Nov. 1, 1960 E. K. WOLFF ET AL 2,958,267

CONTAINER MAKING MECHANISM

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Fig. 1.

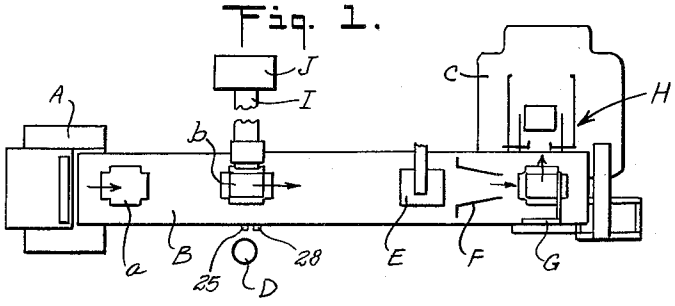
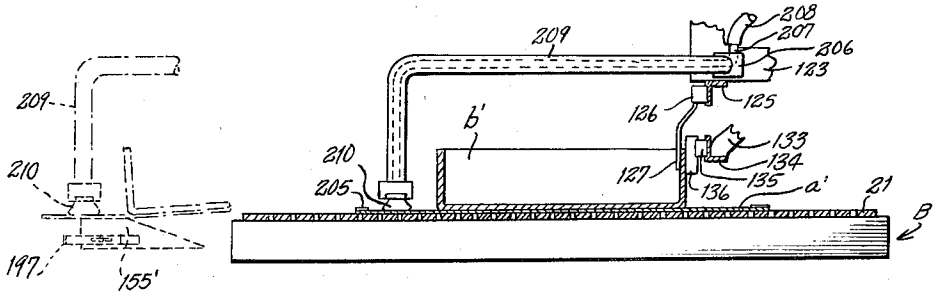


Fig. 14.



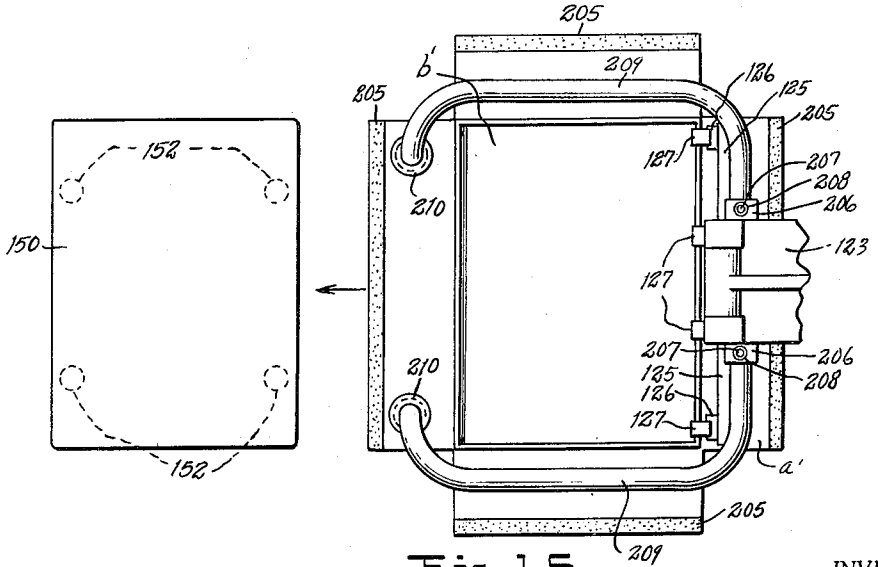


Fig. 15.

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CONTAINER MAKING MECHANISM

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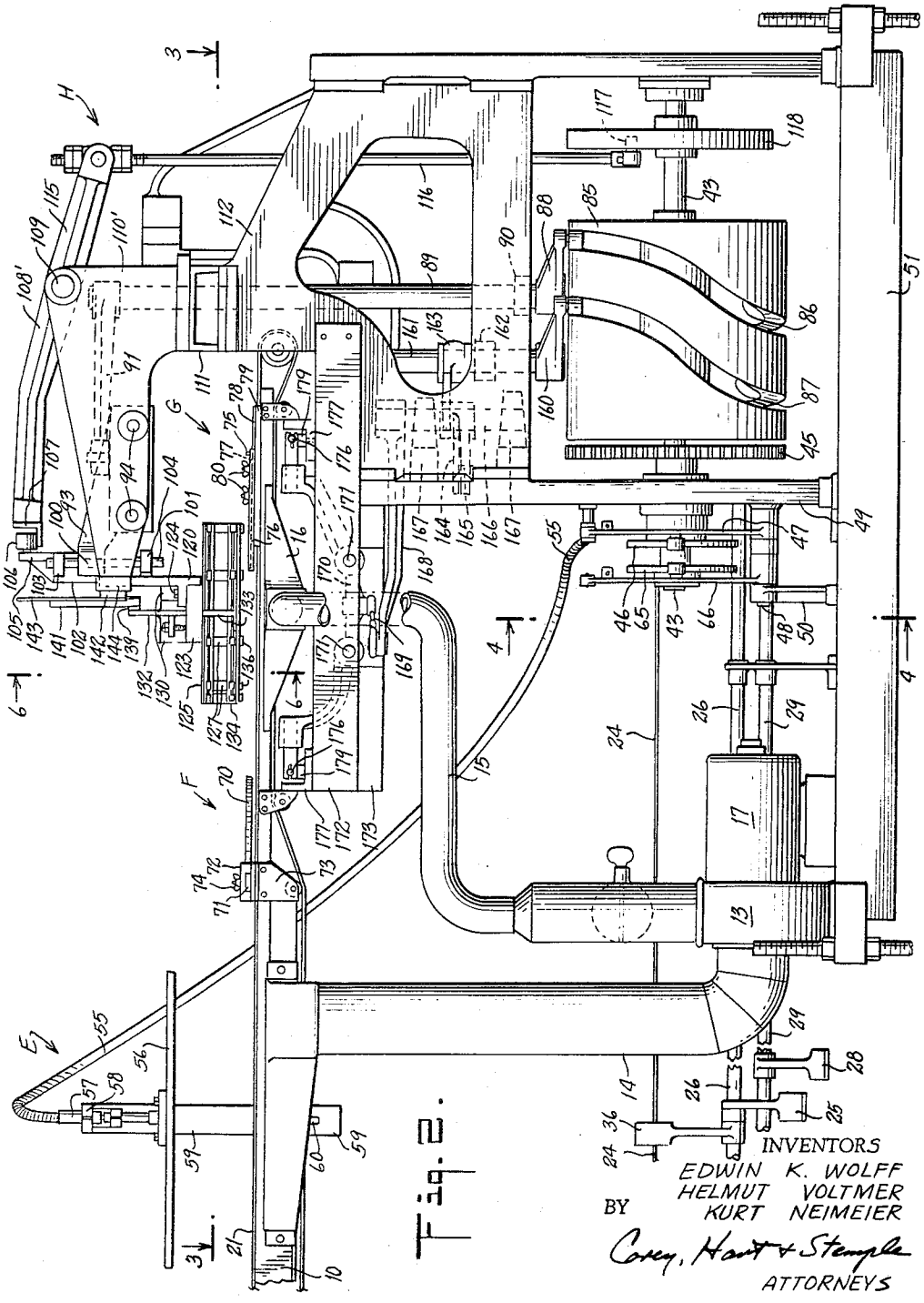


Fig. 2.

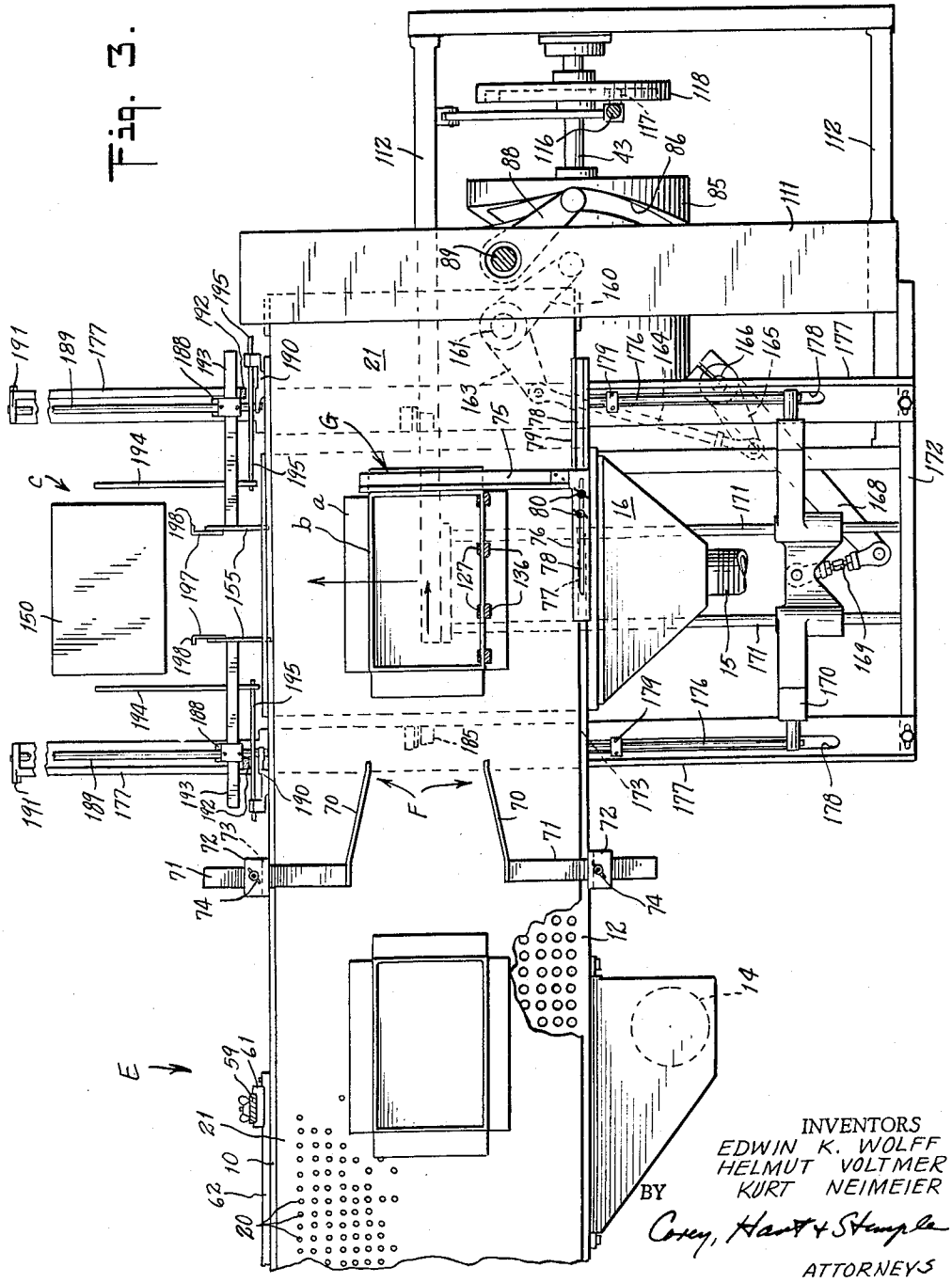
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Nov. 1, 1960 E. K. WOLFF ET AL 2,958,267

CONTAINER MAKING MECHANISM

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Fig. 3.



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CONTAINER MAKING MECHANISM

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Fig. 4.

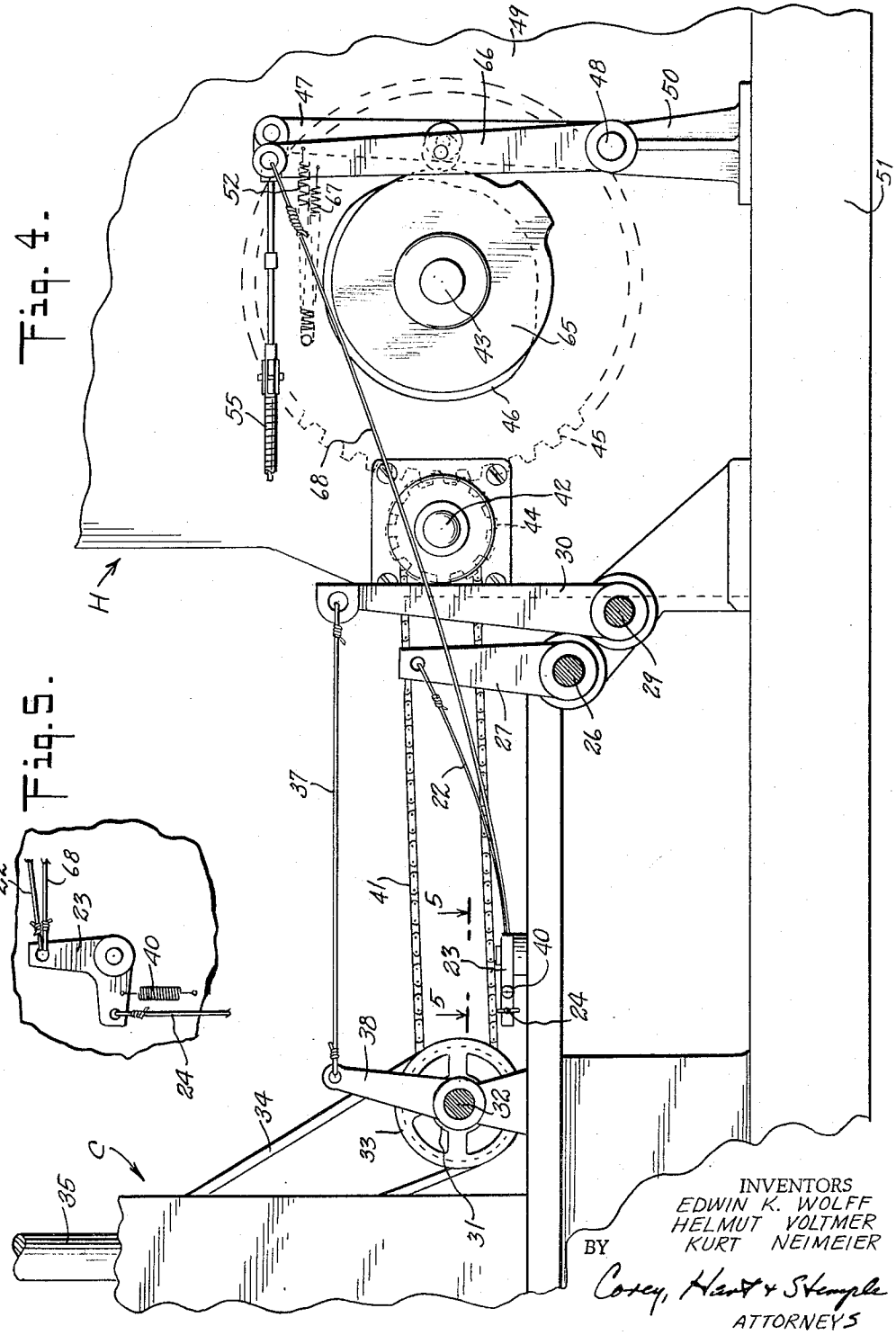


Fig. 5.

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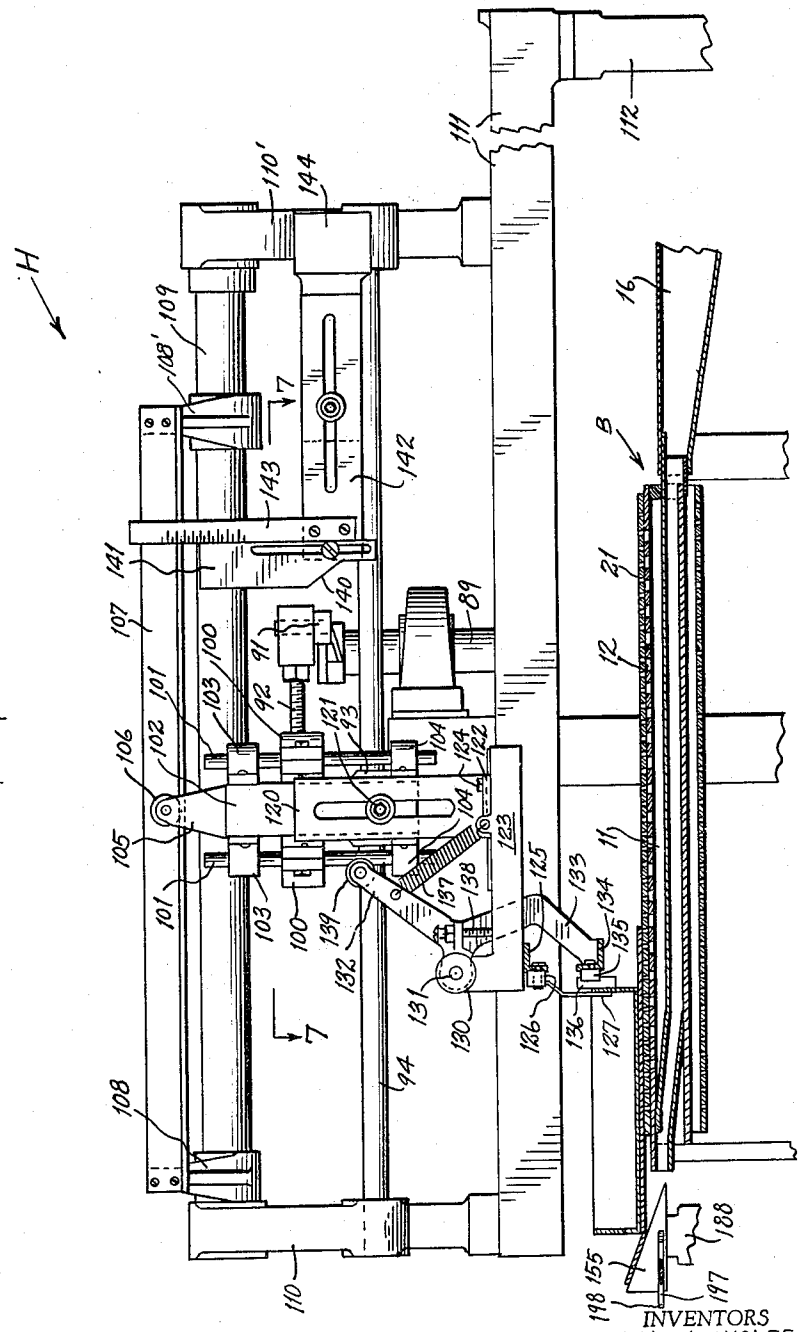
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CONTAINER MAKING MECHANISM

Filed Sept. 6, 1957 9 Sheets-Sheet 5

Fig. 6.



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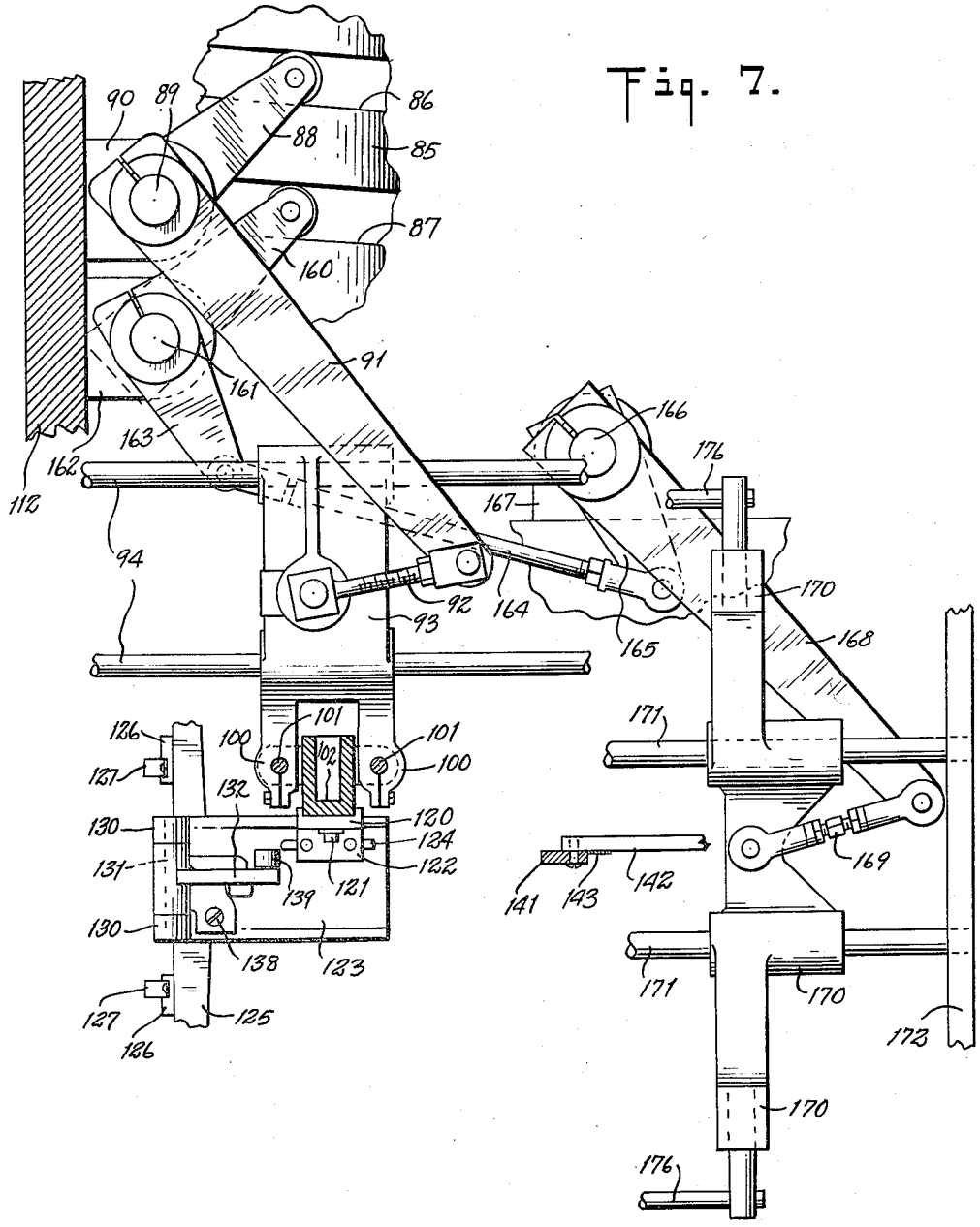
BY Corey, Hart & Stemple
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Nov. 1, 1960 E. K. WOLFF ET AL 2,958,267

CONTAINER MAKING MECHANISM

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Fig. 7.



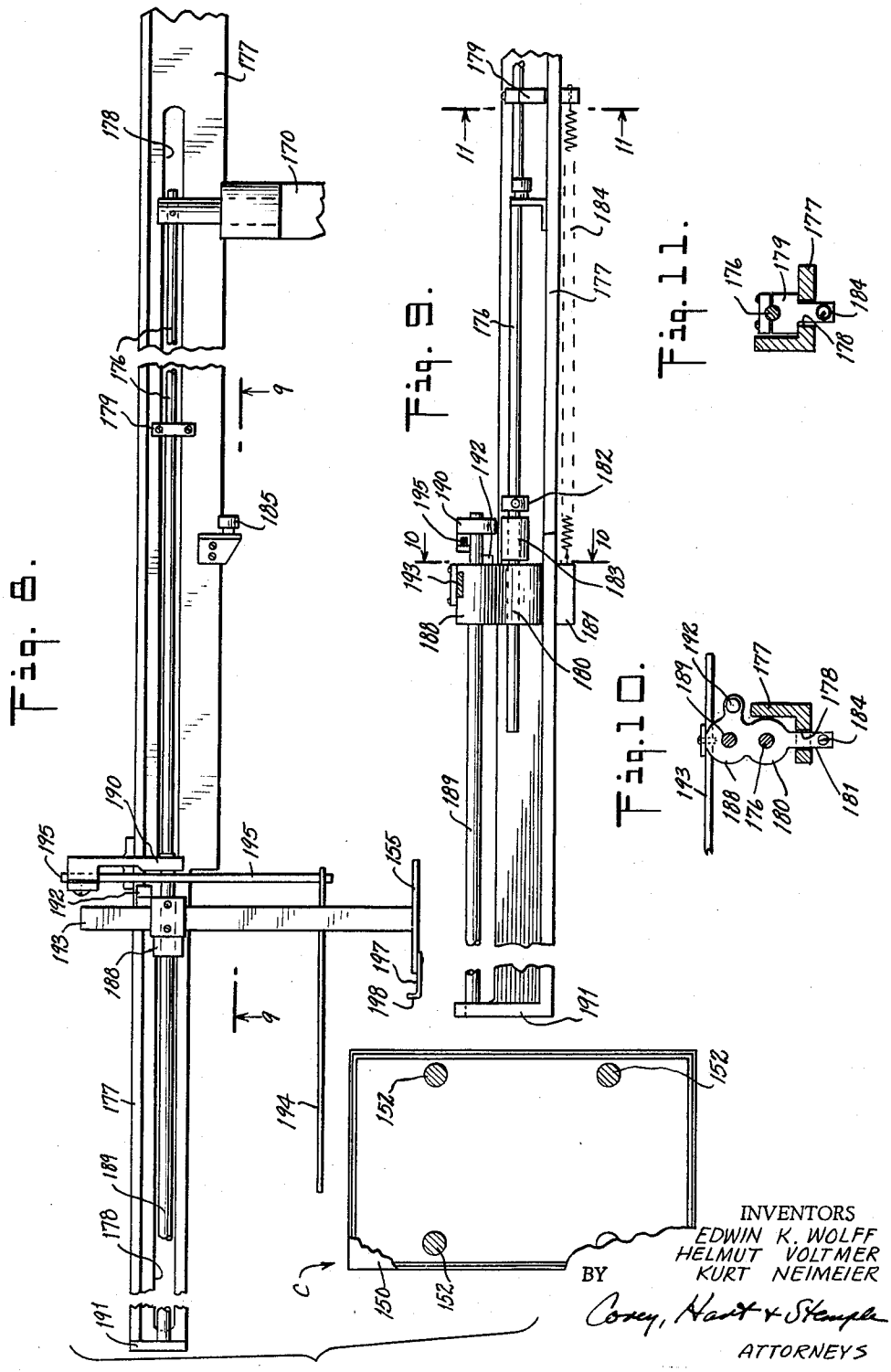
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CONTAINER MAKING MECHANISM

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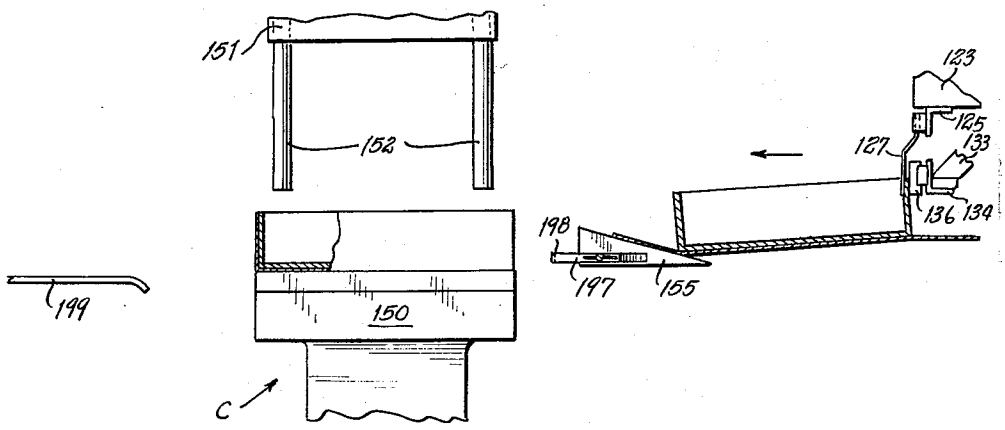


Nov. 1, 1960 E. K. WOLFF ET AL 2,958,267

CONTAINER MAKING MECHANISM

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Fig. 12.



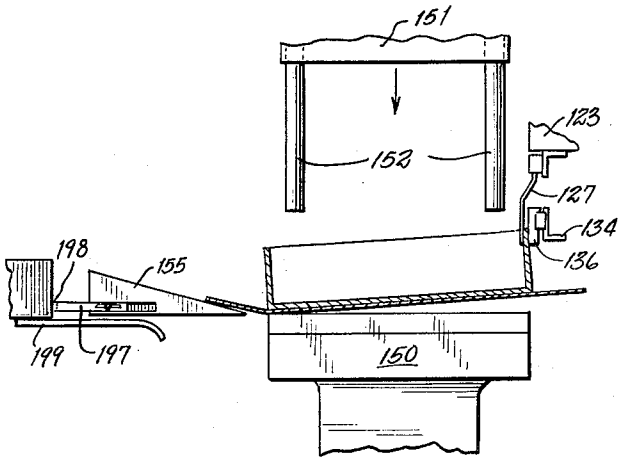


Fig. 13.

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CONTAINER MAKING MECHANISM

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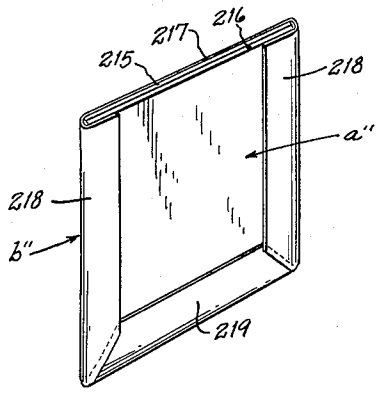


Fig. 16.

Fig. 17.

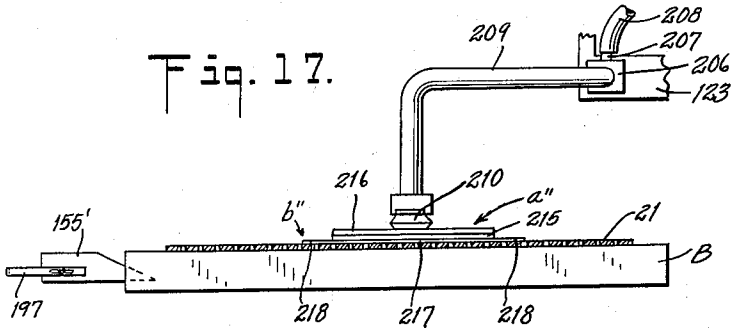
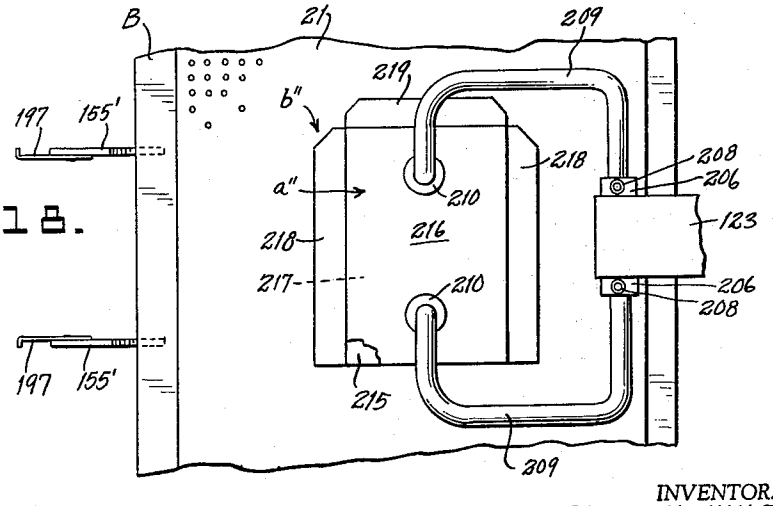


Fig. 18.



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United States Patent Office

2,958,267

Patented Nov. 1, 1960

2,958,267

CONTAINER MAKING MECHANISM

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Filed Sept. 6, 1957, Ser. No. 682,475

65 Claims. (Cl. 93—54)

This invention relates to mechanism 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, phonograph albums, and the like, and has for its primary object the provision of an improved mechanism of the indicated type capable of operating automatically to give fast dependable service with a minimum of care and with the use of unskilled operators.

A particular object of the invention is to provide an improved transfer mechanism for automatically carrying container structures in timed sequence with feeding and forming means and in such manner that there is no likelihood of the structures being crushed or damaged in the transfer thereof.

Another object of the invention is to provide an improved transfer mechanism capable of delivering a container structure to a stripping means with the open end of the container in a controlled flared open condition to facilitate the action of the stripping means.

A further object of the invention is to provide an improved transfer mechanism for moving associated container and wrapper elements from a transfer station to a wrapping machine while exercising positive control over both the associated container and wrapper elements and without the necessity of engaging the adhesive material on the wrapper.

Another object of the invention is to provide an improved transfer mechanism for moving unadhered associated container and wrapper elements from a transfer station to a wrapping machine while exercising positive control over such unadhered associated container and wrapper elements.

A still further object of the invention is to provide an improved transfer mechanism which will feed a container and wrapper assembly from a transfer station to a wrapping machine while simultaneously ejecting a finished assembly from the latter, and which will move into position to feed a succeeding container and wrapper assembly while such succeeding assembly is advancing to the transfer station.

Another object of the invention is to provide an improved transfer mechanism for moving a container and wrapper assembly from a transfer station to a wrapping machine and which is so constructed and arranged with relation to such machine that the form-block structure of the latter and the devices associated with such structure are readily accessible for adjustment, repair and replacement.

Other specific objects of the invention as well as the

advantages and features of novelty thereof will appear from the following description and will be pointed out in the claims. The description should be read in conjunction with the accompanying drawings, in which

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

Fig. 2 is a front elevational view of the mechanisms located at the right hand end of the box wrapping system shown in Fig. 1 and constructed and arranged in accordance with the invention;

Fig. 3 is a horizontal sectional view taken along the line 3—3 of Fig. 2 and shows in top plan view box assemblies being fed to a transfer station with one assembly in position to be transferred from the conveyor to the wrapping machine;

Fig. 4 is a vertical sectional view taken along the line 4—4 of Fig. 2 and shows in enlarged detail the devices which enable the transfer mechanism to control the operation of the gluer which applies an adhesive coating to the wrappers of the box assemblies and feeds such wrappers to the conveyor, the conveyor for advancing the wrappers to the box registering station and for advancing the assemblies to the transfer station, and the wrapping machine for finishing the box;

Fig. 5 is a top plan view looking along the line 5—5 of Fig. 4 and showing the trigger mechanism which is actuated to control the gluer;

Fig. 6 is a vertical sectional view taken along the line 6—6 of Fig. 2 and illustrates the construction of the conveyor at the transfer station and the construction and arrangement of the mechanism for controlling the movements of the transfer means located above the conveyor;

Fig. 7 is a horizontal sectional view taken along the line 7—7 of Fig. 6 and illustrates the manner in which the transfer means located both above and below the upper run of the conveyor is connected to the main actuating cam for such mechanisms;

Fig. 8 is a top plan view of one of the devices constituting the transfer means located below the upper run of the conveyor, the device shown being that located on the right hand side, as viewed in Fig. 3 of the drawings;

Fig. 9 is a side elevational view, looking along the line 9—9 of the slide mechanism shown in Fig. 8;

Fig. 10 is a vertical sectional view taken along the line 10—10 of Fig. 9;

Fig. 11 is a vertical sectional view taken along the line 11—11 of Fig. 9;

Fig. 12 is a side elevational view illustrating the manner in which a box assembly is carried by the transfer mechanism from the conveyor to the form block of the wrapper machine and showing a previously completed box positioned on such form block;

Fig. 13 is a view similar to Fig. 12 and illustrates the manner in which the box assembly is positioned on the wrapper form block and the previously completed box is moved from such block to a discharge ramp by the transfer mechanism;

Fig. 14 is a side elevational view, partly in section, of a modified form of transfer means for transferring an unadhered box and wrapper assembly from the conveyor to the form block of the wrapping machine, the view indicating in dotted outline the manner in which a box assembly is carried by such means to the wrapping machine;

Fig. 15 is a top plan view of the mechanism shown in

Fig. 14 and showing the relation of the parts as such mechanism is nearing the form block of the wrapping machine;

Fig. 16 is a perspective view illustrating a form of phonograph album which may be made with the mechanism of this invention;

Fig. 17 is a side elevational view, partly in section, of a modified form of transfer means for transferring an album assembly to the wrapping machine; and

Fig. 18 is a top plan view of the parts shown in Fig. 17.

In a machine of the type with which the present invention is concerned, the wrappers *a* of the box or container structures are usually fed in a successive fashion under the control of the operator, to a glueing machine A which applies an adhesive coating to a box engaging faces thereof and delivers such wrappers, coated face uppermost, to a conveyor B. The boxes *b* to which the wrappers *a* are to be applied in making such structures, may be initially brought into cooperative relation with each other and the glueing machine A, either by being automatically fed into such cooperative relation by suitable known mechanism such as described and shown in the U.S. Fleischer et al. Patent No. 2,075,605, issued March 30, 1937, or by being manually co-related. Also, the boxes *b* may be manually registered on the wrappers as the latter successively arrive at a position opposite an operator stationed at stool D as shown in Fig. 1 of the drawings. During the travel of the wrappers *a* from the glueing machine A to and past the operators stool D, suction is applied to the under surfaces thereof through the conveyor belt B to hold them flat and in predetermined positions on the conveyor. The wrappers *a* from the glue machine A are intermittently stepped along or advanced by conveyor B in timed relation with the wrapping machine C for completing the application of the wrappers on the boxes. After a wrapper arrives at a position opposite the operator at stool D, a preformed or stayed box *b* is registered thereon while the conveyor is at rest, the adhesive material on the wrapper securing the bottom of the box to such wrapper to form an assembly of the container structure. A supply of boxes may be stacked within easy reach of the operator on a supply table. Also stayed boxes may be delivered to the operator directly from the staying machine by means of a separate conveyor in timed relation with conveyor B. Thus, as indicated in Fig. 1, the stayed boxes may be fed to the operator by a conveyor I which may be embodied in a box stayer J in the manner described and shown in copending application U.S. Serial No. 655,214 filed by George W. von Hofe et al. April 26, 1957. Following the formation of the assembly of the container structure comprising the partially applied wrapper *a* and the box *b*, such assembly is stepped along by conveyor B to a succeeding station at which a tamper E descends while the conveyor is at rest, the tamper engages the upper edges of the box *b* and through such engagement presses the box down uniformly upon the wrapper to assure a smooth uniform adherence of the wrapper to the bottom of the box. Following this tamping operation, the container structure on the next step-by-step movement of the conveyor B, passes between channeling members F. When the adhesively coated wrappers *a* are fed to the conveyor B by the glueing machine A, they are positioned approximately along the center line of such conveyor. The suction applied through the conveyor B tends to hold the wrappers in that position as they are intermittently stepped along to the assembly station where boxes are applied to the wrappers to form the assembly units of the container structures. In the event a container structure may have become misaligned during the registration of a box on a wrapper at station D, the channeling members F are constructed and arranged to realign the container structure in advance of its arrival at the transfer station, at which place the container structure is transferred from conveyor B to the wrapping machine C. Thus, the channeling members F assure proper position of the container structure upon its delivery to the transfer station. On the arrival of a container structure at the transfer station, the leading end of the box *b* thereof comes into engagement with stop means G which insures that the container structure has been fully advanced to the transfer station, in position to be properly engaged by the assembly transfer mechanism H. During the next dwell period of the conveyor B, the transfer mechanism H is actuated under the control of the operator to shift the assembly of the container structure transversely across the conveyor B and to deposit it on the lower part of a form block in the wrapping machine C. While the transfer mechanism is in an advanced dwell position the upper half of the form block moves into the box of the container structure and then the form block as a whole moves down inside the machine C, taking the assembly of the container structure with it, at which time the side and end panels of the wrapper *a* are applied to the corresponding sides of the box *b* by the wrapping tools of such machine in a manner well known in the art to complete the container structure.

The conveyor B in the machine illustrated in the drawings is constructed substantially similarly to the suction type conveyor described and shown in the Fleischer et al. U.S. Patent No. 2,075,605 and like the latter comprises a supporting frame **10** of suitable type and dimensions and on which a suction box or chamber **11** is provided in any suitable manner. The suction box is preferably of elongated form and is provided with a flat, perforated upper wall **12**. Any conventional means may be utilized for developing suction in the suction box **11**, as for instance a blower **13**, the suction side of which is in communication with the interior of the suction box through piping **14**, as is shown in Figs. 2 and 3 of the drawing. The blower **13** at its outlet side is provided with upright piping **15** to the discharge end of which is connected a nozzle **16** arranged to discharge the air under pressure against the underside of the wrapper of an assembly as the assembly is being shifted from the conveyor onto the assembly supporting members of the transfer mechanism H, as will hereinafter be more fully explained. The blower **13** is operatively driven in any well known manner, as by means of an electric motor **17** mounted upon a suitable bed supported by the base **51** on which is mounted the transfer mechanism H. The conveyor B further includes a traveling support pervious to suction for carrying the wrappers *a* and the box assemblies constituted of such wrappers and the boxes *b* from stations A and D, respectively, to the transfer station H. The support is illustrated in the form of an endless belt provided with perforations **20**, the arrangement being such that the upper run **21** of said belt passes over and is in contact with the perforated upper wall **12** of the suction box **11** (note Fig. 6). Accordingly, during operative periods of the machine, the suction developed in the suction box **11** will be effective at the carrying surface of the support, or in other words, through the perforations **20** of the upper run **21** of the conveyor belt as it travels over the perforated wall **12**. In the instant machine, the suction producing means, as exemplified by the blower **13** and its associated elements, is designed to develop only a relatively light suction at the carrying surface of the traveling support or upper run **21** of the conveyor belt. The suction is preferably sufficient to maintain the wrappers *a* in flattened condition and to hold the same on the upper run **21** of the belt so as to cause such wrappers to move therewith, but insufficient to materially interfere with the slidable shifting of the box assemblies during the transfer thereof to the wrapping machine C. As previously mentioned, the conveyor B is intermittently advanced, making one step for each cycle of the wrapping machine C, and its operation is also synchronized with the operation of the gluer A in a manner well known in the art. As 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 instant invention, it is unnecessary to describe the same in detail.

The operation of the gluer A and conveyor B is initiated by the operator depressing a pedal 25 located at the box registering station D and secured to a revolvably supported shaft 26 extending longitudinally below the conveyor (compare Figs. 1 and 2). Also provided on shaft 26 is an arm 27 which is located adjacently to the frame of the transfer mechanism H (note Fig. 4) and which is connected in any suitable fashion to mechanism controlling the operation of the gluer and conveyor. As shown in Fig. 4, arm 27 may be connected by a cable 22 to one arm of a trigger or lever 23 mounted for pivotal movement about a vertical axis on a stationary part of the wrapping machine C. The other arm of lever 23 is connected by a cable 24 to the gluer control mechanism in a manner well understood in the art, the arrangement being such that when pedal 25 is depressed, arm 27, cord 22, lever 23, cord 24 and the control mechanism will be actuated to start the gluer and conveyor. The operator maintains pedal 25 depressed until the gluer A has deposited a sufficient number of glued wrappers *a* on the conveyor to enable the latter in its step-by-step feed to advance the first of such succession of wrappers to station D. On such occurrence, the operator releases pedal 25 and depresses pedal 28 on a revolvably supported shaft 29 located adjacent to and disposed in parallel relation with shaft 26, the two such shafts being substantially coextensive. Provided on shaft 29 adjacently to arm 27 is an arm 30 which is directly connected to in any suitable fashion and which controls a cone shaped clutch 31 mounted on a shaft 32 embodied in the wrapping machine C. As is shown in Fig. 4, such connection may take the form of a cable 37 which is connected at one end to the top of arm 27 and which is connected at its other end to the top of an arm 38 mounted on shaft 32. The construction and operation of the wrapping machine may be of any usual and well known type, but preferably it includes a high speed clutch controlled input shaft, such as shaft 32. In the known type of wrapping machine illustrated, shaft 32 is connected through a free pulley 33 and belt 34 to the motor (not shown) for driving such machine and is connected through suitable gearing (not shown) to the vertically disposed cam shaft 35 of the wrapping machine. Thus when pedal 28 is depressed, clutch 31 will be actuated to drivingly connect pulley 33 to shaft 32 and thereby enable the wrapping machine motor to drive cam shaft 35. The operations of the gluer A and the conveyor B are synchronized with and controlled by the operation of the wrapping machine C in a manner which shall hereinafter become more clear. Thus, even though the operator has released the gluer control pedal 25, by his depressing the pedal 28 to start the wrapping machine C, the latter will take over the control of the gluer A and conveyor B and all units will be caused to operate automatically through one complete cycle. Suitable known mechanism will then come into operation to bring the wrapper C, gluer A and conveyor B to a stop. By maintaining the pedal 28 in a depressed condition, however, so that the driving relation of clutch 31 and pulley 33 is maintained, the gluer A, conveyor B and wrapper C will recycle without interruption in an automatic fashion to feed successive wrappers *a* and to complete the box assemblies that are successively fed to the wrapper C. Shaft 26 is further provided with an emergency stop pedal 36 which is connected to cable 24 at a place between lever 23 and the gluer control mechanism and which if pressed rearwardly will actuate such cable to stop the gluer A and consequently the conveyor B at any point in their cycle. In his operation of pedal 36, the operator will initially or simultaneously release pedal 28 causing the immediate stoppage of the wrapper C at any point in its cycle. The actuating mechanisms are preferably biased to stop positions by the use of springs, such as the spring 40 shown connected to lever 23 and to a stationary part of the wrapper.

The high speed input shaft 32 in the wrapping machine C is drivingly connected by a chain and sprocket connection which is designated generally in Fig. 4 of the drawings by the numeral 41, to a high speed shaft 42 provided in the transfer mechanism H. Shaft 42 is rotatably supported on the side frame members of such transfer mechanism at the rear thereof and is disposed in substantial parallelism with shaft 32. Located forwardly of shaft 32 on such side frame members and disposed in substantial parallelism therewith, is a third shaft 43 which also forms part of the transfer mechanism H and which is driven by shaft 42 through spur gears 44 and 45. Spur gear 44 is provided on shaft 42 and is substantially smaller than spur gear 45 on the shaft 43 so that the latter shaft is rotated at a substantially lower rate of speed than shaft 42. Mounted on one end of shaft 43 (note Figs. 2 and 4) is a cam 46 the peripheral cam surface of which is engaged by a cam roller carried by a vertically disposed arm 47 rotatably supported at its lower end by a shaft member 48 for pivotal movement about the axis of such shaft. Shaft member 48 is supported at its ends by the side frame member 49 of the transfer mechanism H and by a bearing bracket 50 mounted on the base 51 of such mechanism. The cam roller on arm 47 is maintained in engagement with cam 46 by a spring 52 connected to the upper end of arm 47 and to a fixed pin secured to side frame member 49. The upper end of arm 47 is also suitably coupled to one end of a flexible shaft 55, the other end of the latter of which is secured to and carries the tamping plate 56 of the tamper E.

As shown more clearly in Fig. 2 of the drawings, the tamper plate 56 is a flat plate of any suitable, perferably light weighted, rigid material and is disposed in spaced, substantially parallel relation to and above the upper run 21 of the conveyor belt. The plate 56 is substantially greater in area than the horizontal area of the largest box in a particular range of box sizes to be completed by the wrapper C and is located above the region at which a box assembly will dwell after taking its first step in the feed thereof from station D. The cam 46 is so formed that during a period of dwell of a box assembly beneath plate 56, arm 47 will pivot rearwardly under the influence of its associated spring to cause the flexible shaft 55 to advance plate 56 downwardly into engagement with the upper edges of the box *b* of the assembly whereupon such plate will yieldably press the box firmly against the wrapper *a* of such assembly. Following such momentary pressing action of the plate 56, the arm 47 will be pivoted forwardly by cam 46 against the tension of its associated spring to retract shaft 55 and thereby raise the plate 56 away from the box assembly so that the latter will be free to move forwardly on the next step-by-step movement of the conveyor belt. The end of shaft 55 connected to plate 56 is guided in its reciprocating movements by a vertically disposed sleeve 57 that is secured in any suitable manner to the outer free end of a bracket arm 58 extending transversely forwardly above the upper run 21 of the conveyor. The rear end of arm 58 is secured to the upper end of a vertically disposed bracket member 59 having in the lower part thereof an elongated slot 60 which forms part of the means adjustably mounting such member on a block 61 and enabling such member to be adjusted in a vertical direction relative to such block and to the conveyor. The block 61 is slidably supported by a horizontally disposed guide 62 secured to the rear longitudinal edge of the conveyor frame 10. It will thus be seen that the arm 58 and consequently plate 56 may be adjusted vertically and horizontally relative to the upper run 21 of the conveyor belt to take care of variations in the places of dwell of the box assemblies and in the sizes of the boxes of such assemblies and in

the pressure which is to be exerted by such plate on the box of an assembly. In order to exert more positive control on the reciprocating movements of the plate 56 and to assure a uniform pressure thereof on the upper edges of a box in an assembly, there is provided on such plate an upwardly extending substantially vertical guide member (not shown) which passes through a guide opening formed in the bracket arm 58 between sleeve 57 and bracket member 59.

Mounted on shaft 43 adjacent to cam 46 is a cam 65, the peripheral cam surface of which is engaged by a cam roller carried by a vertically disposed arm 66 which is also rotatably supported at its lower end by the shaft member 48 for pivotal movement about the axis of such shaft. The cam roller on arm 66 is maintained in engagement with cam 65 by a spring 67 connected to the upper end of such arm and to the fixed pin to which the spring of arm 47 is also connected. The upper end of arm 66 is also connected in any suitable manner, as by a cable 68, to the same element 23 to which arm 27 is connected in the mechanism for controlling the operation of the gluer and conveyor. The cam 65 is designed to pivot arm 66 forwardly against the tension of the latter's associated spring for a limited period during each cycle of the transfer mechanism H to cause such element in the control mechanism to be actuated to operate the gluer and conveyor for another cycle. Immediately following the actuation of such control element, the cam 65 permits the arm 66 to be returned to normal position by its associated spring. It will thus be seen that the control mechanism for the gluer and conveyor is operable either through the pedal 25, or by the cam 65 through operation of pedal 28. The cam 65 is designed to cause the gluer A to furnish a glued wrapper *a* to the conveyor B and to cause the conveyor to make one step for each cycle of the wrapping machine C, such step being taken while the form block of the wrapping machine is dwelling in its lower or advanced position. As previously mentioned, if the pedal 28 is not held depressed by the operator, cam 65 will cease its rotational movement automatically at the end of one cycle of operation of the wrapping machine, while if the pedal 28 is held depressed to recycle the wrapping machine C, cam 65 will continue to rotate, thus causing the cycles of the gluer A and conveyor B to repeat automatically.

The channeling members F are positioned beyond the tamper E and are located so that a box assembly will pass therethrough in its step-by-step feed from station E to the transfer station H. There are two members F extending inwardly from the side edges of the conveyor and they comprise aligning members 70 which are adjustably supported horizontally above the surface of the upper run 21 of the conveyor belt and between which the box structures of the box assemblies pass in the step-by-step movement of the conveyor. The aligning members 70 are equally spaced from the center line of the conveyor, and are disposed to converge in the direction of feed of the conveyor with the advanced ends thereof spaced apart a distance approximately equal to the width of the box structure of the particular assembly being finished. The members 70 are also raised with relation to the run 21 of conveyor so as to permit the wrapper of the assembly to pass thereunder without obstruction and to cause the advanced ends thereof to engage the side walls of a box structure at points slightly above the glued surface of such wrapper. The rear end of each aligning member 70 is connected to the inner end of a bar 71 extending at right angles to the conveyor run 21. Each bar 71 is adjustably secured in a holder 72 formed on the upper end of a bracket 73 which is mounted on a side of the supporting frame 10 of the conveyor B, the construction being such that each holder 72 holds the bar 71 extending therethrough spaced adjacently above the conveyor belt. Each bar 71 may be adjusted separately transversely of the belt by loosening the wing nut 74 associated with its holder 72 and shifting such bar lengthwise in such holder 72.

The stop means G at the transfer station comprises a stop member 75 which extends transversely over the surface of the upper run 21 of the conveyor bent so that the leading end of the box of each assembly comes into engagement therewith in the advancement of such assembly to such station and so that each assembly is brought to a halt thereby in predetermined position with respect to the transverse center line of the form block of the wrapping machine C. The stop member 75 extends in spaced relation to the conveyor belt so as not to come into engagement with the wrappers of the assemblies and is constituted of an angle member whose narrower vertically disposed side is in opposed relation to the feed of the conveyor and thereby forms the stop against which the boxes of the assemblies come to rest. The wider, horizontally disposed side of the stop member is secured at its forward end in any suitable manner, such as by bolts, to the shorter transverse end of a right angle member 76. The body portion of member 76 extends lengthwise of the conveyor and is adjustably mounted on the front longitudinal edge of the latter. The underside of such body portion has formed therein a longitudinally extending groove 77 in which is received a longitudinal rib 78 provided on a base 79 that is secured to the frame 10 of the conveyor above the nozzle 16 of the compressed air system. The member 76 is adjustably secured in position on the base 79 by wing nuts 80 which are connected to bolts suitably located on such base and extending through a longitudinally extending slot in the body portion of member 76.

The transfer mechanism H is associated with the stop means G and comprises means located above the conveyor belt and including mechanism which grips the front wall of a box structure in an assembly and then advances the assembly transversely across the conveyor and towards the form in the wrapping machine C. The transfer mechanism H further comprises means located in major part below the upper run 21 of the conveyor and includes mechanism which engages the bottom unglued surface of the wrapper *a* beneath the rear wall of the box structure and which coacts with the upper means to carry the assembly from the side of the conveyor into proper position relative to the form of the wrapping machine C. These upper and lower transfer means advance rearwardly in synchronism toward the wrapping machine C in the initial positions of their strokes to accomplish the above mentioned purposes and then retract variably toward their normal forward positions, as will hereinafter appear more clear. The reciprocating movements of both the upper and lower transfer means are produced basically by a barrel cam 85 located within the frame of the transfer mechanism and mounted upon the shaft 43. The barrel cam is provided with two cam slots 86 and 87, slot 86 being utilized to actuate the upper transfer means and slot 87 being utilized to actuate the lower transfer means. The two cam slots are substantially similar in design except in the respect that cam slot 87 will cause the assembly supporting members of the lower transfer means to pull out from the path of the upper part of the form in the wrapping machine during the descent of the latter and while the upper transfer means is in a dwell position at the end of its advancing stroke, as will hereinafter be more fully explained. In view of this and the fact that the cam rollers for such slots are maintained in corresponding positions therein 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 cam slot 86 is provided at 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 90 on the frame of the transfer mechanism H. Connected to the upper end of vertical shaft 89 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. The rails 94 are supported at their ends by bracket members 110, 110' mounted on a crossbeam 111 supported by the front and rear frame members 112 of the transfer mechanism H. Provided on the carriage 93 are a pair of spaced guides 100 designed to slidably receive the vertically disposed side guide rods 101 of a vertically movable block 102. Each side guide rod is connected to the block 102 by an upper holder 103 and a lower holder 104, such holders being formed so that the ends of each guide rod are securely seated therein to prevent movement of the rod relative to the block 102. 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, 110'. Forming part of arm 108' and extending beyond shaft 109 is an arm 115 which is connected at its outer end to the upper end of a vertically disposed connecting rod 116 (note Figs. 2 and 3). The lower end of rod 116 is provided with a cam member 117 which engages a cam slot in a cam 118 located within the housing of the transfer mechanism H and mounted on shaft 43 adjacently to the barrel cam 85.

It will be understood from the foregoing description that the carriage 93 and consequently the block 102 are reciprocated on the transverse rails 94 through a fixed stroke by the connecting 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 reciprocable 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 C when the conveyor is in dwell position and is retracted while the conveyor is making its next step-by-step movement to advance a succeeding box assembly to the transfer station. 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', arm 115, 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 enable gripping means carried thereby to grip the front wall of the box in an assembly. After the box has been so gripped, the block 102 advances in such lowered position transversely of the conveyor towards the wrapping machine to move the gripping means and the assembly toward the form of the wrapper which completes the adhesion of the wrapper to the box. After the assembly has been stripped from the gripping means carried by the block 102, the latter will then be raised vertically to a height which will enable such gripping means to pass freely over the next succeeding assembly moving toward the transfer station. 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.

Slidably mounted on the block 102 is a side flanged bracket member 120 provided with a vertically disposed slot through which extends a bolt 121 provided with a nut to secure the bracket member in a vertically adjusted position relative to block 102. The vertical bracket member 120 is provided at its lower end with a horizontal foot 122 which extends away from the block 102 and in opposed relation to the direction of feed of the conveyor. The foot 122 supports in depending relation an elongated bracket member 123 which extends transversely to and is disposed in parallel spaced relation above the upper run 21 of the conveyor. The member 123 thus supported in offset relation to the bracket member 120, is secured for lengthwise adjustment thereon 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, 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 rear end of member 123 is an angle bar 125 which extends transversely of such member and is disposed above the upper run 21 of the conveyor in substantial parallelism with the longitudinal axis thereof (note Figs. 2, 6 and 7). The central portion only of the horizontal flange of bar 125 is connected to the member 123 so that the ends of such bar project outwardly from the sides of member 123. Each projecting portion 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 a longitudinally extending vertically disposed slot provided in the vertical flange of such bar portion. Each of the bolts adjustably connecting a block 126 to the bar 125 extends through the upper end of and supports a 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 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 the said lever is connected to the central portion of a transverse angle bar 134 which extends in substantial parallelism to transverse bar 125 and like the latter is provided on its projecting ends of its vertical flange with a pair of longitudinally extending slotted grooves forming guide ways for one or more blocks 135 which are adjustably connected to such ends by bolts. Mounted on each of the blocks 135 is a block-like gripping member 136 which has a vertical length substantially the same as the offset lower portion of the gripping member 127 and the rear face of which is in engagement with the front face of such offset portion when the bar 134 is in its fully advanced position. The bar 134 in its fully advanced position is disposed in spaced parallel relation below the transverse bar 125. The bar 134 is normally biased to this advanced position by a spring 137 in Fig. 6 and which is connected at one end to a pin provided on lever arm 132 at a point spaced from the axis of shaft 131 and connected at its other end to a post provided on member 123 in the region of the foot 122. In order to adjust the advanced position of the transverse bar 134 and thereby to adjust the degree of grip of a pair of members 127, 136 on a box structure under the influence of spring 137, lever arm 132 is provided with an adjustable stop 138 which comes into engagement with member 123. The stop 138 may be in the form of a bolt which is in threaded engagement with an ear provided on lever arm 132 and which engages the top surface of member 123, the bolt being maintained in adjusted position by a nut which is screwed into tight engagement with said ear. 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 engagement with such cam surface portion during the last portion of the retracting movement of block 102, the roller rides up on the same causing the lever arm 132 to be pivoted upwardly and rearwardly against the tension of spring 137 to open the pairs of

gripping members 127, 136. When the block 102 moves vertically downward in the initial part of its cycle, the cam roller 139 rides down an inclined portion of the cam surface 140 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 the gripping members 127. 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 the box structure of an assembly located at the transfer station under the tension of spring 137, as is shown in Fig. 6 of the drawings. The vertical member 141 is constructed and mounted for vertical adjustment on an arm 142 supported by a transverse bracket member 144 secured at its forward end to frame 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 coacting with an index element on member 141 to enable ready adjustment of such member to take care of boxes of varying heights in the assemblies fed by the conveyor 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 in the assemblies fed by the conveyor.

It will be understood from the foregoing that while the carriage 93 and block 102 have fixed strokes in the reciprocating movements thereof on the rails 94, adjustments of the gripping members 127, 136 relative to block 102 may be made to vary their path of operation to conform to differences in the heights and widths of box structures in the assemblies fed by the conveyor to the transfer station. Further adjustments of the cam actuating member 141 are then made to take care of the differences in the operations of such gripping members necessitated by such differences in the heights and widths of the box structures. In connection with such adjustments, it will be noted that in making adjustments for wider boxes, the place of grip of the gripping members 127, 136 will take place further and further forwardly of the longitudinal centerline of the conveyor belt which is at a fixed distance from the parallel centerline of the form block in the wrapping machine C. Thus, the stroke of the gripping members while of fixed length, is shifted transversely of the conveyor for varying widths of boxes to cause the centerlines of such different width boxes to all match up with the centerline of the wrapper form block. As has been previously mentioned, 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 box structure *b* and wrapper *a* to the transfer station. During the end portion of such retracting stroke, the cam roller 139 will come into engagement with the cam surface 140 on the vertical member 141 and such cam members will cause the lever arm 132 to pivot rearwardly against the tension of spring 137. This movement of arm 132 will cause lever arm 133 to move forwardly and upwardly, thereby retracting the transverse bar 134 on arm 133 and moving the gripping members 136 forwardly away from their gripping relation with the gripping members 127. The upper transfer means is thus poised above the box assembly being fed to the transfer station, ready to move down into gripping relation therewith. After the box assembly has come to a dwell position at the transfer station and while the block 102 is moved vertically downwardly prior to the commencement of its advancing stroke, the gripping members 127 enter the box structure of the assembly adjacent to the front wall thereof and the spaced gripping members 136 move downwardly over the front surface of such front wall. At the same time, the cam surface 140 permits the gripping members 136 to move progressively to a 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 will be gripped by the pairs of members 127, 136 under the tension of spring 137. On the next advancing stroke of the block 102, the thus gripped box assembly will be shifted transversely rearwardly across the upper surface of the conveyor run 21 toward the rear longitudinal edge of such run which is adjacent to the wrapping machine C. While the wrapper *a* of the assembly is being so shifted and still is in engagement with the upper surface of the conveyor run 21, the vacuum exerted through the perforations 20 thereof will hold the wrapper flat against such upper surface and will overcome any tendency of the advanced edge portions of the wrapper to curl under during such shifting of the assembly. When the leading edge portions of the wrapper move beyond the rear edge of the conveyor run, the air pressure discharged from nozzle 16 will flow onto the underside of the portions of the wrapper leaving the conveyor and will float the wrapper off the conveyor and onto a pair of spaced blocks 155 which form part of the lower transfer means and which at that time are in an at-rest position at the edge of the conveyor, in position to slidably receive the wrapper assembly. The top assembly supporting edges of the blocks 155 incline upwardly and rearwardly from below the conveyor run and during the transfer of the box assembly from the conveyor to such blocks the positive air pressure from nozzle 16 prevents the advancing edge portions of the wrapper from folding under upon such inclined receiving edges of the blocks. As soon as the assembly has moved to a position on the blocks 155 where the rear wall of the box structure will be supported by the same, the blocks are advanced in synchronism with the gripping members 127, 136, as will hereinafter become more clear. The places at which the box structure of the assembly is finally supported on the inclined edges of such blocks 155 are slightly lower than the upper surface of the conveyor run 21. Thus, in coming to such places of final support, the rear of the box droops so that the rear wall thereof is slightly lower than the gripped front wall thereof (note Fig. 12 of the drawings). This drooping of the rear of the box causes the open end thereof to become flared; the configuration of the blocks 155 determining the amount of droop of the box and consequently the degree of flare to which the box is opened. The blocks 155 and the gripping members 127, 136 therefore will fully support the box assembly in its passage to the form block of the wrapping machine C with the box structure of such assembly in a controlled, flared open position. As will hereinafter become more clear, the flared condition of the box facilitates the entry into the box of the upper half of the form in the wrapping machine and enables such form to move downwardly in the box structure readily and with substantially no resistance. The blocks 155 and the gripping members 127, 136 carry the assembly to the lower half 150 of the wrapper form block which is in a raised dwell position, the upper half 151 of such form block at that time being spaced above such block half 150 and the associated stripper rods 152 being in a raised position relative to block half 150. When the supported rear edge of the box structure in the assembly is moved into position over block 150, the lower transfer means is actuated by barrel cam 85 to cause the blocks 155 to increase their speed of movement during this latter portion of their advancing stroke and thereby to pull out from under such assembly and to move to a place rearwardly beyond such block half. The rear of the assembly is thus deposited upon the upper surface of the block half 150 and the upper transfer means continues its advancing stroke to position the assembly upon the block half 150 so that their centerlines coincide. In the fully advanced position of the upper transfer means the gripping members 127 thereof will be positioned at the front edge of the form block half 150 (note Fig. 13 of the drawings). It will be noted that during the shifting

of the assembly across the upper surface of the block half **150**, the box will still be in a controlled flared open position so that the upper half **151** of the form can readily move downwardly into the flared open end of the box and strip the box structure from the gripping members **127**, **136**. During such downward movement of the form half **150**, the front edge thereof will be guided into the box structure by the spring grippers **127**. It will be noted further, that throughout the transfer of the box assembly from the conveyor to the form block, the wrapper *a* is at all times maintained against the bottom of the box structure *b*. Thus, in the shifting movement of the box assembly on the upper conveyor run **21** the wrapper is held against the box bottom by a wiping motion which makes for a uniform smooth adhesion of the wrapper to the box. This adhesive connection is maintained while the assembly is being floated to the inclined supporting edges of the blocks **155**, as is shown in Fig. 6 of the drawings. During the travel of the box to the form block of the wrapping machine, as is shown in Fig. 12 of the drawings, the blocks **155** lock the paper in position on the box. On the lower form block half **150**, the wrapper is again held against the bottom by the upper surface of such block as the assembly is shifted thereover following the pull-out of the blocks **155** (note Fig. 13). Following the removal of the box structure from the grippers **127**, **136**, the block **102** will be raised vertically and then retracted to bring such gripping members to an elevated position over the next box assembly which is being advanced to the transfer station by the conveyor at the same time such gripping members are being retracted.

As has been indicated previously, the reciprocating movements of the lower transfer means, of which the blocks **155** form a part, are also produced by the barrel cam **85** on shaft **43**. The cam slot **87** of such cam is engaged by a cam roller provided on the outer end of an arm **160** similar to and arranged in parallel relation with the associated arm **88** controlled by cam slot **86**. Referring now to Figs. 2, 3 and 7 of the drawings, it will be seen that the arm **160** is connected to the bottom end of a vertically disposed shaft **161** arranged adjacently to and in parallel relation with the vertical shaft **89** to which arm **88** is attached. Shaft **161** is rotatably supported by a bearing bracket **162** secured to the frame of the transfer mechanism. Above the bearing bracket **162** there is connected to shaft **161** an arm **163** which is connected by a link **164** to an arm **165** secured to a vertically disposed stub shaft **166**. Bearing brackets **167** mounted on the frame part **49** of the transfer mechanism rotatably support shaft **166**. Fixedly secured to shaft **166** above arm **165** is an elongated arm **168**, the outer end of which is connected by an adjustable connecting rod **169** to the central portion of a substantially U-shaped cross yoke **170**. The central portion of yoke **170** is slidably mounted at its sides on guide rods **171** extending transversely of the conveyor and supported at their ends by a front horizontal bar **172** carried by the frame member **112** of the transfer mechanism and by a horizontal bar **173** provided on the front side of the conveyor frame. The two ends of the cross yoke **170** are clamped in any suitable fashion to the front ends of a pair of rods **176** to enable such cross yoke during its reciprocating movements on guide rod **171**, to impart longitudinal reciprocal movement to said rods **176**. The rods **176** form part of otherwise independent, similarly constructed mechanisms for reciprocating the assembly transfer blocks **155** and in view of the similarity of the parts of such two mechanisms, a description of one of the same will suffice for both. Before entering into such description, it might be said generally that the two reciprocating mechanisms are arranged in spaced parallel relation on opposite sides of the guide rods **171** and are disposed transversely of the conveyor at the transfer station. The front ends of such mechanisms are mounted on the supporting bar **172** and extend rearwardly from such bar through the frame of the conveyor beneath the top run **21** thereof and into the wrapping machine C to a point beyond the form block thereof. As will be seen in Figs. 2, 3, 8 and 9 of the drawings, each of the aforesaid mechanisms or units includes an angle bar **177**, the horizontally disposed flange of which is mounted at its forward end of the supporting bar **172** and which is supported intermediate its length by the frame of the conveyor. The rear end portion of bar **177** projects in unsupported relation from the rear longitudinal edge of the conveyor into the wrapping machine C and extends substantially beyond the form block of the latter (note Figs. 3 and 8). The horizontal flange of the angle bar **177** is provided with a longitudinal slot **178** which extends from a point spaced from the front end of bar **177** to the rear end of such bar. The slot **178** is engaged by a guide shoe **179** which is slidably mounted on the horizontal flange of bar **177** and which is adjustably secured to the forward half of rod **176** (note also Fig. 11). The shoe **179** is preferably secured to that part of rod **176** which projects forwardly from beyond the front edge of the conveyor in the retracted condition of such rod. Loosely mounted on the rear portion of rod **176** which projects beyond the rear edge of the conveyor, is a bushing **180** in Fig. 10 and provided with a guide shoe **181** which extends down into the slot **178** in bar **177**. Spaced forwardly from the bushing **180** and adjustably secured to rod **176** is a collar **182** which functions as an actuating member in the forward strokes of rod **176** to advance the bushing **180** through a bumper **183** that is slidably mounted on rod **176** between such collar and bushing. The bumper member **183** is cylindrically shaped and is preferably constituted of a suitable resilient plastic material, such as synthetic rubber, capable of cushioning the blow on bushing **180** when such member is advanced by collar **182** and yet having sufficient rigidity to function as a driving member. A spring **184** is connected at one end to the bushing **180** and is connected at its other end to shoe **179**. Thus the spring **184** tends to maintain the bushing **180**, bumper **183**, collar **182** and rod **176** together as a unitary reciprocating means. The movements of bushing **180** with rod **176**, however, are limited by a stop **192** which is fixed with relation to bushing **180** and which comes into engagement with a bracket **190** when the rod **176** is sufficiently withdrawn. It will thus be understood when rod **176** is withdrawn by the cross yoke **170** from an advanced position, the bushing **180**, bumper **183**, collar **182** and rod **176** will be withdrawn as a unit because of spring **184** until stop **192** comes into engagement with the bracket **190** which is located adjacent to the rear longitudinal edge of the conveyor B (note Fig. 3). On such engagement, bushing **180** will halt its retracting movement while rod **176** and collar **182** will continue to retract and thereby cause increase in the stress in spring **184**. As a result of the increased space between bushing **180** and collar **182** the bumper **183** will be in loose condition on rod **176**. When the rod **176** is next advanced by the cross yoke **170**, the collar **182** will pick up the loose bumper **183** and cause the rear end thereof to come into engagement with the bushing **180**, such parts being then advanced as a unit beyond the bracket **190**. Integrally formed on bushing **180** is an upper bushing **188** on which the stop **192** is mounted. The bushing **188** is mounted for slidable movement on a stationary guide bar rod **189** which is supported at its ends by an ear **191** provided on the rear end of the vertical flange of the angle bar **177** and by the bracket **190** which is also mounted upon such bar flange. The bushing **188** carries a bar **193** which extends at right angles to the guide rod **189** and the rod **176** and is substantially parallel with the center line of the conveyor. That end of bar **193** which is disposed in opposed relation of the bar **193** of the other reciprocating unit has mounted thereon one of the guide blocks **155**. The movements of the bar **193** with bushing **188** are guided by a rod **194** the forward end of which is connected to

one end of a rod 195 adjustably secured on the bracket 190.

It will be understood from the foregoing that simultaneously with the advancement of the previously described box gripping members the two rods 176 of the lower transfer means will be simultaneously advanced by the yoke 170 and the mechanism which connects such yoke to the barrel cam 85. During the initial portion of the forward movement of the rods 176, the stops 192 will be maintained by the springs 184 against the brackets 190 so that the bushings 180 will remain stationary adjacent to the rear side edge of the conveyor. In this position of the bushings 180, the assembly supporting blocks 155 which are of triangular shape, will have their apexes disposed under the rear edge of the upper run 21 of the conveyor belt and the inclined supporting edges thereof adjacent to such rear edge, in position to receive a box assembly advanced by the gripping members of the upper transfer means. When the rods 176 have advanced to positions where the collars 182 thereof are just causing the bumpers 183 to come into engagement with the bushings 180, to cause the latter and consequently the blocks 155 to advance beyond the rear edge of the conveyor, the box gripping members will have already advanced the wrapper *a* of the box assembly upon the inclined edges of the blocks 155 and the rear wall of the box *b* thereof is just riding off the conveyor into engagement with such inclined edges of the blocks 155. The blocks 155 and the gripping members will then advance simultaneously and together will support the box assembly in its travel from the conveyor to the form block in the wrapping machine. As a result of this coaction of the parts of the lower transfer units, the collars 182 thereof may be utilized to adjust the time of advancement of the blocks 155 in the advancing strokes of the rods 176 for boxes of different widths. Thus, for wider boxes, the collars 182 would be moved to positions toward the front ends of rods 176. When such adjustments are made in the positions of the collars 182, it may be then necessary to adjust the positions of the guides 179 on rods 176 to place the springs 184 under the tensions required for a proper operation of the apparatus. As previously mentioned the support of the blocks 155 will be such that the rear wall of the box structure will be slightly lower than the gripped front wall thereof so that the box structure will be in a controlled flared condition as it is being carried toward the form block of the wrapping machine to facilitate the entry of the upper part 151 of such block. As has been previously indicated also, the gripping members halt their advancing movement at the forward edge of the lower half 150 of the form block, while the blocks 155 travel across the upper surface of such lower half 150 of the form block. The paths of movement of the blocks 155 relative to the form block are located outside the paths of movement of the stripping pins 152 associated with such block. In the final portion of their advancing stroke the blocks 155 move beyond the form block to positions in rear thereof to permit the upper block half 151 to enter into the flared box structure to strip it from the top grippers and then to force the box assembly, together with the lower half 150 of the form block, downwardly into the field of operation of mechanism for applying the sides of the wrapper *a* to the sides of the box *b* of the assembly. While the form block is in its downward position, the yoke 170 commences its return stroke to withdraw the rods 176 and consequently the guides 179 and collars 182. As the guides 179 retract, the springs 184 holding the bushings 180 and bumpers 183 in engagement with collars 182, withdraw the same, thereby causing the withdrawal of bushings 188 and blocks 155, the latter moving forwardly over the top of the form block of the wrapping machine. The bushings and blocks 155 will be so retracted with the rods 176 until the stops 192 on bushings 188 come into engagement with the associated brackets 190, at which time the retracting movement of the bushings 180 and 188, and the blocks 155 will be halted, while the rods 176 continue their return stroke. At this halted position of the blocks 155, the forwardly projecting apexes thereof will be advanced beneath the run 21 of the conveyor and the inclined supporting edges thereof will be again located adjacently to the rear edge of the conveyor, in position to receive a succeeding box assembly.

It will be noted in Figs. 3, 6, 8, 12 and 13 of the drawings, that each of the assembly supporting blocks 155 has mounted on the inner side thereof an ejector member 197 arranged to engage a previously finished box assembly located on the lower form half 150 and to eject the same rearwardly from such form half as the blocks 155 are advancing a succeeding box assembly to the form block to the wrapping machine (compare Figs. 12 and 13). Each of the ejector members 197 are disposed on its associated block 155 at right angles to the longitudinal center line of the conveyor and are mounted on such block for adjustment in the direction of its length. The rear end of each ejector 197 projects rearwardly beyond its associated block 155 and is bent at right angles to the body portion thereof to provide a box engaging portion 198 spaced from the rear of its associated block 155 so that such portion will engage a finished box on the form block 150 well in advance of the succeeding assembly being carried to the form block by the block 155. As the succeeding assembly is being carried to form block 150, the ejectors 197 will push the previously finished box off such form block and onto a discharge ramp 199 from which it may be removed in any suitable manner.

While the machine has been hereinabove described in relation to wrapper-box structure assemblies in which the wrappers are coated on one side with a layer of suitable adhesive, it is believed evident that it may be efficiently utilized in the performance of other operations such as, for example, the manufacture of what is known in the trade as "loose wrap set-ups" in which the sides of the wrappers *a'* therefore are provided with lines of glue 205 along their outer edges, as shown in Figs. 14 and 15 of the drawings. A machine for the manufacture of boxes of this type would include a conveyor constructed in the manner of conveyor B and provided at the transfer station thereof with upper and lower transfer means such as has been described above to move the box assemblies to the wrapping machine. Accordingly, in the modification shown in Figs. 14 and 15 of the drawings, those parts thereof which correspond to parts of the previously described machine have been given the same reference characters. The transfer mechanism of the modification differs from the mechanism previously described only in the respect that the bar 125 which supports the gripping members 127 has mounted thereon a tubing 206 which extends longitudinally of such bar and which is provided adjacent to the sides of the support member 123 with entry ports 207 to each of which one end of a rubber tubing 208 is attached. The tubes 208 are connected to a suitable source of vacuum which is controlled by valving means of any suitable type properly actuated in timed relation so that suction is provided in the tubing 206 during the transfer of a box assembly from the conveyor B to the wrapping machine C. Communicating with tubing 206 are a plurality of pipes 209 formed to extend rearwardly over the box structure *b'* of an assembly and then downwardly to spaced positions adjacent to the rear side of the wrapper between the box structure and the line of adhesive 205 on the outer edge of such wrapper side. Carried at the lower ends of the pipes 209 are vacuum cups 210 which are pressed into engagement with the rear side of the wrapper when the gripping members 127, 136 are lowered to come into gripping relation with the front wall of the box structure. It will thus be seen that while the wrapper *a'* is not adhesively attached to the box structure *b'*, these two box parts are transferred as a unit along the upper surface 21 of conveyor B by the grippers 127, 136 and the vacuum members 210 as the

box assembly is initially moved to the blocks **155'** in its transfer to the wrapping machine. In this embodiment of the machine it is preferable that the blocks **155'** have an upper edge substantially parallel with the lower edge thereof as shown in Fig. 14 of the drawings, to permit of a more positive gripping of the rear flap of the wrapper *a'* therebetween. In all other respects, the blocks **155'** are similar to the blocks **155** and function in the same manner as the latter. During the transfer of a box assembly by the grippers **127, 136**, the blocks **155'** and the vacuum members **210**, the latter will move past the form block **150** to a position in rear of the latter when the box assembly is deposited on such form block. The pipes **209** on which such members **210** are sufficiently bowed in shape (note Fig. 15) to enable the upper form block to move downwardly therebetween without interference to strip the box assembly from the grippers **127, 136**. Suction may be provided on the pipes **209** until such stripping action takes place.

As a further illustration of the flexibility of the machine of this invention, attention is directed to the type of phonograph album illustrated in Fig. 16 of the drawings. As shown, this album is composed of a rectangularly-shaped piece of cardboard which is bent at its center to provide two sections **215, 216** forming the side walls of the container structure *a''* and between which is received the phonograph record that is to be inserted into the album. The entire outer surface of section or wall **215** is adhered to the body **217** of a wrapper *b''* having a configuration in the blank as shown in Fig. 18 of the drawings. Attached to the body portion of the wrapper are side flap portions **218, 218** which are adhered to the front surfaces of the side edge portions of wall **216**. The album is completed by a bottom flap **219** which is connected to the body **217** of the wrapper and which is adhered to the front surface of the bottom edge portion of wall **216**. The adjacent ends of the flaps **218, 218** and **219** are secured in overlapping relation in the manner shown in Fig. 16 of the drawings. In making containers having the construction of this album, the machine of this invention may be constructed in the manner indicated in Figs. 14 and 15 of the drawings, or may be further modified to eliminate the supporting bars **125** and **134** with the box supporting parts carried thereby and associated mechanisms, since such parts would not be utilized in connection with such containers. With the elimination of such parts, the vacuum members **210** remaining on the bracket member **123** would constitute the sole container supporting means above the conveyor, as is indicated in Figs. 17 and 18 of the drawings. As the parts illustrated in these two figures are substantially similar to corresponding parts shown in Figs. 14 and 15, similar reference numerals have been applied to similar parts in all such figures. It will be understood from the previous descriptions of the machine, that the album structure *a''* and the wrapper *b''* constituting the album assembly, upon arriving at the transfer station in the condition shown in Figs. 17 and 18, will be shifted to the side edge of the conveyor B at which are resting the blocks **155'** in position to receive the album assembly. This operation is readily accomplished by the vacuum members **210** alone because the wall **215** of the album structure *a''* in each assembly is adhered to the wrapper *b''* thereof, and the walls **215** and **216** of the structure *a''* are substantially rigid, the album assembly during this operation being shifted in a side wise fashion on the conveyor run **21** and not lifted therefrom. Preferably the transfer mechanisms are adjusted to substantially center the album structure on the top edges of the blocks **155'** before the vacuum members **210** and the blocks **155'** move in unison toward the form block of the wrapping machine so that such structure is securely held therebetween during such transfer thereof. It is preferred that almost simultaneously with the increase in speed of movement of the blocks **155'** during the final portion of their advancing stroke and when such blocks are pulling out from under the album assembly, the vacuum in members **210** be cut out to permit the assembly to be deposited on the block half **150** of the wrapping machine. The camway **86** of the barrel cam **85** may also be modified to give the vacuum members **210** a stroke motion more suitable to the transfer of this type of container. It shall of course be necessary that the container forming parts of the wrapping machine be modified in a manner understood by those skilled in the art to accomplish the wrapping of this type of container.

It will be understood that various other changes in the specific forms of the invention shown and described may be made without departing from the spirit of the invention or the scope of the appended claims.

We claim:

1. In a container making system, means including a conveyor for feeding box and wrapper elements to a transfer station, transfer mechanism for moving said elements from said transfer station to another station, said transfer mechanism comprising means for gripping a wall portion of a box element above the bottom surface thereof, and means for supporting the box element at its bottom at a place spaced from the gripped portion thereof and cooperating with said gripping means to hold the box element in a controlled given position when both said means are coacting to support said box element in its movement from said conveyor to said other station.

2. In a container making system, means including a conveyor for feeding box and wrapper elements to a transfer station, transfer mechanism for moving said elements from said transfer station to another station, said transfer mechanism comprising means for gripping a wall portion of a box element above the bottom thereof so that the weight of the depending box element causes the open end thereof to be in a flared condition, and means for supporting the box element at its bottom at a place spaced from the gripped portion thereof, said gripping and supporting means being constructed and arranged to hold a box element with the open end thereof in a controlled flared open condition when both said means are coacting to support said box element in its movement from said conveyor to said other station.

3. In a container making system, means including a conveyor for feeding box and wrapper elements to a transfer station, transfer mechanism for moving said elements from said transfer station to another station, said transfer mechanism comprising gripping means engageable with one upright wall of the box element and by its engagement with such one wall carrying the box element in depending relation and means for supporting the box element at a bottom edge thereof and cooperating with said gripping means to hold the box element in a controlled given position when both said means are coacting to support said box element in its movement from said conveyor to said other station.

4. In a container making system, means including a conveyor for feeding box and wrapper elements to a transfer station, transfer mechanism for moving said elements from said transfer station to another station, said transfer mechanism comprising gripping means located above said conveyor and engageable with a portion of elements delivered to said transfer station to carry the same in depending relation, means above the upper run of said conveyor for reciprocating said gripping means transversely of the conveyor, means for supporting delivered elements, said gripping and supporting means being separately mounted for relative movement and means below the upper run of said conveyor for reciprocating said supporting means transversely of the conveyor and through a different range of movement than said gripping means.

5. In a container making system, means including a conveyor for feeding box and wrapper elements to a transfer station, transfer mechanism for moving said ele-

ments from said transfer station to another station, said transfer mechanism comprising means for gripping a wall portion on one side of a box element to carry the same in depending relation, and means positionable beneath the box element for supporting the bottom of the same at a place spaced from the gripped side wall portion thereof and cooperating with said gripping means to hold the box element in a controlled given position when both said means are coacting to support said box element in its movement from said conveyor to said other station.

6. In a container making system, means including a conveyor for feeding box and wrapper elements to a transfer station, transfer mechanism for moving said elements from said transfer station to another station, said transfer mechanism comprising means for gripping a portion of elements delivered to said transfer station located above said conveyor, means above the upper run of said conveyor for actuating said gripping means, means positionable beneath delivered elements for supporting the same, said gripping and supporting means being separably mounted for relative movement, means below the upper run of said conveyor for actuating said supporting means through a different range of movement than said gripping means, and means for operating said actuating means for said gripping and supporting means in timed relation.

7. In a container making system, means including a conveyor for feeding box and wrapper elements to a transfer station, transfer mechanism for moving said elements from said transfer station to another station, said transfer mechanism comprising means for gripping a portion of elements delivered to said transfer station located above said conveyor, means above the upper run of said conveyor for actuating said gripping means, said actuating means including a member reciprocably movable transversely of said conveyor, means positionable beneath delivered elements for supporting the same, said gripping and supporting means being separably mounted for relative movement, means below the upper run of said conveyor for actuating said supporting means through a different range of movement than said gripping means, said lower actuating means including a member reciprocably movable transversely of said conveyor, and means for reciprocating said upper and lower actuating members in synchronism for at least a portion of each cycle of reciprocal movement thereof.

8. In a container making system, means including a conveyor for feeding box and wrapper elements to a transfer station, transfer mechanism for moving said elements from said transfer station to another station, said transfer mechanism comprising means for gripping a portion of elements delivered to said transfer station, a first means for actuating said gripping means, said first actuating means including a member reciprocably movable transversely of said conveyor, means for supporting delivered elements, said gripping and supporting means being separably mounted for relative movement, a second means for actuating said supporting means through a different range of movement than said gripping means, said second actuating means including a member reciprocably movable transversely of said conveyor, and means for causing said first and second actuating members to advance in synchronism while said gripping and supporting means are coacting in the transfer of the elements and for causing said second actuating member to move at a greater velocity than the first actuating member during the final portion of its advancing stroke.

9. In a container making system, means including a conveyor for feeding box and wrapper elements to a transfer station, transfer mechanism for moving said elements from said transfer station to another station, said transfer mechanism comprising means for gripping a portion of elements delivered to said transfer station, a first means for actuating said gripping means, said first actuating means including a member reciprocably movable transversely of said conveyor, means for supporting delivered elements, said gripping and supporting means being separably mounted for relative movement, a second means for actuating said supporting means through a different range of movement than said gripping means, said second actuating means including a member reciprocably movable transversely of said conveyor, means for reciprocating said first actuating member through a fixed stroke, and means for reciprocating said second actuating member through a variable stroke dependent upon the size of the elements being handled by the supporting means associated therewith.

10. In a container making system, means including a conveyor for delivering box and wrapper elements to a transfer station, transfer mechanism for moving such elements from said transfer station to another station, said transfer mechanism comprising carrying means for gripping a portion of the box elements to carry the same in depending relation, and carrying means engageable with a plane surface of the wrapper elements at a place spaced forwardly of the gripped portion of the box elements in the direction of transfer of such elements as such elements are moved off the conveyor towards such other station so that said wrapper engageable carrying means forms an uninterrupted support extension beyond the conveyor, said gripping carrying means being movable relative to said wrapper engageable carrying means until the latter is engaged by a wrapper.

11. In a container making system, means including a conveyor for delivering box and wrapper elements to a transfer station, transfer mechanism for moving such elements from said transfer station to another station, said transfer mechanism comprising means for gripping a portion of the box elements to carry the same in depending relation, means positionable beneath the wrapper for supporting the box and wrapper elements at a place spaced forwardly of the gripped portion of the box elements in direction of transfer of such elements as such elements are moved off the conveyor towards such other station so that said wrapper engageable carrying means forms an uninterrupted support extension beyond the conveyor, and means for moving said gripping and supporting means in timed relation initially to move said gripping carrying means relative to said wrapper engageable carrying means until the latter is engaged by a wrapper and then to move both carrying means in synchronism.

12. In a container making system, means including a conveyor for delivering box and wrapper elements to a registered position at a transfer station, transfer mechanism for moving such elements from said registered position at said transfer station to another station, said transfer mechanism comprising means for gripping a wall portion of a box element located at said registered position to carry the same in depending relation from said position to said other station, suction controlled means for engaging at said registered position a plane surface of a wrapper element at a place on the latter spaced forwardly of the gripped wall portion of the box element in the direction of transfer of such elements and for supporting said wrapper element in depending relation by suction during the transfer thereof from said registered position to said other station, and means for moving said gripping and suction means in synchronism from positions over said conveyor toward said other station.

13. In a container making system, means including a conveyor for feeding box and wrapper elements to a transfer station, transfer mechanism for moving said elements registered at said transfer station to another station, said transfer mechanism comprising means located above said conveyor for gripping a portion of elements delivered to said transfer station, means for supporting delivered elements located between said gripping means and said other station, said gripping and supporting means being separably mounted for relative movement and said supporting means being located in spaced relation to elements regis-

tered at said transfer station and in the path of movement of such elements to said other station, means operable to move said gripping means parallelly with the upper run of the conveyor to shift elements under the control of said gripping means toward said other station and into supported relation on said supporting means, and means operable to move said supporting means in synchronism with said gripping means following the deposit of such controlled elements thereon.

14. In a container making system, means including a conveyor for delivering box and wrapper elements to a transfer station, transfer mechanism for moving such elements from said transfer station to another station and operable to shift a wrapper element on the upper run of said conveyor towards a side edge thereof for movement therebeyond, means associated with said conveyor for developing suction at the carrying surface of such upper run sufficient to hold the wrapper element flat thereagainst during such shifting movement of the wrapper element, and means for applying positive air pressure beyond said upper run to the underside of the wrapper element as it moves beyond the side edge of said upper run, said suction and positive air pressure being applied to the wrapper element simultaneously during the transfer thereof from said conveyor.

15. In a container making system, means including a conveyor for delivering box and wrapper elements to a transfer station, transfer mechanism for moving such elements from said transfer station to another station and operable to shift a wrapper element on the upper run of said conveyor towards a side edge thereof for movement therebeyond, said transfer mechanism including a movable wrapper element supporting member positioned adjacent to such side edge of the upper conveyor run in the path of movement of a shifting wrapper element, means associated with said conveyor for developing suction at the carrying surface of such upper run sufficient to hold the wrapper element flat thereagainst during such shifting movement of the wrapper element, and means for progressively applying positive air pressure beyond said upper run to the underside of the wrapper element as it moves beyond the side edge of said upper run to facilitate the movement of the wrapper element into supported relation on said supporting member, said suction and positive air pressure being applied to the wrapper element simultaneously during the transfer thereof from said conveyor.

16. In a container making system, means including a conveyor for delivering box and wrapper elements to a transfer station, transfer mechanism for moving such elements from said transfer station to another station and operable to shift a wrapper element on the upper run of said conveyor toward a side edge thereof for movement therebeyond, said transfer mechanism including a movable wrapper element supporting member positioned adjacent to and extending beneath such side edge of the upper conveyor run in the path of movement of a shifting wrapper element and having a wrapper element receiving surface extending from beneath the conveyor and beyond such side thereof to provide an uninterrupted wrapper element support extension for the conveyor, means for shifting a wrapper on said conveyor towards said supporting member while the latter is waiting in such position at the side edge of the conveyor, means for facilitating the movement of a wrapper element into supported relation on the receiving surface of said supporting element and means for moving said supporting member and shifting means simultaneously to enable the same to coact to carry a wrapper element from the conveyor to said other station.

17. In a container making system, means including a conveyor for feeding box and wrapper elements to a transfer station, transfer mechanism for moving such elements from said transfer station to another station and operable to shift a wrapper element on the upper run of said conveyor toward a side edge thereof for movement therebeyond, said transfer mechanism including a movable wrapper element supporting member positioned adjacent to such side edge of the upper conveyor run in the path of movement of a shifting wrapper element and having a wrapper element receiving surface adapted to support a shifted wrapper element, and extending without interruption from the conveyor so as to provide an uninterrupted wrapper element support extension for the conveyor means for moving a wrapper element on the conveyor towards said supporting member while the latter is waiting in such position at the side of the conveyor, and means for moving said member towards said other station in coaction with said moving means as soon as the wrapper element is received thereby.

18. In a container making system, means including a conveyor for feeding box and wrapper elements to a transfer station, transfer mechanism for moving said elements from said transfer station to another station and operable to shift a wrapper element on the upper run of said conveyor toward a side edge thereof for movement therebeyond, said transfer mechanism including a movable wrapper element supporting member positioned adjacent to such side edge of the upper conveyor run in the path of movement of a shifting wrapper element and having a receiving surface adapted to support a wrapper element shifted thereon and extending without interruption from the conveyor so as to provide an uninterrupted wrapper element support extension for the conveyor means for moving a wrapper element on the conveyor towards said supporting member while the latter is waiting in such position at the side of the conveyor, means for moving said member towards said other station in coaction with said moving means as soon as a wrapper element is received thereby, and an ejector member mounted on said member and located in a leading position thereon to enable it to eject a container formed from associated box and wrapper elements previously fed to said other station before the wrapper element supported by said member is delivered thereto.

19. In a container making machine, means including a conveyor for feeding box and wrapper elements to a transfer station, box covering mechanism comprising vertically reciprocable form block structure, transfer mechanism for moving said elements from said transfer station to said form block structure and including a supporting member adapted to support associated box and wrapper elements and normally positioned at a side edge of the conveyor so that it forms an uninterrupted support extension of the conveyor, means for shifting associated box and wrapper elements from said transfer station onto the supporting member waiting at said position and toward said box covering mechanism, means supporting said member for movement in coaction with said shifting means along a path that transverses the path of movement of said form block structure to bring associated box and wrapper elements into registry with such structure, said supporting means being constructed and arranged to enable said member to move through its path without interference with said form block structure, and means for actuating said supporting means in timed relation to said form block structure so that said member in its forward stroke transverses the path of said form block structure to a position therebeyond and returns through such path without interference with said form block structure.

20. In a container making system, means including a conveyor for feeding box and wrapper elements to a transfer station, transfer mechanism for moving said elements from said transfer station to another station comprising movable supporting means normally positioned at a side of the conveyor to provide an uninterrupted support extension for said conveyor, gripping means engageable with a portion of a delivered element to carry the same to said supporting means awaiting at the side of the conveyor and to said other station, a slide bar extending horizontally, transversely over the upper

run of said conveyor, a slide mounted on said slide bar, movable means connecting said gripping means to said slide, means for moving said connecting means relative to said conveyor run and slide to enable said gripping means to move into gripping relation with an element delivered to said transfer station, and means for advancing said slide on said slide bar to cause said gripping means to transfer the gripped element to said supporting means and together with the latter to said other station, and means for moving said supporting means with said gripping means after the latter has moved the gripped element into supported condition on said supporting means.

21. In a container making system, means including a conveyor for feeding box and wrapper elements to a transfer station, transfer mechanism for moving said elements from said transfer station to another station comprising a slide bar extending horizontally over and in transverse relation to the upper run of said conveyor, a slide mounted on said slide bar, gripping means engageable with a portion of an element delivered to said transfer station to carry the same, movable means connecting said gripping means to said slide, operative means for moving said connecting means vertically relative to said slide and for reciprocating said slide on said slide bar, said operative means being constructed and arranged to cause said connecting means to move said gripping means down into gripping relation with an element delivered to said transfer station in the retracted dwell position of said slide, to advance said slide to transfer the gripped element to said other station, to cause said connecting means to raise said gripping means after the discharge of the gripped element at said other station, and to cause the slide to return the raised gripping means.

22. In a container making system, means including a conveyor for feeding box and wrapper elements to a transfer station, transfer mechanism for moving said elements from said transfer station to another station comprising a slide bar extending horizontally over and in transverse relation to the upper run of said conveyor, a slide mounted on said slide bar, gripping means engageable with a portion of an element delivered to said transfer station to carry the same, movable means connecting said gripping means to said slide, and operative means for moving said connecting means vertically relative to said slide to advance said gripping means into gripping relation with the element delivered to said transfer station, and for reciprocating said slide on said slide bar to effect the transfer to said other station of successive elements gripped by said gripping means.

23. A container making system such as defined in claim 22 in which said connecting means includes a block slidably connected to said slide for movement in a vertical direction and a support mounted on said block, in which said gripping means is mounted on said support, and in which said operative means is connected to said slidable block.

24. A container making system such as defined in claim 22 in which said gripping means includes a pair of gripping members adapted to clamp an edge portion of a box element, spring means biasing said gripping members to closed position, and means operative to open said members against the tension of said spring in the retracted position of said gripping means.

25. In a container making machine, means including a conveyor for feeding box and wrapper elements to a transfer station, box covering mechanism comprising vertically reciprocable form block structure, transfer mechanism for moving said elements from said transfer station to said form block structure and including movable supporting means normally positioned at a side of the conveyor to provide an uninterrupted support extension for the conveyor, gripping means engageable with a portion of a delivered box element to carry the same to said supporting means awaiting at the side of said conveyor and to said other station, operative means for advancing said gripping and supporting means from the side of the conveyor in coactive and timed relation to said form block structure and so that said gripping means moves the gripped box element into the path of said form block structure in position to enable the latter to strip the gripped box element from said gripping means, said operative means retracting said gripping means as said conveyor is advancing a successive box element for transfer to said form block structure.

26. In a container making system, means including a conveyor for feeding box and wrapper elements to a transfer station, transfer mechanism for moving said elements from said transfer station to another station and operable to shift a wrapper element on the upper run of said conveyor toward a side edge thereof for movement therebeyond, said transfer mechanism including a movable wrapper element supporting member positioned adjacent to such side edge of the upper conveyor run in the path of movement of a shifting wrapper element and having a receiving surface adapted to support a shifted wrapper element, a slide bar extending horizontally below and in transverse relation to the upper conveyor run, a slide mounted on said slide bar, means supporting said member on said slide, and means located below said upper conveyor run for advancing said slide to move said member towards said other station as soon as a wrapper element is received thereby.

27. A container making system such as defined in claim 26, in which said advancing means includes a reciprocatable rod located in spaced parallel relation to said slide bar beneath the upper conveyor run, a member slidably mounted on said rod and connected to said slide, a collar adjustably secured to said rod between the side edges of said conveyor run, a cyclindrically-shaped resilient bumper located between said slidable member and collar, a spring connected to said slidable member and rod so as to tend to maintain said slidable member, collar and bumper in engaged relation, and stop means operative to prevent continued movement of said slidable member with said collar and rod when said supporting member returns to the side edge of the conveyor in the retracting stroke of said rod.

28. In a container making system, an intermittently operating conveyor for advancing partly adhered assemblies of container structure and wrapper in a step-by-step manner to a transfer station, transfer mechanism for moving such assemblies from said transfer station to another station, means for actuating said transfer mechanism in timed relation to the advancing feed of said conveyor, means located at a place of dwell of said conveyor in advance of said transfer mechanism for tamping the container structure of an assembly upon the wrapper thereof and comprising a tamping member located above the assembly at such place of dwell, means supporting said tamping member for vertical movement at such place of dwell, and means controlled by said actuating means for moving said member downwardly into pressing engagement with the container structure of an assembly located therebelow during a period of dwell of said conveyor, said controlled means being operated by said actuating means as the latter operate to actuate said transfer mechanism to move a container assembly from said transfer station to said other station.

29. In a container making system, an intermittently operating conveyor for advancing partly adhered assemblies of structure and wrapper in a step-by-step manner to a transfer station, transfer mechanism for moving such assemblies from said transfer station to another station, means for actuating said transfer mechanism in timed relation to the advancing feed of said conveyor, means located at a place of dwell of said conveyor in advance of said transfer mechanism for tamping the container structure of an assembly upon the wrapper thereof, means controlled by said actuating means for causing said tamp-

ing means to move into pressing engagement with the container structure of an assembly during a period of dwell of said conveyor, said controlled means being operated by said actuating means as the latter operate to actuate said transfer mechanism to move a container assembly from said transfer station to said other station, and means between said tamping means and said transfer station for maintaining a tamped assembly properly registered with the centerline of said conveyor, said registering means comprising a pair of spaced channeling members extending in converging relation in the direction of feed of said conveyor and being spaced apart at their converged ends a distance approximately equal to the width of the container structures of the assemblies, and means supporting said channeling members in parallel relation to and spaced adjacently above the top surface of the upper run of said conveyor.

30. In a container making machine, means including a conveyor for feeding box and wrapper elements to a transfer station, transfer mechanism for moving said elements from said transfer station to another station, said transfer mechanism comprising means for gripping a portion of a delivered element located above said conveyor, means for supporting the gripped element at a place spaced from the gripped portion thereof without creating in such structure stresses tending to collapse the same, and means for moving said gripping means relative to said supporting means to bring the gripped element into supported relation with said supporting means.

31. In a container making machine, means including a conveyor for feeding box and wrapper elements to a transfer station, transfer mechanism for moving said elements from said transfer station to another station, said transfer mechanism comprising means for gripping a portion of elements delivered to said transfer station located above said conveyor, means for supporting delivered elements, separate movable mounting means for said gripping means and supporting means to enable the latter to be movable relative to each other, and means for synchronously operating the movable mounting means for said gripping and supporting means to enable said gripping means initially to move relative to said supporting means and then in unison with the same.

32. In a container making machine, means including a conveyor for feeding box and wrapper elements to a transfer station, transfer mechanism for moving said elements from said transfer station to another station, said transfer mechanism comprising gripping means engageable with a portion of elements delivered to said transfer station to carry the same in depending relation, means for supporting delivered elements by engagement with the bottoms thereof, and means for moving said gripping means relative to said supporting means to bring a gripped element into supported relation with said supporting means.

33. In a container making machine, means including a conveyor for feeding box and wrapper elements to a transfer station, transfer mechanism for moving said elements from said transfer station to another station, said transfer mechanism comprising means including a pneumatic device for gripping elements delivered to said transfer station above said conveyor, means for supporting delivered elements by engagement with the bottoms thereof, and means for moving said pneumatic device relative to said supporting means to bring a gripped element into supported relation with said supporting means.

34. In a container making machine, means including a conveyor for feeding box and wrapper elements to a registered position at a transfer station, transfer mechanism for moving said elements from said transfer station to another station, said transfer mechanism comprising a pneumatic device for exerting a gripping force on a surface of elements delivered to said transfer station located above such elements, carrying means engageable with the delivered elements located below such elements and normally located at a given place spaced from said registered position and in the path of movement of such elements from such position to said other station, and means for moving said pneumatic device relative to said carrying means to bring a gripped element into supported relation with said carrying means.

35. In a container making machine, means including a conveyor for feeding box and wrapper elements to a transfer station, transfer mechanism for moving said elements from said transfer station to another station, said transfer mechanism comprising means for gripping elements delivered to said transfer station located above said conveyor and including a pneumatic device for exerting a gripping force on a surface of a wrapper element and mechanism for exerting a gripping action on a wall of an associated box element, means for supporting the associated box and wrapper elements by engagement with the bottom of at least one of such elements, and means for moving said gripping means relative to said supporting means to bring a gripped element into supported relation with said supporting means.

36. In a container making system, means including a conveyor for feeding box and wrapper elements to a transfer station, transfer mechanism for moving said elements from said transfer station to another station, said transfer mechanism comprising gripping means engageable with a portion of elements delivered to said transfer station to carry the same in depending relation, means for reciprocating said gripping means transversely of the conveyor, means for supporting delivered elements normally located in the path of movement of elements carried by said gripping means, and means separate from said first reciprocating means for reciprocating said supporting means transversely of the conveyor after a gripped element is brought into supported relation therewith by said gripping means, and means for actuating said two reciprocating means in timed relation.

37. In a container making system, means including a conveyor for delivering box and wrapper elements to a registered position at a transfer station, transfer mechanism for moving such elements from said transfer station to another station, said transfer mechanism being constructed and arranged to carry elements delivered to said transfer station by engagement with a plurality of portions of each element and without exerting on the element at such places of engagement any stresses tending to collapse the structure thereof, said transfer mechanism comprising means for carrying a box element by engagement with one wall thereof so that the box tends to droop from such gripped wall and thereby cause the open end thereof to flare open to provide a larger opening than normal; carrying means engageable with a plane surface of an associated wrapper element at a place spaced forwardly of the gripped wall of the box element in the direction of transfer of the associated elements, and means for causing said wall gripping means to come into gripping engagement with said box element wall while such element is in said registered position and for causing such grip to be maintained until the box element is stripped from such means at said other station.

38. In a container making system, means including a conveyor for delivering box and wrapper elements to a transfer station, means for feeding wrapper elements in properly spaced relation to said conveyor, transfer mechanism for moving delivered elements from said transfer station to another station, means at said other station for performing an operation on successive elements carried to such other station by said transfer mechanism, means controlling the operation of said means at said other station and said transfer mechanism, and means controlled by said transfer mechanism for exercising control over the cyclic operation of said feeding means during the continued operation of said transfer mechanism.

39. In a box making system, means for feeding box and wrapper elements to a transfer station, transfer mech-

anism for moving said elements from said transfer station to another station provided with means operative on said elements, said transfer mechanism comprising element carrying means movable from said transfer station to the operative means at said other station, and means for determining the movement of said carrying means between said stations, said determining means comprising a stop having a fixed relation to such operative means for controlling the movement of said carrying means towards said other station, and means for initiating the advancement of said carrying means towards said other station at a predetermined time in the cycle of operation of said transfer mechanism dependent on the size of the elements to be moved by said mechanism to said other station.

40. In a box making system, means for feeding box and wrapper elements to a transfer station, transfer mechanism for moving said elements from said transfer station to another station, said transfer mechanism comprising carrying means for gripping a portion of a box element to carry the same in depending relation, and means for lifting the leading edge of a wrapper element associated with said box element and for maintaining such leading edge lifted but in spaced unattached relation to said box element during the movement of such associated elements from said transfer station to said other station, said means being operative to release such leading edge when such associated elements arrive at said other station.

41. In a box making system, means including a conveyor for feeding box and wrapper elements to a transfer station, means for transferring associated box and wrapper elements from said transfer station to another station comprising means to lift the unattached leading edge of the wrapper element above the surface of the conveyor and to maintain such unattached leading edge lifted during the transfer of such wrapper element to said other station, and means operative to release the unattached leading edge of the wrapper element at said other station when such associated box and wrapper elements are delivered thereto by said transfer means.

42. In a box making system, means including a conveyor for feeding box and wrapper elements to a transfer station, means for transferring associated box and wrapper elements from said transfer station to another station comprising means located above and operative over the conveyor for carrying elements to said other station, means located between said conveyor and said other station for engaging the wrapper elements in supporting relation, means supporting said carrying means and wrapper element engaging means for movement relative one another, and means for causing said carrying means and engaging means to coact in the transfer of associated box and wrapper elements to said other station and to move relative to one another after the delivery of such elements to said other station.

43. In a box making system, means including a conveyor for feeding box and wrapper elements to a transfer station, means for transferring associated box and wrapper elements from said transfer station to another station comprising element supporting means movable between said transfer station and said other station, means for moving said supporting means through a predetermined cycle of movement in the travel thereof between such stations, and means for varying the movement of said supporting means in such cycle thereof to conform to variations in dimensions of the elements to be transferred thereby.

44. In a box making system, means including a conveyor for feeding box and wrapper elements to a transfer station, means for transferring associated box and wrapper elements from said transfer station to another station comprising element supporting means located between said conveyor and said other station, means for moving said supporting means through a predetermined cycle of movement in the movements thereof between said conveyor and other station, and means for varying the movement of said supporting means in such cycle thereof to conform to variations in dimensions of the elements to be transferred thereby.

45. In a box making system, means including a conveyor for feeding box and wrapper elements to a transfer station, means for transferring associated box and wrapper elements from said transfer station to another station comprising element supporting means located between said conveyor and said other station and having an inclined wrapper element supporting surface receptive of the leading edge of a wrapper element on said conveyor and capable of raising such edge above the conveyor as it is moved thereon, means for moving said supporting means through a predetermined cycle of movement in the movements thereof between said conveyor and other station, and means for varying the movement of said supporting means in such cycle thereof to conform to variations in dimensions of the elements to be transferred thereby.

46. In a box making system, means for feeding box and wrapper elements to a transfer station, a second station provided with box covering mechanism including vertically reciprocable form block structure and associated stripper pins, transfer mechanism for moving said elements to said form block structure including means engageable with an element to be transferred to support the same in its travel to said second station and having a path of movement located between the associated stripper pins and extending across the path of movement of said form block structure, means for moving said element supporting means past and beyond the stripper pins in the transfer of an element to said second station, and means for varying the relation of the paths of movement of said stripper pins and element supporting means to conform to variations in dimensions of the elements transferred by said supporting means.

47. In a box making system, means for feeding box and wrapper elements to a transfer station, means for transferring associated box and wrapper elements from said transfer station to another station comprising first element supporting means, means for operating said first means through a predetermined range of movement in each cycle thereof, second element supporting means, and means for operating said second means through a predetermined range of movement different from that of said first means and at a rate of travel different from that of said first means, said operating means operating said first and second element supporting means in synchronism while carrying associated box and wrapper elements from said transfer station to said other station.

48. In a box making system, means for feeding box and wrapper elements to a transfer station, means for transferring associated box and wrapper elements from said transfer station to another station comprising first element supporting means, means including a carriage for moving said first means in each cycle thereof from a raised position of dwell at said transfer station down into engagement with an element at the latter and then through a predetermined range of movement terminating in said dwell position, second element supporting means, and means including a second carriage for operating said second means through a predetermined range of movement different from that of said first means and at a rate of travel different from that of said first means, said operating means operating said first and second element supporting means in synchronism while carrying associated box and wrapper elements from said transfer station to said other station.

49. In a box making system, a transfer station, means for transferring associated box and wrapper elements from said transfer station to another station comprising element supporting means, means for moving said element supporting means between said stations and oper-

able to retract such means over said transfer station along a path different from the path of movement thereof from said transfer station to said other station and substantially higher than the top of a box element located at said transfer station, and means for advancing a box element to said transfer station while said element supporting means is moved above said transfer station by said operable means.

50. In a box making system, a conveyor for intermittently advancing associated box and wrapper elements to a transfer station, means in advance of said station for securely adhering associated elements together comprising a tamping plate having an area substantially greater than the area of a box element, means for supporting said plate in raised position, and means for depressing said plate to engage the upper edges of a box element and thereby to press uniformly the entire bottom thereof against a wrapper element during each period of dwell in the intermittent movement of said conveyor, and means at said transfer station for carrying the adhered box and wrapper elements from said station to another station, said transfer means comprising means located above said conveyor and operative to grip and support said box element, means located between said conveyor and said other station and operative to engage the underside of said wrapper element to maintain the same in the adhered relation with said box element formed by said tamping means during the travel of said elements to said other station, said gripping and supporting means being mounted for relative movement, and actuating means for initially moving said gripping means relative to said supporting means until the adhered wrapper and box elements are supported by said supporting means and then moving said box and wrapper element gripping and supporting means in synchronism toward said other station, said actuating means being operatively connected to said tamping means and operating the same to adhere following associated elements together as said gripping and supporting means are moved thereby toward said other station.

51. In a box making system, means including a conveyor for feeding box and wrapper elements to a predetermined position at a transfer station, means for transferring such elements from said transfer station to another station comprising means located above said station for gripping a portion of a delivered element at said position on said conveyor, means engageable with the leading edge of a wrapper element to maintain it under control without interruption and thereby to prevent the same from turning under during the advancement of such element from such predetermined portion at said transfer station to said other station, and means for moving said gripping means and said wrapper element engaging means in synchronism toward said other station.

52. In a container making machine, means including a conveyor for feeding box and wrapper elements to a predetermined position at a transfer station, transfer mechanism for moving said elements from said transfer station to another station, said transfer mechanism comprising a plurality of bars arranged in spaced parallel relation transversely above said conveyor at a height greater than the depth of the box elements delivered to said transfer station so that such elements may readily pass thereunder, a slide mounted on said bars, element engaging means carried by said slide and adapted to grip an element at said predetermined position at said transfer station and support the same in depending relation, and means for actuating said slide to transfer an element gripped by said engaging means from said predetermined position to said other station.

53. In a container making machine, means including a conveyor for feeding box and wrapper elements to a predetermined position at a transfer station, transfer mechanism for moving said elements from said transfer station to another station, said transfer mechanism comprising a plurality of bars arranged in spaced parallel relation transversely above said conveyor at a height greater than the depth of the box elements delivered to said transfer station so that such elements may readily pass thereunder, a slide mounted on said bars, a vacuum gripping member carried by said slide and adapted to grip an element at said predetermined position at said transfer station, means operable to move said gripping member from a raised position into gripping relation with the element, means for actuating said slide to transfer an element gripped by said engaging means from said predetermined position to said other station, and means operative to provide a vacuum condition in said gripping member prior to its engagement with an element at said predetermined position at said transfer station and to eliminate such vacuum condition upon the delivery of such element at said other station.

54. In a box making system, a transfer station, means to register box and wrapper elements at a predetermined position at said transfer station, means for transferring associated registered box and wrapper elements from said transfer station to another station comprising element supporting means, means for moving said supporting means along a predetermined path between said predetermined position at said transfer station and said other station permitting movement of elements to said transfer station without interference from said supporting means during movement of the latter from such other station into engagement with successive elements to be transferred, said registering means being operative to advance elements to said transfer station while said element supporting means is moving relative to the latter.

55. In a box making system, a transfer station, means to register box and wrapper elements at said transfer station, a box covering machine having reciprocal form block structure spaced from said transfer station, means for transferring associated registered box and wrapper elements from said transfer station to said machine and for presenting the same simultaneously into the path of the form block structure as two independent and unassembled members, and means in said machine cooperating with said form block structure to unite the associated wrapper and box.

56. In a box making system, a transfer station, means to register box and wrapper elements at a predetermined place at said transfer station, and means for transferring associated registered box and wrapper elements from said transfer station to another station, said transfer means comprising a vacuum member engageable with a surface of such an associated wrapper to support such wrapper during the transfer thereof, means for moving said vacuum member along a predetermined path to advance a wrapper gripped thereby from said predetermined place of registry to said other station, and means operable to move said vacuum member from said other station to a pick-up position along a second given path different from said first path and in which the operative portion of said vacuum member is at a substantial distance above a succeeding wrapper registered at said transfer station and thereby to prevent interference between such succeeding wrapper and said member during such movement.

57. In a box making system, a transfer station, means to register box and wrapper elements at a predetermined place at said transfer station, and means for transferring associated registered box and wrapper elements from said transfer station to another station, said transfer means comprising a vacuum member engageable with a surface of such an associated wrapper to support such wrapper during the transfer thereof, means for moving said vacuum member along a predetermined path to advance a wrapper gripped thereby from said predetermined place of registry to said other station, means operable to move said vacuum member from said other station to a pick-up position along a second given path different from said first path and in which the operative portion of said vacuum

member is at a substantial distance above a succeeding wrapper registered at said transfer station and thereby to prevent interference between such succeeding wrapper and said member during such movement, and means to depress said member from said pick-up position into a position in which it is enabled to support such wrapper registered at said transfer station by the vacuum created therein.

58. In a box making system, means including a conveyor for delivering box and wrapper elements to a predetermined place at a transfer station, transfer mechanism for moving such elements from said transfer station to another station including means operable to shift a wrapper element from said predetermined position on said conveyor toward an edge thereof and to move such element from such edge to said other station, means associated with said conveyor for developing suction at the wrapper engaging surface thereof sufficient to hold the wrapper element flat thereagainst during such shifting movement of the wrapper element, and supporting means forming part of said transfer mechanism and located at such conveyor edge in the path of shifting movement of the wrapper element so as to be engageable with the leading edge of such wrapper element as such edge is moved over such conveyor edge by said operable means, said supporting means being constructed and arranged to move with said operable means on engagement of the wrapper element therewith and to support such leading edge of the wrapper element against substantial sag during its transfer from such conveyor to said other station, said suction developing means maintaining suction on the wrapper as aforesaid until it has been completely removed from said conveyor.

59. In a container making system, transfer mechanism for moving two associated container elements from a predetermined position of registration of such elements at a transfer station to a second station, said transfer mechanism comprising means to carry one of such associated container elements and vacuum means to support the other of such associated container elements in depending condition in the movement of such other element from said predetermined position to said second station, said carrying and supporting means being constructed and arranged to carry such associated elements arranged in predetermined relation to said second station, and means for returning at least said vacuum supporting means from said second station along a different path substantially higher than the path it advanced to said second station.

60. In a container making system, transfer mechanism for moving two associated container elements from a predetermined position of registration of such elements at a transfer station to a second station, said transfer mechanism comprising means to carry one of such associated container elements in depending condition from said predetermined position to said second station, vacuum means to carry the other of such associated container elements in depending condition from said predetermined position to said second station, and means cooperating with said carrying and vacuum means to support the leading edges of both of such associated container elements from a point intermediate said stations to said second station, said carrying and vacuum means being movable relative to said cooperating means until the latter engages in supporting relation the leading edges of said elements, said carrying and vacuum means and said cooperating means being constructed and arranged to move simultaneously from such intermediate point to carry such associated elements arranged in predetermined relation to said second station.

61. In a container making system, transfer mechanism for moving two associated container elements from a predetermined position of registration of such elements at a transfer station to a second station, said transfer mechanism comprising means to carry one of such associated container elements from such position of registration to said second station, vacuum means to carry the other of such associated container elements from such position of registration to said second station, means supporting said carrying and vacuum means above the path of travel of such associated container elements, lower supporting means below the path of travel of such associated container elements, and means mounted on said lower supporting means and cooperating with said carrying and vacuum means to support the leading edges of both of such associated container elements from a point intermediate said stations to said second station, said carrying and vacuum means being movable relative to said cooperating means until the latter engages in supporting relation the leading edges of said elements, said carrying and vacuum means and said cooperating means being constructed and arranged to move simultaneously from such intermediate point to carry such associated elements arranged in predetermined relation to said second station.

62. In a container making system, transfer mechanism for moving two associated container elements from a transfer station to a second station, said transfer mechanism comprising means to carry one of such associated container elements from such position of registration to said second station and vacuum means to support the other of such associated container elements from such position of registration to said second station, means for moving said carrying and supporting means from elevated position so that they approach the associated elements from positions above the latter when initially contacting the same, and means operative after engagement of said carrying and supporting means with such elements to cause such means to carry such associated elements in depending predetermined relation to said second station, said moving means being operable to return said carrying and supporting means to said elevated positions thereof after said associated elements have been deposited at said second station.

63. In a container making system, means including a conveyor for feeding box elements to a place of registration at a transfer station, transfer mechanism for moving such elements from said place of registration to another station and including means for shifting a box element on the upper run of the conveyor toward a side edge thereof for movement of such element therebeyond, a supporting member positioned at said side edge in the path of movement of an element moved to the latter by said shifting means, said supporting member having an inclined element supporting surface disposed in opposed relation to the said movement of the box element on said path and in position to receive such box element to support the same, said inclined surface extending from beneath the upper run of the conveyor to a position substantially outwardly from said side edge thereof to provide an uninterrupted element support extension for the conveyor, and means for moving said supporting member in synchronism with said shifting means after an element has been moved into engagement therewith by the latter so that said shifting and supporting means coact to carry such box element to said other station.

64. In a container making system such as defined in claim 63 in which said shifting means includes means to simultaneously move associated box and wrapper elements registered at said transfer station from such station to said other station, and in which the portion of said surface of said supporting member beyond said conveyor edge is inclined to elevate the leading edge of the wrapper element moved thereto by said shifting means substantially above the bottom of its associated box element.

65. In a container making system such as defined in claim 64 in which said other station is provided with means for processing the associated box and wrapper elements transferred thereto, and in which said means for moving said supporting member moves the latter beyond

said processing means to leave said associated elements supported by said shifting means in the remainder of their movement to a registered position over said processing means, and in which the inclination of said supporting surface of the supporting member is such as to avoid possible contact of the leading edge of the wrapper element with such processing means as such associated elements move into said position of registry over such processing means.

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CERTIFICATION OF CORRECTION

Patent No. 2,958,267 November 1, 1960

Edwin K. Wolff et al.

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

In the grant, lines 1 to 3, for "Edwin K. Wolff, of Stockholm, and Helmut Voltmer, of Park Ridge, New Jersey, and Kurt Neimeier, of Chicago, Illinois," read -- Edwin K. Wolff, of Stockholm, and Helmut Voltmer, of Park Ridge, New Jersey, and Kurt Neimeier, of Chicago, Illinois, assignors to New Jersey Machine Corporation, of Hoboken, New Jersey, a corporation of New Jersey, --; line 12, for "Edwin K. Wolff, Helmut Voltmer, and Kurt Neimeier, their heirs" read -- New Jersey Machine Corporation, its successors --; in the heading to the printed specification, lines 3 and 4, for "Edwin K. Wolff, Stockholm, and Helmut Voltmer, Park Ridge, N. J., and Kurt Neimeier, Chicago, Ill." read -- Edwin K. Wolff, Stockholm, and Helmut Voltmer, Park Ridge, N. J., and Kurt Neimeier, Chicago, Ill., assignors to New Jersey Machine Corporation, Hobken, N. J., a corporation of New Jersey --.

Signed and sealed this 25th day of April 1961.

(SEAL)
Attest:

ERNEST W. SWIDER
Attesting Officer

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