United States Patent [19]

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[45] Feb. 19, 1974

[54] **WRAPPING COMPRESSIBLE MATERIAL**

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[73] Assignee: **Certain-teed Products Corporation**, Valley Forge, Pa.

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[52] U.S. Cl. ..... **53/124 E**, 53/124 CC, 53/190, 53/259, 100/153

[51] Int. Cl. **B65b 63/02**

[58] Field of Search ... 53/124 E, 124 CC, 125, 259, 53/260, 188, 190; 100/149, 153, 192

[56] **References Cited**

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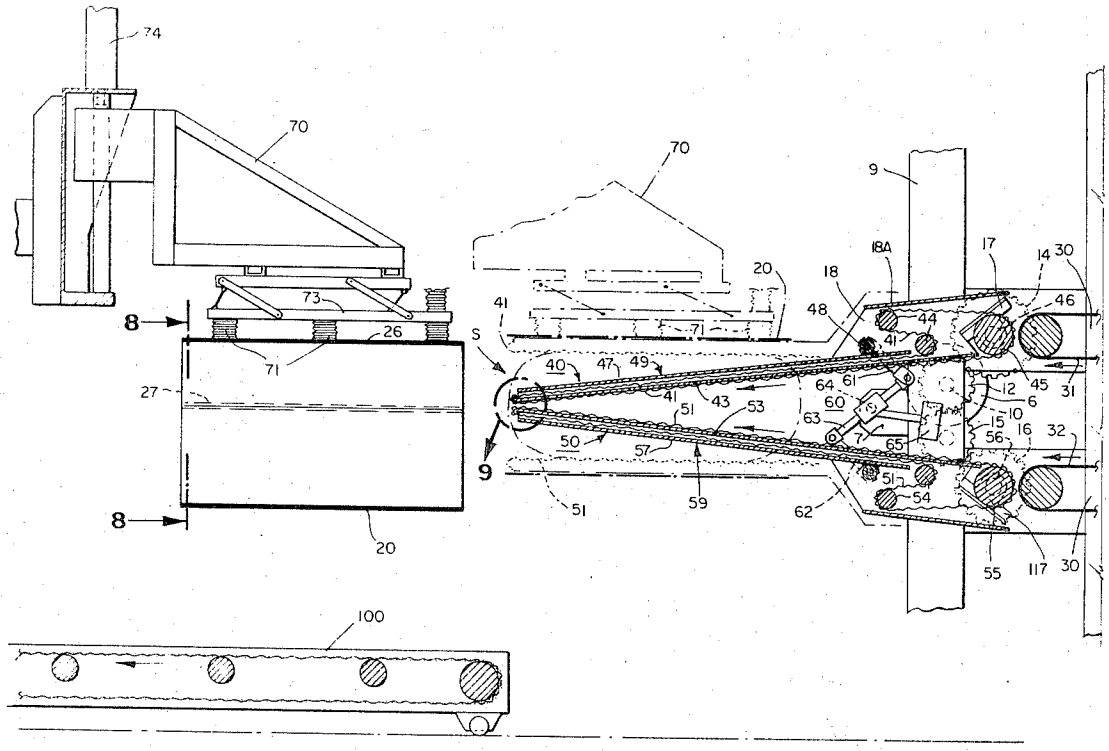
Primary Examiner—Travis S. McGehee
Attorney, Agent, or Firm—Paul & Paul

[57] **ABSTRACT**

Units of resilient compressed material are delivered at spaced intervals to the interior of a tubular wrapper supported by a wrapper carrier in encircling position about the upper and lower jaw members of an almost-closed or collapsed counter-balanced spout. Each of the jaw members has its own driven endless conveyor belt which cooperate to advance the compressed unit toward the almost-closed mouth of the spout, the thrust of the unit causing the counterbalanced jaws to open to allow the unit to pass therethrough. In timed relation thereto, the encircling tubular wrapper is moved by its carrier in the same direction and at the same speed as the advancing compressed unit as it emerges from the opened mouth of the spout. As the compressed resilient material emerges, it expands into pressure engagement with the encircling tubular wrapper. When the wrapper is held in encircling position about the almost-closed jaws, just prior to arrival of the next unit to be wrapped, upper and lower cover plates, above and below the moving jaw conveyors, are interposed between the moving jaw conveyor belts and the wrapper. In preferred embodiments, automatic means pick up a tubular wrapper from a supply of wrappers, spread open the picked-up wrapper in a desired position of orientation with respect to informational matter appearing thereon and also with respect to a carry-handle with which the wrapper is provided, and carry the picked-up wrapper in the desired position of orientation to an encircling position about the almost-closed jaws of the spout, in timed relation to the expected arrival of the next unit of resilient compressible material to be wrapped.

9 Claims, 15 Drawing Figures



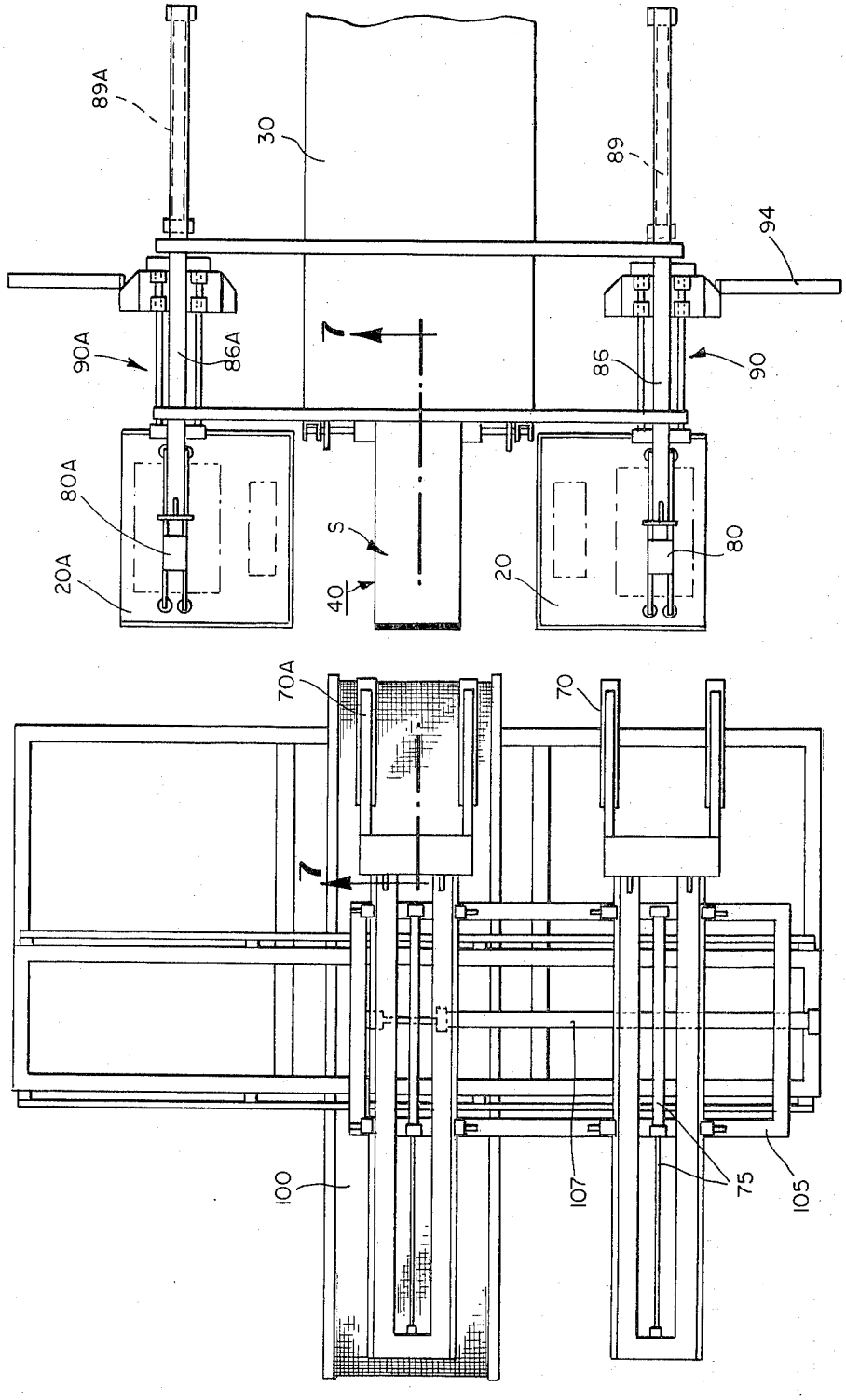

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Fig. 1

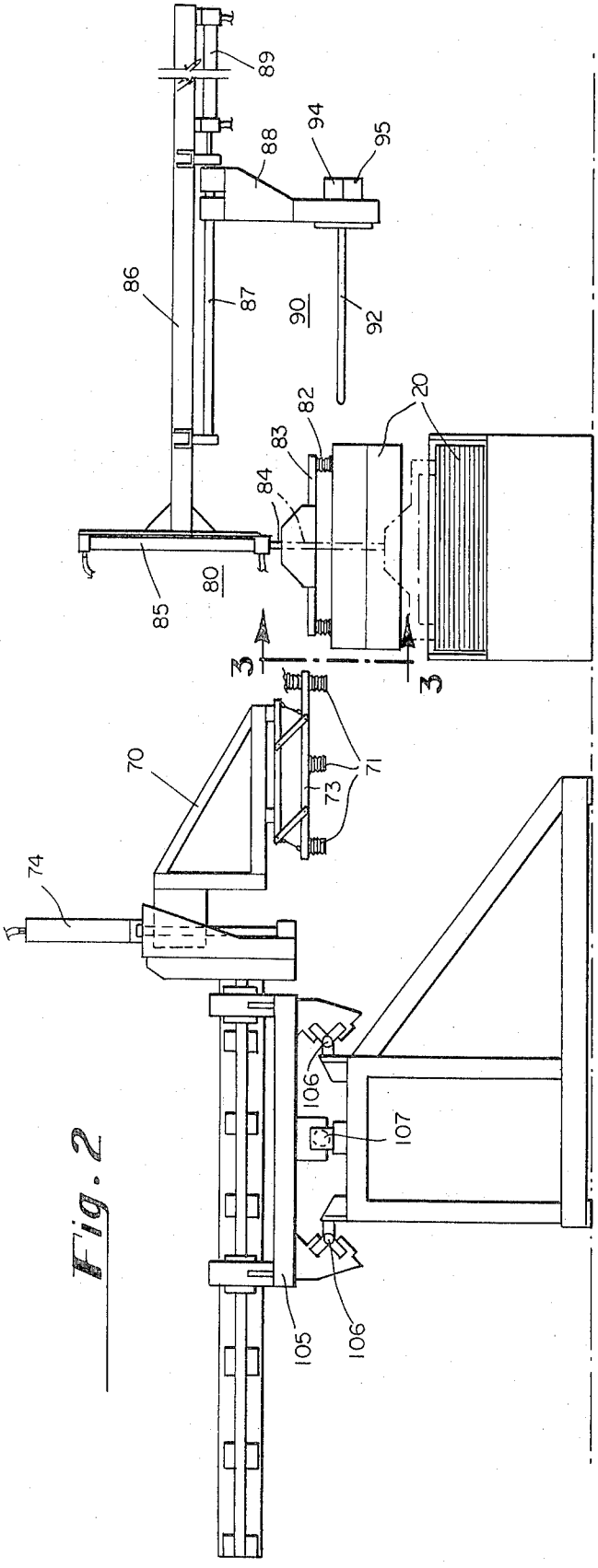
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Fig. 2

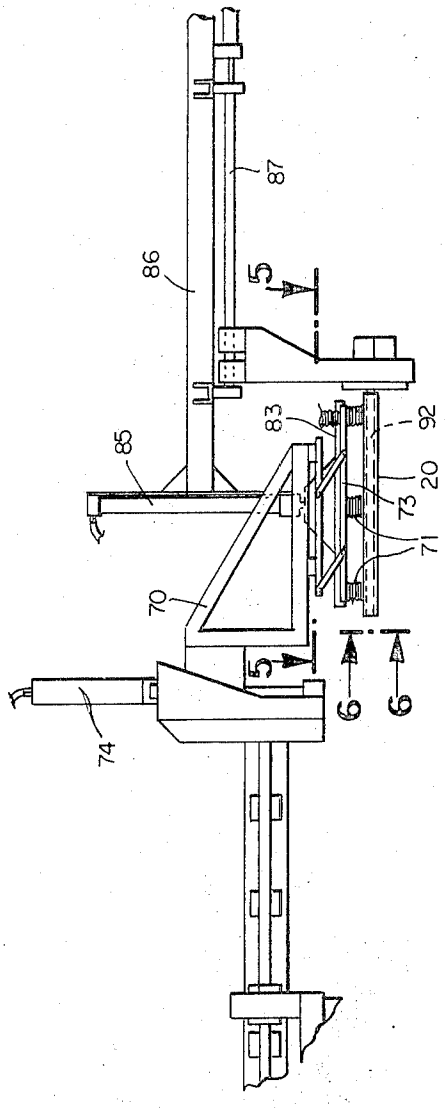
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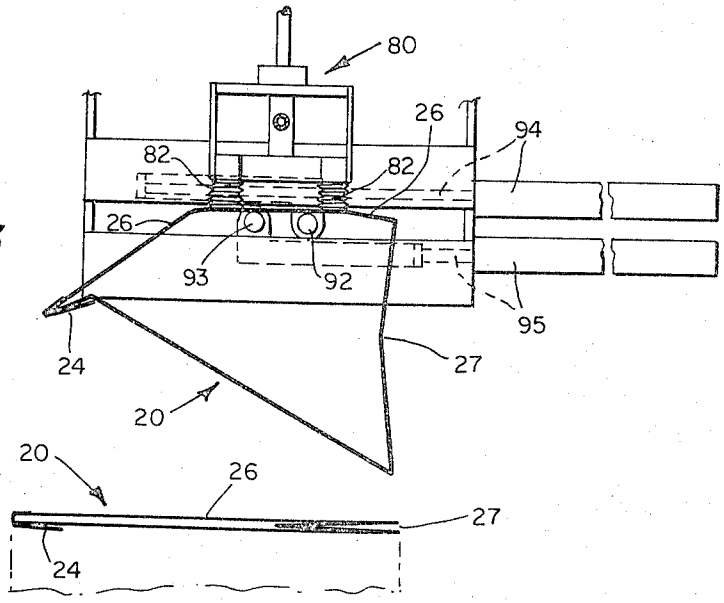
Fig. 4

Fig. 3



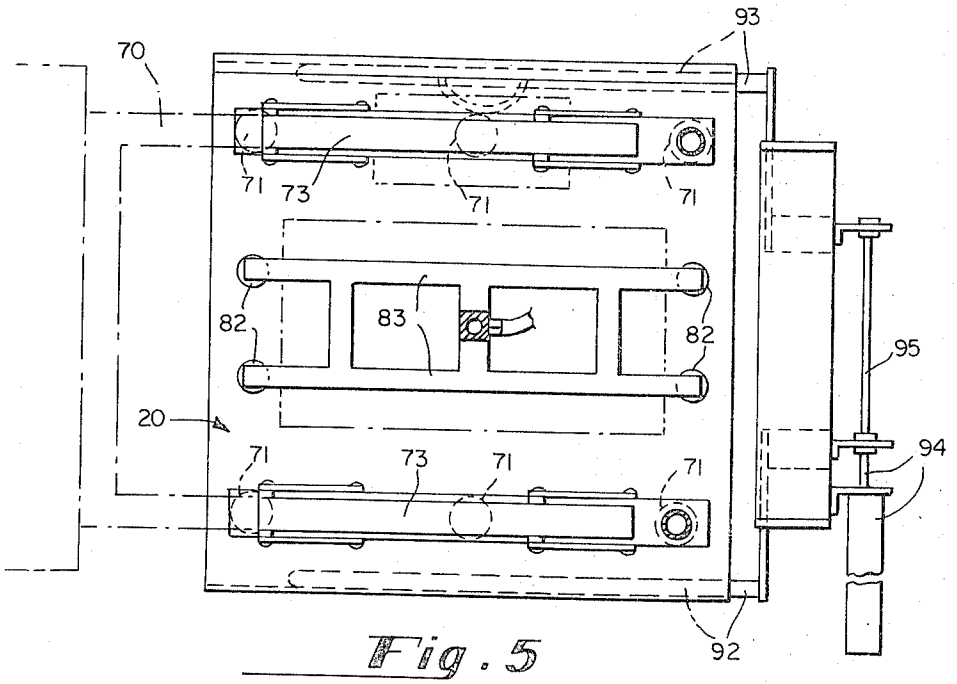


Fig. 5

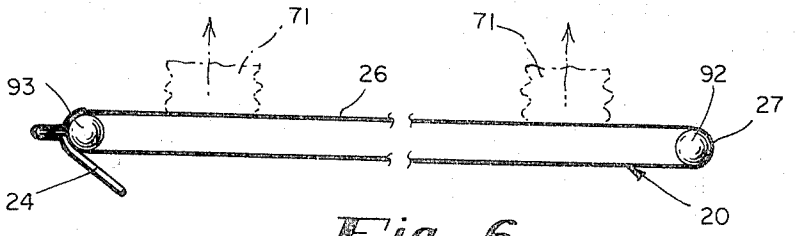


Fig. 6

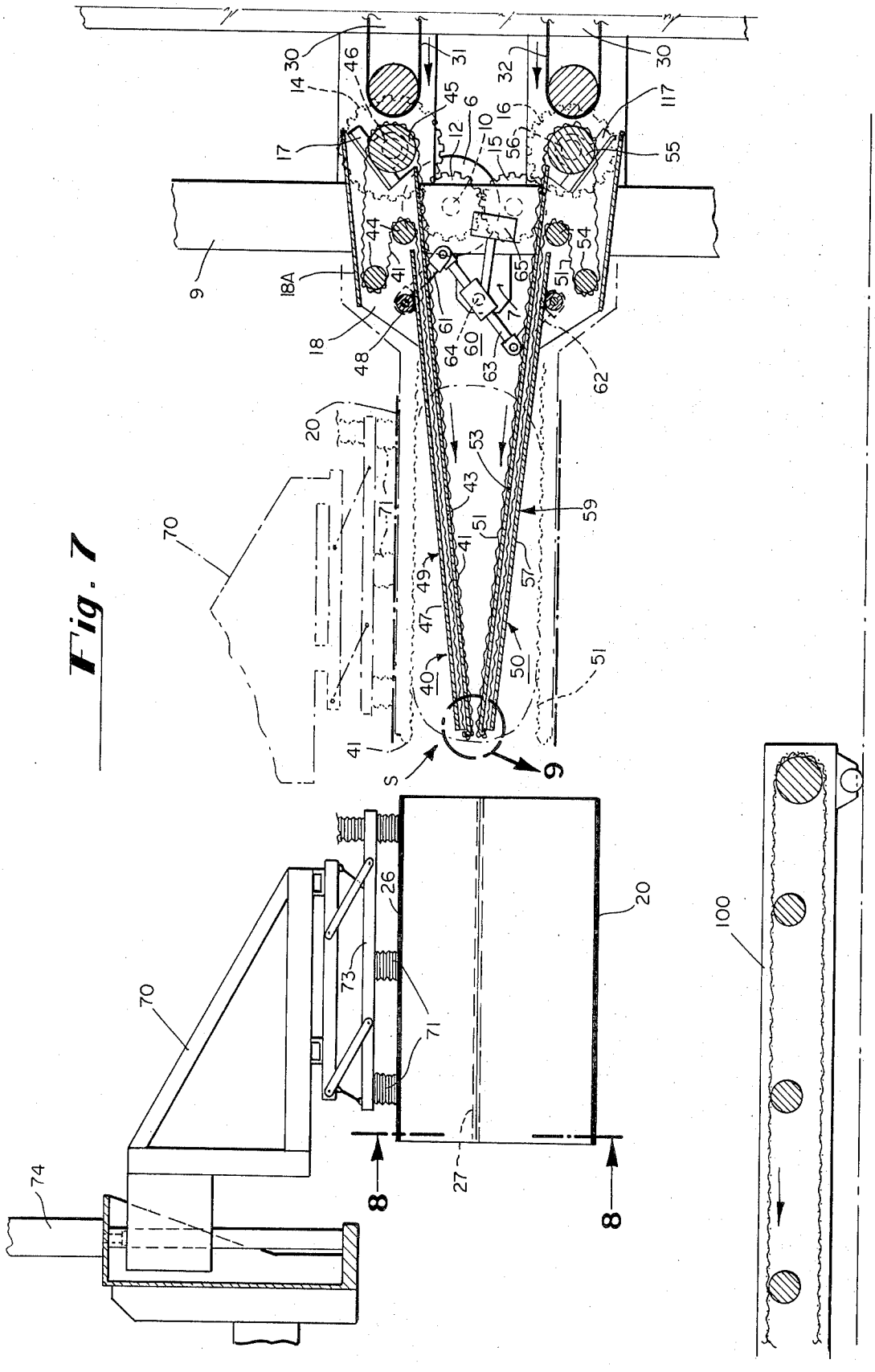

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Fig. 7

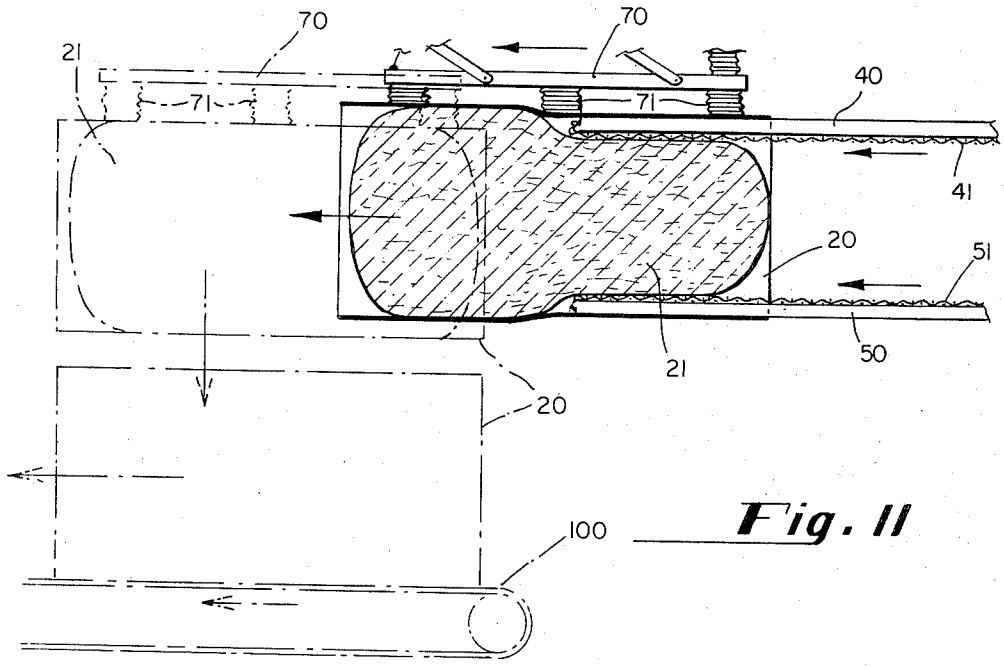

Fig. 11

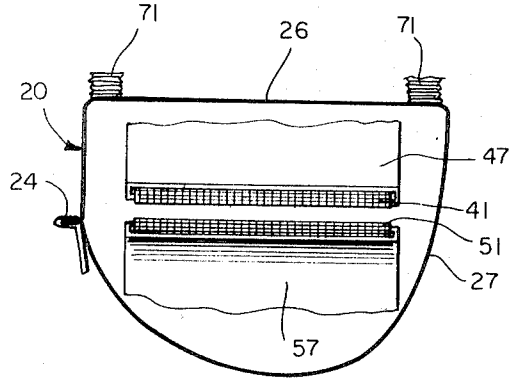

Fig. 8

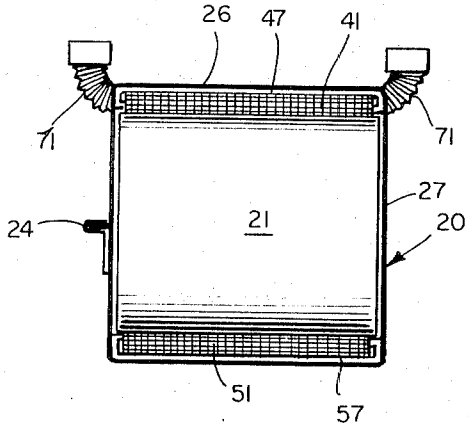

Fig. 10

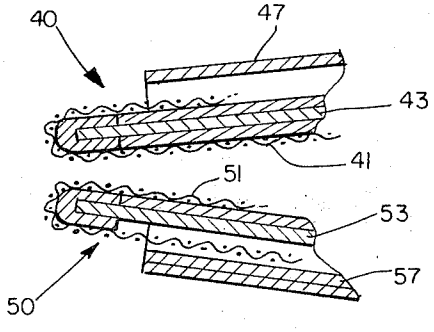

Fig. 9

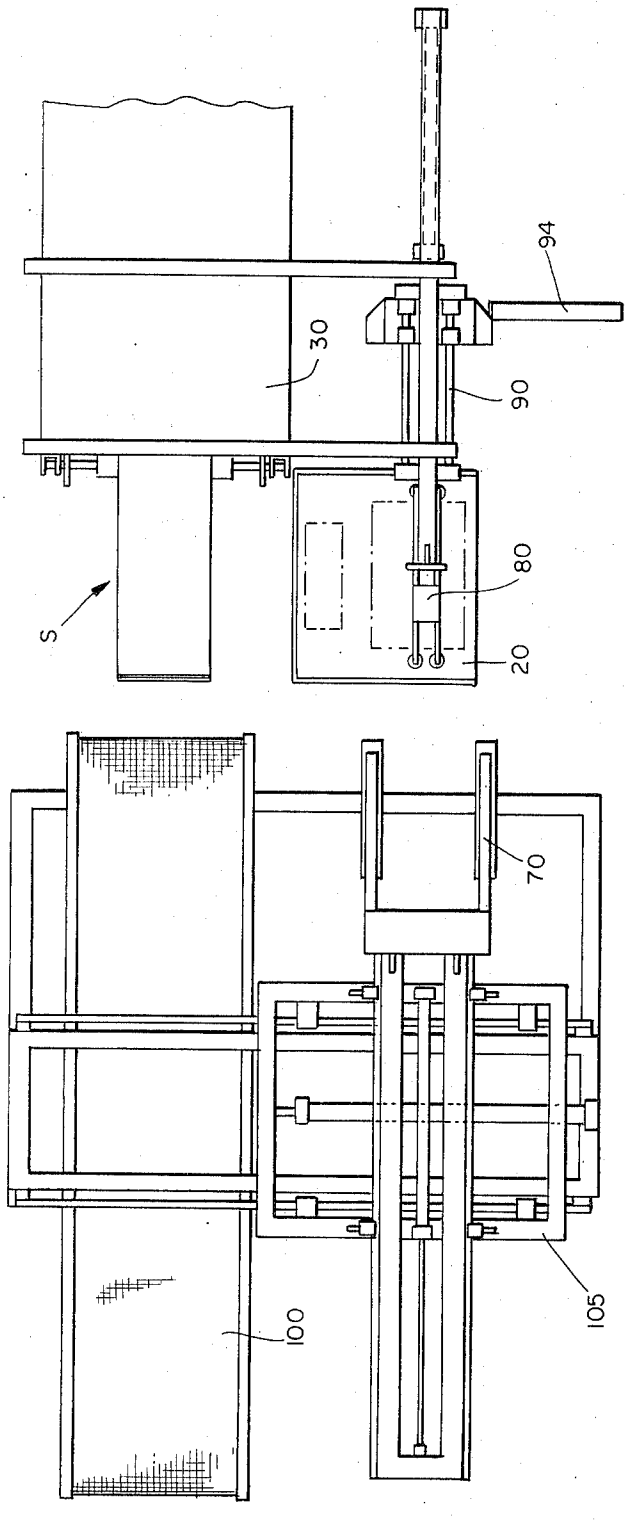

Fig. 12

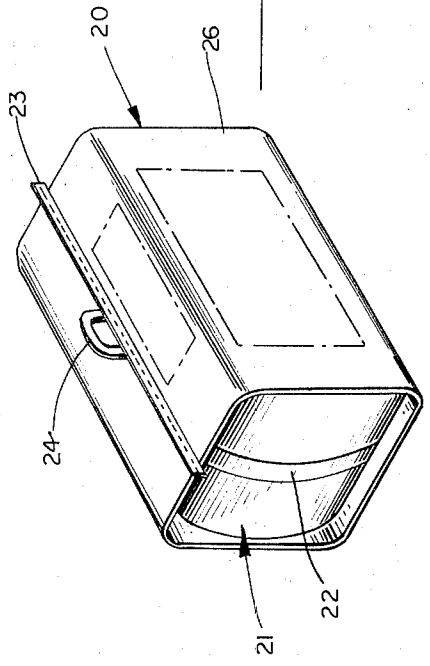

Fig. 13

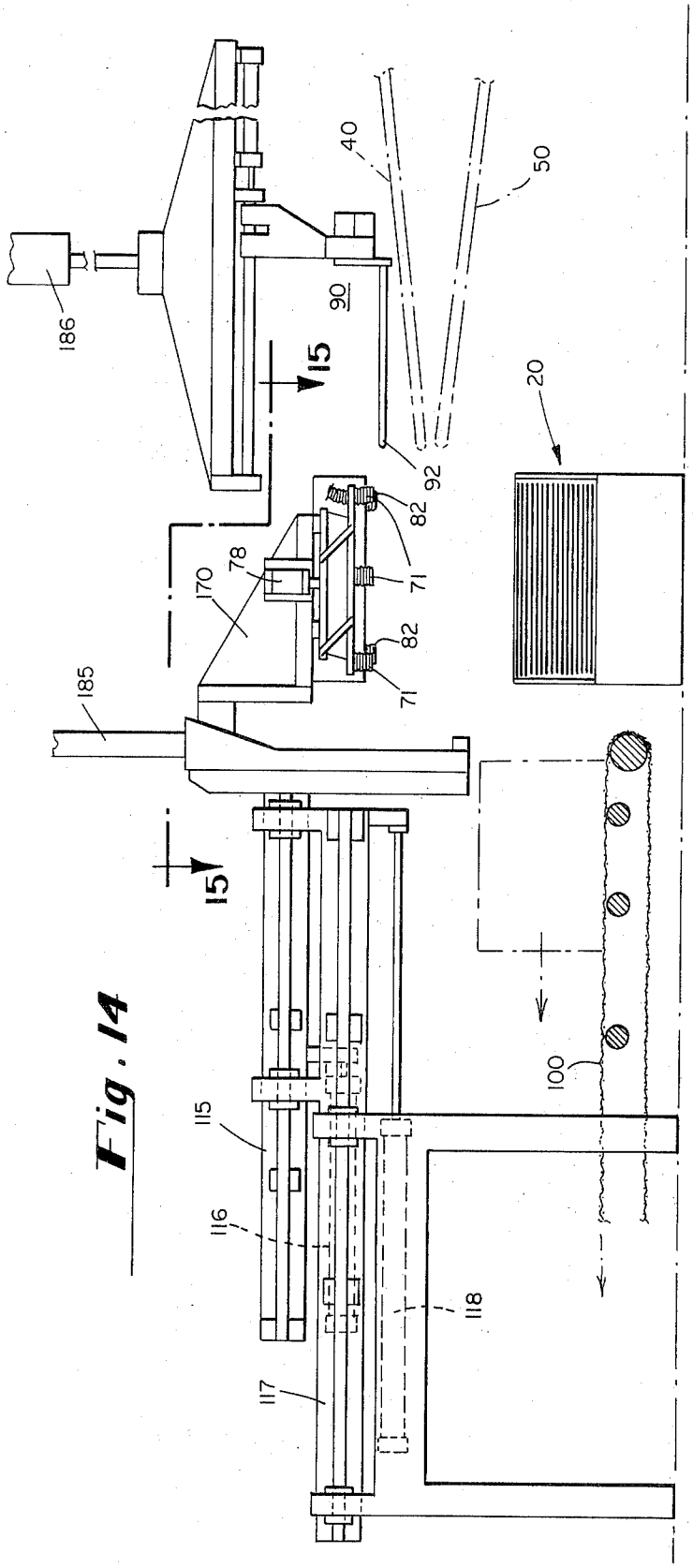
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Fig. 14

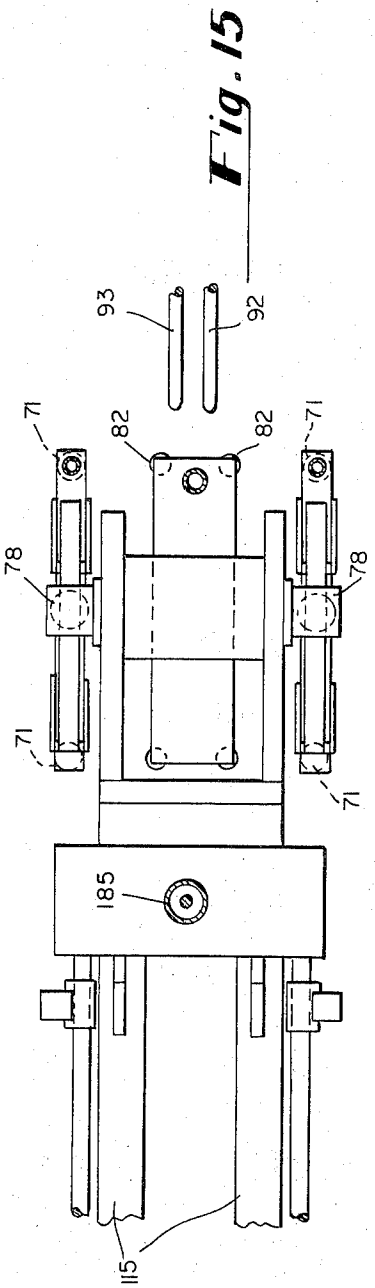
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Fig. 15

WRAPPING COMPRESSIBLE MATERIAL

BACKGROUND OF THE INVENTION

This invention relates to apparatus for packaging resilient compressible materials. While not limited thereto, the apparatus of the present invention is particularly applicable to packaging, in a tubular wrapper, fibrous insulation material, such as rolls or bats of faced or unfaced fibrous insulation, for example, continuous lengths of fiberglass insulation in rolled-up form. The tubular wrapper may be a bag or a carton, but is preferably a sleeve.

Since the insulation material, such as a roll of fiberglass insulation, is resilient and compressible, it is desirable, in order to conserve shipping space, to reduce the volume of the material by compressing, wrapping and shipping it in compressed or partially compressed form, preferably in a generally rectangular package, since rectangular packages, in comparison with round or oval packages may be stacked in shipment with less voids and hence less waste of shipping space.

SUMMARY OF THE INVENTION

An object of the present invention is to provide apparatus for automatically wrapping units of resilient compressible material in tubular wrappers.

Another object is to provide apparatus for automatically wrapping units of resilient compressible material, such as fibrous insulation material in roll or bat form, in sleeve wrappers.

Another object is to provide apparatus for successively inserting units of resilient compressed material, such as compressed rolls of insulation material, into the interior of sleeve wrappers, and for then allowing the compressed material to expand outwardly to a limited extent to pressure engage the encircling sleeve.

Another object of the invention is to provide apparatus as aforesaid which has the additional capability of picking up automatically from a supply stack, one at a time, sleeve wrappers in flattened form, opening the picked-up wrapper, carrying it to a wrapping station, holding the sleeve in open position at the wrapping station to receive within its interior a unit charge of compressed resilient material, and allowing the compressed material to expand to a limited extent within the sleeve wrapper.

Another object of the invention is to provide apparatus as aforesaid, wherein the sleeve has a handle and has printed information thereon, and wherein, when the sleeve wrapper is picked up from the supply stack and opened for carry to the wrapping station, the sleeve is properly oriented as to the handle and as to the informational material appearing thereon.

In the description which follows it is assumed that the tubular wrapper is a sleeve, but, as already indicated, the wrapper could be a bag or a carton.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic plan view of apparatus embodying the present invention.

FIG. 2 is a side elevational view of the apparatus of FIG. 1.

FIG. 3 is a schematic elevational view of the sleeve pick-up mechanism, as seen looking along the line 3—3 of FIG. 2.

FIG. 4 is a side elevational view of the sleeve carrier mechanism showing the sleeve carrier in advanced position over the supply stack of sleeves.

FIG. 5 is a schematic plan view of the sleeve pick-up mechanism and of the sleeve carrier mechanism, as seen looking down along the line 5—5 of FIG. 4.

FIG. 6 is an elevational view as seen looking along the line 6—6 of FIG. 4 showing a single sleeve after it has been picked up from the supply stack and spread open by the spreader arms of the pick-up mechanism.

FIG. 7 is a side elevational view looking along the line 7—7 of FIG. 1 showing the counter-balanced jaws of the discharge spout in collapsed condition for receiving the sleeve held by the sleeve carrier.

FIG. 8 is an elevational view looking along the line 8—8 of FIG. 7 showing the opened sleeve before it is advanced into encircling position about the collapsed jaws of the spout.

FIG. 9 is an enlarged view of the encircled area identified 9 in FIG. 7.

FIG. 10 is an elevational view of the sleeve after it has filled with expanded material and is about to be dropped on to an output conveyor.

FIG. 11 is a schematic side elevational view of a unit of material as it emerges from the jaws of the spout conveyor, showing the leading portion of the material expanding into the encircling sleeve, the trailing portion still being compressed by the open jaws of the spout conveyor.

FIG. 12 is a schematic plan view of an apparatus generally similar to that of FIG. 1 but modified to the extent that it has but a single pick-up mechanism whereas the apparatus of FIG. 1 has a dual pick-up mechanism.

FIG. 13 is a prospective view of a sleeve-wrapped unit which is delivered by the apparatus described herein.

FIGS. 14 and 15 are respectively side elevation and plan views of apparatus generally similar to that of FIGS. 1 and FIG. 13 but modified in that the sleeve is picked-up by the carrier mechanism, no separate pick-up mechanism being provided.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Reference is first made to FIG. 13 which illustrates one form of package which may be the output of the apparatus disclosed and claimed in the present application. In FIG. 13, the package is shown to be generally rectangular. It may contain a partially-compressed continuous spiral roll 21 of fibrous insulation material, such as fiberglass, which may be retained in spiral form by an encircling band 22. The tubular wrapper or sleeve 20 consists of a length of wrapper material, usually heavy paper, the ends of which have been stitched together as at 23. Secured thereto is a handle 24, preferably of plastic. The sleeve 20 embraces the spiral roll 21 normal to the band 22. The sleeve 20 may have been pre-printed with desired information which, in the finished wrapped product, appears in desired locations, as for example, on the top and side surfaces of the generally rectangular package, in the areas indicated in FIG. 13 by the dot-and-dash line rectangles. Handle 24 is located in its most desirable position, in the center of the top of the package. To open the package, the sleeve 20 may be ripped along the line of the stitching 23. The

stitching facilitates the tearing. The wrapped package of FIG. 13 illustrates one form of output product which may be delivered from the wrapping apparatus described and claimed herein.

Referring now to FIGS. 1 and 7, units of resilient compressible material, which in the present discussion will be assumed to be spiral rolls of fiberglass insulation material encircled by a retaining band 22, advance at spaced intervals along a feed conveyor 30 which leads to one end of a collapsible spout conveyor mechanism identified S in FIG. 1. Feed conveyor 30 includes (FIG. 7) an upper endless belt 31 and a lower endless belt 32. The vertical spacing between the conveying surfaces of the two belts is less than the uncompressed diameter of the spiral roll 21 so that the roll 21 is compressed vertically as it is conveyed along between the belts of the feed conveyor 30.

As mentioned hereinbefore, adjacent the delivery end of the feed conveyor 30 is a collapsible spout conveyor mechanism S, the details of which are seen in section in FIG. 7. As there seen, spout conveyor mechanism S includes an upper jaw assembly 40 and a lower jaw assembly 50. Each jaw carries a driven endless conveyor belt, identified 41 and 51, respectively. The upper and lower jaw assemblies 40 and 50 are similar so that a description of one will suffice for the other. The upper jaw assembly 40 will be described.

Journalled in side frame members 18 is a cross shaft 46, and supported for rocking motion on shaft 46 is a pillow block 17. Secured, as by welding, to the pillow block 17, at each side of the machine but inward of the side frame members 8, is a side plate 18 having a cover 18A extending transversely between the two side plates 18. Secured, as by welding, to the side plates 18 and projecting therefrom, toward the discharge end of the spout conveyor, is a hollow rectangular structure 49 having an upper cover plate 47 and a lower plate 43 which functions as a supporting shelf for an endless conveyor belt 41. The spacing between the upper and lower plates 47 and 43 serves as a slot, open at both ends, through which the non-conveying reach of the belt 41 passes.

Mounted on cross shaft 46 and secured thereto, as by key or pin, is a drive roller 45 about which the endless conveyor belt 41 is trained. Roller 45 may preferably have an anti-slip surface. Endless belt 41 is also trained about a pair of tension rollers 44, the positions of which are adjustable to assure that the belt 41 has a tight engagement with the surface of the drive roller 45. The path of the endless conveyor belt 41 may be traced from drive roller 45 along the underside of support plate 43, up and about the end thereof, then back through the interior or slot of the hollow rectangular member 49, about the pair of tension rollers 44, and back to the drive roller 45.

Extending across the machine and passing through the side plates 18 is a cross-shaft 48 which is secured, as by welding, to the upper surface of cover plate 47. Each end of cross-shaft 48 has a reduced-diameter portion which receives one end of a link arm 61 of a counter-balancing mechanism 60. The counter-balancing mechanism 60, one at each side of the machine, is supported on a stub shaft 64 which is supported in a bracket 7 secured to frame member 9. The counter weight 65 of the counter-balancing system ordinarily maintains the counter-balancing mechanism in the position shown in FIG. 7, thereby maintaining the jaw assembly 40 in the downward or convergent position as seen looking toward the mouth of the spout, i.e., in the direction in which the rolls 21 are advanced through the machine.

The lower jaw assembly 50 is similarly constructed. Reference numeral 51 identifies the lower endless conveyor belt; 59 is the lower hollow rectangular jaw member; 57 is the lower cover plate; 53 is the shelf about which the lower belt 51 is trained; 56 is the cross shaft; 117 is the pillow block 117; 55 is the drive roller for belt 51; 54 identifies the pair of tension rollers; 58 is the cross shaft which is supported in the side plates 118 and which is welded to the cover plate 57; and 62 is the lower link of the counter-balancing mechanism 60.

The endless belts 41 and 51 of the spout conveyor mechanism may be driven by a motor 6 mounted on a stub shaft 10 supported at one side of the machine on frame members 9. Secured to stub shaft 10, as by pin or key, is a drive gear 12 which is in mesh with and drives a gear mounted on and secured to shaft 46. Gear 12 is also in mesh with and drives an intermediate gear 15 which in turn is in mesh with and drives a gear 16 mounted on and secured to the lower shaft 56. By the means just described, the shafts 46 and 56, and the drive rollers 45 and 55, which are keyed or otherwise secured thereto, are driven in the same direction to move the conveying surfaces of the belts 41 and 51 in the direction indicated by the arrows in FIG. 7.

The counter-balancing system is so arranged that when the counter-weight 65 is at its lowest position, as illustrated in FIG. 7, the convergent ends of the upper and lower jaw assemblies are spaced slightly apart, as illustrated in FIG. 7, and in enlarged detail in FIG. 9.

When a to-be-wrapped roll 21 is delivered in compressed condition from the feed conveyor 30 to the input end of the spout conveyor mechanism, it is advanced by the spout conveyor belt 41 and 51 in compressed condition. The thrust of the advancing compressed roll 21 forces the convergent jaws 40 and 50 to open. When fully open, the jaws are in a position such as shown in phantom in FIG. 7. When the jaws 40 and 50 are spread open, as just described, the cross shafts 48 and 58 are caused, by the movement of cover plates 47 and 57, to rotate clockwise about their own axes, and the link arms 61 and 62 of the counter-balancing mechanism 60 are likewise moved in clockwise directions. This causes the connecting rod 63, at each side of the machine, to rotate counterclockwise on stub shaft 64 which is supported on the side frame of the machine. This lifts the counterweight 65 on each side of the machine.

After the roll 21 has been advanced fully through the mouth of the spout, and has cleared the terminal ends of the spout mechanism, the counter-weight 65 on each side of the machine falls down to its counter-balanced position, illustrated in FIG. 7, and the spout mechanism returns to the collapsed convergent condition, shown in solid line in FIG. 7.

It should be understood that the counter-balancing mechanism illustrated and briefly described above is merely representative of one suitable form of counter-balancing mechanisms which may be used.

The drive means described previously herein for driving the spout conveyor belts 41 and 51 may preferably have common means for driving the conveyor belts 31 and 32 of the feed conveyor 30, so that the feed con-

veyor and spout conveyor advance at the same rate of travel.

While the spout conveyor is in its convergent condition, illustrated in solid line in FIG. 7, and shown also in FIG. 9, (which for convenience may be referred to as the "closed" condition) and before the spout is opened to the position shown in phantom in FIG. 7 by the advancement of a roll 21 or other unit of material through the spout conveyor system, an opened sleeve wrapper 20 is carried to and placed over the closed spout, by the carrier 70, as shown in phantom in FIG. 7. In this phantom position, the sleeve 20 is supported in hanging position by the carrier 70. The convergent spout mechanism is within the interior of the sleeve 20, with cover plates 47 and 57 being interposed between the sleeve 20 and the moving belts 41 and 51.

When a roll 21 (or other item to be wrapped) is advanced into the spout conveyor system, the jaws of the spout open, as previously described, and as shown in phantom in FIG. 7. The roll 21 is in compressed condition, being flat on top and bottom, the leading and trailing ends being somewhat rounded.

When the roll 21 reaches the position shown in phantom in FIG. 7, a signal is generated, as by photo-cell or mechanical switch means, and, carrier 70 moves back away from the spout at a rate of travel corresponding to that of the spout conveyor belts. Thus, the sleeve 20 is moved back at the speed of the emerging roll 21 and concurrently therewith.

Reference is now made to the schematic illustration in FIG. 11. As the compressed roll 21 emerges from the open mouth of the spout conveyor system S, the resilient compressed material expands outwardly and comes into pressure engagement with the inside surfaces of sleeve 20. In FIG. 11, the leading half portion of roll 21 is shown to be so expanded. When roll 21 has advanced sufficiently to be fully clear of the spout conveyor, as shown in phantom in FIG. 11, the entire roll 21 has expanded and is now in pressure engagement with the sleeve 20. Suction force which has been applied through flexible tubes 71 to the outer surface 26 of the sleeve 20 is now cut off, and the sleeve-wrapped roll drops on to an output conveyor belt 100, and is carried away, as indicated in phantom in FIG. 11.

As soon as the roll 21 has cleared the open jaws 40 and 50 of the spout conveyor system S, the jaw members are returned to closed position by the counterbalancing mechanism 60, as indicated previously.

The means by which an open sleeve wrapper 20 is delivered to and held over the closed jaws of the spout in timed relation to the advancement of a roll 21 through the jaws, will first be described in a general fashion with reference to FIG. 1.

In FIG. 1, a sleeve 20 is picked up from a supply stack of flat sleeves by a pick-up mechanism 80. The sleeve picked up is then spread open by a spreader mechanism 90 after which it is transferred to sleeve carrier 70. After receiving the sleeve 20, carrier 70 is moved in a transverse direction on a cross carriage 105 to a center position, in line with the spout mechanism S. FIG. 8 is a view looking along the line 8—8 of FIG. 7 and shows the open sleeve 20 held by the carrier 70 about to be moved toward the closed jaws of the spout conveyor S. After reaching the center line position, the sleeve carrier 70 is moved toward the spout mechanism, to the position shown in phantom in FIG. 7. When the roll 21 has emerged from the mouth of the spout and has expanded into the sleeve 20, the sleeve 20 assumes a generally rectangular cross-sectional shape, as is illustrated in FIG. 10. It is to be noted that that portion of the side surface 26 of the sleeve 20, which in FIG. 8 is shown to be held by the suction tubes 71, has been pulled down in FIG. 10 to become part of the top and bottom surfaces of the finished package. The surface having the handle 24 is the top surface of the finished package.

In connection with the description of FIGS. 1, 7 and 11, it has been indicated that the sleeve carrier 70 carries a sleeve 20 and places it over the closed jaws of the spout conveyor system. Various arrangements and mechanisms may be used for carrying a sleeve to, and placing it about, the collapsed jaws of the spout mechanism. Several different embodiments are illustrated in the present patent application. A preferred dual arrangement is schematically illustrated in FIG. 1 in which two supply stacks 20 and 20A of sleeves are provided, one stack located on each side of the spout mechanism S. A single arrangement is shown in FIG. 12. In FIG. 14, another modification is shown. In the arrangement of FIG. 14, the supply of sleeves 20 is in line with the spout mechanism S.

Referring now to FIG. 2, positioned above the supply stack of sleeves 20 is a sleeve pick-up mechanism 80 which, in the particular form illustrated, includes four suction tubes 82 suspended from a pair of horizontally disposed rods 83 carried at the lower end of a vertical piston 84.

Piston 84 is extended and retracted by a fluid cylinder 85 supported by a beam 86. Also supported from beam 86 are a pair of rails 87 along which a carriage 88 is movable, as by a piston and cylinder 89. Carriage 88 carries a pair of spreader arms 92 and 93. When the piston of cylinder 89 is in retracted position, as in FIG. 2, arms 92 and 93 project from the lower end of the carriage 88 toward the sleeve pick-up mechanism 80.

In timed relation to the advancement of rolls 21 or other units through the wrapping machine, piston rod 84 is extended to lower tubes 82 into contact with the top sleeve 20 of the supply stack. Suction is applied and piston 84 is retracted upwardly, lifting the top sleeve 20, as illustrated in FIG. 2. One side 27 of the sleeve 20, the near side as viewed in FIG. 2, which is the left side as viewed from the spreader arms 92, 93, is gusseted, and this side falls open, as seen in FIG. 3. The right side is stitched and has a handle 24 attached thereto, as seen in FIGS. 13 and 3. FIG. 3 illustrates the sleeve 20 both before and after it is picked up by the suction tubes 82.

After the upper-most sleeve 20 has been lifted from the supply stack, the spreader-arm carriage 88 is moved, as by the piston and cylinder 89 toward the pick-up mechanism 80, and the spreader rods 92, 93 enter into the partially-opened picked-up sleeve 20. As indicated above, the picked-up sleeve 20 is partially open because, as seen in FIG. 3, the gusseted side 27 has dropped open because of gravity. In FIG. 3, the spreader rods 92, 93 are side by side. After entering into the partially-open sleeve 20, the arms 92 and 93 are moved laterally, as by a pair of pistons and cylinders, 94 and 95, seen in FIG. 3. In so moving laterally, the arms 92 and 93 spread the sleeve 20 to its full width, which as seen in FIG. 6, is wider than the original width since the inward gusset in side 27 has now

been extended outwardly. By this action, the stitched edge and the handle 24 of the sleeve 20 is placed in a position at one edge of the spread sleeve and the center fold of the gusset is placed at the other edge. When the picked-up and spread-open sleeve 20 is subsequently transferred to carrier 70, as will be described, it is held suspended by the suction tubes 71 of the carrier 70, and moved to and placed about the closed jaws of the spout conveyor S. When the compressed roll 21 emerges from the jaws of the spout conveyor and expands into the suspended sleeve 20, the stitched edge and handle 24 will be positioned at the center of one side of the package, which after expansion assumes a generally rectangular form, and the areas of printed information will appear in the proper locations, shown as dot-and-dash line rectangles in FIG. 13. The output package, when turned through 90°, so that the gusseted side 27 becomes the bottom, has the appearance illustrated in FIG. 13, with the handle 24 being at the center of what is now the top of the generally rectangular package.

Returning now to FIGS. 1 and 2, after a sleeve 20 has been picked up and spread open by the pick-up means 80 and spreader means 90, as just described, carrier 70 is moved, as by piston and cylinder 75, toward the pick-up mechanism 80 until it is over the supply stack and occupies the same lateral plane as the pick-up mechanism 80. This position is illustrated in FIGS. 4 and 5. The sleeve carrier 70 is shown to have a pair of arms 73, each carrying three suction tubes 71. The spacing between arms 73 of the carrier 70 is greater than the spacing between the pick-up arms 83. After the carrier 70 reaches the lateral position illustrated in FIGS. 4 and 5, the carrier 70 is lowered, as by piston 74, until the suction tubes 71 engage the surface 26 of the picked-up sleeve 20, as illustrated in FIG. 6. As soon as the surface 26 of sleeve 20 is held by the suction tubes 71 of the carrier 70, the suction in the pick-up tubes 82 is cut-off, and the sleeve 20 is released, so far as the pick-up mechanism 80 is concerned. The carrier 70 is then withdrawn, away from the supply stack and pick-up mechanism 80, into the position seen in FIG. 1. The sleeve carrier 70 is then, by means of a cross-carriage 105 which, as seen in FIG. 2, rides on cross-rails 106, moved in a transverse direction until the carrier 70 is in line with the jaws of the spout mechanism. The cross-carriage 105 is shown to be moved by piston and cylinder 107.

In the dual arrangement shown in FIG. 1, when the carrier 70 is so moved crosswise, the other sleeve carrier 70A is moved simultaneously from the center position to a side position in line with the other supply stack 20A. Then, when the carrier 70 moves its sleeve 20 into an encircling position over the closed jaws of the spout S, the carrier 70A may be moved into position over the supply stack to receive a wrapper 20A which has been picked up and opened by the pick-up means 80A and spreader means 90A. The dual arrangement illustrated in FIG. 1 permits faster wrapping and increased output.

FIG. 12 is a schematic representation of a single machine which is similar to that of the dual machine of FIG. 1 except that the apparatus of FIG. 12 has but one supply stack of sleeve wrappers, one pick-up mechanism, one spreader mechanism, and one carrier mechanism.

FIGS. 14 and 15 are schematic representations of a modified machine which is also generally similar to that of the apparatus of FIGS. 1 and 12 but which is different in certain respects as will now be described. In the machine of FIGS. 14 and 15, a single supply stack of wrappers 20 is located in line with the center axis of the machine, i.e., in line with the path along which the units to be wrapped are advanced. The single supply stack of wrappers 20 is positioned just in front of the discharge ends of the jaws 40 and 50 of the spout mechanism. Separate pick-up mechanism, such as mechanism 80 of FIGS. 1 and 12, is not required in the machine of FIGS. 14 and 15 since the picking up of the flat sleeve from the supply stack is done by a combined pick-up and carrier 170.

The pick-up and carrier 170 is provided with two sets of suction tubes, each set being separately supported. The one set consists of four suction tubes 82. The ends of these tubes 82 contact first the top sleeve of the supply stack. The other set consists of six suction tubes 71 carried by pistons 78. After the carrier 170 has been lowered, as by the piston 185, the set of suction tubes 82 contact and pick up the top sleeve 20 in a manner generally similar to that described and illustrated in FIG. 3.

The spreader arm mechanism 90, which occupies a position above the discharge end of the jaws 40 and 50 of the spout mechanism, is elevated and lowered as by piston 186. After the sleeve has been picked up by the suction tubes 82, the spreader arms 92, 93 are lowered and moved to cause the arms to enter the picked-up sleeve. The arms are then spread in the manner previously described with respect to the apparatus of FIG. 1, and as is illustrated in FIG. 6. The pistons 78 then lower the second set of suction tubes 71 into contact with the picked-up spread sleeve 20 and the tubes 71 take hold of the sleeve 20. Suction is then cut-off in the tubes 82. The spreader arms 92, 93 are withdrawn and the spreader mechanism is raised by piston 186 to allow the carrier 170 to be moved, as by piston 116, in the direction of the jaws 40, 50 until the sleeve 20 suspended from the carrier 170 is in encircling position about the closed jaws of the spout mechanism. After the sleeve is filled with a unit of expanded material, the carrier 170 is withdrawn by piston 116 from its position over the jaws 40, 50 to the position over the supply stack, after which the carrier 170 is further withdrawn, as by piston 118, to a position over the output conveyor 100. The suction in tubes 71 is then cut-off and the package dropped on to the conveyor 100, as indicated in phantom in FIG. 14.

What is claimed is:

1. Apparatus for wrapping units of resilient compressible material in tubular wrappers, said apparatus including:

a. a pair of movable jaw members;

b. feed means for feeding unwrapped units to one end of said pair of jaw means;

c. each of said jaw means carrying an endless conveyor belt;

d. drive means for driving said conveyor belts in a direction to convey units of unwrapped material through said jaw means from the feed end toward an output end;

e. means pivotally supporting each of said conveyor belts at the feed end of said jaw means for pivotal movement;

f. means pre-loading said jaw means to positions in which said conveyor belts occupy converging positions toward said output end, said pre-loading means being adapted to yield to the thrust of units of unwrapped material being conveyed on said jaw conveyor belts to cause said jaws and said belts to swing pivotally to an open position in which said belts occupy substantially parallel positions;

g. said pivotal support means being so spaced that the spacing between the conveying surfaces of said belts when in substantially parallel positions is less than the corresponding dimension of an uncompressed unit of resilient material to be transported therethrough.

2. Apparatus according to claim 1 wherein:

a. means are provided for suspending a tubular wrapper in encircling position about said jaw means and conveyor belts when said belts are in converging positions;

b. means are provided for moving said suspension means in the same direction as, and concurrently with, the emergence of a unit from the opened jaws, whereby as the material of the emerging unit expands outwardly it comes into pressure engagement with the inner surfaces of said tubular wrapper.

3. Apparatus according to claim 1 wherein said pair of jaw means comprise upper and lower jaw means supported for pivotal movement in a vertical plane.

4. Apparatus according to claim 1 wherein said pre-loading means include counter-balancing mechanism adapted to maintain said jaw means and conveyor belts in converging positions in the absence of a unit of material being conveyed by said belts.

5. Apparatus according to claim 2 wherein:

a. cover means cover the outward reaches of said jaw conveyor belts, said cover means occupying positions interposed between said belts and said suspended encircling wrapper.

6. Apparatus according to claim 2 wherein:

a. said means for suspending a tubular wrapper in encircling position about said jaw means and conveyor belts and for moving said suspension means includes a carrier having suction means for holding said tubular wrapper in suspended open position.

7. Apparatus according to claim 6 wherein:

a. a supply stack of tubular wrappers in flattened condition is provided; and

b. suction pick-up means are provided for picking up the top wrapper from said supply stack.

8. Apparatus according to claim 7 wherein:

a. spreader means are provided for spreading open said picked-up wrapper;

b. said spreader means include a pair of arms, means for inserting said arms into the interior of a picked-up tubular wrapper, and means for moving said arms laterally in opposing directions to spread open said wrapper.

9. Apparatus according to claim 8 wherein:

a. means are provided for moving said carrier into position above said supply stack for taking a spread-open wrapper from said pick-up means and carrying said wrapper to said encircling position about said jaw means.

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