

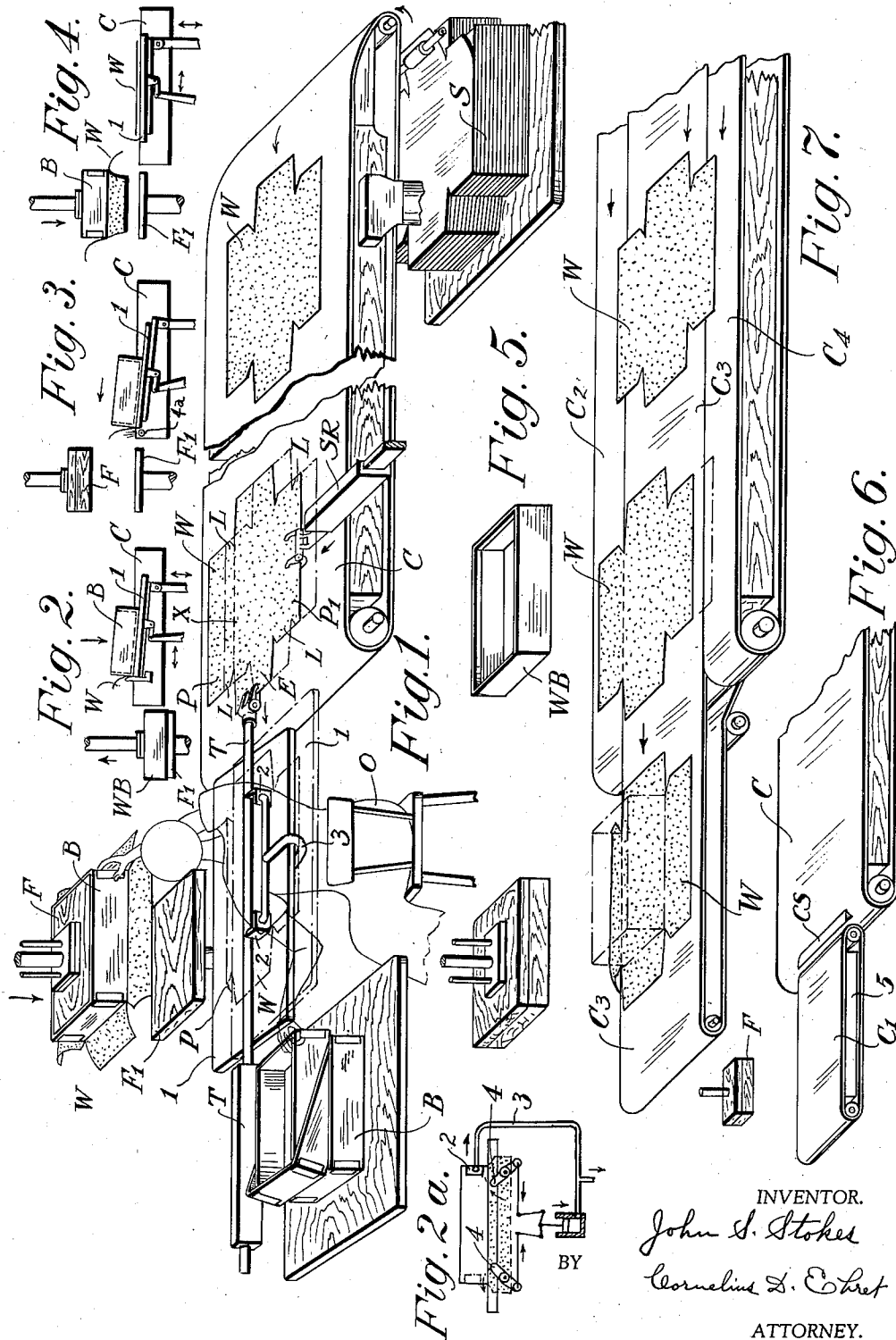
Sept. 7, 1937.

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2,092,382

METHOD OF FORMING BOXES

Filed March 14, 1935



UNITED STATES PATENT OFFICE

2,092,382

METHOD OF FORMING BOXES

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Application March 14, 1935, Serial No. 11,004

15 Claims. (Cl. 93—54.2)

My invention relates to methods of forming wrapped boxes, box covers, containers or the like, generically termed "boxes".

In accordance with my invention, labels, wrappers or the like, generically termed "wrappers", are delivered in succession, preferably to a registered position, in front of an operator who registers upon each of them a box structure, preferably a stayed box, and then places the assembly on the form-block of a wrapping machine. More particularly, and in accordance with one aspect of my invention, the wrappers delivered in front of the operator are received by a surface which tilts to facilitate registration of a box thereon, and preferably the wrapper receiving surface moves toward and away from the form-block to facilitate the movements of the operator necessary to place the assembly on the form-block.

My invention further resides in the method hereinafter described and claimed.

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

Fig. 1, in perspective, illustrates the delivery of wrappers in front of an operator at a wrapping station;

Figs. 2, 3 and 4 diagrammatically represent the relative position of parts shown in Fig. 1 at various points in the cycle of operation of the wrapping machine;

Fig. 2a is a side elevation of parts shown in Figs. 1 to 4;

Fig. 5, in perspective, illustrates the completed box;

Figs. 6 and 7, in perspective, illustrate modifications of the conveyor system shown in Fig. 1.

Referring to Fig. 1, wrappers W are fed in succession from the stack S, coated with adhesive and transported by the conveyor C to the left toward the assembly and wrapping station at which the operator O is seated. Preferably the mechanism for feeding and coating the wrappers is generally of the type shown in Rider Patent #1,857,260 or Davis Patent #1,818,198. The wrappers move intermittently or step-by-step, each in turn arriving at the dotted line position between the operator O and the path of the form-block F of a wrapping machine.

Heretofore, the operator would reach to the right, as viewed in Fig. 1, take a wrapper at the end of the conveyor, register it on a table in front of her, then take a box, register it on the wrapper and then move the assembly from the table and place it upon the form-block F. These

several manual operations require substantial time, and accordingly it is necessary to run the wrapping machine at low speed to accommodate the operator. The curtailment of the possible output of the machine is particularly large when the wrapping machine is of the type shown in copending application Serial No. 17,018, filed April 18, 1935, or disclosed in Rider Patent #1,826,287 of which it is characteristic that the form-block F does not stop for turning in of the corner laps L of the side panels P, P' of the wrapper.

My invention is concerned with a method which reduces the time essential to perform the manual operations necessary to form the assemblies of boxes and wrappers preparatory to placing them upon the form-block of the wrapping machine.

As shown in Fig. 1, each wrapper when it arrives at the delivery end of conveyor C, is moved transversely as by suitable mechanism SR to the full line position shown so that the line x of the wrapper is in alignment with the edge of the registering table I, in dotted line position. It is to be understood, of course, that the line x need not actually appear on the wrapper, but is shown simply to indicate the line along which the wrapper is subsequently folded when applied to the box. The wrapper is then drawn, as by reciprocating transfer device T, off the conveyor C on to the registering table I, the wrapper coming to rest in registered position in front of the operator upon the table I. If the conveyor is of the suction type, the suction is reduced or cut off during movement of the wrapper to the aligned position, and while it is being moved onto table I. An air blast through the conveyor belt may be used slightly to lift the edge of panel E that it may be more readily engaged by the grippers of the transfer device T. As indicated, the table I may be provided with guides 2 supported above the receiving surface of the table to allow transfer of the wrapper W thereunder, and so disposed that when the wrapper is moved to its proper position by transfer device T, the guides 2 are in register with the corner notches of the wrapper so that the box B can be guided by them into registered position with the wrapper.

Preferably the surface I, after receiving a wrapper, tilts downwardly towards the operator so as to enable her better to see that the box is being placed in proper position upon the wrapper. If desired, the table I may be provided with a ground-glass top and with lights disposed under

the glass. The operator can thus easily ascertain if the wrapper and box are in proper position, as indicated by lines on the glass and visible by shadow upon the wrapper.

Boxes B are delivered within reach of the operator O at the assembly station in any suitable manner, as by a conveyor from a staying machine, or in a batch. My method also contemplates that the box structures may be unstayed blanks, in which event the wrappers W are tabbed and the form block is preferably provided with holding clips of known construction.

Preferably the panel P of the wrapper which hangs over the front edge of the registering board is wiped up into engagement with the corresponding side panel of the box before the operator lifts the assembly from the registering board. This operation avoids possibility of engagement of the adhesive-coated face of panel P with the platen F, or other parts of the machine, as the operator moves the assembly from table 1 toward the form block. This application of panel P may be performed automatically after the box is brought into registered position on the wrapper. For example, the guides 2 may be provided with bleeder ports connected by tube 3 to a source of suction. When the box is brought to position these ports are covered and the suction is then effective, by suitable means, to operate the wiping plates 4, (Fig. 2a) preferably with assistance of an air-blast from tube 4a, to move the depending wrapper panel P up into adhesive engagement with the side panel of the box which is substantially flush with the rear edge of the registering table 1. The operator then pushes or lifts the assembly from the registering table onto the form-block F.

Although the registering table 1 is substantially narrower than the conveyor C, it is necessary, in order to accommodate the wide range of wrappers used, to make it of such width that it hinders the operator in reaching forward to put the assemblies on the form-block of the wrapping machine. Preferably the registering table 1, after receiving a wrapper from the conveyor C, is moved toward the path of the form-block so that it does not offer obstruction to the operator in leaning forward to put the assembly on the form-block. As indicated in Fig. 1, while the operator is holding, with her right hand, one assembly upon the form-block, to prevent it falling off before the form-block F moves downwardly into engagement with the platen or lower form-block F', she is reaching with her left hand for another box B, so that both arms are out of the path of the transfer device T which is, at this time, in front of her to perform the operation of transferring a wrapper from the conveyor C into registered position on table 1.

As shown in Fig. 2, when the form-block structure is moving upwardly, the wrapping operations of one box WB, Fig. 5, being completed, the operator has registered another box upon a wrapper W, and by the time the form-block has reached its upper position, as shown in Fig. 3 and the completed box discharged therefrom, the table 1 has moved inwardly towards the path of the form-block so that the operator can lean forward and transfer the newly formed assembly from the registering assembly onto the form-block. Then the table 1 returns to its horizontal position and away from the form-block, Fig. 4, to receive another wrapper which in the meantime has been moved transversely of the conveyor C by the mechanism SR, as above described.

As the operator is relieved of the operations of moving the wrappers from the conveyor C and registering them upon the table 1, the speed of the wrapping machine can be increased and yet allow ample time in each cycle for the operator to register a box on the label to form an assembly and place it upon the form-block of the machine. It is, therefore, possible to reduce the cost of making any given number of boxes, and to increase the number of boxes made in a given time.

As shown in Fig. 6, instead of using a registering table and a transfer device T, such as shown in Fig. 1, the labels may be delivered in front of the operator upon a second conveyor C' which is narrower than the main conveyor C to allow the operator to sit sufficiently close to the form-block that she may readily hold a box and wrapper assembly upon the form-block structure. The conveyor C', which is operated concurrently with the main conveyor C, stops with the wrapper in registered position, or it may run slightly faster than the main conveyor C and move the wrapper against a registering stop. Preferably, the conveyor C' is translucent so that the shadow of registering lines projected thereon may be visible to the operator. When belt C' is translucent, there is provided the housing 5 containing a source of light and whose upper wall is or may be ground glass. The secondary conveyor C' may be pivoted so that it may be inclined towards the operator to facilitate registration of a box on the wrapper in substantially the same manner that the table 1 of Fig. 1 is adapted to be tilted. Furthermore, the secondary conveyor may move toward the form-block to allow the operator to lean forward in placing the assembly upon the form-block. At the receiving end of the secondary conveyor C', suction may be used to flatten the wrapper onto the secondary conveyor as it passes beyond the stripper, or bridging member, CS.

In the modification shown in Fig. 7, the wrapper conveyor consists of three endless belts C2, C3 and C4 whose combined width is suitably great to accommodate the largest wrappers to be used and which may, for example, correspond to the width of the conveyor C of Fig. 1. The central conveyor belt C3 is substantially longer than the other two and extends in front of the operator, between the operator and the form-block. The conveyor C therefore delivers the wrappers in front of the operator so that she need not reach for them, and the steps of the intermittent movement of the conveyor are such that the wrappers come to rest in a registered position in front of the operator, or, alternatively, a registering stop may be used to register the wrapper, the conveyor step being slightly greater than the distance between the stop and the position of the wrapper and the end of the prior step. As shown in Fig. 7, the width of the central belt C3 is substantially narrower than the combined width of the three belts so that the operator may sit close enough to the path of movement of the form block to allow her to place the assemblies on the form-block without undue stretching.

With either of the arrangements of Figs. 6 or 7, the wrapper panel extending over the rear edge of the narrow conveyor is preferably wiped up into engagement with the corresponding panel of the box before the operator moves it therefrom onto the form-block of the wrapping machine. As in the method of Fig. 1, the indi-

vidual wrappers are shifted transversely of the conveyor so that the line x thereof is substantially flush with the edge of the narrow conveyor which, in these modifications, performs at least some of the functions of the registering board of Fig. 1.

What I claim is:

1. In a system including a wrapping machine having form-block structure, the method which comprises delivering wrappers in succession to a supporting surface at an operator's assembly station within reach of the form-block structure, tilting said surface to facilitate registry by the operator of a box structure thereon to form an assembly, and in succession placing the assemblies upon said form-block structure.

2. In a system including a wrapping machine having form-block structure, the method which comprises delivering wrappers in succession to a supporting surface at an operator's assembly station, tilting the supporting surface to facilitate registry by the operator of box structure thereon to form an assembly, and moving said surface toward said form-block structure after each delivery of a wrapper there to facilitate movement of the operator incident to placing each assembly upon the form-block structure.

3. In a system including a wrapping machine having form-block structure, the method which comprises delivering wrappers in succession to an operator's assembly station in front of an operator within reach of said form-block structure, delivering box structures within reach of said assembly station for registry by the operator upon the wrappers so delivered to form assemblies, and at said station adhesively applying a side panel of each wrapper to the corresponding wall of the registered box structure, the operator thereafter placing the assemblies in succession upon said form-block structure.

4. In a system including a wrapping machine having form-block structure, the method which comprises feeding wrappers toward an operator's assembly station, moving the wrappers transversely into alignment with a registry zone at said assembly station, transferring the aligned wrappers in succession to said operator's assembly station, delivering box structures within reach of said assembly station for registry by the operator upon the wrappers at said registry zone to form assemblies, and in succession placing the assemblies upon said form-block structure.

5. In a system including a wrapping machine having form-block structure, the method which comprises feeding corner-notched wrappers toward an assembly station, moving the wrappers transversely to bring corner-notches thereof into alignment with the edge of a supporting surface at said assembly station, transferring the aligned wrappers in succession to said supporting surface, registering box structures upon the wrappers aligned upon said supporting surface to form assemblies, for each assembly moving the wrapper panel extending beyond said edge into adhesive engagement with the corresponding box wall, and thereafter placing the assembly upon the form-block structure.

6. In a system including a wrapping machine having form-block structure, the method which comprises so delivering a wrapper to an operator's assembly station that a panel thereof extends beyond the edge of a supporting surface at said station, tilting said surface to facilitate registry of a box thereon to form an assembly, ef-

fecting adhesive engagement between said panel and the corresponding wall of said box, and thereafter moving the assembly from said surface and placing it upon said form-block structure.

7. In a system including a wrapping machine having form-block structure, the method which comprises so delivering a wrapper to an operator's assembly station that a panel thereof extends beyond the edge of a supporting surface at said station, tilting said surface to facilitate registry of a box thereon to form an assembly, effecting adhesive engagement between said panel and the corresponding wall of said box, and moving said surface toward the form-block structure to facilitate movement of the operator incident to placing the assembly upon the form-block structure.

8. In a system including a wrapping machine having form-block structure, the method which comprises conveying adhesive-coated wrappers toward an operator's assembly station in front of the wrapping machine operator, applying suction to the wrappers, moving the wrappers transversely into alignment with a path of movement to a registry zone at said assembly station, reducing the suction during said aligning operation, transferring the aligned wrappers in succession to said operator's assembly station, delivering box structures within reach of said assembly station for registry by the operator upon the wrappers at said registry zone to form assemblies, and in succession placing the assemblies upon said form-block structure.

9. In a system including a wrapping machine having form-block structure, the method which comprises conveying adhesive-coated wrappers toward an operator's assembly station in front of the wrapping machine operator, applying suction to the wrappers, moving the wrappers transversely into alignment with a path of movement to a registry zone at said assembly station, transferring the aligned wrappers in succession to said operator's assembly station, reducing the suction during the aligning and transfer operations, delivering box structures within reach of said assembly station for registry by the operator upon the wrappers at said registry zone to form assemblies, and in succession placing the assemblies upon said form-block structure.

10. In a system including a wrapping machine having form-block structure, the method which comprises feeding wrappers toward an operator's assembly station by engagement with a movable surface, transferring the wrappers in succession from said movable surface to said assembly station, and producing a blast adjacent the wrappers to facilitate said transfer.

11. In a system including a wrapping machine having form-block structure, the method which comprises conveying adhesive-coated wrappers toward an operator's assembly station in front of the wrapping machine operator, applying suction to the wrappers, moving the wrappers transversely into alignment with a path of movement to a registry zone at said assembly station, reducing the suction during said aligning operation, transferring the aligned wrappers in succession to said assembly station, and applying a blast adjacent the wrappers to facilitate said transfer.

12. In a system including a box-wrapping machine having form-block structure, the method which comprises conveying wrappers in succession to an assembly station between the path of said form-block structure and the operator of

said wrapping machine, and delivering stayed boxes or unstayed box blanks within reach of said operator for registry thereby with said wrappers at said station to form assemblies which in succession are, by the operator, transferred from
5 said assembly station to said form-block structure.

13. In a system including a box-wrapping machine having form-block structure, the method which comprises conveying wrappers in succession to an assembly station between the path of said
10 form-block structure and the operator of said wrapping machine, moving the wrappers in succession at said assembly station to a predetermined position, and delivering stayed boxes or
15 unstayed box blanks in succession within reach of said operator for registry thereby with said positioned wrappers to form assemblies which, in succession, are by the operator transferred from said assembly station to said form-block
20 structure.

14. In a system including a box-wrapping ma-

chine having form-block structure, the method which comprises conveying wrappers in succession to an assembly station between the path of said form-block structure and the operator of said wrapping machine, delivering box structures within reach of said operator for registry thereby
5 with said wrappers at said station to form assemblies, and at said station subsequent to formation of an assembly applying a side panel of the wrapper to the corresponding box wall prior to
10 transfer by the operator of the assembly to said form-block structure.

15. In a box-wrapping system, the method which comprises conveying wrappers toward an assembly station for registration of box structure
15 thereon, applying suction to the wrappers during their transport, moving the wrappers in succession into alignment with a registry zone at said assembly station, and reducing the suction during the aligning operation.
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