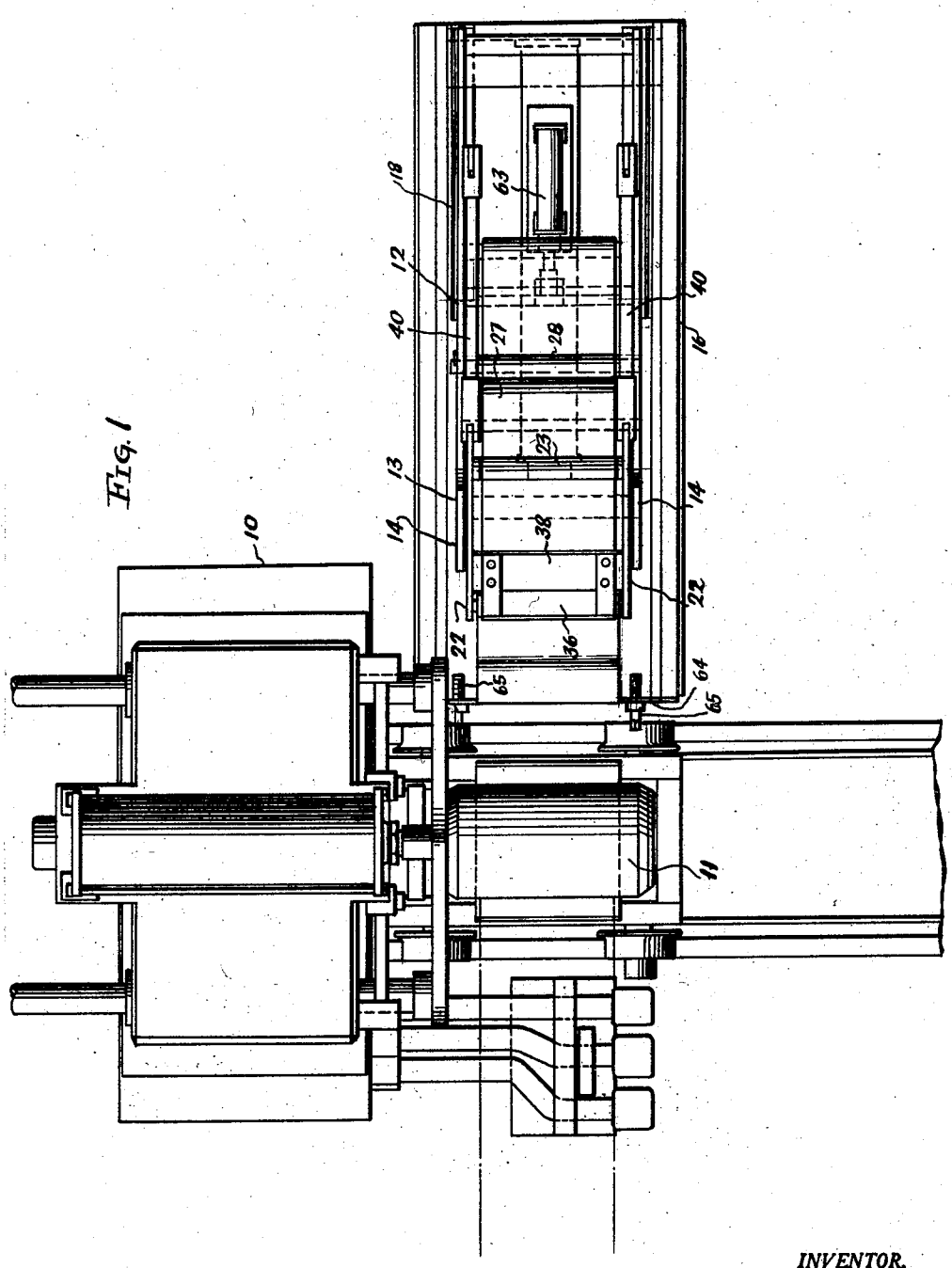

FIG. 1

INVENTOR.
FRANK J. WOOD
BY Clarence F. Poole
ATTORNEY

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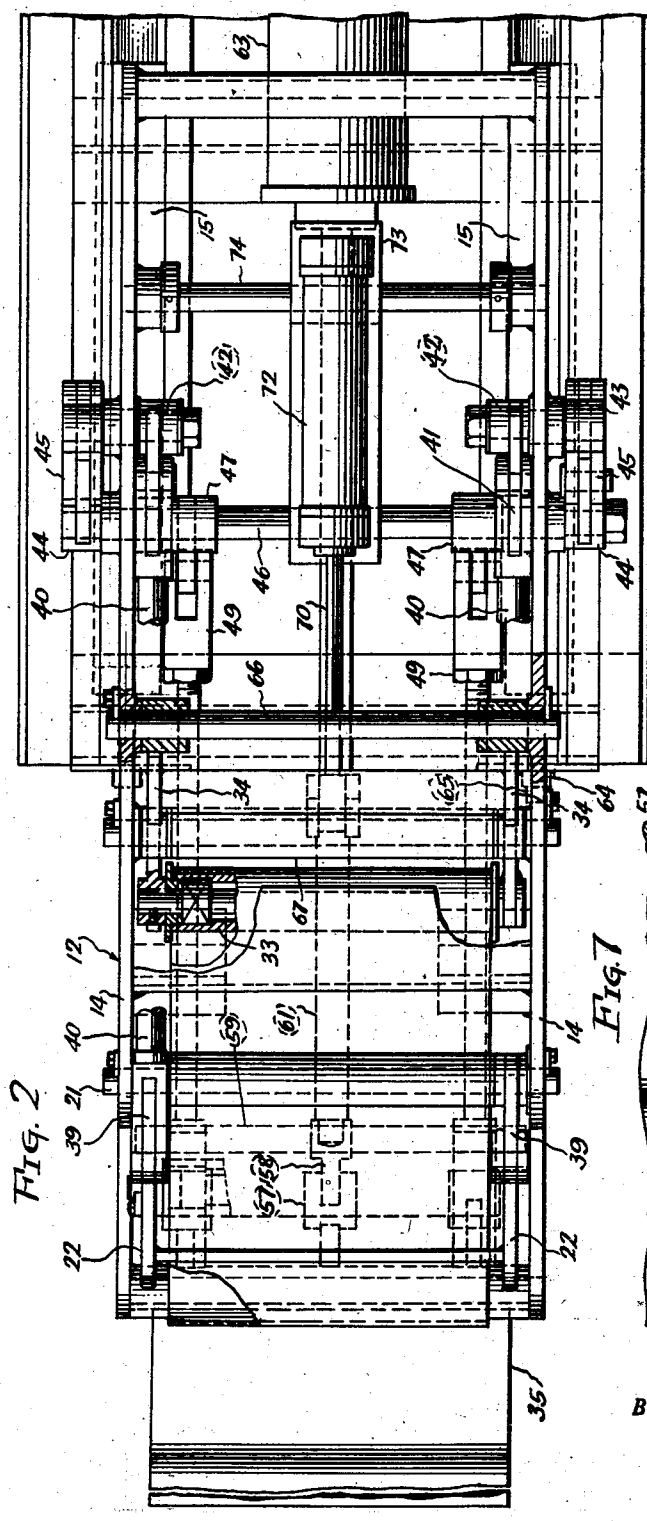

FIG. 2

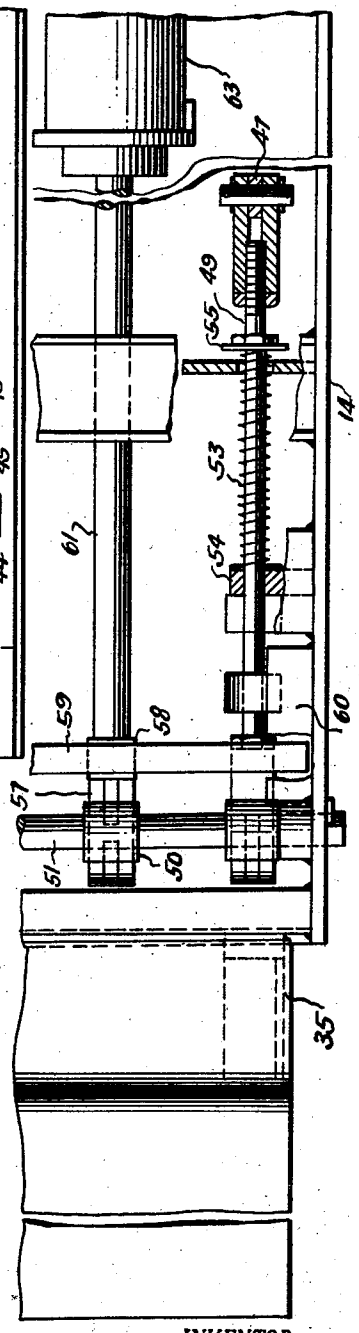

FIG. 7

INVENTOR.
FRANK J. WOOD
BY Clarence F. Poole
ATTORNEY

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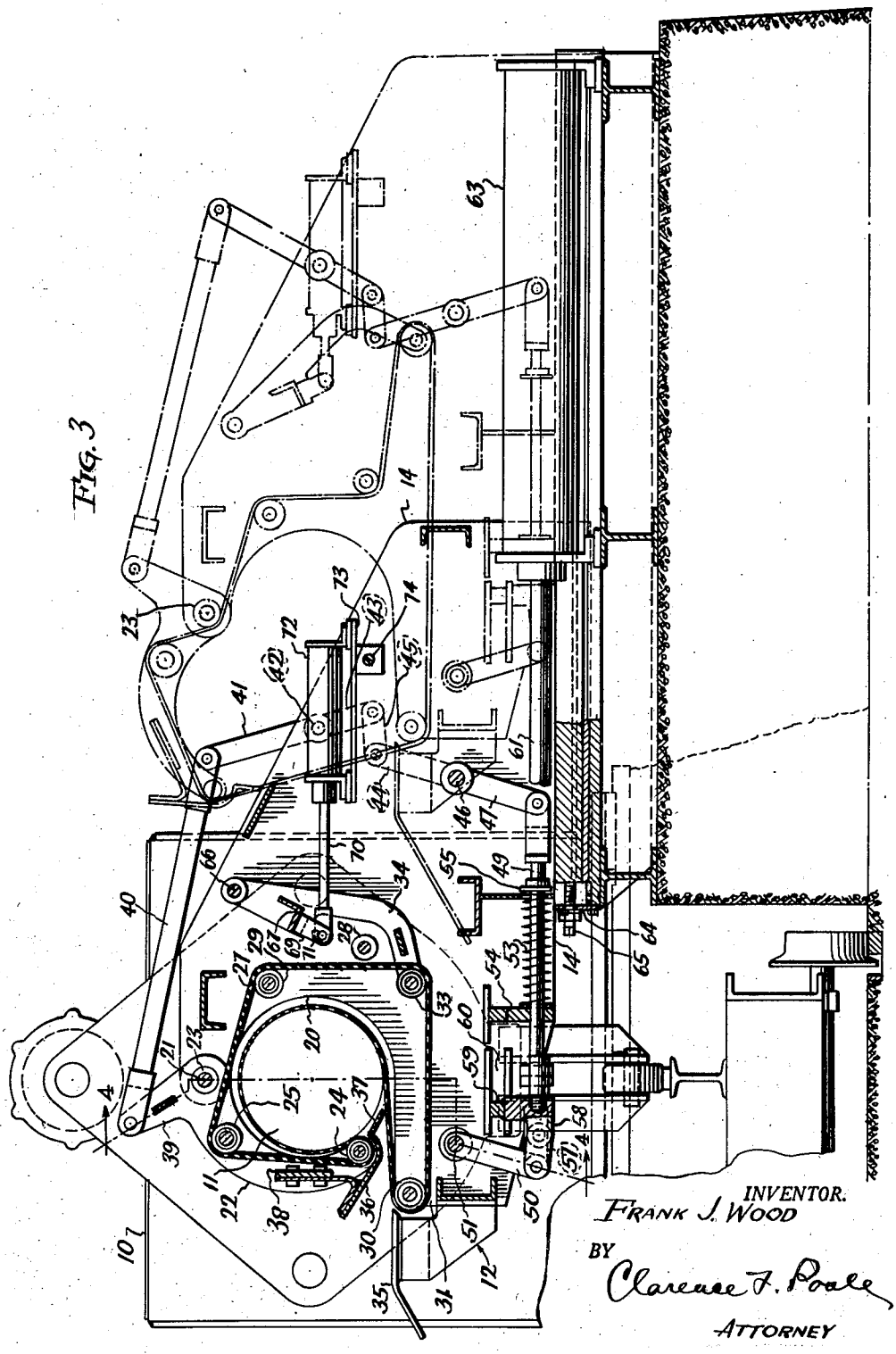
FIG. 3



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BELT WRAPPER

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FIG. 4

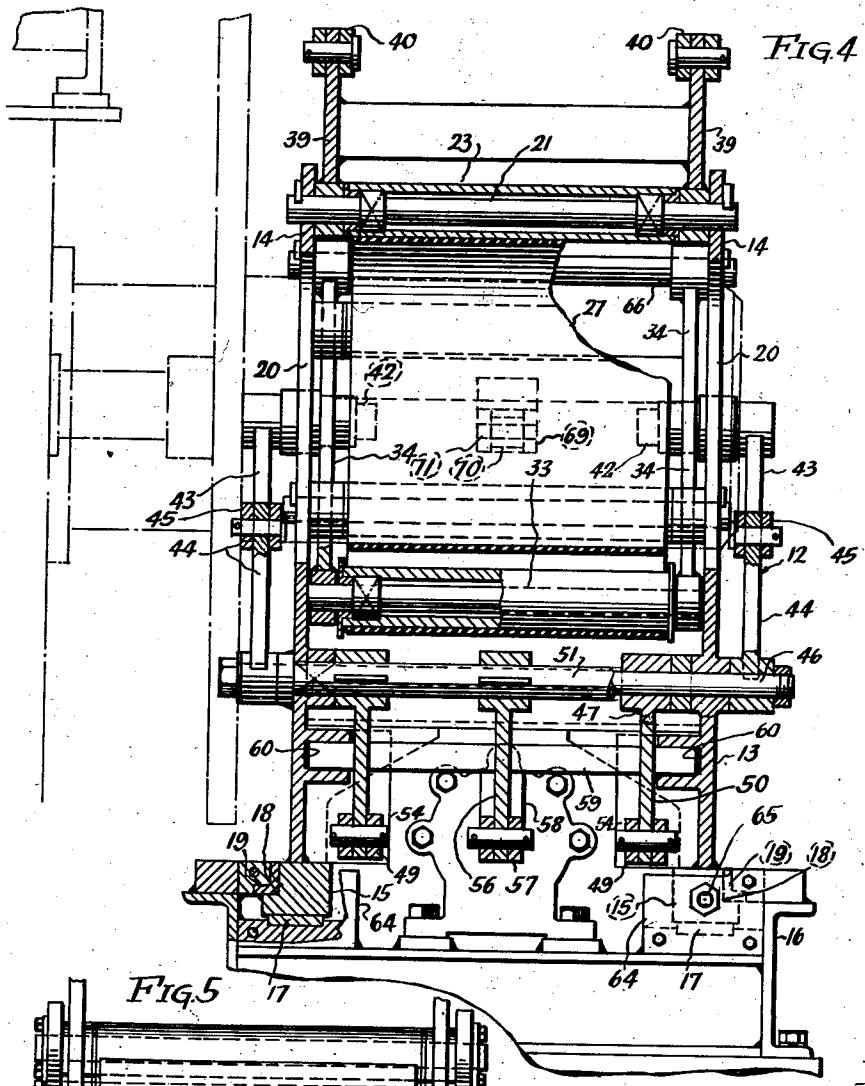


FIG. 5

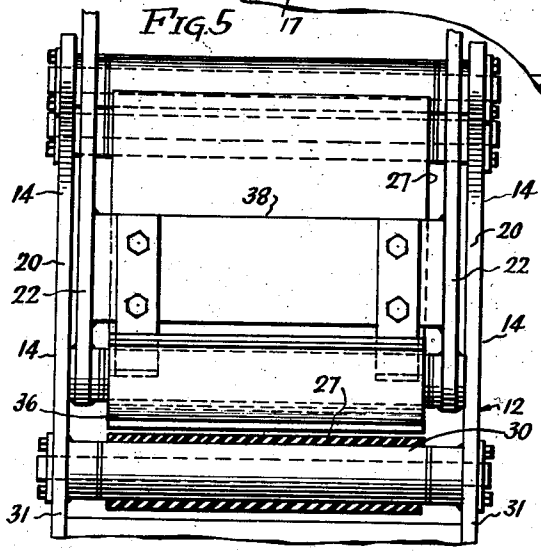
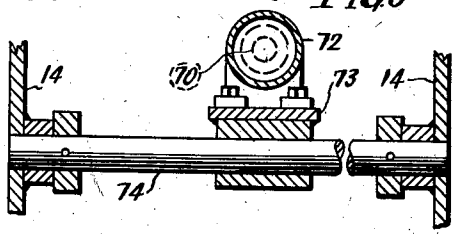


FIG. 6



INVENTOR.
FRANK J. WOOD
BY Clarence F. Poole
ATTORNEY

Patented Aug. 29, 1944 2,357,157

UNITED STATES PATENT OFFICE

2,357,157

BELT WRAPPER

Frank J. Wood, Riverside, Ill., assignor to Goodman Manufacturing Company, Chicago, Ill., a corporation of Illinois

Application April 17, 1942, Serial No. 439,337

8 Claims. (Cl. 242—78)

This invention relates to improvements in belt wrappers particularly adapted for initially wrapping strip metal around a strip coiling block.

The principal objects of my invention are to provide a new and improved form of belt wrapper adapted to efficiently wrap strip metal of various thicknesses around a coiling block.

A further object of my invention is to provide a simplified and more efficient form of belt wrapper having a novel form of means for positively wrapping the belt of the wrapper around a coiling block, so arranged that the belt may more efficiently wrap strip metal of various gauges around the block, and including means operated by power for engaging the belt with the block with the desired pressure and means independently operated by power and manually controllable, for maintaining the desired tension on the belt.

A more specific object of my invention is to provide an improved form of belt wrapper including a pivoted wrapping arm having a wrapping roll on the end thereof, together with means for positively pivoting this arm in a predetermined sequence of operation of the belt wrapper and positively engaging the wrapping roll and belt with the coiling block with pressures which may be regulated by the operator at will, and arranged to permit the belt wrapper to adapt itself to varying gauges of metal and sizes of coiling blocks.

Other objects of my invention will appear from time to time as the following specification proceeds and with reference to the accompanying drawings wherein:

Figure 1 is a plan view of a coiling apparatus showing a belt wrapper constructed in accordance with my invention in a retracted position with respect to the coiling block of the coiler;

Figure 2 is an enlarged plan view of the belt wrapper shown in Figure 1, with the wrapper in an extended position;

Figure 3 is an enlarged view in side elevation of the belt wrapper, with certain parts broken away and certain other parts shown in longitudinal section, and showing the belt wrapped around the coiling block in position to wrap the strip metal therearound;

Figure 4 is an enlarged transverse sectional view taken substantially along line 4—4 of Figure 3;

Figure 5 is a fragmentary end view of the belt wrapper;

Figure 6 is an enlarged detail transverse sectional view, showing certain details of the support for the cylinder for operating the belt tensioning roller; and

Figure 7 is an enlarged detail partial fragmentary plan view, with certain parts shown in horizontal section, and illustrating certain details of the mechanism for operating the belt wrapper.

In the drawings, Figure 1 shows a blocker 10 which includes a projecting coiling block 11 rotatably driven by power, to coil strip metal. Said coiling block may be of a usual collapsible construction and said blocker and coiling block are not herein shown or described in detail since they are no part of my present invention. A belt wrapper indicated generally by reference character 12 is provided to guide and wrap the leading end of the metal around said coiling block until the frictional engagement between the drum and strip is such that the drum will coil the strip of itself, at which time the belt wrapper may be removed from the block.

The belt wrapper 12 includes generally a movable frame 13 having a pair of upright parallel spaced side walls 14, 14, mounted at their lower ends on supporting blocks 15, 15, which are guided for slidable movement along a stationary base frame 16 (see Figure 4). Said blocks, as herein shown, rest on bearings 17, 17 extending along said base frame and are provided with recessed shouldered portions 18, 18 engageable with bearings 19, 19 extending along the base and forming a lateral guide for said movable frame.

The side walls 14, 14 of the movable frame 13 have semicircular forwardly opening recessed portions 20, 20, which partially encircle the coiling block when said frame is in an extended position. The upper forward portions of said side walls have a transverse shaft 21 mounted therebetween which has a pair of spaced interconnected wrapping arms 22, 22 pivotally mounted thereon and disposed adjacent the insides of opposite side walls. A roller 23 is journaled on said shaft between said arms, and is adapted to engage the outside of the belt, when the belt wrapper is in an open position.

The arms 22, 22 are of a curved formation and the inner sides thereof form a substantial continuation of the curved surfaces of the recessed portions 20, 20 of the side walls 14, 14, when said arms are in a closed position, which is herein shown as being a lowered position. A transverse wrapping roller 24 is journaled between the outer ends of said arms and serves to engage an endless belt 27, which is trained therearound, with the block 11, during the wrapping operation. A second transverse roller 25 is spaced inwardly of said roller 24 and is also mounted between said arms and has said belt trained thereover. Another transverse roller 29 having said belt trained therearound is mounted between the side walls

14, 14, just rearwardly of the recessed portions 20, 20 in a horizontal plane disposed beneath the roller 25 but a substantial distance above the roller 24, when the belt wrapper is in a closed position. A transverse roller 30 is mounted between forwardly extended lower portions 31, 31 of said side walls, and serves to change the direction of the belt when wrapped around the block.

The belt 27 is maintained at the desired tension, when the wrapper is in an open or closed position, by means of a tension idler 33, mounted between a pair of pivoted arms 34, 34. Said tension roller, as herein shown, is disposed beneath the roller 29 and in substantially horizontal alignment with the roller 30. A roller 28 is mounted between the side plates 14, 14 below and rearwardly of the roller 29 but above the roller 33. Said roller 28 and the roller 23 are adapted to engage the outside of the belt, during opening of the belt wrapper. When the belt wrapper is in an open position, slack is taken up on the belt by movement of the tension idler to the rearwardly extended position shown by broken lines in Figure 3.

A table 35 extends transversely across the forward end of said belt wrapper and forms a support for the strip metal as it passes to the block 11. The top discharge edge of said table is substantially in alignment with the top surface of the belt, as it turns around the roller 30, when wrapped around the coiling block 11 (see Figure 3). A deflecting and protecting plate 36 is mounted between the arms 22, 22 on a connecting member 38, connecting said arms together, and extends partially around the front roller 24, to protect the belt as it turns around said roller. Said plate has an inwardly extending portion 37, spaced outwardly from and extending a short distance around the periphery of the coiling block 11, to a point adjacent the belt, as it passes from the roller 30 around the underside of said coiling block.

The means for pivoting the wrapping arms 22, 22 in directions to open or close the belt wrapper includes a pair of arms 39, 39, which are herein shown as being formed integrally with and as projecting upwardly from said wrapping arms. A pair of rearwardly extending links 40, 40 connect the upper ends of said wrapping arms to the upper ends of rocking arms 41, 41, mounted adjacent the insides of the side frame members 14, 14 on transverse stub shafts 42, 42. Said shafts are journaled in the side walls 14, 14 intermediate their ends. Depending rocking arms 43, 43 are mounted on the outer ends of the shafts 42, 42 on the outsides of the side walls 14, 14. Said rocking arms are connected to the upper ends of rocking arms 44, 44 by links 45, 45. Said last mentioned rocking arms are mounted on the outer ends of a transverse shaft 46. Depending lever arms 47, 47 are mounted on said transverse shaft, adjacent the inner sides of the plates 14, 14. Said rocking arms are rocked by and are pivotally connected to the rear ends of links 49, 49, the forward ends of which links have pivotal connection with rocking arms 50, 50, keyed to a transverse shaft 51.

A compression spring 53 encircles each link 49 and urges said link in a direction away from the coiling block 11, to tend to move the rocking arm 47 in a direction to elevate the wrapping arms 22, 22 about the axis of the shaft 21. The forward end of said spring abuts a plate 54 mounted on and extending inwardly from the side wall 14, and also forming a guide for the link 49. The rear end of said spring abuts a collar 55, which may be threaded on said link, to provide for adjustment of said spring.

A depending rocking arm 56 is keyed to the transverse shaft 51, intermediate the rocking arms 50, 50. The lower end of said rocking arm is pivotally connected with the forward end of a link 57, the rear end of which link has pivotal connection with a depending portion 58 of a guide member 59. Said guide member extends transversely between the side walls 14, 14 and is guided at its ends in inwardly projecting channelled guides 60, 60 extending longitudinally along said side walls. A piston rod 61 is threaded at its forward end in the side of said depending portion, opposite from the link 57. Said piston rod extends from a piston (not shown) in a cylinder 63, mounted on the central portion of the base frame 16 and extending longitudinally thereof.

Stops are provided at the ends of the guides for the blocks 15, 15, to limit movement of the frame 13. Said stops, as herein shown, include a pair of plates 64, 64, extending inwardly from the outer sides of the frame 16 and having screws 65, 65 threaded therein. The ends of said screws are adapted to be engaged by the blocks 15, 15, to limit travel thereof along the bearing plates 17, 17. Said screws form reacting members, to cause the cylinder 63 to push the wrapping arms 22, 22 to a closed position through the piston rod 61 and arms 50, 50 against the compression springs 53, 53, when said frame 13 is in the proper position with respect to said coil, and may be adjusted to determine the point of closing of said arms, to accommodate the belt wrapper to various sizes of blocks.

When the belt wrapper is in the forwardly extended position shown in Figure 3, and fluid under pressure is admitted to the piston rod end of the cylinder 63, the piston rod 61 aided by the compression springs 53, 53 will first pivot the rocking arm 56 and the rocking arms 50, 50 in a rearward or counterclockwise direction. This will move the arms 22, 22 in a clockwise direction through the links 49, 49, and the hereinbefore described rocking arms and links connected with the free ends of the arms 39, 39.

When fluid under pressure is admitted to the head end of the cylinder 63, the piston rod 61 will move in a forward direction. The strength of the compression springs 53, 53, however, is greater than the force required to move the frame 13 along the frame 16. Thus said springs will hold the rocking arms 50, 50 in a rearwardly inclined position so the entire frame 13 will be moved along the frame 16, with the wrapping arms 22, 22 in an open position. When said frame 13 has been moved to a position where it is stopped by the screws 65, 65, further forward movement of said piston rod will compress the springs 53, 53, and pivot the rocking arms 56 and 50, 50 in a forward direction against said springs. This will lower the wrapping arms 22, 22 and cause said arms to wrap the belt around the coiling block 11, in the hereinbefore described manner, and to positively engage the belt with the block by means of the roller 24, the amount of pressure being determined by manual operation of the valve (not shown) controlling operation of the cylinder 63. Thus when heavy gauge metal, difficult to bend, is wrapped around said block 11, the pressure with which said roller engages said block is increased from pressures necessary to bend lighter gauge metal around

the block, as is the tension of the belt, controlled by the tension idler **33**.

Referring now to the tension idler **33** and the means for maintaining the desired tension on the belt **27**, the lever arms **34**, **34** are mounted at their upper ends on a transverse shaft **66**, which is mounted between the side walls **14**, **14**. A connecting member **67** connects said lever arms together and an arm **69** extends angularly forwardly and downwardly from said connecting member. Said arm has the forward end of a piston rod **70** pivotally connected thereto by means of a pivotal pin **71**. Said piston rod is extensible from a fluid cylinder **72**, which cylinder is mounted on a support bracket **73**, transversely pivoted adjacent its rear end on a transverse shaft **74**, which is mounted at its ends in the side walls **14**, **14** (see Figure 6).

Thus when it is desired to maintain tension on the belt **27**, fluid is admitted to the piston rod end of the cylinder **72**, and during movement of the belt wrapper to a retracted open position, the admission of fluid under pressure to the piston rod end of said cylinder will move said tension idler in a rearward direction, and move the belt to the extreme position shown by broken lines in Figure 3. The desired degree of tension of said belt may be maintained by manual operation of a control valve (not shown) for said cylinder, so that when it is desired to wrap light metal around the coiling block, the belt tension may be less than when wrapping heavy metal therearound, as has been described before.

It may be seen from the foregoing that a novel form of belt wrapper of a simplified construction has been provided, which is so arranged as to be positively opened and closed by the mechanism which moves the frame **13** to an extended or retracted position and that the belt wrapper is not moved to a closed position until the arms **22**, **22** are in a position to encircle the coiling block as they are being moved to a closed position. It may also be seen that the belt may be positively engaged with the block **11** by the wrapping roller **24**, or with the strip metal, as it is being wrapped thereon, with various desired pressures determined by the gauge of the metal, and that the belt may be maintained at various desired tensions independently of opening or closing of the belt wrapper. It may further be seen that since the wrapping mechanism is positively operated by power through a fixed system of links and levers, that the entire wrapping mechanism may be inverted so the arms **22**, **22** will move upwardly instead of downwardly when moving to a closed position, if desired, without impairing the efficiency thereof, in cases where it is more desirable to train the metal onto the upper side of the coiling block than the lower side thereof.

While I have herein shown and described one form in which my invention may be embodied, it will be understood that the construction thereof and the arrangement of the various parts may be altered without departing from the spirit and scope thereof. Furthermore, I do not wish to be construed as limiting my invention to the specific embodiment illustrated, excepting as it may be limited in the appended claims.

I claim as my invention:

1. A belt wrapper for strip metal comprising a frame, a wrapping arm pivoted on said frame and having a plurality of rollers thereon, a plurality of vertically and horizontally spaced rollers on said frame, a belt trained around said rollers on said arm and frame and adapted to be partially wrapped around a coiling block by said arm, means for positively moving said frame towards or away from said coiling block including a rectilinearly movable member, a rocking arm mounted on said frame and connected with said rectilinearly movable member, whereby movement of said frame is effected through said rocking arm, a linkage connection between said rocking arm and said wrapping arm, for moving said arm towards or away from said block, a yieldable member having operative connection with said linkage connection for holding said rocking arm from rocking movement until a predetermined point is reached, as said rectilinearly movable member moves said frame towards said drum, to prevent said wrapping arm from moving in a direction to wrap said belt around said coiling block until said frame is properly positioned with respect to said coiling block.

2. A belt wrapper for strip metal comprising a frame, a wrapping arm pivoted on said frame and having a plurality of rollers thereon, a plurality of vertically and horizontally spaced rollers on said frame, a belt trained around said rollers on said arm and frame and adapted to be partially wrapped around a coiling block by said arm, means for positively moving said frame towards or away from said coiling block including a rectilinearly movable member, a rocking arm mounted on said frame and connected with said rectilinearly movable member, whereby movement of said frame is effected through said rocking arm, a linkage connection between said rocking arm and said wrapping arm, for moving said arm towards or away from said block, a yieldable member having operative connection with said linkage connection for holding said rocking arm from rocking movement until a predetermined point is reached, as said rectilinearly movable member moves said frame towards said block, to prevent said arm from moving in a direction to wrap said belt around said coiling block until said frame is properly positioned with respect to said coiling block, a bodily movable roller engaging the inside of said belt and adapted to maintain tension thereon, and manually controllable power operated means for moving said movable roller in directions to increase or decrease the tension on said belt independently of movement of said frame and belt towards and away from said block.

3. In a belt wrapper, a coiling block, a frame mounted for movement towards or from said block, a wrapping arm pivotally mounted on said frame and movable to a position to partially encircle said coiling block, a plurality of spaced rollers on said arm and frame, an endless belt trained about said rollers, a tension roller engaging the inside of said belt and manually controllable to maintain the desired degree of tension on said belt, power means for moving said frame towards or from said block, a linkage connection from said power means to said wrapping arm for pivotally moving said wrapping arm towards or from said block, depending upon the direction of movement of said frame, and a yieldable member operatively connected with and adapted to exert a force on said linkage connection in a direction to tend to pivot said arm in a direction away from said block and to prevent pivotal movement of said arm towards said block until said frame reaches a predetermined position with respect to said block.

4. In a belt wrapper, a coiling block, a frame mounted for movement towards or from said

block, a wrapping arm pivotally mounted on said frame and movable to a position to partially encircle said coiling block, a plurality of spaced rollers on said arm and frame, an endless belt trained about said rollers, a tension roller engaging the inside of said belt and manually controllable to maintain the desired degree of tension on said belt, a power means for moving said frame towards or from said block, a linkage connection from said power means to said wrapping arm for pivotally moving said wrapping arm towards or from said block, depending upon the direction of movement of said frame, and a yieldable member operatively connected with and adapted to exert a force on said linkage connection in a direction to tend to pivot said arm in a direction away from said block and to prevent pivotal movement of said arm towards said block until said frame reaches a predetermined position with respect to said block, and a stop arranged to stop movement of said frame towards said block and to cause said power means and linkage connection to move against said yieldable member and pivotally move said wrapping arm towards said block and wrap said belt around and positively engage it with said block.

5. In a belt wrapper, a coiling block, a frame mounted for movement towards or from said block, a wrapping arm pivotally mounted on said frame and movable to a position to partially encircle said coiling block, a plurality of spaced rollers on said arm and frame, an endless belt trained about said rollers, a tension roller engaging the inside of said belt, a fluid cylinder for moving said tension roller towards or from said block, manual control means for said fluid cylinder to vary the tension of said belt at will, a fluid cylinder for moving said frame towards or from said block, a linkage connection from said cylinder to said wrapping arm for pivotally moving said wrapping arm towards or from said block, and a compression spring operatively connected with and adapted to exert a force on said linkage connection in a direction to tend to pivot said arm in a direction away from said block and to prevent movement of said arm towards said block until said frame reaches a predetermined position with respect to said block, a stop adapted to stop movement of said frame towards said block and to cause yielding of said yieldable member, to cause said linkage connection to move said wrapping arm towards said block and to wrap said belt around and positively engage it with said block.

6. A belt wrapper for strip metal comprising a frame, a coiling block, a wrapping arm pivoted on said frame and having a plurality of rollers thereon, a plurality of vertically and horizontally spaced rollers on said frame, a belt trained around said rollers, a bodily movable tension roller engaging the inside of said belt, manually controllable power operated means for moving said tension roller in directions to increase or decrease the tension of said belt, a fluid pressure cylinder and piston for positively moving said frame towards and away from said coiling block, and means actuated by said fluid pressure cylinder and piston to pivot said arm away from said coiling block, to open said belt wrapper, and then move said frame in a direction away from said coiling block, upon the admission of fluid under pressure to one end of said cylinder, and upon the admission of fluid under pressure to the other end of said cylinder to positively move said frame towards said coiling block, and engage the belt with said block, and then move said arm in a direction to wrap said belt about said block and to positively engage said belt therewith.

7. A belt wrapper for strip metal comprising a frame, a coiling block, a wrapping arm pivoted on said frame and having a plurality of rollers thereon, a plurality of vertically and horizontally spaced rollers on said frame, a belt trained around said rollers, a bodily movable tension roller engaging the inside of said belt, manually controllable power operated means for moving said tension roller in directions to increase or decrease the tension of said belt, a fluid pressure cylinder and piston for positively moving said frame towards and away from said coiling block, and means actuated by said fluid pressure cylinder and piston to pivot said arm away from said coiling block, to open said belt wrapper, and then move said frame in a direction away from said coiling block, upon the admission of pressure on one end of said cylinder, and upon the admission of fluid under pressure to the other end of said cylinder to positively move said frame towards said coiling block and engage the belt with said block, and then move said arm in a direction to wrap said belt about said block and to positively engage said belt therewith including a rocking shaft mounted on said frame, a rocking arm mounted on said rocking shaft, a connection between said piston and the free end of said rocking arm, for moving said frame through said rocking arm, and a linkage connection between said rocking shaft and said wrapping arm for pivotally moving said wrapping arm upon pivotal movement of said rocking shaft.

8. A belt wrapper for strip metal comprising a frame, a coiling block, a wrapping arm pivoted on said frame and having a plurality of rollers thereon, a plurality of vertically and horizontally spaced rollers on said frame, a belt trained around said rollers, a bodily movable tension roller engaging the inside of said belt, manually controllable power operated means for moving said tension roller in directions to increase or decrease the tension of said belt, a fluid pressure cylinder and piston for positively moving said frame towards and away from said coiling block, and means actuated by said fluid pressure cylinder and piston to first pivot said arm away from said coiling block, to open said belt wrapper, and then move said frame in a direction away from said coiling block, upon the admission of pressure on one end of said cylinder, and upon the admission of fluid under pressure to the other end of said cylinder to positively move said frame towards said coiling block and engage said belt with said block, and then move said arm in a direction to wrap said belt about said block and to positively engage said belt therewith including a rocking shaft mounted on said frame, a rocking arm mounted on said rocking shaft, a connection between said piston and the free end of said rocking arm, for moving said frame through said rocking arm, a yieldable member acting in a direction to hold said rocking arm from rocking movement when said frame is moved towards said coiling block by said cylinder and piston until said belt is positively engaged with said coiling block, to prevent said wrapping arm from pivoting in a direction to positively wrap said belt about said coiling block until said arm reaches a predetermined position with respect to said block.

FRANK J. WOOD.