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J. S. STOKES
BOXMAKING SYSTEM

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2 Sheets-Sheet 1

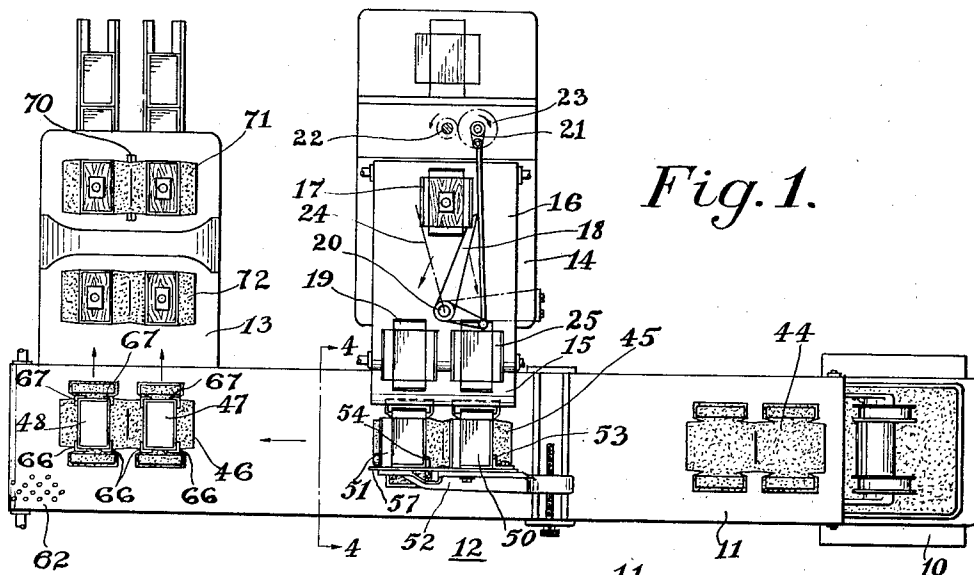


Fig. 1.

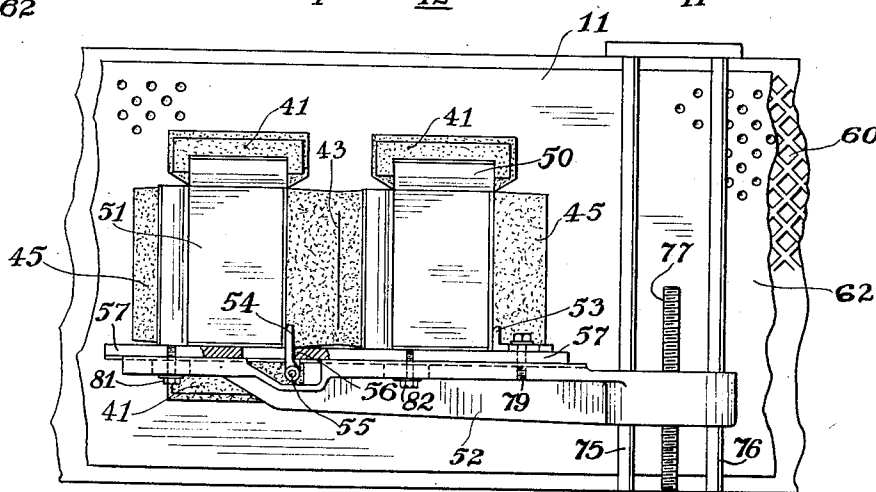


Fig. 2.

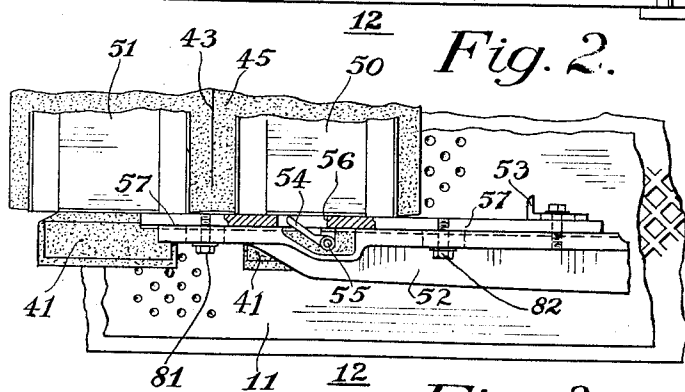


Fig. 3.

INVENTOR
JOHN S. STOKES
BY
Woodcock & Chelan
ATTORNEYS

UNITED STATES PATENT OFFICE

2,542,099

BOXMAKING SYSTEM

John S. Stokes, Huntingdon Valley, Pa.; May Margaret Stokes, John S. Stokes, Jr., D. Robert Yarnall, Philip Price, Percy C. Madeira, Jr., and Provident Trust Co. of Philadelphia, executors of said John S. Stokes, deceased, assignors to Stokes and Smith Company, Philadelphia, Pa., a corporation of Pennsylvania

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7 Claims. (Cl. 93—54)

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This invention relates to systems in which sheet material is applied to box blanks, and has for an object the provision of a method for increasing the output of such a system. The sheet material in the form of individual sheets, labels or wrappers, whether tabbed or untabbed, will be generically referred to herein by the term "wrapper" or "wrappers"; the box blanks, whether stayed or unstayed, or with the walls erect or otherwise, will be generically referred to herein by the term "box blank" or "box blanks."

In accordance with my Patent 2,362,163 of November 7, 1944, there is disclosed a system in which an operator manually registers a box blank on a wrapper which is then folded about and adhesively secured to the walls thereof. In that system, a guide is provided to assist the operator in quickly and accurately registering a box blank on a wrapper. Though my prior system has been very satisfactory, in accordance with the present invention the output or the boxes made per hour may be further increased without increasing fatigue or loss of efficiency of the operator.

In carrying out the present invention in one form thereof, there are provided duplex wrappers which are mechanically joined together and which are delivered in succession to an assembly station. At the station they are brought to standstill in predetermined relation to a guide having indexes or stops by means of which two box blanks may be properly registered on each half of a duplex wrapper. The box blanks are delivered within ready reach of the operator by means of a conveyor, and they rest upon a delivery shelf in side-by-side relation. Thus, the operator can grasp a box blank in each hand and substantially simultaneously place them in registration on each half of the duplex wrapper. To minimize the possibility of improper registration, and to assist in guiding the box blanks to their proper positions with respect to the indexes, there is provided an apron or guiding means which supports at least one end of the box blank until it has been moved substantially to its final position in registry on the box wrapper. In accordance with the invention, the output of the system may be substantially twice that of the system disclosed in my aforesaid patent.

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

For a more detailed understanding of the in-

vention, and for further objects and advantages thereof, reference is to be had to the following description taken in conjunction with the accompanying drawings in which:

Fig. 1 is a plan view of a system embodying the invention;

Fig. 2 is an enlarged fractional plan view of the guide and index means associated therewith;

Fig. 3 is a fractional view of Fig. 2 illustrating one of the index means in a retracted position and the box assemblies in positions enroute from the assembly station;

Fig. 4 is a fractional sectional view taken on line 4—4 of Fig. 1 with the guide omitted;

Fig. 5 is an enlarged view of a duplex wrapper; and

Fig. 6 is a plan view of a duplex wrapper of substantially the reverse proportions of the one illustrated in Fig. 5.

Referring to the drawings, the preferred form of the invention has been illustrated as applied to a box-making system wherein a machine 10 of the type shown in Bailey Patent 2,276,683 comprises a means for feeding box wrappers to a suction conveyor 11 which transports them to an assembly station 12 and thence to a wrapping machine 13. This machine preferably is of the type shown in Bailey Patent 2,262,783, with certain modifications. Intermediate the ends of the conveyor 11 and the machines 10 and 13, is located a bender 14 of the type shown in Federwitz Patent 2,295,461, or preferably Stokes Patent 2,352,665, which bends the side panels of each box blank upon predetermined score lines. A delivery shelf 15 is associated with a conveyor 16 which extends from the delivery shelf to a receiving position for box blanks delivered from the bender 14. The box blanks are delivered in succession by the bender 14. One of them, the box blank 17, is shown in Fig. 1 about midway of the conveyor 16. After arrival on the conveyor 16 it is moved toward the assembly station 12 but due to the interposition of a guide 18 it travels to the left until its arrival on the delivery shelf 15. Its final position is illustrated by the box blank 19. The guide 18 after the forward movement of the box blank 17 is rotated in a counter-clockwise direction about a pivot 20 by means of a crank 21 driven by any suitable means such as the gears 22 and 23. The final position of the guide 18 is shown by the broken line 24. When it reaches this final position, a second box blank is delivered to the conveyor 16, and during the forward movement of the second blank the guide 18 is returned to

the illustrated position for delivery of the second box blank to a position illustrated by that of the box blank 25. With these two box blanks 19 and 25 disposed on the delivery shelf 15 in side-by-side relation and within ready manual reach, an operator positioned at the assembly station 12 may grasp them, one in each hand, and substantially simultaneously register them on their respective wrappers.

Further in accordance with the invention, the glue-applying and wrapper-delivering machine 10 is arranged to deliver duplex wrappers to the conveyor 11 in predetermined positions thereon. Each duplex wrapper, as best shown in Fig. 5, comprises a pair of box wrappers having the panels on one side thereof attached to each other so that they may be handled as a unit both before and after delivery to the conveyor 11. More specifically, one-half of the duplex wrapper 30 comprises end panels 31 and 32, a side panel 33, a body panel 34, and a side panel 35, which at its respective ends joins the respective ends of a side panel 36 of the other half of the duplex wrapper. That half of the wrapper also includes a body panel 37, a side panel 38, and two end panels 39 and 40. It will be observed that the end panels 31-32 and 39-40 are provided with tabs 41 which extend across the end panels. They have a length adequate to insure that they will be folded over the corners of the box to provide additional strength. The side panels 35 and 36, though they may be joined together throughout the length thereof, are preferably divided intermediate the ends thereof by means of a slit 43 which not only facilitates later severance of the respective halves of the duplex wrapper but also forms an index line along which the duplex wrapper is divided.

In Fig. 1, there are illustrated a duplex wrapper 44 just after its delivery to the conveyor 11, a duplex wrapper 45 at the assembly station 12, and a duplex wrapper 46 together with box blanks 47 and 48 adhesively secured thereto and forming a double box assembly ready for delivery to the wrapping machine 13. There are also shown at the assembly station 12, box blanks 50 and 51 in registry with the respective halves of the duplex wrapper 45. Accordingly, it will be understood that the operator has moved the box blanks 50 and 51 from the delivery shelf 15 toward a stationary guide 52 and into registry with an index comprising a member 53 and a retractable index comprising the member 54.

The guide 52 is, in general, of similar construction to the one shown in my said Patent 2,362,168, and the index member 53 may be of the type shown therein. However, the index member 54, in the position for registry of a box blank, extends outwardly into the forward path of the box blank 50. To avoid interference therewith, the member 54 as shown in Figs. 2 and 3 is pivoted at 55 and is biased by a very light spring (not shown) to the position illustrated in Fig. 2, where it will be observed the intermediate portion of member 54 abuts against a stop 56. The stop 56 comprises the end of a slot in a guide bar 57 which is adjustably carried by the guide 52. The index member 54, pivoted to the guide bar 57 at a position spaced from the guiding edge thereof, is free to move through the slot in the guide bar 57 and out of the path of the box blank 50. The spring biasing the index member 54 can be very light since it is only necessary for it to move the member 54 outwardly of the slot in the bar 57. The

shoulder or stop 56 accurately determines its position for registration of a box blank on the leading half of the duplex wrapper 45.

Accordingly, the box blank 50, adhesively secured to the trailing half of the duplex wrapper 45, may be relied upon to move the index member 54 out of its path. When moved to its retracted position, it does not in any way interfere with forward movement of the double box assembly.

It may be further emphasized that the conveyor 11 is preferably of the suction type, where a perforated steel plate 60 forming the upper half of a suction box 61, Fig. 4, supports a perforated conveyor belt 62 through which suction is applied to the duplex wrappers to maintain them in predetermined positions.

Further in accordance with the invention, the delivery shelf 15 is provided with a downwardly inclined adjustable guide 15a, Fig. 4, which extends outwardly over the conveyor 11 to support the trailing end of the box blank 19 as it is moved to a registering position with respect to a wrapper, as illustrated by the position of the box blank 51. In this manner, there is avoided premature contact of any bottom surface of a box blank with the adhesively-coated wrapper until the blank has been placed in predetermined position by registration with the respective index members 53 and 54 and with the side of the guide bar 57 of the guide 52.

After the box blanks 50 and 51 have been registered on the duplex wrapper 45, the conveyor 11 transports them to the delivery position. As shown, transfer means is provided for engaging the corners of the boxes to move the duplex assembly to the wrapper 13. The transfer mechanism has been diagrammatically indicated by the corner-engaging members 66 and 67. Though the duplex wrapper may be severed by lengthening the slit 43, Fig. 5, at any time after assembly of the box blanks thereon, there has been shown a severing means 70, Fig. 1, which consists of a knife operable by relative movement with respect to the duplex wrapper 71. The knife may be located at the illustrated location of another duplex wrapper 72. Thus, in the preferred form of the invention, the two or more assemblies are mechanically locked together through the duplex wrapper until arrival at the wrapping machine 13.

In the form of the wrapping machine 13 as disclosed in said Bailey Patent 2,262,788, adjustments, within predetermined limits, may be made to take care of boxes of different sizes. In this connection, the spacing of the plungers in the wrapping machine 13 is relatively fixed, and though that distance may be varied, in many existing machines it is not convenient to do so. However, in the event it is desired to make boxes where, if disposed side by side as in Fig. 5, the centers would be much closer together, the wrapping machine 13 may be utilized by delivering wrappers in the manner illustrated in Fig. 6. In Fig. 6, the double wrapper 73 is delivered to the conveyor 11 with the greater dimensions of the wrappers lengthwise of the conveyor. Accordingly, the distance from center to center between the two halves of the wrapper is more nearly that of the plungers of the wrapping machine 13. Accordingly, boxes of many sizes may be made on the machine with a minimum number of changes in the adjustments of the parts thereof.

Since the wrappers may be joined together along a side as in Fig. 5, or along an end as in Fig. 6, it is to be understood that reference in the

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claims to wrappers joined together along a side is to be taken as a generic term applicable to both Figs. 5 and 6. The guide 52 and the stops or indexes 53 and 54 are adjustable to conform with the size of box being made. More particularly, the guide 52 is in the form of a cantilever, the supporting end of which is slidable on rods 75 and 76 and may be moved to the desired position by an adjusting screw 77 rotatable by a knob 78. The stop 53 may be adjusted by loosening the screw 79 and sliding the stop 53 in the desired direction, an elongated slot being indicated in Fig. 2 for that purpose. The bar 57 which carries the pivot pin 55 may be adjusted to position the index 54 by loosening screws 81 and 82 which extend through slots provided in the guide 52. Similarly, by loosening a clamping nut 83, the guide 15a is adjustable for control of the extent of its guiding action as the box blanks are moved into registry with their wrappers, a slot being shown in member 15a, Fig. 4, for this adjustment.

When an operator, as above described, moves the box blanks into registration with the duplex wrappers, two wrappers mechanically connected together would, in general, be adequate. However, more than two wrappers may be secured together, as for example, where provision is made for automatic transfer of box blanks to the wrappers. Each group may comprise three or four or more wrappers, each having applied thereto tabs and adhesive material or glue as it is fed to the suction conveyor.

While a preferred form of the invention has been described and a number of modifications thereof indicated, it is to be understood that further changes may be made without departing from the scope of the appended claims.

What is claimed is:

1. The method of making boxes which comprises locating in predetermined position at an assembly station a duplex wrapper, placing in registration on each half of said duplex wrapper a box blank, and thereafter concurrently covering the box blanks each with its own half of said duplex wrapper.

2. The method of making boxes which comprises bringing duplex wrappers in succession to standstill at an assembly station, while at standstill simultaneously registering on each duplex wrapper a pair of box blanks, and thereafter individually and concurrently covering said pair of box blanks each with its own wrapper.

3. In a system for making boxes having a suction conveyor, the method which comprises feeding in succession to the conveyor adhesively-coated duplex wrappers partly joined together along one side and each having tabs located along predetermined sides thereof, while said duplex wrapper is at standstill at an assembly station placing a pair of box blanks in registration respectively with each half of said duplex wrapper, severing said duplex wrapper into two wrappers, and thereafter individually and concurrently covering said pair of box blanks each with its own wrapper.

4. A method of making wrapped boxes which

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includes the steps of feeding freshly adhesively-coated duplex wrappers in turn to an assembly station, at said station substantially concurrently registering a pair of box blanks on respective halves of each of said duplex wrappers, and transporting from said station assemblies each comprising a duplex wrapper and a pair of box blanks adhesively attached thereto in registered position thereon.

5. A method of making wrapped boxes which includes the steps of intermittently feeding a succession of freshly adhesively-coated duplex wrappers toward and beyond an assembly station, at said station substantially concurrently registering a pair of box blanks on respective halves of each of said duplex wrappers as it in turn is at a standstill at said station, and at a station beyond said assembly station in turn severing each of said duplex wrappers to form two assemblies each comprising a box blank and a wrapper adhesively attached thereto in registered position thereon.

6. A method of making wrapped boxes which comprises intermittently feeding freshly adhesively-coated duplex wrappers toward and beyond an assembly station to a wrapping station, at said assembly station substantially concurrently manually registering a pair of box blanks on respective halves of each of said duplex wrappers as it in turn is at a standstill at said station, and at said wrapping station in turn severing each of said duplex wrappers to form two box and wrapper assemblies which are substantially concurrently converted at said wrapping station to a pair of wrapped boxes.

7. A method of making wrapped boxes which comprises feeding duplex wrappers in succession to an assembly station, in each interval between delivery of successive wrappers to said station delivering a pair of box blanks thereto in side-by-side position, simultaneously manually registering the box blanks of each pair upon respective halves of a wrapper at said station, and transferring from said station successive assemblies, each comprising a duplex wrapper and a pair of box blanks attached thereto in registered position thereon.

JOHN S. STOKES.

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