

Nov. 29, 1960

G. W. VON HOFE ET AL

2,961,931

CONTAINER WRAPPING SYSTEM

Filed Nov. 17, 1958

5 Sheets-Sheet 1

Fig. 1.

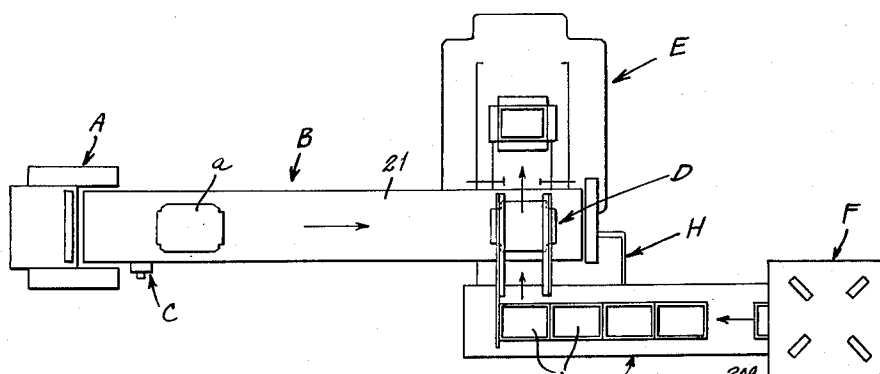


Fig. 2.

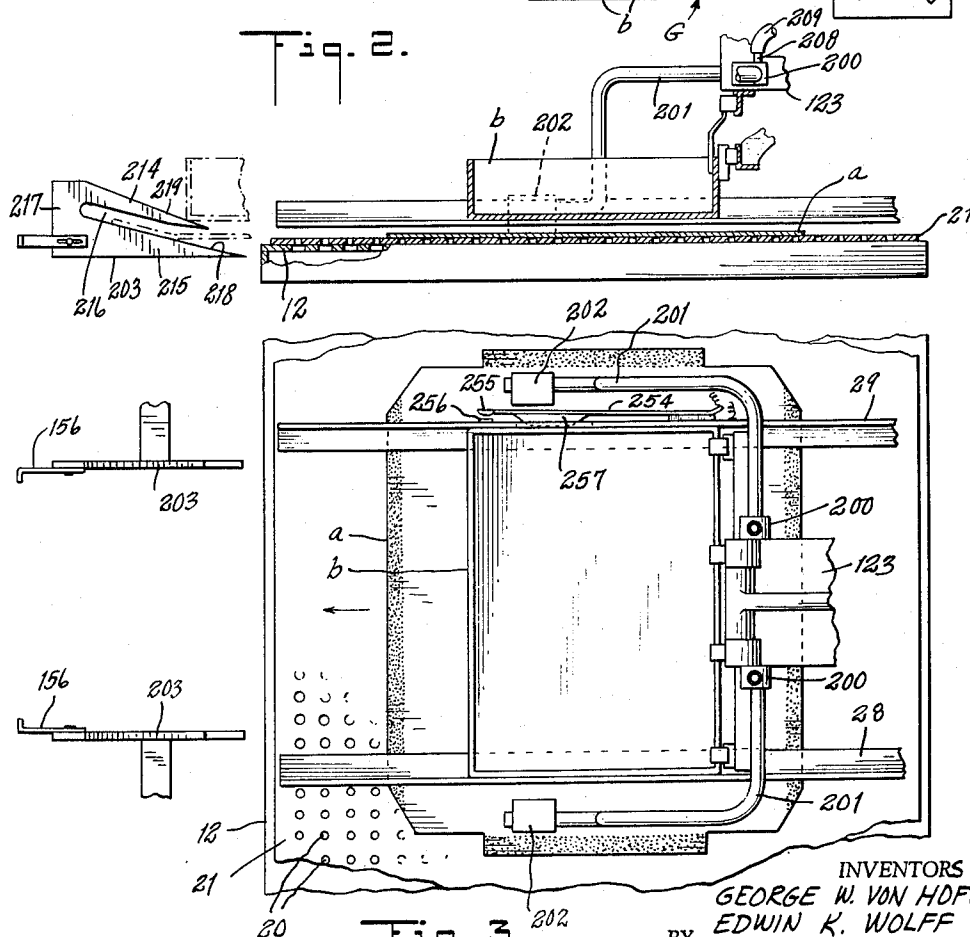


Fig. 3.

INVENTORS
GEORGE W. VON HOFE
EDWIN K. WOLFF

BY *Casey, Hart & Sample*
ATTORNEYS

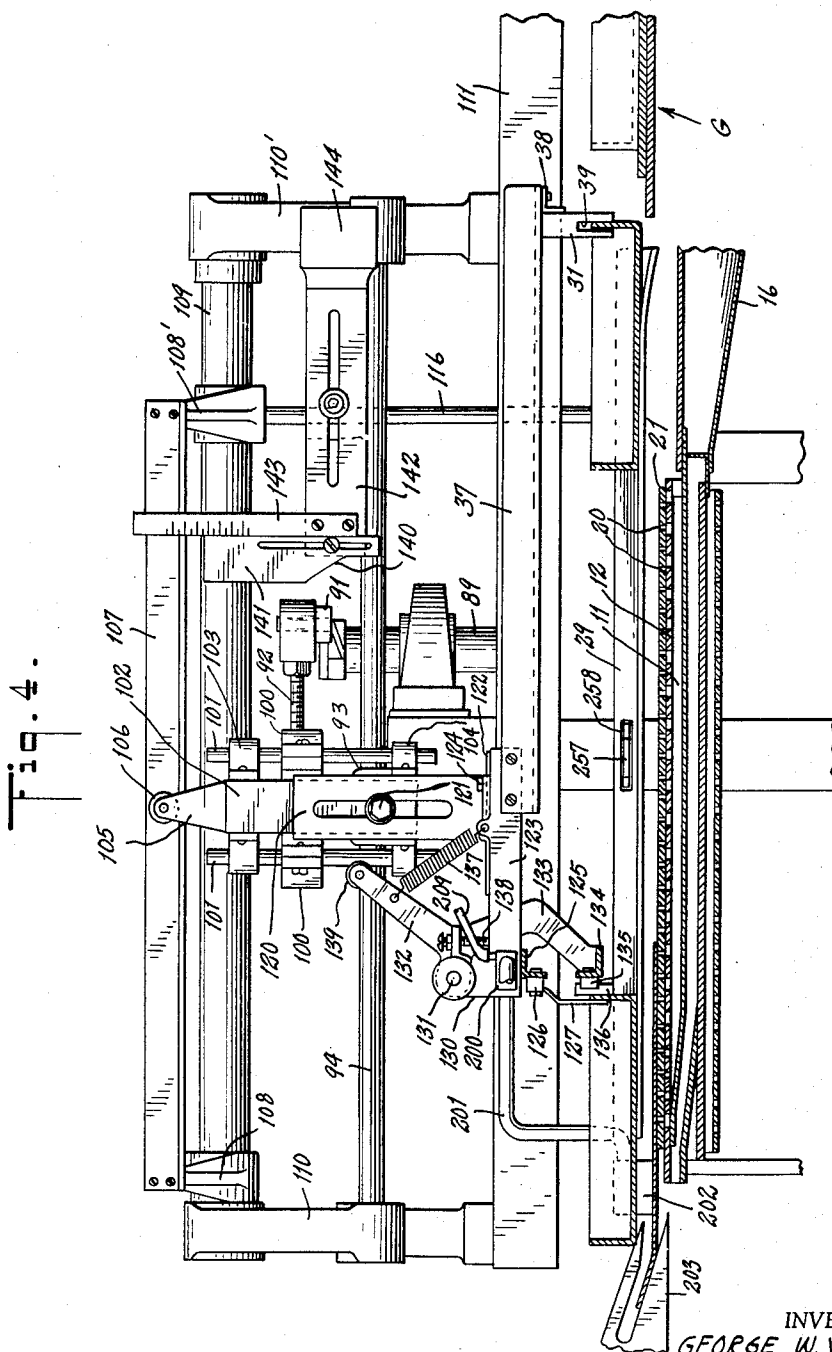
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INVENTORS
GEORGE W. VON HOFE
EDWIN K. WOLFF

BY

Coney, Hart & Atcham

ATTORNEYS

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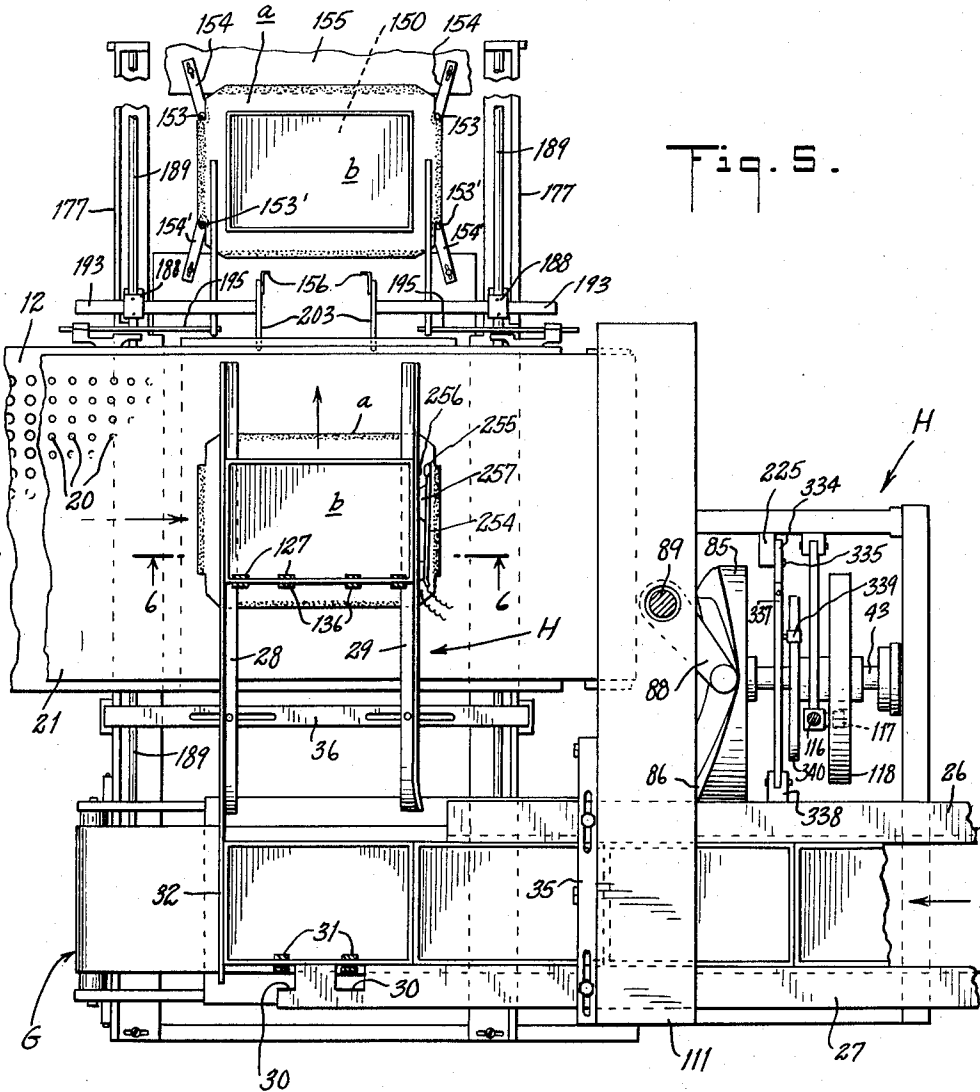
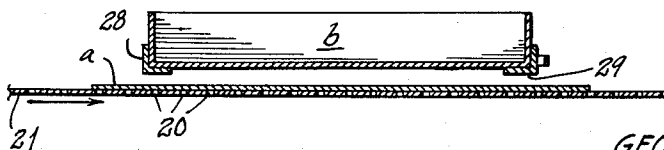


Fig. 6.



INVENTORS
GEORGE W. VON HOFE
EDWIN K. WOLFF
BY *Coxey, Hart & Sample*
ATTORNEYS

Nov. 29, 1960

G. W. VON HOFE ET AL
CONTAINER WRAPPING SYSTEM

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Fig. 7.

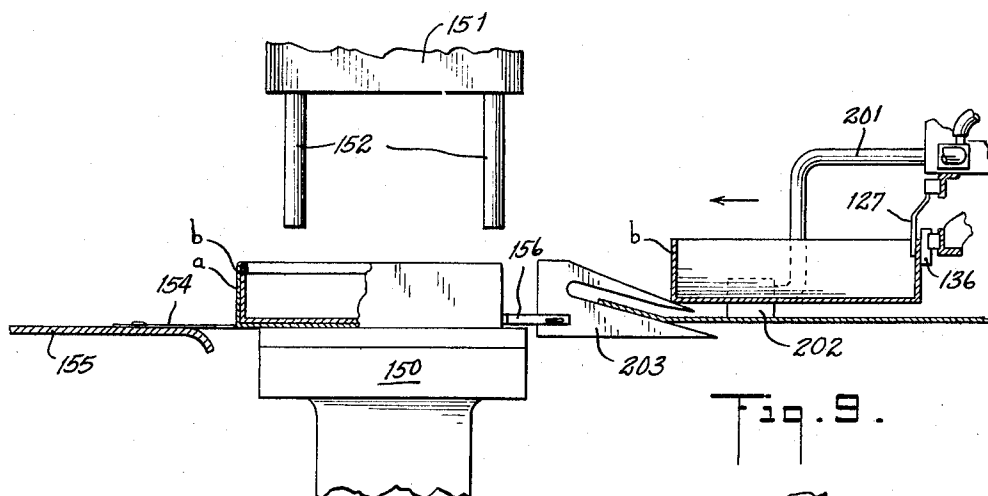
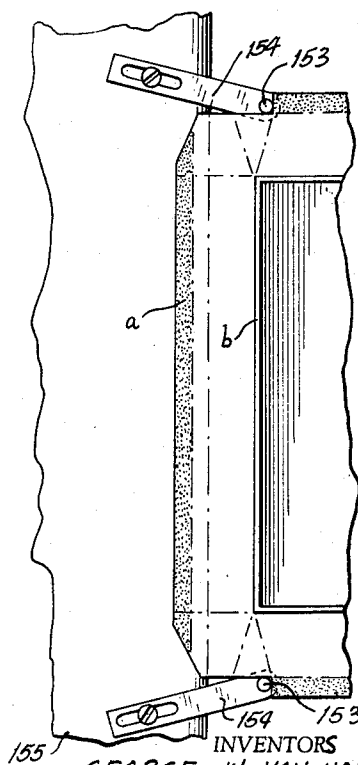
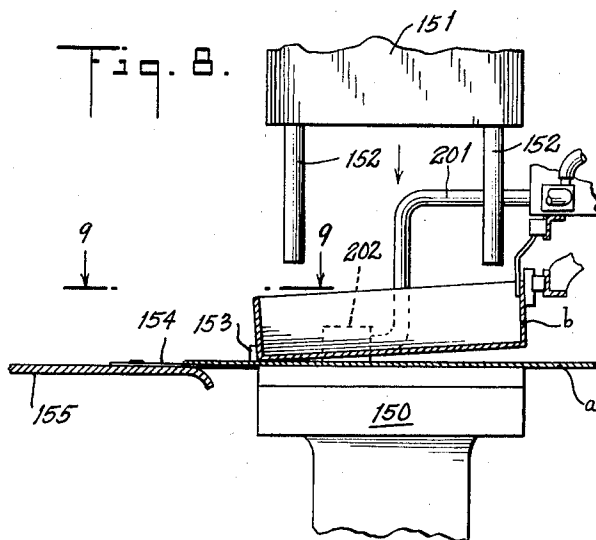


Fig. 9.



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INVENTORS
GEORGE W. VON HOFE
EDWIN K. WOLFF

Cory, Hart & Sample

ATTORNEYS

Nov. 29, 1960

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Fig. 10.

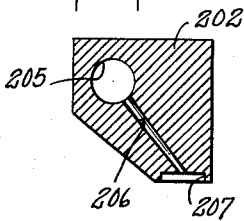


Fig. 11.

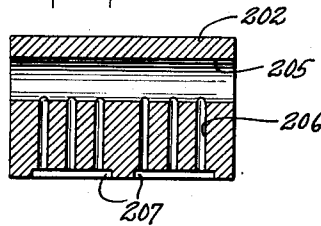


Fig. 12.

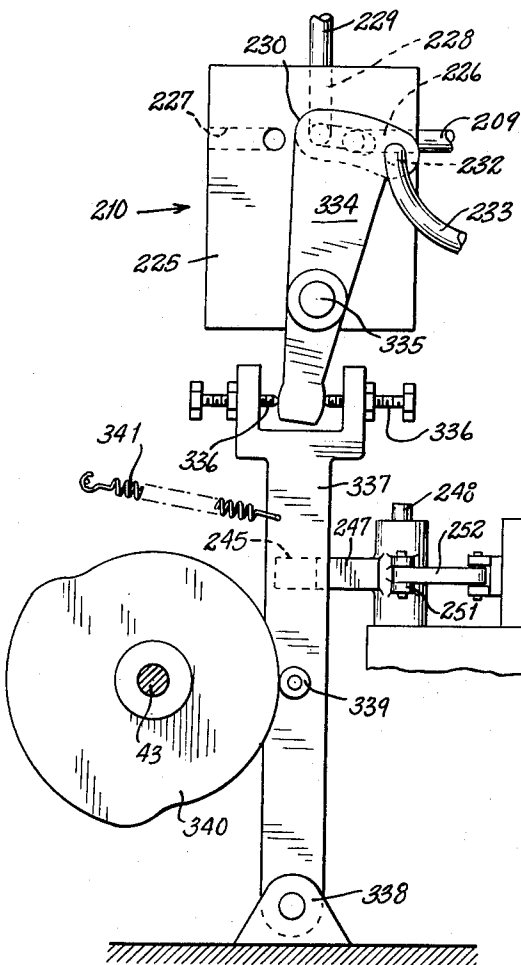


Fig. 13.

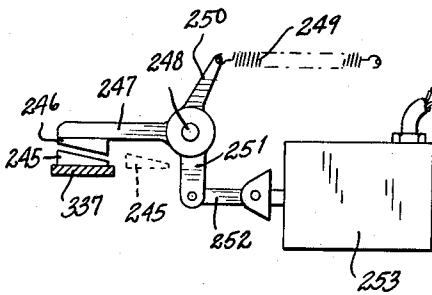
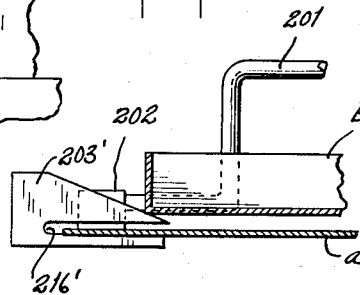


Fig. 14.



INVENTORS
GEORGE W. VON HOFE
EDWIN K. WOLFF
BY *Chap, Hart & Hample*
ATTORNEYS

1

2,961,931

CONTAINER WRAPPING SYSTEM

George W. von Hofe, Millington, and Edwin K. Wolff, Stockholm, N.J., assignors to New Jersey Machine Corporation, Hoboken, N.J., a corporation of New Jersey

Filed Nov. 17, 1958, Ser. No. 774,424

35 Claims. (Cl. 93—54)

This invention relates to systems for applying wrappers, covers, labels or the like, generically termed "wrappers," to container structures in the manufacture of containers such as set-up boxes or their equivalent, book casings, and the like, and is concerned more particularly with mechanism for automatically transferring the boxes and wrappers from a transfer station located in the lines of feed of such container parts to a wrapping machine positioned adjacent to the transfer station.

The present invention relates to improvements in mechanism of the general construction shown in the pending patent application filed by Edwin K. Wolff et al., September 6, 1957, under Serial No. 682,475.

In the set-up paper box industry there has been demand for a box making machine having substantially higher production capacities than those heretofore known by the art and capable of making a satisfactory set-up paper box cheap enough to enable this type of package to be placed in a more favorable competitive position relative to other types of packaging materials. One of the chief obstacles to increasing the speed of many of the machines now being used for making this type of container is the present practice in connection with the use of the same of assembling the box and wrapper by a hand operation before delivering these parts to the wrapping machine. Not only is the operator who spots the boxes on the wrappers the slowest part of the operation, but it is difficult for such an operator to register the box properly on the wrapper because the adhesive is still somewhat slippery when the glued wrapper arrives at the spotting station. This condition of the adhesive when the box is so assembled with the wrapper also presents other troublesome problems. Thus, should the wrapper be finished with embossment, the latter may be somewhat deleted and may even be lost as a result of this practice of gluing the wrapper to the box at the spotting station. Also, at the present time there is a demand from the trade for other unusual finishes on the wrappers accomplished for example either by coating the wrappers with lacquers, varnishes, plastics, etc., or by laminating them with foil, acetate sheeting, polyethylene, etc. When the paper side of such finished wrappers is coated with a moisture bearing adhesive, the paper will stretch at a different rate in relation to its coating or lamination. This creates in the sheet tensions which result in curling of the sheet and present other difficulties in the handling of such adhesive coated sheet. Also, when the wrapper is applied to the box body as aforesaid, unsightly blisters and wrinkles are likely to develop in the wrapper because of the continuing expansion of the paper after certain portions thereof have been firmly adhered to the box body. This condition is especially likely to occur when large areas of the wrapper are adhered to the box body. On the other hand, if it is attempted to handle the wrapper apart from a transport conveyor as an individual, independent element not assembled to a supporting box body before the aforesaid curling tendencies in the sheet

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have been materially reduced or removed, substantial difficulties will be encountered and the use of complicated mechanisms will be required to accomplish such handling.

The primary purpose of the present invention is to provide an improved system which will eliminate the above noted difficulties now encountered in the use of many machines now being employed by the art. One of the objects of the invention, for example, is to provide an improved system capable of operating automatically to assemble a paper box and wrapper therefore without the necessity of an operator for this purpose and at greater speeds than can be obtained with the machines heretofore used for such purpose.

Another object of the invention is to provide an improved system in which the box and wrapper are under automatic positive control until their assembly into a complete container and which will permit a greater variety of materials and combinations thereof to be handled without difficulty.

A further object of the invention is to provide an improved system which will enable the adhesive on the wrapper treated as an independent element to be so completely seasoned or tempered that substantially all the tendencies of the wrapper to curl will have been removed prior to the assembly thereof with the box in the wrapping machine.

A still further object of the invention is to provide an improved transfer mechanism of the type indicated and capable of being combined with existing machines to increase the production speeds of the latter quite substantially.

In accordance with the foregoing objects, a system embodying the invention maintains the box body and the adhesively coated wrapper separated until the last possible moment and utilizes the box form block in the wrapping machine as the medium for making the initial juncture of the box body and wrapper while simultaneously completing the container. The system also embodies a combination of controls and detectors that maintain the system automatically so perfectly balanced that the human element needed in operating the system is at a minimum. A better understanding of the construction and operation of the system as well as the advantages and novel features thereof will become apparent from the following description when read in connection with the accompanying drawings, in which:

Fig. 1 shows in plan view a box wrapping system embodying the invention;

Fig. 2 is a side elevational view, partly in section, of the means for supporting an associated wrapper and box as independent, separate elements during the movement thereof from the transfer station to the block form of the wrapping machine; the view indicating in dotted outline the manner in which such separate components are carried by the double wedge members forming part of such supporting means;

Fig. 3 is a top plan view of the mechanism shown in Fig. 2;

Fig. 4 is a vertical sectional view taken at the transfer station of the system and shows in enlarged detail the construction of the wrapper conveyor at the transfer station and the construction and arrangement of the mechanism located above such conveyor for controlling the operation of the transfer means;

Fig. 5 is a top plan view of the discharge end portions of the box and wrapper conveyors and illustrates the manner in which the box elements are fed thereby to and are interrelated at the transfer station;

Fig. 6 is a vertical sectional view taken along the line 6—6 of Fig. 5;

Fig. 7 is an elevational view showing the relation of

the parts as the box element supporting means approach the form block of the wrapping machine;

Fig. 8 is a similar view showing the relation of the parts after the wrapper has been deposited on the lower half of the form block of the wrapping machine and the upper half of such block is descending to strip the box element from the box gripping means;

Fig. 9 is an enlarged top plan view looking along the line 9—9 of Fig. 8 to show more clearly the manner in which the leading end of the wrapper is re-registered at the wrapping machine;

Fig. 10 is a vertical cross-sectional view of one of the vacuum members for carrying the wrapper to the transfer station;

Fig. 11 is a longitudinal vertical sectional view of the vacuum member shown in Fig. 10;

Fig. 12 is a perspective view of the mechanism for controlling the air pressure in the vacuum members of Figs. 10 and 11;

Fig. 13 is a top plan view of a portion of the means for preventing the operation of the air control means when there is no delivery of a box to the transfer station; and

Fig. 14 is a vertical sectional view showing a modified form of wedge member for transferring the wrapper and box body from the transfer station to the wrapping machine.

Considering more particularly at this time Figs. 1, 4 and 5 of the drawings, the system of this invention is of the type shown in the aforesaid application Serial No. 682,475 and as in the latter, the wrappers *a* of the box or container structures are fed in a successive fashion to a gluing machine A which applies an adhesive coating to box engaging surfaces thereof and delivers such wrappers, coated face uppermost, to a conveyor B. The adhesive coating may be applied to the wrappers as lines of glue along the outer edges thereof when such wrappers are used to manufacture those boxes which are known to the trade as "loose wrap set-ups" (note Fig. 3), or such coating may be applied to the entire areas of the wrappers when the latter are utilized to make the "tight wrap" type of set-up box. The conveyor B is driven by known driving mechanism which is indicated generally in Fig. 1 of the drawings by the letter C and which intermittently steps the conveyor along to advance the wrappers in a step-by-step fashion into registered position at a transfer station D, from which position the wrappers are successively transferred to a wrapping machine E. The driving mechanism C causes the conveyor B to advance the wrappers in timed relation with the box conveying means so that successive wrappers are successively brought into proper registry at the transfer station with boxes *b* delivered by such conveying means therefor, in timed relation with the mechanism for transferring such wrappers and boxes from the conveyor B to the wrapping machine, and in timed relation with the wrapping machine. During the travel of the wrappers from the gluing machine A to the transfer station D and until such wrappers leave the conveyor in their travel from their registered position at the transfer station to the wrapping machine E, suction is applied to the undersurfaces thereof through the conveyor belt B to hold them flat and in the predetermined positions in which they have been deposited upon the conveyor by the gluer A.

The boxes *b* to which the wrappers are to be applied in making the desired container structures are fabricated in a box staying machine F constructed as shown and described in co-pending application Serial No. 655,214, filed by George W. von Hofe et al., April 26, 1957. The box stayer F has incorporated therewith a conveyor G which feeds the stayed boxes toward the transfer station D to a position in which they may be properly engaged by the transfer mechanism located at such station and designated generally by the letter H in Fig. 1 of the drawings. During a dwell period of the

conveyor B, the transfer mechanism operates to shift an associated wrapper and box as two independent and separate elements transversely across the conveyor B toward the wrapping machine E. The transfer mechanism deposits the wrapper on the lower half or part of a form block in the wrapping machine and brings the box into proper position to be stripped from the transfer mechanism by the upper half of the form block. In this connection, it is to be noted that while the transfer mechanism is in its advanced dwell position with the wrapper and box positioned as aforesaid, the upper half of the form block will move into the box, strip it from the transfer mechanism and drive the box into engagement with the wrapper. The form block as a whole will then move without pause down into the machine E, taking the now assembled wrapper and box with it, and during such downward movement the wrapping tools of the machine will apply the side and end panels of the wrapper to the corresponding sides of the associated box in a manner well known in the art to complete the container structure.

The gluer A may be of any known construction suitable for the purposes of the box wrapping system disclosed and as the details of construction of such a gluer specifically form no part of the present invention, it is believed unnecessary to describe the same in detail. The conveyor B is fully disclosed in the aforesaid copending application Serial No. 682,475, so that it is believed sufficient here to point out the general features only of the same. As is indicated in Figs. 2, 4 and 5 of the drawings, the conveyor B comprises an elongated suction box or chamber 11 provided with a flat, perforated upper wall 12. As in the construction disclosed in said copending application, the chamber 11 is in communication with the suction side of a blower, while the outlet side of the blower is connected to a nozzle 16 arranged to discharge air under pressure against the underside of a wrapper being shifted from the rear longitudinal edge of the conveyor to the wrapping machine by the transfer mechanism H. The conveyor further includes an endless belt provided with perforations 20 and the upper run 21 of which passes over and is in contact with the perforated upper wall 12 of the suction box. Accordingly, during operative periods of the machine, the suction developed in the suction box 11 will be effective at the wrapper carrying surface of the support through the perforations 20 of the upper run 21 of the conveyor belt as it travels over the perforated wall 12. The suction so developed at the carrying surface of the upper run 21 of the conveyor belt is a relatively light suction which is sufficient to maintain the wrappers in flattened condition and to hold them on the upper run 21 in the positions in which they were placed thereon by the gluer, but which is insufficient to interfere materially with the slidable shifting movement of the wrapper on the upper run 21 as such wrapper is being transferred to the wrapping mechanism. As previously mentioned, the conveyor is intermittently advanced by its operating mechanism C, making one step for each cycle of the wrapping machine E, and bringing a wrapper thereon into registered position at the transfer station D at the end of each such step-by-step movement thereof. The step-by-step movement of the conveyor takes place while the form block of the wrapping machine is dwelling in its lower or advanced position. The conveyor B is also synchronized in its operation with the operation of the gluer A in a manner well known in the art to effect such successive registration of the wrappers at the transfer station.

The gluer A, conveyor B and wrapping machine E are operatively associated in a manner substantially like that disclosed in said application Serial No. 682,475. Thus, the operation of the gluer A and the conveyor B is initiated by the operator depressing a starting pedal which is maintained depressed until the gluer has deposited a plurality of glued wrappers *a* on the conveyor. The op-

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erator then releases such starting pedal and depresses a second pedal to start the wrapping machine E which thereupon takes over the control of the gluer and conveyor and all three units will operate automatically through one complete cycle and then stop. By maintaining the second pedal depressed, the gluer A, conveyor B and wrapper E will recycle without interruption in an automatic fashion to feed successive wrappers and to assemble and complete the box assemblies in the wrapper E. As in the construction described and shown in the aforesaid Von Hofe application Serial No. 655,214, the wrapper E also sets the pace of operation of the stayer F. The connections between the stayer F and wrapper E are similar to those described in said Von Hofe application so that the wrapper will control the start of each cycle of the stayer which thereupon will progress through its prescribed series of operations for such cycle and will then automatically come to a stop and await the next actuation by the wrapper. Thus, if the wrapper E continues to operate, the staying machine F will run with it cycle for cycle, but if the wrapper does not continue operating for any reason, the staying machine will remain at rest after it has completed the last cycle initiated by the wrapper and until it is again actuated by the wrapper.

The box *b* completed in each cycle of operation of the stayer F is deposited upon the conveyor G in the manner described in said application Serial No. 655,214. In the arrangement shown in Figs. 1, 4 and 5 of the drawings, the stayer F is so positioned with relation to the transfer station D of the conveyor B that the stayed boxes flow from within the interior of such stayer, out through the front discharge end of such stayer and towards such transfer station in a direction parallel to but opposing the line of feed of the wrapper *a* on conveyor B. It will be understood, however, that the units may be arranged so that the stayed boxes will flow toward the transfer station in the same direction as the wrappers, or in a direction at right angles to the feed of the wrappers, or at any other angle to the line of feed of the wrappers considered desirable in a particular installation. The conveyor G preferably is incorporated in the transfer mechanism H as an integral part thereof, and in the construction illustrated is disposed in adjacent relation to the barrel cam 85 for actuating such mechanism and to the discharge end of the conveyor B which is also associated with the latter. The conveyor G extends from the stayer F, under the cross channel beam 111 of the transfer mechanism and to a point beyond the transfer station D, being constructed and operated in a manner substantially similar to the discharge conveyor shown in said application Serial No. 655,214. In conveyor G, however, the inner box guide rail 26 thereof terminates just short of the transfer station D, while the outer box guide rail 27 thereof extends slightly past the centerline between two transverse rails 28 and 29 forming part of such transfer mechanism. These two ends of the guide rails 26 and 27 are adjustably supported by a plate 35 secured to a side of the cross channel beam 111. The terminal end of guide rail 27 is provided with notches 30, 30 to permit the passage thereof of a pair of box transfer members 31, 31, as will hereinafter become more clear. The end stop 32 for the boxes advancing on conveyor G is an extension of the vertical flange of the angle shaped rail 28 and extends beyond the box supporting flange of such rail and across the upper run of conveyor G and the line of feed of the boxes on such conveyor. The leading box is thus stopped by end stop 32 on the continuously moving conveyor G in proper position to be transferred from the latter to the rails 28 and 29 by the members 31, 31. In the operation of the machine there are usually a line of boxes formed at the discharge end of the conveyor by stop 32 as indicated in Fig. 1 of the drawings.

The transfer mechanism H is basically similar in construction to the transfer mechanism described and shown in said application Serial No. 682,475, and like the latter

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includes upper and lower transfer means to move the associated box and wrapper elements from the transfer station D to the wrapper E. As above indicated, the reciprocating movements of both the upper and lower transfer means are produced basically by the barrel cam 85 which is provided with two substantially similar cam slots, slot 86 of which actuates the upper transfer means and the other cam slot of which actuates the lower transfer means. Since the cam rollers for such slots are maintained in corresponding positions in the latter throughout the cyclic movements of the barrel cam 85, the upper and lower transfer means will be caused to be operated by the barrel cam 85 in complete synchronism. The cam roller engaging the slot 86 is provided on the outer end of an arm 88 secured to the lower end of a vertically disposed shaft 89 which is rotatably supported by suitable bearings on the frame of the transfer mechanism H. Connected to the upper end of vertical shaft 89 (compare Figs. 4 and 5) is an arm 91, the outer end of which is connected by an adjustable link 92 to a carriage 93 slidably mounted on a pair of parallel guide rails 94 extending transversely across the upper run 21 of the conveyor belt adjacently beyond the transfer station D. The rails 94 are supported at their ends by bracket members 110, 110' mounted on the crossbar 111 which is supported in turn by the front and rear frame members of the transfer mechanism. Provided on the carriage 93 are a pair of spaced guides 100 slidably receiving the vertically disposed side guide rods 101 of a vertically movable block 102. Each side guide rod 101 is securely fastened to the block 102 by an upper holder 103 and a lower holder 104. Extending upwardly from the upper end of block 102 is a fixed arm 105 carrying a cam roller 106 arranged to ride on a horizontally disposed track 107 extending transversely of the conveyor. The track 107 is supported at its ends by a pair of arms 108, 108' which are secured to a transverse horizontally disposed shaft 109 mounted for oscillatable movement on the frame members 110 and 110'. Forming part of the arm 108' and extending rearwardly beyond shaft 109 is an arm which is connected at its outer end to the upper end of a vertically disposed connecting rod 116. The lower end of rod 116 is provided with a cam member 117 which engages the cam slot of a cam 118 mounted on shaft 43.

It will be understood from the foregoing description that carriage 93 and consequently the block 102 are reciprocated on the transverse rails 94 through a fixed stroke by the rod 92, arm 91, vertical shaft 89, arm 88 and slot 86 of the barrel cam 85. The block 102 is, therefore, under the control of the cam 85 at all times and one cycle of reciprocal movement is imparted thereto by such cam during each cycle of operation of the transfer mechanism H. The arrangement of the parts are such that the block 102 is advanced across the conveyor toward the wrapping machine E when the conveyor B is in a dwell position and is retracted while the conveyor is making its next step-by-step movement to advance a succeeding wrapper *a* to the transfer station D. After each advance movement of the block 102 and after each retracting movement thereof, the block is raised and lowered respectively through the arm 105, roller 106, track 107, arms 108, 108', connecting rod 116 and cam 118. During each cycle of operation of the transfer mechanism H, the block 102 will start from a raised, retracted position and will be lowered vertically to cause the transfer members 31, 31 to engage the front wall of the leading box on conveyor G and to cause box gripping means to grip the front wall of a second box which had previously been moved from conveyor G onto the horizontal flanges of the transverse parallel rails 28 and 29 by such members 31, 31. The lowering of block 102 also causes wrapper gripping means to come into gripping relation with a wrapper registered at the transfer station. After the box and the wrapper have been so engaged, the block 102 advances in such lowered position trans-

versely of the conveyor toward the wrapping machine to move the box on the conveyor G toward the rails 28, 29 and to a position on such rails in which it will be in registry with the next succeeding wrapper and to move the associated box and wrapper engaged by said gripping means toward the form of the wrapper E which assembles the box with its associated wrapper and folds the latter around the box. After the associated box and wrapper have been so transferred, the block 102 is raised vertically to release the box deposited on the rails 28, 29 by the transfer members 31, 31 and to a height which will enable the box gripping means thereof to pass freely over such released box. The block 102 then retracts in a horizontal path parallel to the top run 21 of the conveyor to its initial starting position, thus completing the cycle of operation that such block 102 makes during each cycle of operation of the transfer mechanism.

Adjustably mounted on the block 102 is a bracket member 120 provided at its lower end with an offset horizontal foot 122 which supports in depending relation an elongated bracket member 123 extending transversely to and disposed in parallel spaced relation above the upper run 21 of the conveyor. The member 123 is secured for lengthwise adjustment on the foot 122 by a bolt 124 which extends through a longitudinal slot provided in such member 123 and through an opening in the foot 122. As a result of this arrangement, the bracket member 123 may be adjusted vertically relative to the block 102 and to the upper run 21 of the conveyor B, and may be adjusted horizontally relative to such conveyor run and the block 102 in a direction transverse to the direction of feed of the conveyor. Secured to the front end of a side of bracket member 123 is the rear end of an angle bar 37 that projects forwardly towards the conveyor G. Connected at its central portion to the front end of bar 37 is an angle bar 38 to the projecting ends of which are connected the two transfer members 31, 31. As is shown more clearly in Fig. 4 of the drawings, the transfer members 31, 31 are carried in depending relation by the bar 38 and are provided at their lower ends with aligned slots 39 of a width to readily receive the front wall of a box. The length of bar 37 is such that when the slide block 102 is in a retracted position as aforesaid, the transfer members 31, 31 are positioned so that as the retracted slide block is then lowered such members will move through the notches 30, 30 in the guide bar 27 and receive in their aligned slots 39 the front wall of the box which is in engagement with such guide bar. On the next advancing movement of the block 102 in a lowered position the transfer members 31, 31 will shift the engaged box sidewise off conveyor G and onto the horizontal flanges of the box supporting rails 28, 29 to a position on the latter in which it will be registered with the wrapper to be associated therewith. Preferably, the forward ends of the rails 28, 29 are beveled to facilitate the advancement thereon of the box. The slots 39 should obviously be made deep enough to permit the box to rise as it moves up such beveled ends onto the rails. The rails 28 and 29 are adjustably mounted on a bar 36 supported at its ends on the framework of the machine. The rails 28 and 29 extend from points adjacent to the rear side edge of the upper run of conveyor G, and in spaced relation rearwardly over the upper run 21 of conveyor B, to points adjacent to the rear side edge of upper run 21. The space between the rails 28, 29 and the upper conveyor run 21 need only be sufficient to enable the wrappers carried by the latter to move freely under such rails as they are being fed to the transfer station and as they are being shifted from such station to the wrapping machine.

Secured to the rear end of member 123 is the central portion of an angle bar 125 which extends transversely of such member so that the ends thereof project outwardly from the sides of member 123. Each projecting end of bar 125 has slidably mounted on the rear surface

of the vertical flange thereof one or more blocks 126. Each of the blocks 126 is secured in an adjusted position on bar 125 by a bolt which extends through the block and through the upper end of a depending gripping member 127 having a lower vertically disposed gripping portion offset rearwardly from the upper portion thereof.

The rear end of the bracket member 123 is provided also with a pair of upstanding, spaced bearing supports 130 which support the ends of a shaft 131 upon which is rotatably mounted the hub of a lever having an upwardly extending arm 132 and a downwardly extending arm 133. The arm 133 of said lever supports an angle bar 134 which extends in substantial parallelism to bar 125 and like the latter is provided on its projecting ends with a pair of adjustable blocks 135. Mounted on each of the blocks 135 is a block-like gripping member 136, the rear face of which is adapted to engage with the front face of the offset lower portion of an associated member 127 when the bar 134 is in its fully advanced position. The bar 134 is normally biased to this advanced position by a spring 137 which is connected at one end to lever arm 132 at a point spaced from the axis of shaft 131 and which is connected at its other end to a post provided on member 123. In order to adjust the advanced position of the transverse rod 134 and thereby to adjust the degree of grip of a pair of members 127, 136 on a box under the influence of spring 137, lever arm 132 is provided with an adjustable stop member 138 which coacts with the top surface of member 123 to such end. The upper free end of lever arm 132 is provided with a cam roller 139 which engages the upper vertical portion of a cam surface 140 on a vertical member 141 during the return movement of block 102 in a raised position. On such engagement the roller 139 rides up on said cam thereby causing the lever arm 132 to pivot upwardly and rearwardly against the tension of spring 137 to retract the gripping members 136 from the members 127. When the block 102 thereafter moves vertically downward in the start of a new cycle, the cam roller 139 rides down on an inclined portion of the cam surface 140 below said vertical portion thereof and which permits the lever 132 to progressively pivot downwardly and forwardly under the tension of spring 137 thereby progressively moving the gripping members 136 towards their associated gripping members 127. As the gripping members are so closing they receive therebetween the front wall of a box located on rails 28 and 29 at the transfer station. When the cam roller 139 reaches the lower vertical portion of the cam surface 140, the members 127, 136 will have firmly gripped the front wall of such box and are ready to carry the same towards the wrapping machine E. The vertical member 141 is mounted for vertical adjustment on an arm 142 supported by a transverse bracket 144 secured at its forward end to frame member 110'. Mounted on arm 142 adjacently to the vertical member 141 is a vertical scale 143 graduated to show inches and fractions of inches and associated with an index element on member 141 to enable such member to be readily adjusted to take care of boxes of varying heights fed from the conveyor G to the transfer station. The arm 142 is mounted on bracket member 144 for adjustment in a horizontal direction transversely of the conveyor to enable the vertical member 141 to be adjusted for different widths of boxes fed from the conveyor G to the transfer station D.

It will be understood from the foregoing that while the carriage 93 and the block 102 have fixed strokes in the reciprocating movements thereof on the rails 94, adjustments of the gripping members 127, 136 may be made to vary their path of operation to conform to differences in the heights and widths of boxes fed by the staying machine F to the transfer station D. As has been previously indicated, the carriage 93 and consequently block 102 and the gripping members 127, 136 are retracted over the conveyor while the upper run 21 thereof

is advancing the next wrapper *a* into registry with a box *b* which has been registered at the transfer station by the transfer members 31, 31 during the previous advancing movement of such parts. During the end portion of such retracting movement of the gripping members 136 will be moved forwardly away from gripping relation with the gripping members 127 in the manner described and both such gripping members will be brought to a position where they will be poised above the front edge of the box which previously had been fed into position at the transfer station on rails 28 and 29, and ready to move down into gripping relation therewith. Simultaneously, the transfer members 31, 31 will be moved into proper position over the front edge of the leading box on the conveyor G. At the same time the conveyor B will move the advancing wrapper *a* into registered position beneath the box already registered at the transfer station. After the wrapper *a* has come to dwell position at the transfer station and while the block 102 is moved vertically downwardly prior to the commencement of its advancing stroke, the transfer members 31, 31 will receive the front wall of the box on conveyor G in their slots 39 and the gripping members 127, 136 will receive between them the front wall of the box at the transfer station with which the wrapper *a* at such station has been registered. While the gripping members 127, 136 are so moving into box engaging relation, the cam surface 140 permits the gripping members 136 to move progressively to closed position under the tension of spring 137. By the time the upper transfer means has completed its downward movement, the gripping members 136 will be fully closed so that the front wall of the box structure at the transfer station will be gripped by the pairs of members 127, 136 under the tension of the spring 137. The upper transfer means is now ready to carry the box gripped thereby to the wrapping machine and simultaneously to move the leading box on conveyor G into registry at the transfer station.

The rear end of the support member 123 has connected to the sides thereof a pair of blocks 200 provided with an air passage therethrough. Connected to and supported by the blocks 200 are lengths of metal tubing 201. Each tubing is in communication with one end of the passage in its associated block 200 and extends outwardly from such block at right angles to member 123 to a point just beyond the associated box supporting rail 28 or 29 and then extends rearwardly in substantial parallelism with such rail to a second point approximately above the place at which the vacuum member 202 provided on the outer end of such tubing 201 is to engage the wrapper *a* registered with the box on rails 28, 29. At the said second point each tubing 201 turns downwardly and then again turns rearwardly to locate the mouth of its associated vacuum member 202 in proper operative position over the portion of the upper surface of the wrapper *a* it is to engage. The places at which the two vacuum members 202 are to engage the wrapper will depend on the operating conditions encountered in making a particular set-up box. In the particular embodiment illustrated in Figs. 2 to 4 of the drawings, the vacuum members are arranged to engage the rear half of the wrapper adjacently in front of the rear wall of the associated box so that the wrapper can be satisfactorily shifted on the conveyor run 21 and at the same time the rear edge thereof may be readily flexed as the latter is received by the transfer blocks or wedges 203. Obviously, since the wrapper *a* is located in spaced relation below the box *b* on the rails 28, 29 with which it is registered, such engagement of the vacuum members 202 will take place below the bottom of such box.

As is shown more clearly in Figs. 10 and 11 of the drawings, each vacuum member 202 comprises a horizontal passage 205 which is in communication with its associated tubing 201. The passage 205 is located in the upper, outer portion of the member 202 so that it is offset from the

longitudinal axis of such member. Extending from the lower inner side of passage 205 are a plurality of longitudinally aligned, inclined air passages 206 which extend downwardly and inwardly towards the lower, inner portion of member 202 into communication with recesses 207 provided in the bottom face thereof. The recesses 207 are located on the opposite side of the longitudinal axis with relation to passage 205 and each is elongated lengthwise of member 202 to be in communication with a plurality of the passages 206, for example, three. As a result of this construction the working surface of member 202 is relatively narrow and long and the major portion of its area is taken up by the recesses 207. This construction, it has been found, provides a more efficient use of the suction effect and enables the device to get a stronger grip on the wrapper than is possible with other known constructions. The surface of member 202 containing the recesses 207 is as a result of the aforesaid construction offset from the axis of such member toward the center of the wrapper a sufficient amount as to avoid the lines of glue applied to a wrapper for a "loose-wrap" box (note Fig. 3). Such surface, however, may be made of material which does not adhere to the type of adhesives that is usually applied to the wrappers of set-up boxes whether of the "loose-wrap" or "tight-wrap" type. A suitable material for this purpose is the resinous substance which is sold under the trademark "Tafilon" and which provides a surface to which such adhesives do not adhere to. Thus, the member 202 may be used to transfer both loose-wrap and tight-wrap types of wrappers. In using this substance it may be preferred to form the member 202 entirely of the same.

Connected to the other end of the passage in each block 200 is a nipple 208 to which is attached one end of a rubber tubing 209. The tubings 209 are connected to a suitable source of vacuum through a valve 210 which is actuated in timed relation so that suction is provided in such tubings and consequently in the vacuum members 202 during the transfer of a wrapper to the wrapping machine E and so that such suction effect is broken when the wrapper has been delivered to the wrapping machine. The valve 210 is associated with means to prevent its actuation to supply suction to the vacuum members 202 and thereby to prevent the transfer of a wrapper to the wrapping machine when there is no box to be transferred with such wrapper, as will hereinafter be more fully explained.

It will be understood from the foregoing, that when in the normal operation of the machine, vacuum is provided in the vacuum members 202 during the aforesaid downward movement of the upper transfer means, the wrapper *a* spaced below and separate from the box *b* will be gripped by the vacuum members at the same time that the gripping members 127, 136 grip the front wall of the box registered with such wrapper. Thus, these two box parts, though separate independent elements, will be simultaneously handled in registered relation as a unit during their transfer to the wrapping machine.

In the advancement of the upper transfer means towards the wrapping machine E, the box and wrapper gripped thereby as aforesaid, will be shifted transversely rearwardly across the conveyor toward the rear longitudinal edge of the latter. While the wrapper *a* is being so shifted and is still in engagement with the upper surface of the conveyor, the vacuum exerted through the perforations 20 thereof will hold the wrapper flat against such upper surface and will overcome any tendency of the advancing edge portions of the wrapper to curl under. When the leading edge portions of the wrapper move beyond the rear edge of the conveyor, the air pressure exerted from nozzle 16 will flow against the underside of the portions of the wrapper leaving the conveyor and will float the wrapper off the conveyor and onto the pair of spaced wedge-shaped plates 203. At that time, the wedges 203 which form part of the lower transfer means, are in at-rest position at the edge of the conveyor, in posi-

tion to slidably receive both the wrapper and the box, the latter of which is being moved simultaneously with the wrapper toward the rear edge of the conveyor. As shown in Figs. 2 and 3, the wedges 203 are each composed of two substantially triangularly-shaped members 214, 215 which are spaced apart by an inclined slot 216 and which are integrally connected by a back portion 217. The lower member 215 is provided with a wrapper supporting edge 218 which in the said position of said wedge, inclines upwardly and rearwardly from below the upper run of the conveyor. The upper member 214, is provided with a box supporting edge 219 which inclines upwardly and rearwardly from a point spaced between the upper conveyor run and the box supporting rails 28, 29. During the transfer of the wrapper from the conveyor to the supporting edges 218 the positive air pressure from the nozzle 16 prevents the advancing edge portions of the wrapper from folding under upon such inclined edges 218 and facilitates the upward movement of the front portion of the wrapper on such edges 218. As the front portion of the wrapper is being received in the slots 216 of the wedges, the box advances until the bottom edge of its rear wall comes into engagement with the inclined edges 219 of the upper members 214. As soon as the box has moved to such position the wedges 203 are advanced in synchronism with the gripping members 127, 136 and the vacuum members 202 to carry the wrapper and the box to the form block of the wrapping machine. At that time, the lower half 150 of the wrapper form block (note Fig. 7) is in a raised dwell position and the upper half 151 of such form block is spaced above block half 150 so that the associated stripper rods 152 are in a raised position relative to block half 150. When the upper and lower transfer means advance the wrapper and box in controlled spaced relation between the block half 150 and the lower ends of the rods 152 to a point where the supported rear edge of the box is about to move into position over such block half, the lower transfer means is actuated by barrel cam 85 to cause the wedges 203 to increase their speed of movement during this latter portion of their advancing stroke and thereby to pull out from under the box and wrapper and to move to a place rearwardly beyond such block half. At the same time the valve means 210 will be actuated to cut the vacuum to the vacuum members 202 and to supply positive air pressure to the latter, thereby simultaneously releasing the wrapper from the grip of the members 202 and blowing it down upon the lower block half 150. The discharged wrapper comes into engagement with a set of four registering pins 153, 153' which accurately position the wrapper with relation to the block half 150 and precisely register it with relation to its associated box during the assembly therewith. The pins 153, 153' are preferably beveled at their wrapper engaging surface portions to facilitate the guidance of the discharged wrapper into such registered position. As is shown in Fig. 9 of the drawings, two of the registering pins 153 are provided on the forward ends of bracket members 154 adjustably mounted on a discharge ramp 155 associated with the block half 150. The pins 153 are spaced apart a distance greater than the length of the box and engage end portions of the wrapper so that when the wrapping operation is completed the box may be readily pushed between such pins onto the ramp 155 by the ejector members 156 projecting rearwardly from the wedge members 203. The other two registering pins 153' engage the forward part of the wrapper and are mounted on bracket members 154' mounted on the frame of the wrapping machine in front of the form block structure thereof (note Fig. 5 of the drawings).

Following the discharge of the wrapper into engagement with the registering pins 153, 153', the upper form half 151 moves down into the open end of the box and strips the box from the gripping members 127, 136. As the form half 151 continues its downward movement without interruption it simultaneously registers the box

with and brings it into engagement with the wrapper registered on the upper surface of the lower block half 150. Thus, the box and wrapper will be positively united together in registered relation and maintained in such relation by the two form halves 150, 151 as the latter move as a unit down inside the wrapping machine to complete the application of the wrapper to the box. The tubings 201 are sufficiently bowed in shape to permit of such movement of the form half 151 without interference. As has been above indicated, following the removal of the box from the grippers 127, 136, the block 102 will be raised vertically to release the box which has been registered on rails 28, 29 by the transfer members 31, 31. At the completion of such vertical movement, the block 102 is retracted to bring the gripping members 127, 136 to elevated position over the new box which has been registered on the rails 28, 29 by the transfer members 31, 31 and to bring the latter to elevated position over the box which has been advanced to a leading position on the conveyor G, both ready to move down into engagement with such boxes as has been previously explained.

It has been indicated previously that the reciprocating movements of the lower transfer means, of which the wedges 203 form a part, are also produced by the barrel cam 85 on shaft 43. The manner in which this is accomplished is more fully disclosed in said application Serial No. 682,475. Suffice it here to say that each one of the two transfer wedges 203 is associated with a separate mechanism that is connected to cam 85 by suitable means to convert the action of such cam into reciprocating movements. As indicated in Fig. 5 of the drawings, each of such units includes an angle bar 177 which is supported intermediate its length by the frame of the conveyor B and projects in unsupported relation from the rear longitudinal edge of the conveyor into the wrapping machine E, extending substantially beyond the form block 150 thereof. Slidably mounted on a rod 189 provided on the projecting end of each of the bars 177 is a slide 188 which carries a bar 193 supporting one of the two wedged transfer members 203. Each slide 188 is advanced on rod 189 in synchronism with the box gripping members 127, 136 and the vacuum members 202 of the upper transfer means, after a wrapper has been moved up on the inclined edges 218 of the wedges 203 and the rear bottom of the box has come into engagement with the inclined edges 219 of such wedges. As has been explained, after the box and wrapper gripping members have halted their advancing movement, the wedges 203 will continue their advancing movement to positions in rear of the form block in the wrapping machine to enable the upper half 151 thereof to strip the box from the box grippers and to assemble the stripped box with the wrapper deposited on the lower form half 150. While the form block is completing the application of the wrapper to the box, the slides 188 and wedges 203 are withdrawn to their starting positions to enable such wedges to receive a succeeding box and wrapper advanced toward the wrapping machine by the upper transfer means.

The valve means 210 for controlling the suction to the vacuum members 203 comprises a plate 225 provided at one end with a side passage 226 which opens at its inner end at the outer surface of the plate and is connected by the tubing 209 to the passages in the blocks 200 in bracket 123, which block passages are in turn connected to the vacuum members 202 by the tubings 201. Opposed to passage 226 and communicating with the atmosphere on the other side of plate 225 is a passage 227 which also opens at its inner end at the outer surface of the plate. Located between passages 226 and 227 is a central passage 228 open at its inner end at the outer surface of the plate and connected by tubing 229 to a suitable source of vacuum such as a vacuum pump. Overlying the inner ends of the passages 226, 227 and 228 is a valve member 230 which slides on the outer surface of the plate 225 and which is provided on its inner face with a recess 231. The

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recess 231 is of such length that in one position of valve member 230 such recess connects the vacuum of passage 228 with the atmosphere through passage 227 and in the other position of such valve member connects the vacuum of passage 228 with the vacuum members 202 through passage 226. The valve member 230 is provided with an opening 232 which registers with the inner end of passage 226 when such valve member is positioned to connect the vacuum passage 228 with the atmosphere and which is closed by the plate 225 in the other position of such valve member. Opening 232 is connected by tubing 233 to a suitable source of positive air pressure, such as the blowing side of the vacuum pump connected to passage 228. Thus, when opening 232 registers with passage 226 positive air pressure is passed therethrough to the vacuum members 202. The sliding movement of valve member 230 is arranged to connect passage 226 with the vacuum passage 228 before the vacuum members 202 move into position to pick up a wrapper at the transfer station. The vacuum condition created at the recesses 207 of the members 202 is sufficiently strong to raise the wrappers into gripped relation by such members when the latter come to a dwell at the end of their movement to gripping position, in which position the members 202 are slightly spaced above the wrapper registered at the transfer station. The valve 230 remains in this position to maintain passage 226 connected with the vacuum passage 228 until the wrapper is delivered to the form block 150 in the wrapping machine, whereupon such vacuum connection is broken and positive air pressure is passed through passage 226 to positively discharge the delivered wrapper from the vacuum members 202 onto the form block 150 into engagement with the registry pins 153.

The valve member 230 is mounted on one end of a lever 334 pivoted at 335 on the plate 225 and disposed at its other end between a pair of bolts 336 adjustably mounted on the forked end of a pivoted lever 337. As is shown more clearly in Figs. 5 and 12 of the drawings, the lever 337 is pivoted at its lower end on a bearing bracket 338 mounted on the frame of the machine and is provided intermediate its ends with a cam roller 339 which bears against the peripheral surface of a cam 340 mounted on shaft 43. The roller 339 is maintained in engagement with the came surface by means of a spring 341 which is attached at one end to lever 337 and at its other end to a fixed part of the frame. It will thus be seen that as shaft 43 rotates through one revolution in each cycle, cam 340 will pivot lever 337 to actuate the valve lever 334. When cam roller 339 is in engagement with the lower portion of cam 340 as shown in Fig. 12, the lever 337 is in a retracted position and valve lever 334 is positioned to connect the passageway 226 leading to the vacuum members 202 with the vacuum passage 228 thus providing a vacuum condition in the members 202. This relation of the cam roller 339 and cam 340 prevails while the members 202 are dropping down to pick up a wrapper element and during the movement of such members to the wrapping machine E. When the associated box and wrapper elements being transferred arrive at the wrapping machine E, cam roller 339 rides up on the high portion of cam 340 and in doing so moves lever 337 clockwise about bracket 338 to move valve lever 334 counter clockwise about its pivot 335. At the end of its counter clockwise movement, valve 334 simultaneously registers the opening 232 in the valve member 230 thereof with the inlet end of passage 226, thereby connecting the blowing hose 233 to the vacuum members 202, and connects the vacuum passage 228 with the passage 227 which leads to the atmosphere. Thus, the vacuum in members 202 is cut off and at the same time air under positive pressure is delivered thereto to blow the gripped wrapper off such members into engagement with the registering pins 153 associated with the wrapping machine. This position of valve lever 334 is maintained by cam 340 while the vacuum members 202 are retracted

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to the transfer station and until they are again advanced to pick up a new wrapper element for transference to the wrapper in the manner previously explained. During such advancement of the vacuum members 202, cam roller 339 will ride off the high part of cam 340 and lever 337 will tend to move counter clockwise under the influence of spring 341 to move valve lever 334 clockwise to a position in which the members 202 are again connected to vacuum.

Means are provided to prevent such counter clockwise movement of lever 337 and thereby to prevent the connection of members 202 to the vacuum pump in the event there is no box element registered at the transfer station in association with the wrapper element to which such members 202 are advancing. As is shown in Figs. 12 and 13 of the drawings, such means include a latch plate 245 provided on lever 337 and coactable with a latch plate 246 carried by a lever 247 mounted for pivotal movement transversely to lever 337 about a vertical axis 248. The arm of lever 247 on which the latch plate 246 is mounted is normally held withdrawn by a spring 249 which is connected at one end to a second arm 250 of lever 247 and at its other end to a fixed part of the frame of the transfer mechanism. Lever 247 is provided with a third arm 251 which is connected by linkage 252 to the movable magnet of a solenoid 253. The circuit of solenoid 253 includes the box rail 29 at the transfer station, and a switch member 254 mounted at one end on an insulating block secured to such rail 29. The other end of switch member 254 is provided with a contact point 255 which cooperates with a contact point 256 electrically connected to rail 29. The member 254 is made of spring metal and normally tends to close the contacts 255 and 256 to complete the solenoid circuit. Provided on switch member 254 intermediate its ends is a semicircularly-shaped push button 257 which extends through a slot 258 (in Fig. 4) in the vertical flange of rail 29 into engagement with a side edge of a box element supported on such rail. It will be apparent that when there is no box on rail 29 in position to engage button 257, contacts 255, 256 will be closed and solenoid 253 will be energized, while when there is a box so positioned on rail 29 the circuit of solenoid 253 will be broken.

It will be understood from the foregoing description, that normally as the box transfer members 31, 31 are pushing a box from conveyor G onto rails 28 and 29 and into registry at the transfer station while the box gripping members 127, 136 are carrying a previously registered box and its associated wrapper to the wrapping machine E, the pushed box will force the push button 257 out through its slot 258 and thereby disengage the contacts 255, 256 to de-energize the solenoid 253. The spring 249 is thereby permitted to withdraw lever 247 and its associated latch plate 246 which permits lever 337 to pivot without hinderance under the influence of cam 340. When, however, the box transfer members 31, 31 do not advance a box from conveyor G onto the rails 28, 29, the contacts 255, 256 which were permitted to close by the previously registered box moving on to the wrapping machine with its associated wrapper, remain closed even though the transfer carriage and its associated parts continue their normal cycle of operations. The closing of contacts 255, 256 energizes solenoid 253 which through link 252 and lever arm 251, rotates lever 247 to move latch plate 246 towards latch plate 245. Since at this portion of the cycle latch plate 245 is in the path of movement of latch plate 246, the solenoid will be prevented from rotating lever 247 to fully advance latch plate 246 and the vacuum members 202 will continue to receive vacuum as the transfer carriage advances the previously registered box and its associated wrapper to the wrapping machine. When the previously registered box and wrapper have been delivered to the wrapping machine, cam 340 pivots lever 337 to cut off the

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vacuum to the members 202 as has been previously explained and such pivotal movement of lever 337 moves latch plate 245 to the dotted line position shown in Fig. 13 of the drawings, thereby permitting the energized solenoid to fully advance the lever 247 and its associated latch plate 246. In this relation of the latch plates 245, 246, the lever 337 will be barred from returning to a position in which the members 202 will again be connected to the vacuum pump. This relation of the latch plates will continue until a new box registered at the transfer station on rails 28, 29 opens the associated switch contacts 255, 256 to de-energize solenoid 253. The latch plate 246 will then be withdrawn by spring 249 to permit the lever 337 to operate normally with cam 340.

While the vacuum members 202 have been shown and described as gripping the wrapper at places sufficiently removed from the leading edge of such wrapper to enable the latter to bend up as the wrapper is fed to the wedges 203, it will be apparent that since the vacuum in such members is sufficiently strong to raise the wrapper into gripping relation though such members may be spaced say approximately one quarter inch away from the wrapper, it is possible to utilize such members on the leading edge of the wrapper as is indicated in Fig. 14 of the drawings. This figure also demonstrates that the slot 216' in the wedge members 203' may be made substantially horizontal instead of being inclined in the manner of the slots 216 in the wedge members 203. The slight lift given to the leading edge of the wrapper by the members 202 enable the latter to readily insert the wrapper into the slots 216' even though the front end of wedge member 215' is somewhat blunt, as indicated.

While I have hereinabove described and illustrated a preferred form of my invention, it will be evident to those skilled in the art that various changes in the construction thereof may be made without departing from the spirit of the invention or the scope of the following claims.

We claim:

1. In a box covering system, a transfer station from which unassembled box elements are transferred to another station spaced from such transfer station, means to advance a wrapper along a predetermined path to said transfer station, means to advance a box for such wrapper along a second predetermined path into spaced relation with said wrapper at said transfer station, means to transport said wrapper and box simultaneously as two independent and unassembled pieces from said transfer station to said other station, and means at such other station for automatically uniting said wrapper and box upon delivery thereof to such other station.

2. In a box covering system, a transfer station from which unassembled box elements are transferred to another station spaced from such transfer station, means for advancing a wrapper along a predetermined path to a predetermined position at said transfer station, means to advance a box for such wrapper along a second predetermined path into a predetermined position at said transfer station in which it is at a different level than such wrapper and in spaced relation to the latter, means to transport said wrapper and box simultaneously as two independent and unassembled pieces from said transfer station to said other station, and means at such other station for automatically moving said box into engagement with said wrapper and covering the former with the latter.

3. In a box covering system, a transfer station from which unassembled box elements are transferred to another station spaced from such transfer station, means for advancing a wrapper along a predetermined path to a predetermined position at said transfer station, means to advance a box for such wrapper along a second predetermined path to a predetermined position at said transfer station wherein said box and wrapper will be associated together in spaced registered relation, means to

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transport said box and wrapper simultaneously as two independent and unassembled pieces without substantially disturbing their spaced registered relation from said transfer station to said other station, and means at such other station for automatically uniting said wrapper and box upon delivery thereof to such other station.

4. In a box covering system, a transfer station from which unassembled box elements are transferred to another station spaced from such transfer station, means to advance a wrapper along a predetermined path to said transfer station, means to advance a box for such wrapper along a second predetermined path into spaced relation with said wrapper at said transfer station, means to transport said wrapper and box simultaneously as two independent and unassembled pieces from said transfer station to said other station, means at said other station for registering said box and wrapper while in spaced relation, and means at such other station for automatically uniting said registered box and wrapper.

5. In a box covering system, a transfer station from which unassembled box elements are transferred to another station spaced from such transfer station, means to advance a wrapper along a predetermined path to said transfer station, means to advance a box for such wrapper along a second predetermined path into spaced relation with said wrapper at said transfer station, means to transport said wrapper and box simultaneously as two independent and unassembled pieces from said transfer station to said other station, means at said other station for registering such wrapper while the box is supported by said transporting means, means to discharge the wrapper from said transporting means to said registering means, and means at such other station for automatically uniting said box with said registered wrapper.

6. In a box covering system, a transfer station from which unassembled box elements are transferred to another station spaced from such transfer station, means to advance a wrapper along a predetermined path to said transfer station, means to advance a box for such wrapper along a second predetermined path into spaced relation with said wrapper at said transfer station, means to transport said wrapper and box simultaneously as two independent and unassembled pieces from said transfer station to said other station, means associated with said transporting means for discharging the wrapper at such other station, and means at such other station for stripping the box from said transporting means and uniting it with the discharged wrapper.

7. In a container making system, means for advancing adhesively coated sheets along a predetermined path into registered position with relation to a place of intersection of said predetermined path with a different path of feed of boxes to be associated with said sheets, means for advancing boxes along a second predetermined path of feed into registered position at said place of intersection, and means for transferring an associated registered sheet and box as two independent separate elements without substantially disturbing their registered relation from said place of intersection to means at a place spaced therefrom for uniting the same together.

8. In a container making system, means for advancing adhesively coated sheets along a predetermined path into registered position with relation to a place of intersection of said predetermined path with a different path of feed of boxes to be associated with said sheets, means for advancing boxes along a second predetermined path of feed to a predetermined point in said path, means for moving boxes delivered to said predetermined point into registered position at said place of intersection, and means for transferring an associated registered sheet and box as two independent separate elements without substantially disturbing their registered relation from said place of intersection to means at a place spaced therefrom for uniting the same together, said moving means forming part of and movable with said transferring means.

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9. In a container making system, means for advancing adhesively coated sheets along a predetermined path into registered position with relation to a place of intersection of said predetermined path with a different path of feed of boxes to be associated with said sheets, means for advancing boxes along a second predetermined path of feed to a predetermined point in said path, and means for moving a box delivered to said predetermined point into registered position at said place of intersection and at the same time transferring a previously associated sheet and box registered at said place of intersection as two independent separate elements without substantially disturbing their registered relation from said place of intersection to means at a place spaced therefrom for uniting the same together.

10. In a box covering system, means to advance an adhesively coated sheet along a predetermined path of feed, means to register said sheet relative to a path of motion extending across said predetermined path of feed, means to advance a box along a second path of feed to a predetermined position relative to said path of motion, and means movable along said path of motion to feed said registered sheet and said predeterminedly positioned box as two independent and unassembled pieces without substantially disturbing their registered relation into the path of a plunger of a box covering machine.

11. In a container making system, means for advancing an adhesively coated sheet along a predetermined path of feed into registered position with relation to a path of motion extending across said path of feed, means for advancing a box along a second path of feed to a predetermined position relative to said path of motion, means for moving said box from said predetermined position in the direction of said path of motion to a position in substantial registry with said registered position of the coated sheet, and means movable along said path of motion to feed a sheet and box at said registered positions as two independent and unassembled pieces without substantially disturbing their registered relation to means at a place spaced therefrom for uniting the same together.

12. In a box covering system, means to advance an adhesively coated sheet along a predetermined path of feed, means to register said sheet relative to a path of motion transverse to said predetermined path of feed, means to advance a box along a second path of feed into registry with said path of motion, the places of registry of said sheet and box being in substantial registry, and means to feed said registered sheet and box as two independent and unassembled pieces without substantially disturbing their registered relation into the path of a plunger of a box covering machine spaced from said places of registry.

13. In a box covering system, means to advance a wrapper along a predetermined path of feed and to register the same at the place at which said path extends under a second predetermined path of feed, means for advancing a box along said second path of feed and to register the same at the place at which said second path extends over said first path so that said box will be located above said wrapper in spaced registered relation therewith, means for moving said box and wrapper as two independent and unassembled pieces while maintaining them in such spaced registered relation, to a station spaced from said place of registration thereof, and means at said spaced station for automatically uniting said box and wrapper into a complete container.

14. In a box covering system, means to advance one element of a box along a predetermined path of feed and to register the same at the place at which said path passes a second predetermined path of feed extending transversely of said first path, means for ad-

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vancing a second box element along said second path of feed and to register the same at said place so that said box elements will be located in spaced registered relation at said place, means for moving said box elements as two independent and unassembled pieces while maintaining them in such spaced registered relation, to a station spaced from said place, and means at said spaced station for automatically uniting said box elements.

15. In a box covering system, a box covering machine having a reciprocating form block structure, a conveyor for advancing a wrapper along a predetermined path to a place of registration on said path, means for advancing a box along a different path and registering the same over a wrapper on said conveyor at said place of registration, horizontal slide means movable between said place of registration and said structure, box gripping means carried by said slide means and operable to grip a box at said place of registration, means carried by said slide means for supporting a wrapper for said box in separate relation to the latter and operable to engage a wrapper at said place of registration, and means including said slide means to move a box and wrapper engaged by said gripping and supporting means as independent and unassembled elements from said place of registration to and beyond an edge of said conveyor, and into the path of movement of said form block structure.

16. In a box covering system, a box covering machine having a reciprocating form block structure, slide means movable toward and away from said structure and including gripping means for supporting a box in depending relation and means for supporting a wrapper for said box in separate relation to the latter by engagement with one surface of such wrapper, means engageable with the bottom of said box and the other surface of said wrapper and coactable with said gripping and supporting means to simultaneously support said box and wrapper in such separate relation, and means to actuate said slide and coactable means to move a box and wrapper carried thereby as independent and unassembled elements into the path of movement of said form block structure.

17. In a box covering system, a box covering machine having a reciprocating form block structure, a horizontal slide movable toward and away from said structure, box gripping means carried by said slide, means carried by said slide for supporting a wrapper for said box in separate relation to the latter, means including said slide to move a box and wrapper engaged by said gripping and supporting means as independent and unassembled elements into the path of movement of said form block structure, and means controlling said gripping and supporting means and operable to cause said supporting means to release said wrapper prior to the release of said box by said gripping means.

18. In a box covering system, a box covering machine having a reciprocating form block structure, means movable toward and away from said structure and including gripping means for supporting a box in depending relation and means for supporting a wrapper for said box in separate relation to the latter by engagement with one surface of such wrapper, means coactable with said gripping and supporting means and engageable with the bottom of the box and the other surface of the wrapper to simultaneously support the box and wrapper in such separate relation, means to actuate said movable and coactable means to transfer a box and wrapper carried thereby as independent and unassembled elements into the path of movement of said form block structure, and means controlling said gripping and supporting means and said coactable means and operable to cause said supporting means and said coactable means to become disengaged from the body and box whereby the wrapper

is released prior to the release of the box by said gripping means and the latter alone is supporting the box following such release of the wrapper.

19. In a box covering system, a box covering machine having a reciprocating form block structure, a conveyor for advancing a wrapper along a predetermined path to a place of registration on said path, means for registering a box in spaced relation above a wrapper on said conveyor at said place of registration, horizontal slide means movable between said place of registration and the path of movement of said form block structure, means on said slide means to grip a box at said place of registration, means on said slide means to support a wrapper for said box in a plane spaced below said box and engageable with the wrapper at said place of registration, means for actuating said slide means to move the box and wrapper engaged by said gripping and supporting means from said place of registration, to and beyond an edge of said conveyor, and into the path of movement of said form block structure without disturbing the grip of said gripping and supporting means so as to maintain the spaced registered relation of the moved box and wrapper, whereby the box and wrapper do not contact each other in their lateral movement to the form block structure.

20. In a box covering system, a box covering machine having a reciprocating form block structure, a conveyor for advancing a wrapper along a predetermined path to a place of registration on said path, means for registering a box in spaced relation above a wrapper on said conveyor at said place of registration, horizontal slide means movable between said place of registration and the path of movement of said form block structure, means on said slide means to grip a box at said place of registration, means on said slide means to support a wrapper in spaced relation to the box and engageable with the wrapper at said place of registration, means to actuate said slide means to move the box and wrapper engaged by said gripping and supporting means as independent and unassembled elements without disturbing their spaced registered relation from said place of registration, to and beyond an edge of said conveyor, and into the path of movement of said form block structure, and means in said box covering machine operable to insert said form block structure into said box prior to the contact of the latter with said wrapper.

21. In a box covering system, a box covering machine having a reciprocating form block structure, a conveyor for advancing a wrapper along a predetermined path to a place of registration on said path, means for registering a box in spaced relation above a wrapper on said conveyor at said place of registration, slide means movable between said place of registration and the path of movement of said form block structure, means on said slide means to grip a box at said place of registration, means on said slide means to support a wrapper in spaced relation to the box and engageable with the wrapper at said place of registration, means to actuate said slide means to move the box and wrapper engaged by said gripping and supporting means as independent and unassembled elements without disturbing their spaced registered relation from said place of registration, to and beyond an edge of said conveyor, and into the path of movement of said box structure, means to arrest the lateral movement of said gripping and supporting means when the box and wrapper carried thereby have been moved in the path of movement of said block structure, and means in said box covering machine operable to insert said block structure into said box following the arrestment of the lateral movement of said gripping and supporting means and while the box is in spaced relation to the wrapper to bring such box into engagement with the wrapper.

22. In a box covering system a box covering machine,

means to apply adhesive material to a wrapper to be delivered to said machine, means including wrapper conveying means to temper the adhesive material applied to said wrapper before delivery to said machine to substantially eliminate tendency of the wrapper to curl, means separate from said conveying means to register said wrapper in a predetermined position at said box covering machine after said tempering has been accomplished, means to feed a box for said wrapper as an independent element to said covering machine, and means in said covering machine to unite said box with said registered wrapper and to cover the same therewith.

23. In a box covering system a box covering machine, means to apply adhesive material to a wrapper to be delivered to said machine, means including wrapper conveying means to temper the adhesive material applied to the wrapper before delivery to said machine to substantially eliminate tendency of the wrapper to curl, means separate from said conveying means to register said wrapper in a predetermined position at said box covering machine after said tempering has been accomplished, means to feed a box for said wrapper as an independent element to said covering machine, means to register the box in relation to the wrapper registered in said covering machine, and means in said covering machine to unite said registered box and wrapper and to cover the box with the wrapper united thereto.

24. In a box covering system, means to register a box and a wrapper therefor at a transfer station in an initial registered relationship while said box and wrapper are out of contact with each other, means to transfer said box and wrapper from said station in substantially such registered relation to a second station spaced from said transfer station, means at said second station to re-register said box and wrapper while still out of contact with each other, and means at said second station for uniting said box and wrapper as thus re-registered.

25. In a box covering system, a transfer station, means to register box and wrapper elements while in spaced relation at said transfer station, a box covering machine having reciprocating form block structure spaced from said transfer station, means for transferring associated registered box and wrapper elements as separate independent members while in substantially such spaced registered relation from said transfer station to said machine and for presenting the same simultaneously into the path of movement of the form block structure as two independent spaced members, and means in said machine cooperable with block structure to unite such associated spaced box and wrapper.

26. In a box covering system, a transfer station from which unassembled box elements are transferred to another station spaced from such transfer station, means to advance a wrapper along a predetermined path to said transfer station, means to advance a box for such wrapper along a second predetermined path into spaced relation with said wrapper at said transfer station, means to transport said wrapper and box simultaneously as two independent and unassembled pieces from said transfer station to said other station, said transporting means comprising two parallel guide bars, a device movably mounted on said guide bars, and means for moving said device on said guide bars, said guide bars, device and device moving means being located above the planes of said box and wrapper advancing means to enable said device in its movements to sweep over box and wrappers being fed by said advancing means to said transfer station, and means at said other station for automatically uniting an associated box and wrapper delivered thereto.

27. In a box covering system, a transfer station from which unassembled box elements are transferred to another station spaced from such transfer station, means to advance wrappers along a predetermined path to said transfer station, means to advance boxes for such wrappers along a second predetermined path to said transfer sta-

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tion, means to transfer a wrapper and box associated at said transfer station to said other station, means controlled by the boxes positioned at said transfer station for controlling the operability of said transfer means, said control means being operative to render said transfer means able to transfer a wrapper located at said transfer station when a box is associated therewith and to render said transfer means incapable of transferring such wrapper when a box has not been associated therewith.

28. In a box covering system, a transfer station from which unassembled box elements are transferred to another station spaced from such transfer station, means to advance wrappers along a predetermined path to said transfer station, means to advance boxes for such wrappers along a second predetermined path to said transfer station, means to transfer a wrapper and box associated at said transfer station to said other station, means associated with said box advancing means at said transfer station and controlled by the boxes positioned at said transfer station by said advancing means for controlling the operability of said transfer means, said control means being operative to render said transfer means able to transfer a wrapper located at said transfer station when a box is associated therewith and to render said transfer means incapable of transferring such wrapper when a box has not not been associated therewith.

29. In a box covering system, a transfer station from which unassembled box elements are transferred to another station spaced from such transfer station, means to advance wrappers along a predetermined path to said transfer station, means to advance boxes for such wrappers along a second predetermined path to said transfer station, means to transfer a wrapper and box associated at said transfer station to another station and including means for carrying a box and means for supporting a wrapper, means controlling the operability of said wrapper supporting means, and means controlled by the boxes positioned at said transfer station for controlling said control means, said box controlled means being operative to condition said control means to render said wrapper supporting means able to transfer a wrapper located at said transfer station when a box is associated therewith and to render said wrapper supporting means incapable of transferring such wrapper when a box has not been associated therewith.

30. In a box covering system, a transfer station from which unassembled box elements are transferred to another station spaced from such transfer station, means to advance wrappers along a predetermined path to said transfer station, means to advance boxes for such wrappers along a second predetermined path to said transfer station, means to transfer a wrapper and box associated at said transfer station to said other station and including means for carrying a box and means for supporting a wrapper, means controlling the operability of said wrapper supporting means, switch means engageable by the boxes positioned at said transfer station and controlling said control means, said switch means when engaged by a box at said transfer station operating said control means to render said wrapper supporting means able to transfer a wrapper associated with such box and when not engaged by a box causing said control means to render said wrapper supporting means incapable of transferring a wrapper at such station.

31. In a box covering system, a transfer station from which unassembled box elements are transferred to another station spaced from such transfer station, means to advance box elements of one type along a predetermined path to said transfer station, means to advance box elements of another type along a second predetermined path to said transfer station and into association with said first elements, means to transfer associated elements at said transfer station to said other station and including means for carrying such associated elements and means for actuating said transfer means to move said carrying means

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through a predetermined cycle, and means controlled by one type of the box elements at said transfer station for controlling the operability of said carrying means without affecting the cycling action of said actuating means, said control means being operative to render said carrying means able to carry the other of such box elements when said one type of box element is positioned at said transfer station and to render said carrying means incapable of carrying said other type of box element when said one type of box element has not been associated therewith at said transfer station.

32. In a box making system, a transfer station from which unassembled box elements are transferred to another station spaced from such transfer station, means to register box and wrapper elements at said transfer station, and means for transferring associated registered box and wrapper elements from said transfer station to said other station, said transfer means comprising a vacuum member engageable with a surface of said associated wrapper to support such wrapper during the transfer thereof, valve means controlling the supply of vacuum to said vacuum member, means for actuating said valve in accordance with a predetermined cycle, and means controlled by the box elements at said transfer station for controlling said valve actuating means, said control means being operative to permit said actuating means to operate normally as box elements are normally registered at said transfer station and to render said actuating means inoperative to actuate said valve to produce a condition of vacuum in said vacuum member when the wrapper registered at the transfer station does not have a box associated therewith.

33. In a box making system, a transfer station from which unassembled box elements are transferred to another station spaced from such transfer station, means to register box and wrapper elements at said transfer station, and means for transferring associated registered box and wrapper elements from said transfer station to said other station, said transfer means comprising a vacuum member engageable with a surface of such associated wrapper to support such wrapper during the transfer thereof, valve means controlling the supply of vacuum to said vacuum member, means for actuating said valve in accordance with a predetermined cycle to control the supply of vacuum to said vacuum member, and means for providing positive pressure in said vacuum member when said valve member is actuated to discontinue the supply of vacuum to said vacuum member.

34. In a box covering system, a box covering machine having a reciprocating form block structure, a conveyor for advancing a wrapper along a predetermined path to a place of registration on said path, means for registering a box in spaced relation above a wrapper on said conveyor at said place of registration, horizontal slide means movable between said place of registration and the path of movement of said form block structure, box element supporting means on said slide means for supporting the registered box and wrapper in spaced relation and including means to grip a box at said place of registration, vacuum gripping means engageable with the upper surface of a wrapper at said place of registration for supporting such wrapper in a plane spaced below such box, and means at the edge of said conveyor and formed to engage spaced leading edges of said box and wrapper in supporting relation, means for actuating said slide means to move the box and wrapper engaged by said box element supporting means from said place of registration, to and beyond such edge of said conveyor, and into the path of movement of said form block structure without disturbing the grip of said box element supporting means so as to maintain the spaced registered relation of the moved box and wrapper, whereby the box and wrapper do not contact each other in their lateral movement from said place of registration to the form block structure.

35. A box covering system such as defined in claim 34, in which said box element supporting means engageable

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with the leading edges of the associated box and wrapper comprises a pair of spaced members providing upper and lower inclined supporting surfaces for the box and wrapper respectively, and in which said vacuum gripping means engages the upper surface of the wrapper at a place spaced from the leading edge thereof supported by such inclined surfaces.

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