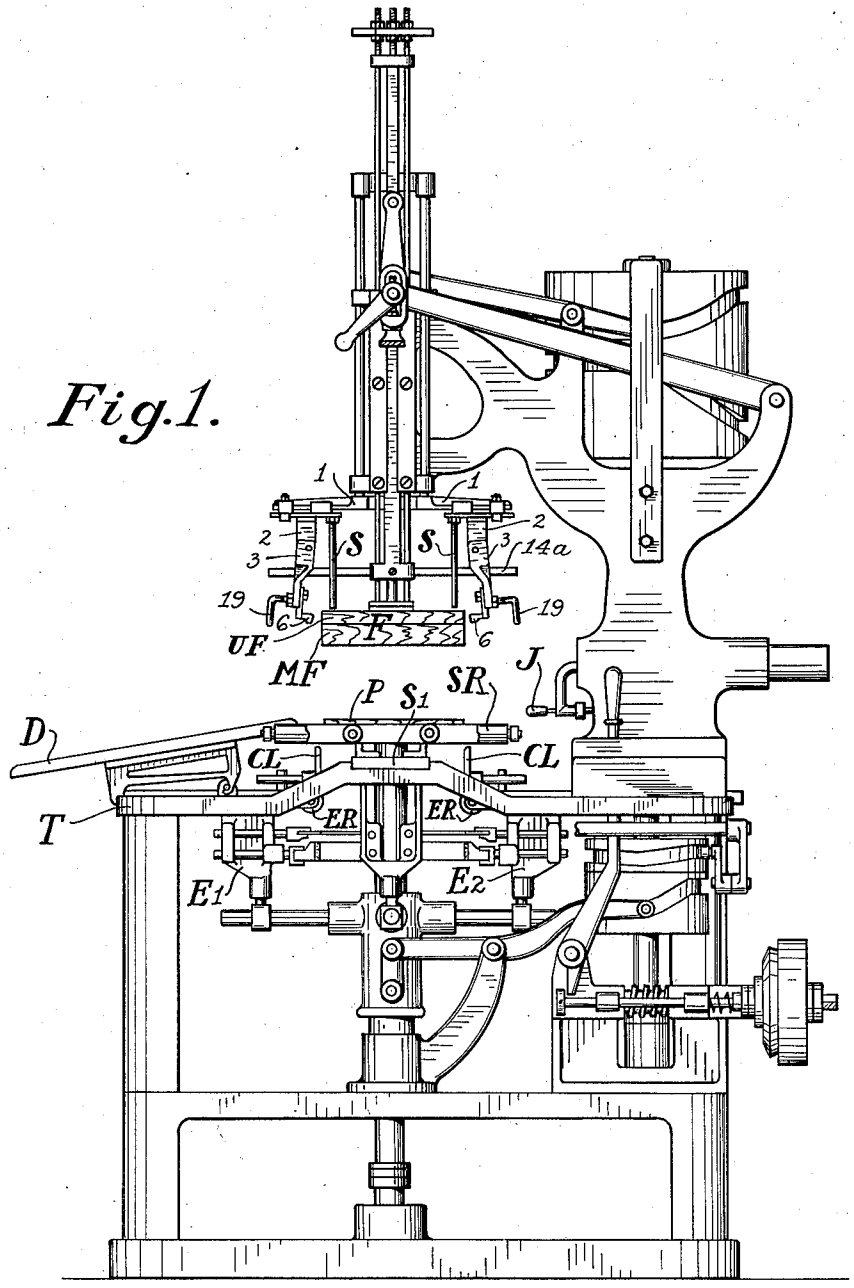
Sept. 28, 1937. L. H. LANGE 2,094,455

BOX WRAPPING MACHINE

Filed June 22, 1936 3 Sheets-Sheet 1

Fig. 1.



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BOX WRAPPING MACHINE

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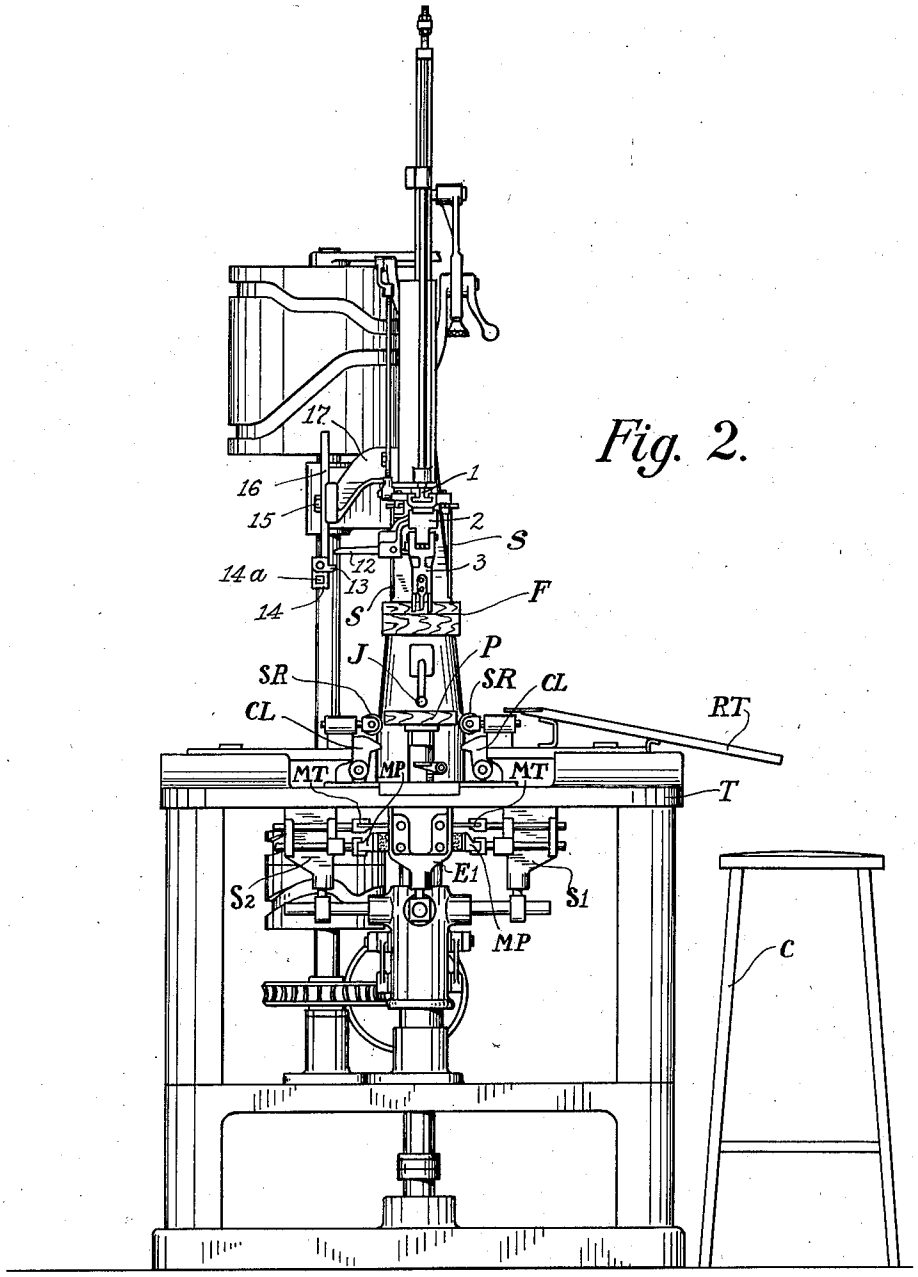


Fig. 2.

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BOX WRAPPING MACHINE

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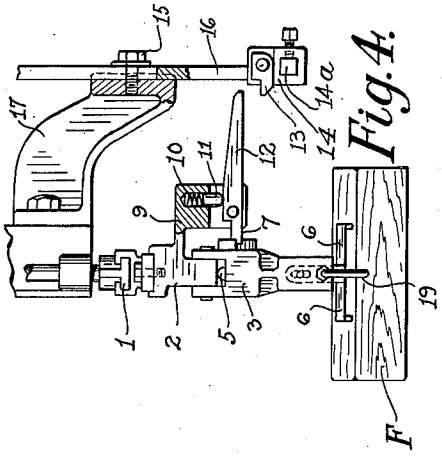


Fig. 4.

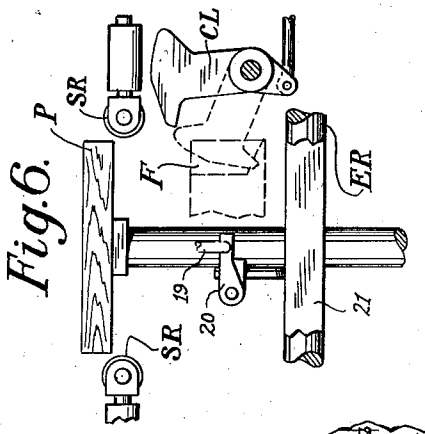


Fig. 6.

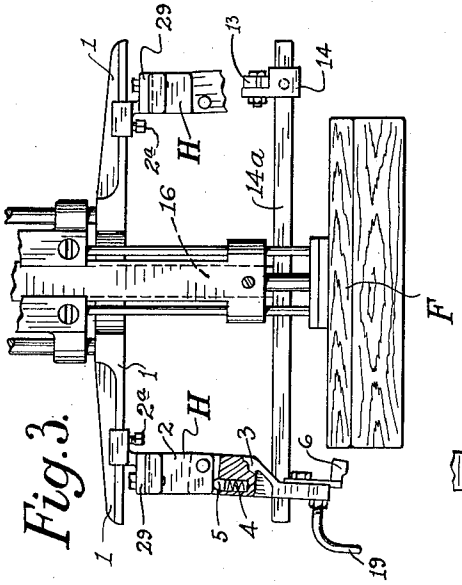


Fig. 3.

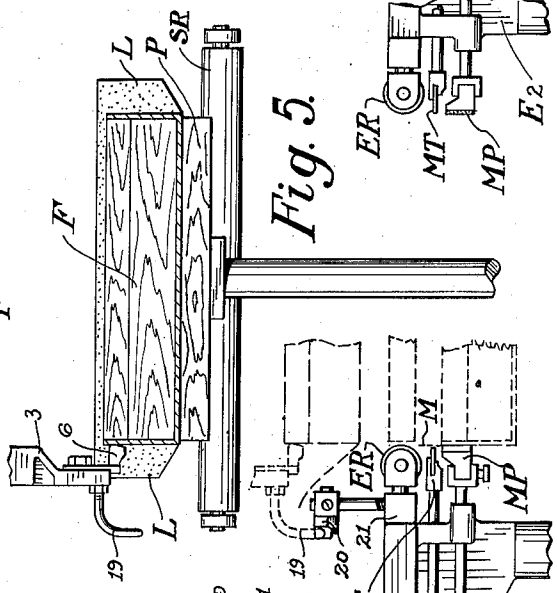


Fig. 5.

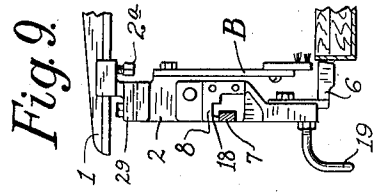


Fig. 9.

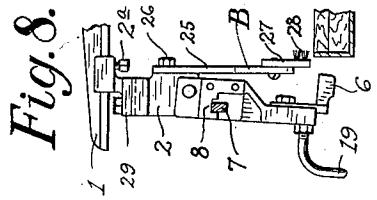


Fig. 8.

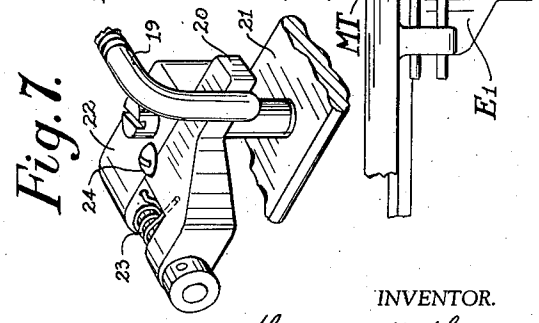


Fig. 7.

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Patented Sept. 28, 1937 2,094,455

UNITED STATES PATENT OFFICE

2,094,455

BOX WRAPPING MACHINE

Ludwig H. Lange, Philadelphia, Pa., assignor to Stokes and Smith Company, Summerdale, Philadelphia, Pa., a corporation of Pennsylvania

Application June 22, 1936, Serial No. 86,591

14 Claims. (Cl. 93—54.2)

My invention relates to box machines for wrapping or forming boxes, cartons, containers or the like, hereinafter termed "boxes", by applying wrappers, tabbed or untabbed, labels or the like, or tabs, without wrappers, to unwrapped boxes, one-piece box blanks or components of multi-piece box blanks.

In accordance with my invention, a box or box blank is held against the form block which transports the box or blank and adhering sheet material adjacent sheet-applying tools by holding devices which are retracted before completion of the box-forming or wrapping operations and which do not thereafter re-engage the same box or blank, thus avoiding marks or depressions on the walls of the finished box.

More specifically, the holding devices are moved automatically toward the form block to engage the end walls of a box or blank disposed thereon. Before the marginal portions of the wrappers or tabs are turned over the edges of the box walls, the holding devices are moved away from the form block and remain away from it for the remainder of the cycle of the machine.

Preferably the retraction of the holding devices is effected by movement of a box-wrapping or forming tool with respect to the path of the form block. Specifically, the movement of a wrapping tool away from the form block after applying a wrapper panel or tab to the box wall is utilized to retract the holding device for that wall.

My invention further resides in the features of construction, combination, and arrangement hereinafter described and claimed.

For an understanding of my invention, reference is to be had to the accompanying drawings in which:

Fig. 1 is a front elevational view, with parts omitted, of a box-wrapping machine;

Fig. 2 is a side elevational view, with parts omitted, of the box machine of Fig. 1;

Fig. 3 is a detail view on enlarged scale, and in front elevation, of form-block structure and holding devices shown in Fig. 1;

Fig. 4 is an end elevational view of parts appearing in Fig. 3;

Fig. 5 is a front elevational view with parts in section, and parts omitted, of sheet-applying mechanism shown in Figs. 1 and 2;

Fig. 6 is an end elevational view, with parts omitted, of Fig. 5;

Fig. 7 is a detail perspective view on enlarged scale, of retracting mechanism shown in Fig. 5;

Figs. 8 and 9 illustrate a modification of the invention in two different operating positions.

The box-wrapping machine shown in Figs. 1 and 2 is generally of the type illustrated and described in Smith Patent No. 691,329 and more particularly is of the construction described in copending Rider et al. application Serial No. 45,247, filed October 16, 1935.

To make a wrapped box, the operator of the machine, seated in the front thereof, as upon a stool C, registers a stayed box, or an unstayed box blank, upon a wrapper tabbed or untabbed, lying upon the feed table RT, to form an assembly, which is then placed upon the form block F while it is substantially in the position shown in Figs. 1 and 2. As the form block F descends, the bottom of the assembly is clamped against the platen P biased to the position shown in Figs. 1 and 2; as the descent of the form block continues, the side rolls SR, SR wipe the side panels of the wrapper into engagement with the corresponding walls of the box.

As the form block continues its movement, the four corner-lap tools CL turn the flaps L projecting from the side panels of the wrapper into engagement with the end walls of the box. Subsequently, during descent of the form block the end rolls ER wipe the end panels of the wrapper into engagement with the end walls of the box and the corner-laps L. At substantially this part of the cycle of the machine, the movement of the upper component UF of the form block F is arrested, the movement of the lower or main component MF continuing until the top edge of the box is in substantial alignment with the top edges of the presser tools MP. With the form block in this position, the margin turn-in tools MT move inwardly to turn the marginal portions M of the wrapper underneath the auxiliary form block UF, and substantially concurrently the presser blocks MP move inwardly to exert light pressure against the box walls. The upper form component UF is then permitted to drop and in moving towards reengagement with the main component MF it completes the turn-in of the wrapper margin M. Shortly thereafter, in the cycle of the machine, the presser blocks MP move in to exert hard pressure to insure intimate adhesive engagement with the box of the turn-in wrapper margins.

The several sheet-applying tools described are retracted from the path of the form block to permit its ascent without obstruction.

When the form block reaches such position that the platen P is again in the position shown in Fig. 1, the motion of the frame I which carries the strippers S, S is arrested so that, as the up-

ward movement of the form block continues, the completed box is stripped from the form block. Substantially as soon as the stripping operation is completed, the ejector J fires, forcibly to remove the completed box from the path of the form block and onto the discharge chute D.

The mechanism and its operation as thus briefly described is generally in accord with the description of the construction and operation of the box-wrapping machines disclosed in the aforesaid Smith patent and the Rider et al. application.

With the mechanism as thus far described, it is necessary for the operator, after placing an assembly upon the form block, to hold the assembly until the form block F meets the platen P. This need for the operator to hold the box assembly on the form F for part of the machine cycle reduces the period during which the operator, in a cycle of the machine, can prepare the next box and wrapper assembly.

In accordance with my invention, as hereinafter more fully explained, there are associated with the form block, holding-devices H which automatically move towards the form block during its descent from box-receiving position to hold the box and wrapper assembly thereon; these holding-devices remain in engagement with the box structure until at least some of the sheet-applying operations have been completed, and are retracted before application of wrapper panels to the walls which the holding devices engage, and remain retracted until after removal of the box from the form block.

As appears in Fig. 3, each of the holding devices H comprises a bracket 2 preferably adjustably secured to the stripper bar 1 as by bolts 2a. Pivotally suspended from each bracket 2 is a clamping member 3 biased as by spring 4 and pin 5 toward engagement with the form block F. Preferably to the lower end of each of the pivoted members 3 is adjustably secured the divided clamping tip 6.

When the parts are in the box-receiving position, the clamping members 3 are held in their retracted position (Fig. 3) against the biasing action of spring 4 by the latching bar 7 which, as shown in Fig. 8, engages a recess 8 in the pivoted member 3.

As appears in Fig. 4, the latching bar 7 is pivotally supported by the bracket extension 9 and is biased towards the latched position by the spring 10 and pin 11.

During descent of the form block, the end 12 of each latching bar 7 engages the stationary abutment 13 carried by block 14 whose position may be adjusted vertically by releasing the bolt 15 which clamps the supporting bar 16 to the frame member 17 of the machine. The blocks 14 are carried by the horizontal bar 14a at the lower end of the vertical bar 16; they are adjustable laterally on bar 14a to position the tripping abutments 13 for different sizes of boxes requiring different positions of the supporting brackets 2 of the clamping devices. Continued downward movement of the form block rocks the lever 12 in counterclockwise direction, as viewed in Fig. 4, to move latch 7 from groove 8, whereupon the springs 4 are free to move the clamping members 3 toward the form block to engage the end walls of a box or box blank which has been placed thereon by the operator of the machine.

With the clamping members 3 in this position, the latching bar 7, after arm 12 passes beyond the tripping abutment 13, is held against movement by spring 10, by the engagement between bar 7 and the shoulder 18 (Fig. 9).

As soon as the clamping members 3 have swung inwardly to engage the box, the operator is free to release her hold and to prepare the next box and wrapper assembly. The tripping abutment 13 is adjustable, as above mentioned, for the purpose of adapting the time of operation of the holding devices to the convenience of the operator.

The tips 6 of the clamping devices remain in engagement with the end walls of the box until the form block reaches the position shown in Fig. 6, whereupon the motion of the stripper bar 1 is arrested; the fingers 6, therefore, slide off the ends of the box as the form block continues its movement downward toward rolls ER for application to the end panels of the wrapper. The remainder of the wrapping operations are then completed, as above described.

Before the ascending form block returns to the position for which the fingers 6 would reengage the end walls of the box, the frames carrying the end rolls ER, ER are retracted, and this movement is utilized to retract the clamping devices 3 to prevent the tips 6 from engaging and marring of the upper edges of the box end walls. Specifically, to the lower end of each of the pivoted clamping members 3 is attached a hook member 19 which, as the clamping members 3 approach the lower limit of their travel pass to one side of the stop members 20 carried by the slidable frames 21 which support the end rolls ER. When, therefore, the end rolls ER are moved away from the path of the form block, the engagement between the stops 20 and hook members 19 cause the clamping members 3 to swing away from the path of the form block. When this movement of each member 3 progresses to such extent that the shoulder 18 passes beyond the edge of the latching bar 7, the spring 10 is then effective to move the latching member 7 into groove 8, thus resetting the holding device to its latched-out position. The fingers 6 are, therefore, held away from the form block throughout movement of the latter to the initial or box-receiving position.

To prevent possibility of injury to the mechanism because of maladjustment or during setting up of the machine for different size boxes, the stop 20 is preferably yieldable; specifically, as shown in Fig. 7, the stop 20 is pivotally mounted upon the standard 22 and is biased upwardly as by spring 23 against a shoulder 24. Therefore, if the slides E1 and E2 are not properly adjusted, so as to be clear of the hooks 19 during their descent, the members 20 will simply yield when engaged by hooks 19 instead of breaking parts of the mechanism.

The same holding devices are of aid to the operator when the machine is used to make unwrapped stayed boxes. The operator registers an unstayed box blank with tabs, preferably long tabs such as shown in Fig. 6 of Stokes application Serial No. 37,162, filed August 21, 1935, and then holds the assembly on the form block until the holding devices H, H operate.

The tips 6 of clamping members 3 hold the end walls of the blank erect until application thereto of the portions of the tabs corresponding to flaps L by the corner-lap tools CL. They are retracted when the end rolls ER are moved away from the form block and, therefore, do not reengage the box when the form block ascends.

When small boxes are made on machines of this

type, it is difficult to provide room for stripper rods S, S such as shown in Fig. 1. This difficulty may be avoided by the construction shown in Figs. 8 and 9 in which the strippers B, B each comprise a bar 25 held as by screw 26 to the bracket 2 of the holding device and an adjustable extension 27 which carries a brush 28, or equivalent, at its lower end. With this construction, as the form block approaches its box-receiving position, and is moving upwardly with respect to the holding devices, the brushes 28 engage the upper edges of the end walls of the finished box and strip it from the form block.

Preferably, as shown in Fig. 3, each of the brackets 2 is made in two parts, so that the upper part 29 which clamps to the cross-piece 1 can be reversed from the position shown to adapt the holding device for use with small form blocks.

Though I have illustrated preferred arrangements, it is to be understood my invention is not limited thereto but is coextensive in scope with the appended claims.

What I claim is:

1. A box machine comprising form-block structure movable in one direction to transport a box structure and sheet material partially applied thereto, tools operating in timed relation to said form-block structure for completing the application of said sheet material, means for holding said box structure against said form block, and mechanism for retracting said means prior to completion of the operation of said tools and for preventing said means from ever reengaging said box structure and the sheet material applied thereto, during movement thereof with said form-block structure in reverse direction.

2. A box machine comprising movable form-block structure for transporting a box structure and sheet material partially applied thereto, tools operating in timed relation to said form-block structure for completing the application of said sheet material, means for holding a wall of said box structure against said form block, and mechanism movable with one of said tools for retracting said means.

3. A box machine comprising reciprocating form-block structure for transporting a box structure and sheet material partially applied thereto, tools operating in timed relation to said form-block structure for completing the application of said sheet material, means for holding said box structure against said form-block structure during movement thereof in one direction, and mechanism for retracting said means and holding it from said form-block structure throughout movement thereof in reverse direction.

4. A box machine comprising separable form-block structure for supporting a box structure and partially applied sheet material, sheet-applying tools operable while said form-block structure is temporarily separated, means for holding said box structure against said form-block structure, and mechanism for retracting said means prior to operation of said tools and for maintaining it retracted to prevent reengagement with said box structure subsequent to re-union of said form-block structure.

5. A box machine comprising separable form-block structure for supporting a box structure and partially applied sheet material, sheet-applying tools comprising corner-lap tools and marginal turn-in tools operable while said form-block structure is temporarily separated, means holding said box structure against said form-block structure for operation of said corner-lap tools, means for stripping the completed box from said form-block structure, and mechanism for retracting said means after operation of said corner-lap tools and prior to operation of said turn-in tools and maintaining it retracted subsequent to re-union of said form-block structure and until after operation of said stripping means.

6. A box machine comprising a turn-in station, separable form-block structure for moving an assembly comprising a box structure and partially applied sheet material to said station, means for separating said form-block structure prior to transfer of said assembly to said station, means for holding said box structure against said form-block structure during movement toward said station, and mechanism for retracting said holding means prior to arrival of said assembly at said station and holding it retracted to prevent its engagement with the completed box during movement thereof with the form-block structure from said station.

7. A box machine comprising separable form-block structure for moving an assembly comprising a box structure and partially applied sheet material from a receiving station, through sheet-applying stations to a discharge station, means for effecting separation of said form block prior to arrival at one of said sheet-applying stations and subsequent reunion thereof, means operated in timed relation to said form-block structure to engage said assembly at said receiving station and hold it against said form-block structure, and mechanism for retracting said holding means prior to arrival of said assembly at said one of said stations and for maintaining it retracted during the movement of said assembly to said discharge station.

8. A box machine including reciprocating form-block structure for transporting an assembly comprising box structure and sheet material partially applied thereto, means for holding said assembly against said form, and mechanism including structure movable toward and away from the path of said form-block structure for retracting said means before completion of movement of said form-block structure in one direction and holding it retracted for movement of said structure in reverse direction.

9. A box machine including form-block structure, means for holding against said form-block structure an assembly comprising box structure and partially-applied sheet material, a sheet-applying tool operating in timed relation to said form-block structure, and mechanism for effecting retraction of said holding means by movement of said tool.

10. A box machine including form-block structure reciprocating from box-receiving to sheet-applying stations, box-holding means biased toward said form-block structure, means for restraining said holding means to permit said form-block structure to receive an assembly comprising box structure and partially applied sheet material, means adjacent the box-receiving station for releasing said restraining means, and means at a sheet-applying station for resetting said restraining means.

11. A box machine comprising reciprocating form-block structure, sheet-applying tools movable toward and from the path of said structure, holding means biased toward said form-block structure to hold box structure thereagainst, and means operable by movement of said tools to retract said holding means.

12. A box machine comprising reciprocating

form-block structure, sheet-applying tools movable toward and from the path of said structure, holding means biased toward said form-block structure, means for restraining said holding means to permit disposition of box structure on said form-block structure, means adjacent the path of said form-block structure for releasing said restraining means, and means operable with said tools for resetting said restraining means.

13. A box machine comprising reciprocable form-block structure for transporting a box structure and sheet material partially applied thereto, tools movable toward and from the path of said form-block structure to effect further application of said sheet material, adjustable means movable with said form-block structure for holding said box structure thereagainst, and members movable with said tools for effecting retraction of said holding means, said members yielding in the direction of movement of said form-block structure to avoid damage in event of maladjustment.

14. A box machine comprising reciprocable form-block structure for transporting a box structure and partially applied sheet material, supporting structure movable with said form-block structure, and units carried by said supporting structure, each of said units comprising a frame member, a device, attached to said frame member, for holding a wall of said box structure against said form-block structure, means, attached to said frame member, for stripping the finished box from said form-block structure and means, independent of the attachment of said holding device and of said stripping means to said frame member, for adjustably securing said frame member to said supporting structure.

LUDWIG H. LANGE.