July 19, 1966 F. S. HYER ET AL 3,261,141

ARTICLE BAND WRAPPING MACHINE

Filed March 28, 1963 6 Sheets-Sheet 1

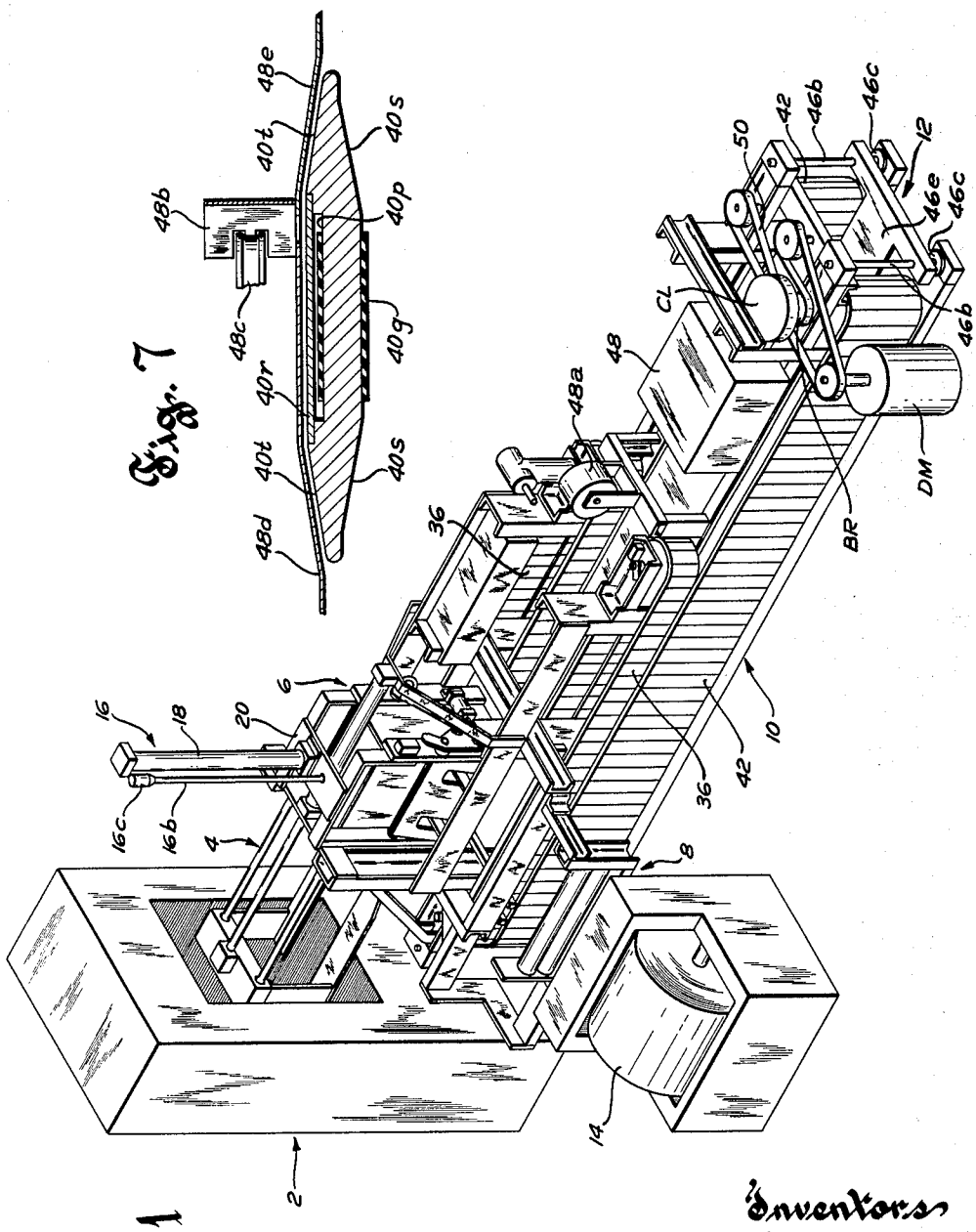


Fig. 7

Fig. 1

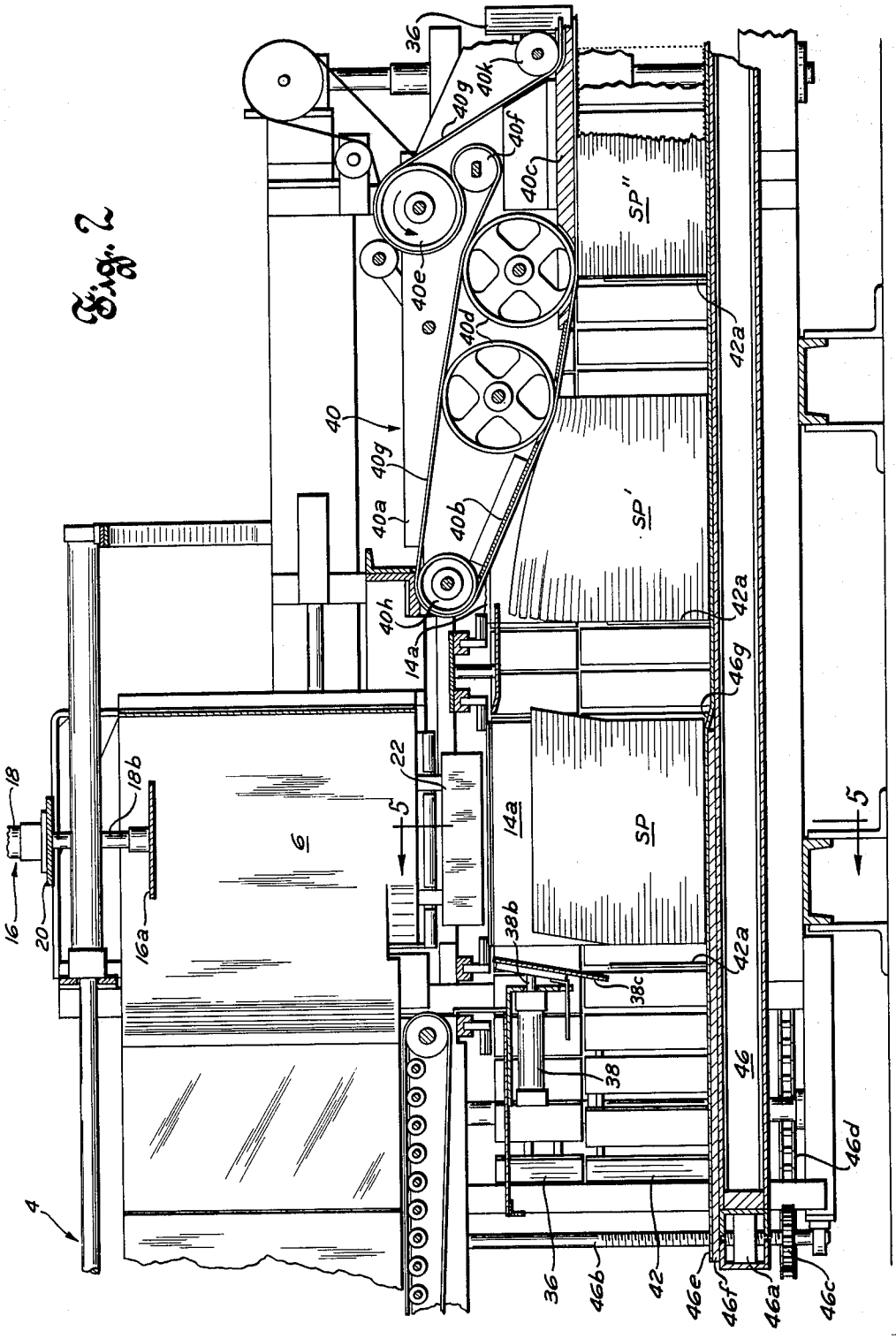
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ARTICLE BAND WRAPPING MACHINE

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Fig. 2



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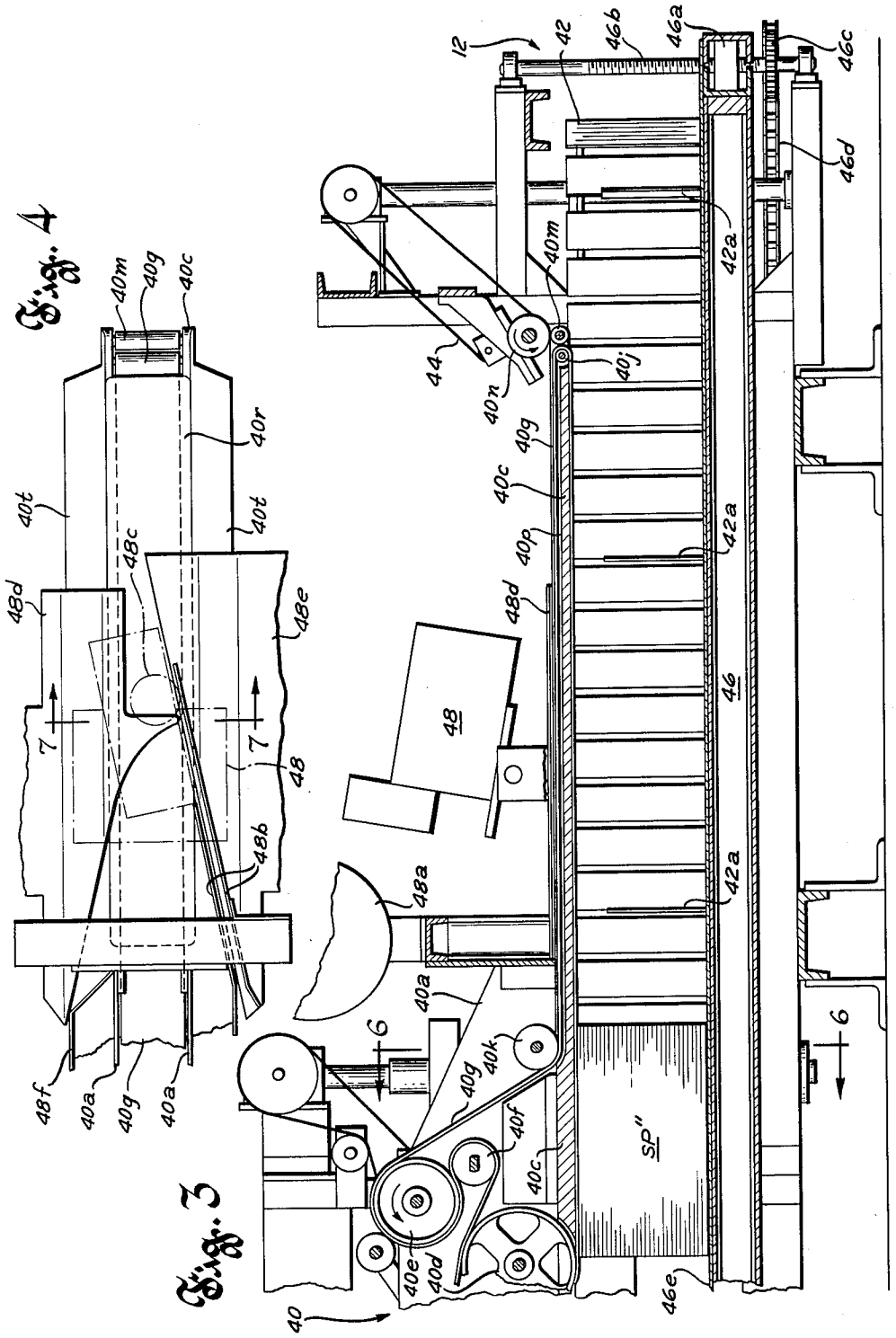


Fig. 4

Fig. 3

ARTICLE BAND WRAPPING MACHINE

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Fig. 5

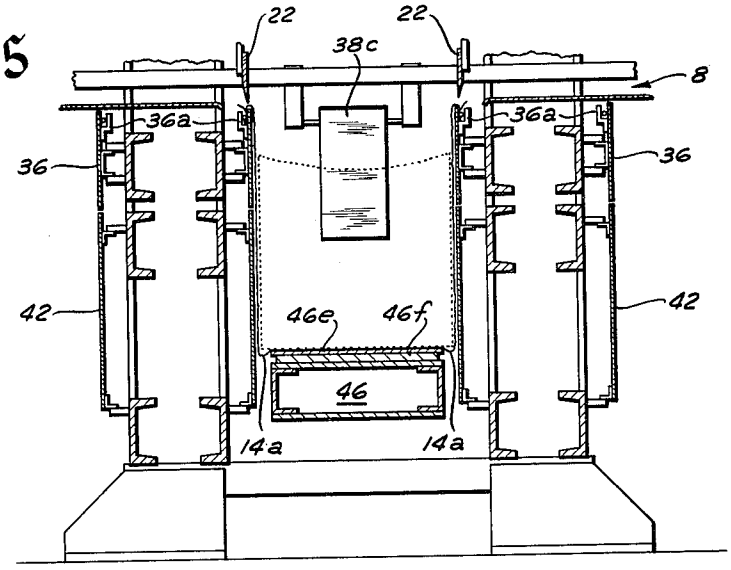
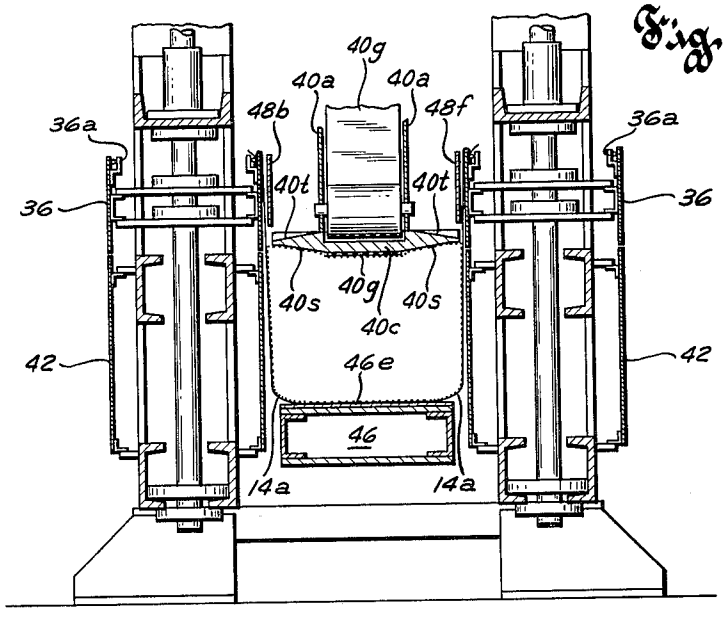


Fig. 6



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Fig. 8

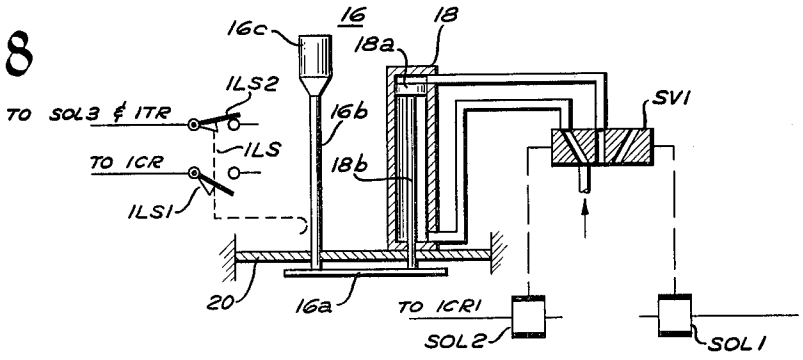


Fig. 9

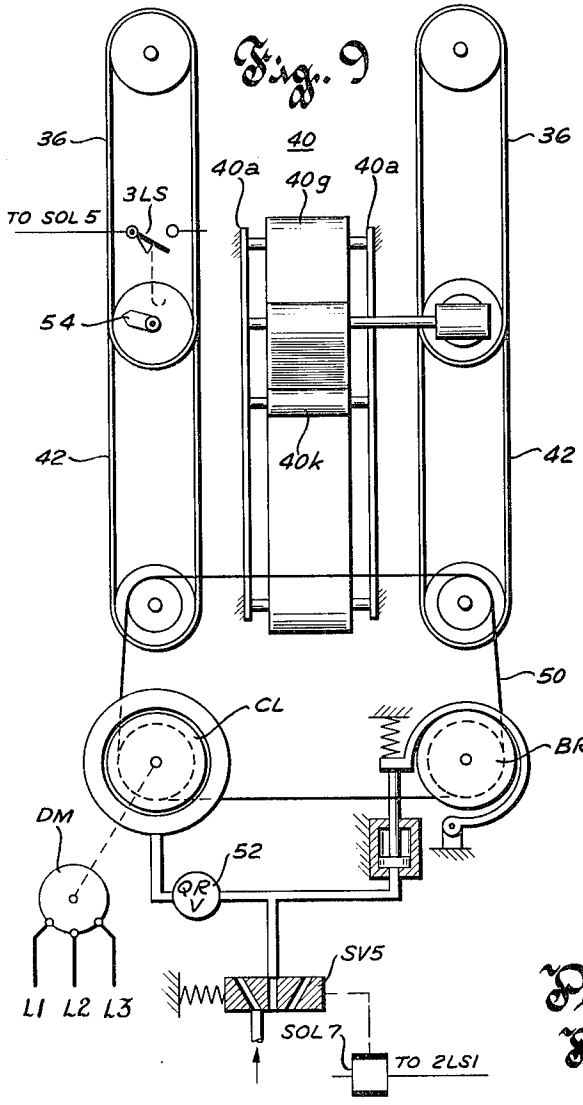
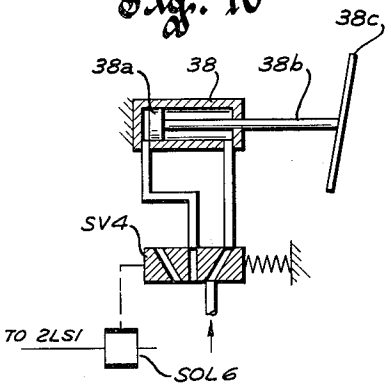


Fig. 10



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Fig. 11

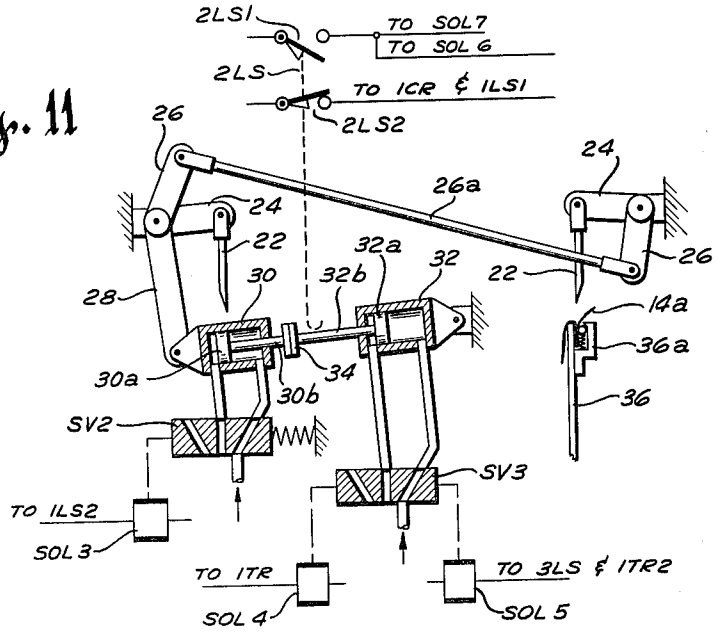
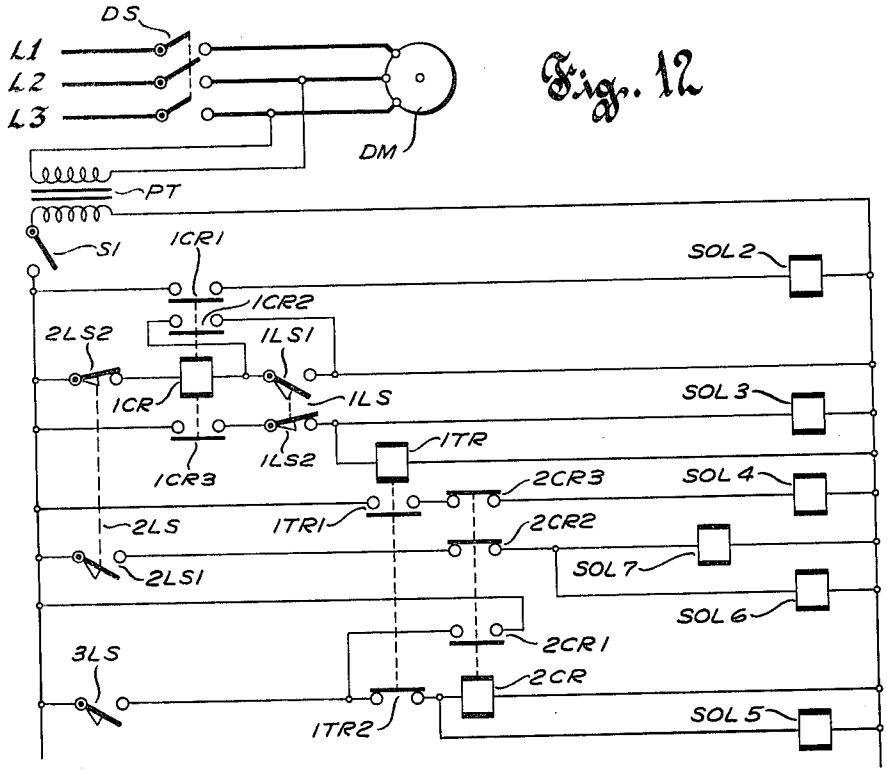


Fig. 12



United States Patent Office 3,261,141 Patented July 19, 1966

3,261,141

ARTICLE BAND WRAPPING MACHINE

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Filed Mar. 28, 1963, Ser. No. 268,816
14 Claims. (Cl. 53—124)

This invention relates to an improved article band wrapping machine.

While not limited thereto the present invention is particularly suited to four sided band wrapping of a plurality of stacked flexible multi-leaf articles such as newspapers or the like.

A primary object of the invention is to provide an article band wrapping machine of the aforementioned type with improvements affording better alinement and compression of the articles while the ends of the wrap are overlapped and secured together to complete the band around four sides of the articles.

A more specific object is to provide such a machine for better filling and tightening of a partially completed wrap about three sides of the articles.

Another specific object is to provide for improved compression of the articles and distribution of compression forces on the fourth side of the articles before and during the overlapping and securing of the ends of the wrap over said fourth side in such a machine.

A still further specific object is to provide for offsetting of articles on the top of a stack of articles preparatory to compression to compensate for opposite movement of such articles during compression.

Other objects and advantages of the invention will hereinafter appear.

The accompanying drawings illustrate a preferred embodiment of the invention which will now be described in detail, it being understood that the embodiment illustrated is susceptible of various modifications without departing from the scope of the appended claims.

In the drawings:

FIGURE 1 is a perspective view of a complete stacker-wrapper device for newspapers and the like embodying the invention;

FIG. 2 is a fragmentary sectional view taken along the longitudinal center of the stacker-wrapper device of FIG. 1 and showing the left-hand portion of that machine;

FIG. 3 is a sectional view similar to FIG. 2, overlapping and showing portions of the device to the right of that shown in FIG. 2;

FIG. 4 is a top plan view of a portion of FIG. 3;

FIG. 5 is a sectional view taken along line 5—5 of FIG. 2;

FIG. 6 is a sectional view taken along line 6—6 of FIG. 3;

FIG. 7 is a sectional view of a portion of the device as indicated by line 7—7 in FIG. 4;

FIG. 8 is a more or less schematic view of a stack ram, pneumatic operator therefor and certain electrical controls used therewith;

FIG. 9 is a more or less schematic view of sidewall conveyors and a compression belt and controls therefor;

FIG. 10 is a more or less schematic view of a stack pusher together with certain controls associated therewith;

FIG. 11 is a more or less schematic view of a wrap tucker mechanism together with certain controls associated therewith; and

FIG. 12 is a diagrammatic showing of a complete electrical control system for operating the portion of the stack-wrapper machine shown in FIGS. 1 to 11.

FIGURE 1 shows a complete stacker-wrapper device comprising a stacker 2, a transfer unit 4, a loading unit 6, a wrap feed unit 8, a stack wrapper unit 10, and a

wrapped stack discharge portion 12. Stacker 2 in one preferred form is like that described in the Howdle et al. Patent No. 2,819,661, now Reissue Patent 25,018, and may be assumed to deliver vertically stacked and alined newspapers at its right-hand side.

The stacked newspapers are discharged from the stacker 2 onto the transfer unit 4. Transfer unit 4 in turn carries the stack toward the right and places it in the loading unit 6. Prior to placing the stack in the loading unit 6, the wrap feed unit 8 draws a length of wrap 14*a* from a paper supply roll 14, cuts it to a predetermined length of sheet and inserts it within the loading unit 6 in a plane just below the position of the incoming stack. As the transfer unit 4 returns to its left-hand position to await another stack of newspapers, it actuates a switch to initiate the release of the stack from the loading unit 6, and to cause a ram mechanism 16 to move downward in a manner and for reasons to be later described.

As can be seen in FIGS. 2 and 8, the ram mechanism 16 has a pneumatic cylinder 18 mounted on a cross member 20 of the loading unit frame. Pneumatic cylinder 18 has a piston 18*a* and a piston rod 18*b*. A ram plate 16*a* is attached to piston rod 18*b* at its lower end at the opposite side of the cross member 20. A guide rod 16*b* is also attached to ram plate 16*a* and extends up through cross member 20. At its upper end guide rod 16*b* has a cam member 16*c* which actuates a limit switch 1LS when the ram plate 16*a* is in its lowest position. Pneumatic cylinder 18 is under the control of a slide valve SV1 which is operated by two pusher solenoids SOL1 and SOL2.

A paper tucker mechanism is shown in FIG. 11. The paper tucker mechanism has tucker blades 22 suspended from the ends of levers 24 which are rigidly secured to a pair of shafts which are rotatably mounted, one on each side, to the frame of the stack wrapper machine. Each shaft has a second lever 26 rigidly secured to it and a connecting rod 26*a* interlinks the two assemblies. One shaft also has a third lever 28 rigidly secured to it to which there is attached a pneumatic cylinder 30 having a piston 30*a* and a piston rod 30*b*. A second pneumatic cylinder 32, having a piston 32*a* and a piston rod 32*b*, is pivotally mounted to the frame of the stack wrapper. Piston rods 30*b* and 32*b* are rigidly secured to each other to form a common piston rod, and their joint forms a cam 34 which actuates a limit switch 2LS.

Cylinder 30 is under the control of a spring biased slide valve SV2 which is operated by a pusher solenoid SOL3. Cylinder 32 is under the control of a slide valve SV2 which is operated by a pair of pusher solenoids SOL4 and SOL5. The pneumatic connections from the air cylinders 30 and 32 to the slide valves SV2 and SV3, respectively, are of the flexible hose type.

It can be seen that tucker blades 22 can be moved to three positions. The mechanism shown in FIG. 11 is in the intermediate position. In this position, air is admitted to the right-hand side of piston 32*a*, which forces piston 32*a* and the common piston rod 30*b*–32*b* to the left. Air is also admitted to the right-hand side of piston 30*a*, which forces the cylinder 30 to its right-hand position with respect to the piston 30_a, the cylinder 30 in this application being the movable member and the piston 30_a being the stationary member. When air is maintained to the right-hand side of piston 32*a* in cylinder 32 and air is admitted to the left-hand side of piston 30*a*, the cylinder 30 moves to its left-hand position with respect to the piston 30*a* and thereby rotates lever 28 clockwise about its shaft and drives the tucker blades 22 downward to their lowest, or tucking, position. The blades 22 push the ends of the length of the wrap 14*a* into paper grippers 36*a* mounted on the upper edges of each segment of a pair of upper sidewall conveyors 36—36.

When air is admitted to the left-hand side of piston 32*a*,

the piston moves to its right-hand position and carries with it the common piston rod 30*b*–32*b* and the cylinder 30. The admission of air at this time to the right-hand side of piston 30*a* moves cylinder 30 to the right-hand position with respect to the piston 30*a*. This step in the operation of the tucker mechanism provides the shortest length between the outer ends of the two cylinders, and the tucker blades are thereby raised to their highest, or fully retracted position. It can be seen that whenever piston 32*a* is in its right-hand position, cam 34 on the common piston rod 30*b*–32*b* actuates the limit switch 2LS.

FIGS. 2 and 10 best illustrate a stack pusher mechanism which is mounted to the frame of the stack wrapper machine. The stack pusher has a pneumatic cylinder 38 with a piston 38*a* and a piston rod 38*b*. A pusher plate 38*c* is mounted at a slight angle to the vertical at the outer end of piston rod 38*b*. The cylinder 38 is under the control of a spring biased slide valve SV4 which is operated by a pusher solenoid SOL6.

The stack wrapper machine has a compression unit 40 as shown in FIGS. 2 and 3 which comprises an endless belt conveyor. Compression unit 40 has sideplates 40*a* which are mounted to the frame of the stack wrapper. Mounted to, and between, sideplates 40*a* is a guide plate 40*b*. A cantilevered member 40*c* is similarly mounted to sideplates 40*a* and extends to the right-hand end, or discharge portion 12, of the stack wrapper machine. A pair of compression rollers 40*d* are rotatably mounted on shafts secured to sideplates 40*a*, and protrude slightly through clearance openings in guide plate 40*b* and member 40*c*. A drive roller 40*e* is also mounted on a shaft between sideplates 40*a* and is driven by a link chain and sprocket connection to the drive for sidewall conveyors 36. A tensioning roller 40*f* is rotatably mounted on still another shaft between the sideplates 40_a, which is secured within slots in sideplates 40*a* to afford horizontal adjustment of the tensioning roller.

An endless belt 40*g* runs on the drive roller 40*e* which rotates in a counterclockwise direction. Thus belt 40*g* travels around drive roller 40*e*, loops around the opposite side of tensioning roller 40*f*, over the compression rollers 40*d*, around an idler roller 40*h*, below guide plate 40*b*, under compression rollers 40*d*, below the cantilevered member 40*c*, around a second idler roller 40*j*, along the top of cantilevered member 40*c*, under a third idler roller 40*k*, and back up to drive roller 40*e*. A fourth idler roller 40*m* is mounted on the cantilevered member just to the right of idler roller 40*j* for engagement with a driven pressure roller 40*n* which is mounted to the frame of the stack wrapper machine. As will hereinafter be explained in more detail, pressure roller 40*n* is driven through a link chain 44 and sprocket connection to the drive of a pair of lower sidewall conveyors 42—42. The purpose of this pair of rollers is to hold down the cantilevered member 40*c* and thus maintain better compression.

A vertically adjustable compression bed 46 lies between the lower sidewall conveyors 42—42 and extends the full length of the stack wrapper machine. As can be seen in FIGS. 2, 3, 5 and 6, compression bed 46 is an elongated, hollow, rectangular box which has adjusting blocks 46*a* secured at each end. Each adjusting block 46*a* has a pair of vertical threaded openings for engagement with a pair of jack screws 46*b*. Each jack screw 46*b* has a sprocket 46*c* secured to it. A link chain 46*d*, common to all four sprockets 46*c* and to a reversible motor (not shown), serves to raise or lower the compression bed 46 uniformly when so desired to provide flexibility as to the size of the stack of newspapers the stack wrapper machine will handle.

Secured to the top of the compression bed 46 is a polished, stainless steel slide plate 46*e* which extends across the width and the length of compression bed 46. At its left end a spacer plate 46*f* is located between the slide plate 46*e* and the compression bed. Spacer plate 46*f* extends to a point slightly before the compression unit 40 and provides a step 46*g* in the slide plate 46*e* where the latter drops to the compression bed, which affords a two step compression sequence that will later be described more fully.

With reference to FIGS. 3, 4, and 7, a gluer mechanism 48 (shown in dot-dash lines in FIG. 4) is mounted on the frame of the stack wrapper machine near its discharge end 12. The gluer mechanism is of the commercially available hot-melt type and is supplied from a glue supply roll 48*a*. The ends of the length of wrap 14*a* pass above the cantilevered member 40*c* and one end passes through a pair of guide plates 48*b* to the gluer and receives the glue from an applicator wheel 48*c*. As will be more fully described later, the ends of the wrap 14*a* are folded over each other by folding plates 48*d* and 48*e*. Another guide 48*f* and one of the guides 48*b* keep the ends of the wrap upright before they reach the folding plates.

With reference to the schematic view in FIG. 9, it can be seen that both the upper sidewall conveyors 36—36 and the lower sidewall conveyors 42—42 are driven from a common mechanical connection, such as a link chain 50 or the like. Thus connection ties together both sides of the conveyor with a brake BR, a clutch CL, and a drive motor DM. Both the brake BR and the clutch CL are pneumatically operated and under the control of a spring biased slide valve SV5 which is operated by a pusher solenoid SOL7. A quick release valve 52 is placed in the line to the clutch CL to prevent the latter and the brake BR from being simultaneously energized.

The operation of the stack wrapper will now be explained.

As can be seen in FIG. 12, electrical power to the stack wrapper is supplied through main conductors L1, L2 and L3 of a three phase A.C. supply source. A main disconnect switch DS connects the lines L1, L2 and L3 with the drive motor DM, and lines L2 and L3 to the primary winding of a power transformer PT. A selector switch S1 connects the transformer PT to the rest of the system.

Let it be assumed with switches DS and S1 closed, that the wrap feed unit 8 has inserted a length of precut wrap 14*a* into its place within the loading unit 6, and that the transfer unit 4 has deposited a stack of newspapers within the loading unit and is returning to its stack-receiving position at the stacker 2. As the transfer unit clears the loading unit it trips a limit switch which releases the stack of papers from the loading unit 6 and momentarily actuates solenoid SOL1 (FIG. 8), which moves slide valve SV1 as viewed in FIG. 8. In its left-hand position slide valve SV1 admits air to the top of piston 18*a* within pneumatic operator 18, forcing the ram mechanism down against the stack of papers. The ram, together with gravity, forces a stack of papers SP down onto the slide plate 46*e* carrying with it the center portion of the length of wrap 14*a*, while adjacent portions of the wrap extend upward along the sidewall conveyors 42 and 36 and over the top of sidewall conveyors 36.

As the ram reaches the bottom of its stroke, cam member 16*c* actuates limit switch 1LS, closing contacts 1LS1 and opening contacts 1LS2. The closure of contacts 1LS1 completes a circuit to a control relay 1CR, energizing the latter to close its contacts 1CR1, 1CR2 and 1CR3. Closure of contacts 1CR1 completes a circuit to solenoid SOL2, which moves valve SV1 back to its right-hand position as shown in FIG. 8. Valve SV1 then admits air to the bottom of air cylinder 18, forcing the piston 18*a* and hence the ram mechanism upward, thereby reclosing contacts 1LS2 and reopening contacts 1LS1 of limit switch 1LS. Contacts 1CR2 maintain relay 1CR energized.

Upon reclosure of contacts 1LS2, a circuit is completed through contacts 1CR3, 1LS2 and solenoid SOL3 to energize the latter and to move spring biased valve SV2 to the right against the bias of its spring as viewed in FIG.

11. This action admits air to the left-hand side of the piston 30*a* in cylinder 30, thereby causing the latter to move to its left-hand position, and in so doing, pivots lever 28 clockwise. As a result, the tucker blades 22 move downwardly, forcing the ends of the wrap 14*a* into the paper grippers 36*a*.

At the same time the circuit to SOL3 is closed, a time delay relay 1TR of the "on-delay" type is energized. When relay 1TR times out, its contacts 1TR1 in the control circuit for solenoid SOL4 close, thereby energizing the latter to move valve SV3 to the right as viewed in FIG. 11, to move the piston 32*a* of cylinder 32 to the right. Such movement of the piston 32*a* rotates lever 28 counterclockwise which raises the tucker blades 22 clear of the paper grippers 36*a* and causes cam 34 to actuate limit switch 2LS and close its contacts 2LS1 and open its contacts 2LS2. Opening of contacts 2LS2 opens the circuit to relay 1CR thereby dropping out the latter. The opening of contacts 1CR3 drops out the relay 1TR and solenoid SOL3, and the latter allows valve SV2 to be spring returned to its left-hand position as shown in FIG. 11 which admits air to the right-hand side of piston 30*a* and causes cylinder 30 to move to its right-hand position and rotates lever 28 further counterclockwise. With cylinder 30 in its right-hand position with respect to the piston 30*a*, and piston 32*a* in its right-hand position with respect to the piston 30*a*, and piston 32*a* in its right-hand position, tucker blades 22 are raised to their fully retracted position.

The closure of contacts 2LS1 of limit switch 2LS upon the first step of the two-step retraction of the tucker blades closed the control circuit of solenoids SOL7 and SOL6. Energization of solenoid SOL7 moves valve SV5 to its left-hand position as viewed in FIG. 9 to release brake BR and engage clutch CL, and thereby start the sidewall conveyors 36—36 and 42—42 and the endless conveyor belt 40*g*, in motion. At the same time, energization of solenoid SOL6 moves valve SV4 to its right-hand position as viewed in FIG. 10, admitting air to the rear of piston 38*a* within cylinder 38, to thereby extend the piston rod 38*b* and pusher plate 38*c*. Pusher plate 38*c* imparts a "kick" to the rear of the top few papers of the stack SP, causing the stack to take the form substantially as shown at SP in FIG. 2. This is done to compensate for deformation of the stack during the next step of compression shown in SP′ in FIG. 2. During this time the wrap feed unit 8 inserts another sheet of wrap 14*a* into position within the loading unit 6 in preparation for the next stack of papers which is entering the transfer unit 4.

A number of brackets 42*a* are attached at equally spaced intervals to segments of lower sidewall conveyors 42—42 to engage and push the stack of papers SP along the slide plate 46*e*. As the conveyors 42—42 push the stack SP from SP to SP′ as shown in FIG. 2, it passes over the downwardly angled step 46*g* in the slide plate as formed by the end of spacer plate 46*f*. As seen in FIG. 5, when the stack is at SP, the wrap 14*a* is somewhat loose around the stack. The ends of the wrap 14*a* remain in the paper grippers 36*a* of upper sidewall conveyors 36—36 and travel with the stack. As the stack travels over the step 46*g* and drops to the lower level it pulls the wrap tight around it, thus adding to the compression which the stack receives as it enters SP′.

Movement of the sidewall conveyors 36—36 and 42—42 cause a cam 54, fixed to an extension of a shaft of upper sidewall conveyors 36—36 to rotate clockwise and actuate a limit switch 3LS. Closure of limit switch 3LS completes the circuit to a control relay 2CR and to solenoid SOL5. Upon energization of relay 2CR, normally closed contacts 2CR2 and 2CR3 open, deenergizing solenoids SOL6 and SOL7, thus insuring that solenoid SOL4 is deenergized, even though relay 1TR might fail to drop out.

Solenoid SOL6, upon deenergization, allows valve SV4 to return to the position shown in FIG. 10 under the bias of its return spring, and thereby retracts the pusher plate 38*c*. Deenergization of solenoid SOL7 allows valve SV5 to be spring returned to its position shown in FIG. 9, thereby releasing the air supply from the brake BR and clutch CL. Quick release valve 52 insures that the clutch will be disengaged before the spring biased brake engages to stop the sidewall conveyors, endless belt 40*g* and pressure roller 40*n*.

Contacts 2CR1 of relay 2CR close upon energization of the latter to maintain the latter relay energized around switch 3LS until such time as relay 1TR opens its contacts 1TR2 during the next operating cycle.

The energization of solenoid SOL5 and deenergization of solenoid SOL4 moves valve SV3 to the position shown in FIG. 11, with air admitted to the right-hand side of piston 32*a*, and moves the latter with common piston rod 30*b*–32*b* and cylinder 30 to the left, and moves the tucker blades 22 to their intermediate position.

In the next increment of travel as depicted from the operating cycle just described, the stack SP travels from the position shown as SP′ to that shown as SP″. During this movement the stack becomes fully compressed. The upper side wall conveyors 36—36 end in this area and the paper grippers 36*a* are cammed open in a conventional manner to release the ends of the wrap 14*a* to travel along guide plates 48*f* and 48*b*.

As can be seen in FIG. 5, the stack of papers (dotted lines) sags somewhat along its longitudinal center due to the placement of the folded portion of the newspaper along its edges. To compress the stack uniformly, it is necessary to shape the compression members to mate with the concave upper surface of the stack. The compression members are the endless belt 40*g* and the cantilevered member 40*c*, which are shown in cross section in FIGS. 6 and 7.

Belt 40*g* travels along the underside of cantilevered member 40*c* at its longitudinal center, which is its lowest surface, and along the upperside of member 40*c* in a shallow trough 40*p*. A cover plate 40*r* secured to the member 40*c*, covers the belt and provides a smooth, flush upper surface for the member 40*c*. Uniform compression of the stack is provided by upwardly angled relief portions 40*s* formed on the underside of the member 40*c*. Downwardly angled portions 40*t* formed on the upperside of member 40*c* meet relief portions 40*s* at the edges of member 40*c* and are joined by a small radius.

Folding plates 48*d* and 48*e* overlie the top of member 40*c* in close proximity to its upper contour. As can be seen in FIG. 4 the folding edge of plate 48*d* turns its end of the wrap 14*a* down between itself and the surface 40*t* very gradually at first and increasingly faster as the stack and the wrap move along the machine. Plate 48*e* folds its edge down between itself and the other surface 40*t* at a uniform rate, which allows the glueing wheel 48*c* to apply the glue evenly to the end of the wrap that will overlap the end already down by plate 48*d*. The outer guide plate 48*d* has fingers at its one end which mate with the glueing wheel 48*c* to keep pressure on the paper against wheel 48*c* as the glue is applied.

As the machine repeats its cycles, the wrapped stack moves along the slide plate 46*e*, while the overlapped and glued seam of the wrap moves along the plate 40*r* on the upper surface of member 40*c*. At the end of member 40*c* driven pressure roller 40*n*, which drives whenever the lower sidewall conveyors 42—42 move because of the link chain 44 and sprocket connection, helps drive the wrap off the end of member 40*c* as brackets 42*a* push the wrapped stack toward the right. There is some spring back of the papers when the wrap clears the member 40*c*. However, because of the cross sectional design 40*c* the portions 40*t* allow the wrap to be folded over at a point very close to the stack of papers. This eliminates the excess space that would have occurred if the member 40*c* would have had squared upper corners at its output end, and accordingly reduces the paper stack

spring-back over that of previous designs. It will be apparent that a tighter wrap can thus be effected.

The wrapped bundles are discharged out the right-hand end of the machine and may be carried away by conveyors, chutes or the like.

The control system depicted in FIG. 12 is a somewhat modified portion of a more comprehensive system for a complete stacker-wrapper mechanism disclosed and claimed in the Frank S. Hyer application Serial No. 262,414, filed March 4, 1963, now Patent No. 3,186,564.

It will be understood in the following claims that the word "article" refers to either a single article or a plurality of stacked articles.

We claim:

1. In an article wrapping machine:
(a) a flat bed plate having a first level and a second level offset below said first level,
(b) a pair of conveyors having active portions extending the length and on opposite sides of the bed plate and in perpendicular relation to the latter,
(c) means for placing a pre-cut length of wrap material across the upper edges of the conveyors over the first level of said bed plate,
(d) means for moving an article downwardly against a length of wrap and together with the latter against the first level of said bed plate,
(e) means for clamping each length of wrap adjacent its ends against said conveyors when the intermediate portions of the wrap and article thereon bottoms against said bed plate,
(f) means for operating said conveyors in synchronism to move clamped lengths of wrap and any articles thereon in equal increments along said bed plate each time a length of wrap is clamped as aforestated, in a manner such that the first increment of movement of a clamped length of wrap and article thereon will be on said bed plate from said first level to said second level to effect tightening of an intermediate portion of the wrap around the bottom and sides of the article,
(g) means disposed between said conveyors over the second level of said bed plate for compressing the article in each length of wrap, comprising a belt which has an active portion running angularly downwardly toward said bed plate between first and second points along said bed plate and then parallel with the latter between said second point and a third point, said belt running in increments corresponding to those of the conveyors each time the latter are operated, and a cantilever member overlying the active portion of said belt and supported adjacent said second point and extending to said third point.

2. The combination according to claim 1, together with means for effecting selectively vertical adjustment of said bed plate.

3. The combination according to claim 2, wherein said vertical adjustment means comprises a plurality of jack screws on which said bed plate is mounted at spaced points and means including motor means common to said jack screws to effect simultaneous rotation of said jack screws.

4. The combination according to claim 1, together with means operable to forwardly offset the upper portion of said article at said first point.

5. The combination according to claim 4, wherein said offset means comprises a plate at an angle to the vertical and motor means to effect linear movement of said plate in synchronism with said conveyor movement.

6. The combination according to claim 5, wherein said offset means and said conveyors are provided with fluid power under the direction of limit switches to provide energization of said operators to afford movement of said offset means and said conveyors.

7. The combination according to claim 1, together with means for effecting release of wrap clamping means each time a length of wrap and the article thereon moves through a point intermediate said second and third points, means for folding the released ends of wrap one over the other, and means for securing said ends of wrap in said overlapped position.

8. The combination according to claim 7, wherein said folding means comprises a pair of members which overlie the upper surface of said cantilevered member and effect folding of said released ends of wrap over said upper surface between the latter and said folding means.

9. The combination according to claim 1, together with a pair of rollers at said third point, said rollers comprising an idler roller attached to the free end of said cantilevered member and a driven roller engaging said idler roller, said driven roller providing an upper limit for flexure of said cantilevered member, and means operable to drive said driven roller in synchronism with said conveyor movement.

10. The combination according to claim 1, wherein said cantilevered member is of substantially flattened hexagonal form in cross section having a rectangular central portion with parallel upper and lower surfaces and substantially triangular portions extending from opposite ends of said central portion with corresponding apexes being on an imaginary line parallel with and between the upper and lower surfaces of said central portion.

11. The combination according to claim 10, wherein said triangular portions have slightly rounded apexes and the lower surfaces of said triangular portions have relieved portions comprising surfaces extending inwardly from said rounded apexes parallel to said upper and lower surfaces of said central portion, and portions extending from said central portion to said inwardly extending surfaces at an angle with the horizontal.

12. The combination according to claim 11, together with means for effecting release of wrap clamping means each time a length of wrap and the article thereon moves through a point intermediate said second and third points, means for folding the released ends of wrap one over the other, and means for securing said ends of wrap in said overlapped position.

13. The combination according to claim 7, wherein said folding means comprises a pair of members which overlie the upper surface of said cantilevered member in close proximity to its contour to fold the released ends of wrap between said folding means and said upper surface at points close to the upper edges of said article.

14. The combination according to claim 13, together with a pair of rollers at said third point, said rollers comprising an idler roller attached to the free end of said cantilevered member and a driven roller engaging said idler roller, said driven roller providing an upper limit of said cantilevered member and driving said overlapped and secured ends of wrap off said cantilevered member between said pair of rollers, and means operable to drive said driven roller in synchronism with said conveyor movement.

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