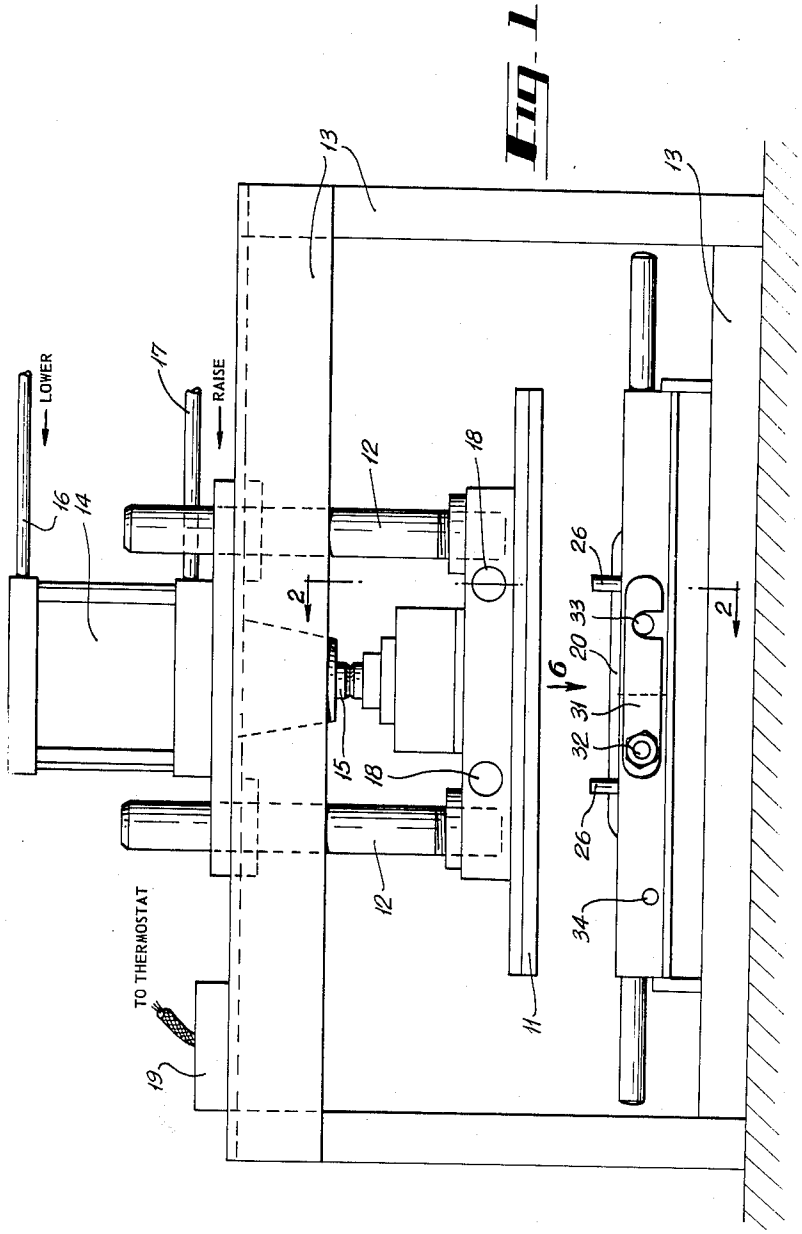
Oct. 5, 1965 J. SHUBERT 3,209,661

METHOD AND APPARATUS FOR THE MANUFACTURE OF PAPER BOXES

Filed June 17, 1963 4 Sheets-Sheet 1

Fig. 1



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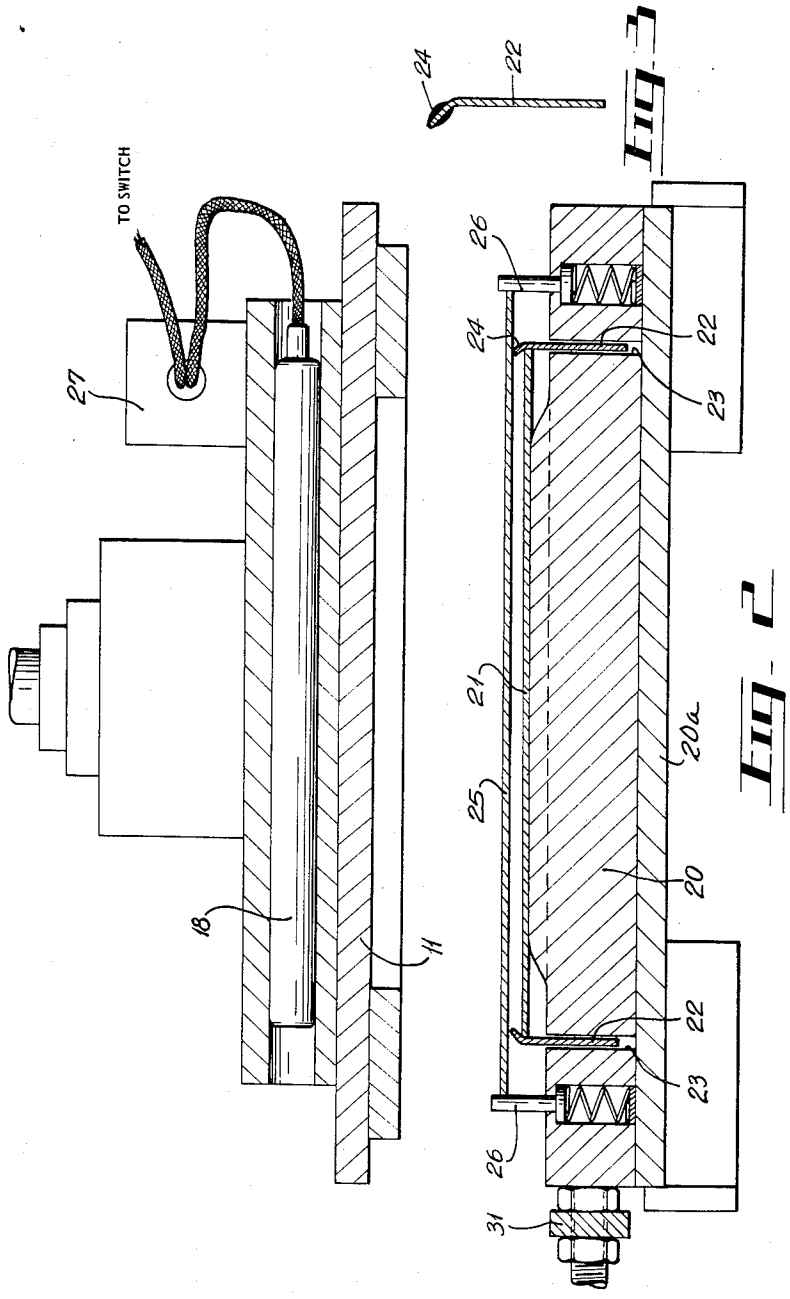


Fig. 2

Fig. 3

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METHOD AND APPARATUS FOR THE MANUFACTURE OF PAPER BOXES

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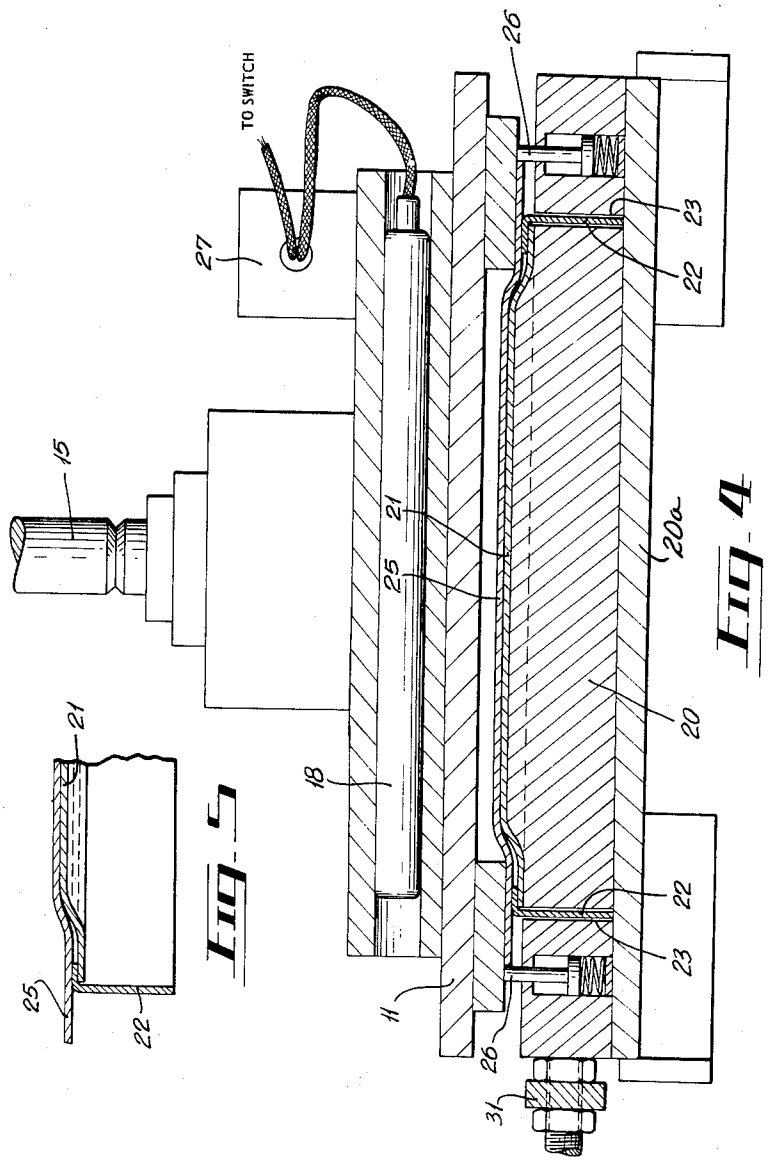


Fig. 4

Fig. 5

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METHOD AND APPARATUS FOR THE MANUFACTURE OF PAPER BOXES

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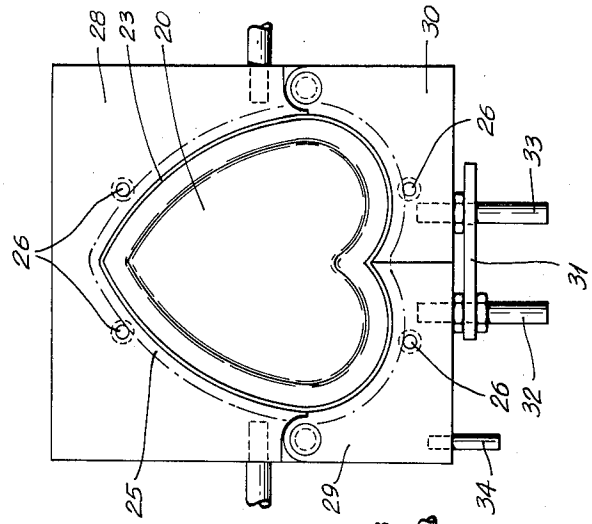


Fig. 7

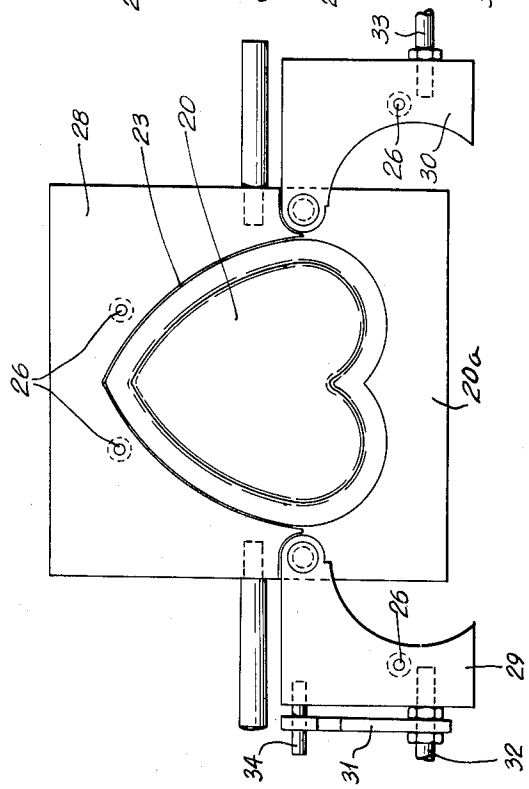


Fig. 6

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METHOD AND APPARATUS FOR THE MANUFACTURE OF PAPER BOXES

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Claims priority, application Canada, Aug. 24, 1962, 856,658
9 Claims. (Cl. 93—55)

This invention relates to an improved method and apparatus for the manufacture of paper boxes and has particular reference to the manufacture of fancy paper boxes for the packaging of chocolates, candies and such items.

Paper boxes made in accordance with this invention comprise a top box member and a bottom box member, each box member comprising 3 components consisting of an outer panel, an inner panel and a side wall strip with a pre-glued and pre-formed edge.

The construction and assembly of the top and bottom box members are identical and so reference will be made to the top box member only in the following description.

New and improved apparatus is required to assemble the box members which includes, a stationary lower male die, an upper female die arranged to be lowered and to apply pressure pneumatically, means for positioning the side wall strip, and means for heating the assembly whilst applying the requisite pressure.

This heat and pressure results in the formation of a secure bond between the contacting surfaces of the outer and inner panels and the pre-glued edge of the side wall strip, which is sandwiched therebetween.

It is the main object of this invention to provide a new and improved method which simplifies the construction of paper boxes.

Another object of this invention is to provide new and improved apparatus for assembling paper boxes, manufactured in accordance with the aforementioned simplified method.

Another object of this invention is to manufacture a paper box which has distinct economic advantages over contemporary boxes of a similar nature, whilst maintaining at least an equivalent standard of strength and quality.

These and other objects of this invention will be apparent from the following detailed specification and the accompanying drawings, in which:

FIG. 1 is a front elevation of apparatus in accordance with this invention, shown with the female die in a raised position.

FIG. 2 is a section to an enlarged scale, on 2—2 of FIG. 1, and shows specific details of the apparatus with the 3 basic box components positioned in the apparatus but not assembled. In this section, the female die is in a raised position.

FIG. 3 is a further enlarged section through the side wall strip, showing the pre-glued and pre-formed edge.

FIG. 4 is a section similar to FIG. 2 but shows the female die lowered and exerting a pressure to assemble and secure the 3 basic box components.

FIG. 5 is a section through an assembled box top member.

FIG. 6 is a view to a reduced scale taken in the direction of arrow 6 in FIG. 1, and shows a plan view of the lower male die and the means for retaining the side wall strip, which includes two movable portions. In this view, the movable portions are in an open position.

FIG. 7 is a view similar to FIG. 6, which shows the movable portions in a closed position.

Refer now to FIG. 1. This view shows a front elevation of apparatus in accordance with this invention, in which upper female die 11 is guided for vertical movement by guide posts 12 moving in bearings in frame 13 and is urged downwardly by double-acting air cylinder 14 which is fixed to frame 13. Rod 15 in air cylinder 14 is attached to upper female die 11, such that upper female die 11 is raised and lowered when rod 15 is extended and retracted. Air pressure applied through pipe 16 causes upper female die 11 to be lowered and to exert a downward pressure, and air pressure applied through pipe 17 causes upper female die 11 to be raised. Pipes 16 and 17 are connected to a foot-operated control.

Electrically operated heater elements 18 are positioned in upper female die 11 in a manner to achieve efficient heat transfer and are connected, via thermostat 27 (see FIG. 2), to switch 19.

Lower male die 20 is attached, by screws or other conventional means, to base 20*a* which is supported by the lower portions of frame structure 13.

Refer now to FIGS. 2 and 4, which show enlarged sections through the upper and lower dies, with the upper female die 11 in, respectively, raised and lowered positions.

In FIG. 2, upper female die 11 is raised and box inner panel 21 is placed on lower male die 20, side wall strip 22 is located in groove 23 with the angle of its pre-formed and pre-glued edge 24 located on the periphery of box inner panel 21, box outer panel 25 is positioned over and rests on the pre-formed edge 24 and is located at its peripheral edges by spring loaded stop pins 26. Pre-glued edge 24 is coated on each side with thermoreactive adhesive.

In FIG. 4, upper female die 11 is lowered resulting in box inner and outer panels 21 and 25 respectively following the shapes of upper female and lower male dies 11 and 20 respectively. During the lowering operation side wall strip 22 slides down groove 23 until it bottoms and at the same time stop pins 26 move downwards against spring pressure to follow the downward movement of upper female die 11, whilst maintaining the location of box outer panel 25.

Upper female die 11 is heated by electrical elements 18 and maintained at a specific temperature by thermostat 27, such that the combination of a specific temperature with the specific downward pressure exerted by upper female die 11 on the formed box components, results in the adhesion of the pre-glued edge 24 of side wall strip 22 to inner and outer panels 21 and 25 respectively.

FIGS. 6 and 7 show a plan view of lower male die 20 combined with means whereby side wall strip 22 is located and retained.

In FIG. 6, the outer wall of groove 23 is formed by a front fixed portion 28 mounted on base 20*a*, and two movable portions 29 and 30 pivotally mounted on base 20*a* and shown in the open positions.

In FIG. 7, movable groove portions 29 and 30 are closed to complete groove 23 and to retain side wall strip 22. Movable groove portions 29 and 30 are located in position by clamp 31 which pivots about pivot 32 and is located on locking pin 33.

When the movable groove portions are in an open position, clamp 31 is swung through approximately 180° and rests on pin 34.

The complete cycle of operation is as follows:

Electrical heater elements 18 are switched on to allow upper female die 11 to reach the required adhesion temperature.

Then box inner panel 21 is positioned on lower male die 20 and side wall strip 22 is positioned in the front fixed portion of groove 23, with the pre-formed edge 24 projecting inwardly. The rear portion of groove 23 is then completed by closing movable groove portions 29 and 30 and locking with clamp 31 on locking pin 33.

Next, outer panel 25 is positioned on the pre-formed

and pre-glued edge **24** of side wall strip **22** and located by stop pins **26**.

Upper female die **11** is then lowered to apply the specific temperature and pressure for a specific time, according to the thermoreactive adhesive used.

In the preferred execution of this invention, the specific temperature is 250° C. and the specific pressure is 800 p.s.i., applied for a time period of 14–15 seconds.

Upper female die **11** is then raised and the box member removed and completed by stapling together the open ends of side wall strip **22**.

What I claim is:

1. A method for the manufacture of paper boxes including the steps of positioning a box inside panel on the upper surface of a lower die, placing within groove means which partially surrounds the periphery of said lower die a side wall strip having an inwardly facing pre-formed lip disposed to overlie the upper surface of said box inside panel, closing movable groove means to provide substantially complete groove means around said periphery and to retain said side wall strip in a position completely surrounding said periphery, positioning a box outside panel over the upper surface of said box inside panel such that said box outside panel rests on the pre-formed inwardly facing lip of said side wall strip, advancing a heated upper die against the upper surface of said box outside panel to thereby force the pre-formed lip of said side wall strip downwards into flat contact with the upper surface of said box inside panel and the lower surface of said box outside panel, said method being characterized in that the upper and lower surfaces of said pre-formed lip are adhesively united to the contacting surfaces of said box inside and outside panels as these parts are pressed together.

2. The method set forth in claim **1** in which, said inwardly facing pre-formed lip is coated on both sides with thermoreactive adhesive.

3. The method set forth in claim **1** in which, said upper die is maintained at a constant temperature of 250° C., and applies a downward pressure of 800 p.s.i. on said box components, for a time period of 14–15 seconds.

4. Apparatus for the manufacture of paper boxes including a frame structure, a lower die mounted on said frame structure for positioning box panel blank means thereon, a vertically movable upper die positioned in vertical co-acting alignment over said lower die, fixed groove means mounted on said frame structure and partially surrounding the periphery of said lower die, movable groove means mounted on said frame structure and substantially surrounding the remaining periphery of said lower die, said groove means for positioning separate adhesive box side wall strip means around the periphery of said panel blank means, and means for vertically moving said upper die towards said lower die to adhesively unite said side wall strip means to said panel blank means.

5. Apparatus as set forth in claim **4**, in which said movable groove means are pivotally mounted on said frame means.

6. Apparatus for the manufacture of paper boxes including a frame structure, a base member mounted on said frame structure, a lower die mounted on said base member for positioning box panel blank means thereon, an upper die positioned in vertical coacting alignment over said lower die and mounted for vertical movement in said frame structure, fixed groove means mounted on said base member and partially surrounding the periphery of said lower die, movable groove means pivotally mounted on said base member and substantially surrounding the remaining periphery of said lower die, said fixed and movable groove means for positioning separate adhesive side wall strip means around the periphery of said panel blank means, and pneumatically operated means mounted on said frame structure for vertically moving said upper die and for applying downward pressure against said lower die to adhesively unite said side wall strip means to said panel blank means.

7. Apparatus as set forth in claim **6**, in which said adhesive on said side wall strip means is thermoreactive and including means for heating said upper die for effecting said adhesive uniting of said side wall strip means to said panel blank means.

8. Apparatus as set forth in claim **6**, including yieldable stop means mounted in said fixed and movable groove means for locating further panel blank means positioned on the upper surface of said lower die.

9. Apparatus for the manufacture of paper boxes including a frame structure, a base member mounted on said frame structure, a lower die mounted on said base member for positioning box panel blank means on the upper surface thereof, an upper die positioned in vertical coacting alignment over said lower die and mounted for vertical movement in said frame structure, a fixed outer groove member mounted on said base member and partially surrounding the periphery of said lower die, movable outer groove members pivotally mounted on said base member and substantially surrounding the remaining periphery of said lower die, said fixed and movable outer groove members for positioning separate thermoreactive adhesive side wall strip means around the periphery of said panel blank means, yieldable stop means mounted in said fixed and movable outer groove members for locating further panel blank means over said lower die, means for heating said upper die, and pneumatically operated means mounted on said frame structure for vertically moving said heated upper die for applying downward pressure against said lower die to adhesively unite said side wall strip means to said panel blank means.

References Cited by the Examiner

UNITED STATES PATENTS

1,575,741	3/26	Deline	93—55
2,637,252	5/53	Swisher	93—44.1 X
2,725,001	11/55	O'Neil	93—55.1 X
2,758,522	8/56	Baxter et al.	93—55.1
3,019,833	2/62	Reardon.	

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