Aug. 16, 1927. 1,639,282

S. BERGSTEIN

BOX SEALING MACHINE AND THE LIKE

Filed June 21, 1926 3 Sheets-Sheet 1

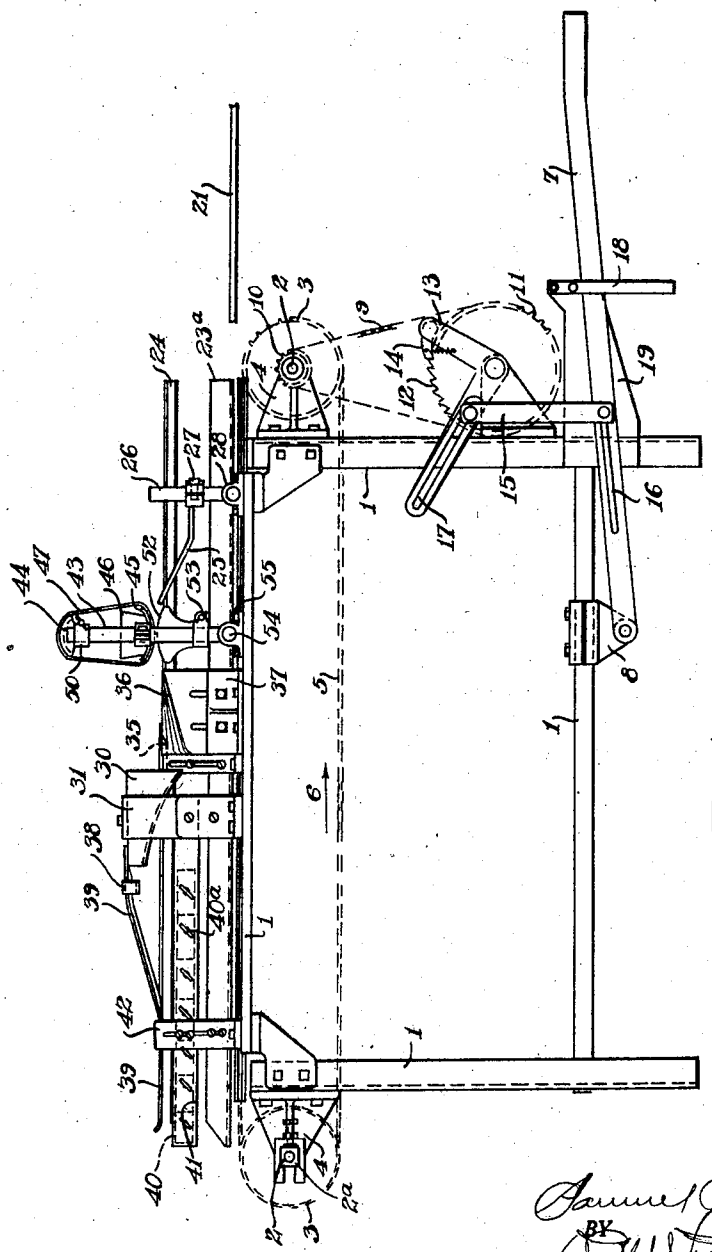


Fig. 1.

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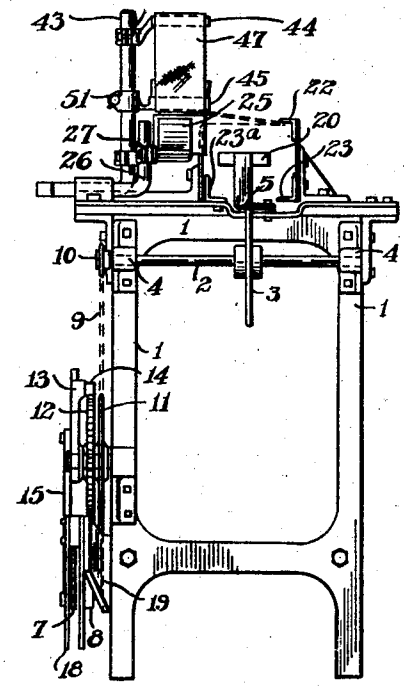


Fig. 2

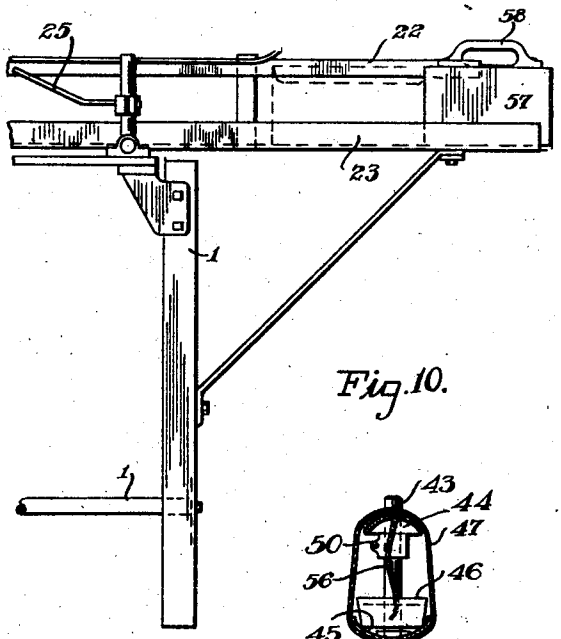


Fig. 10.

Fig. 9.

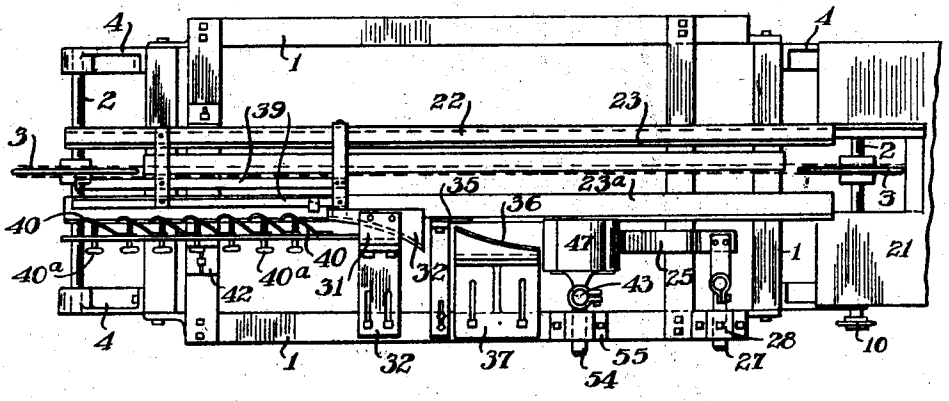


Fig. 3.

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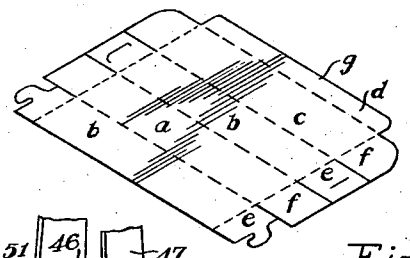


Fig. 7.

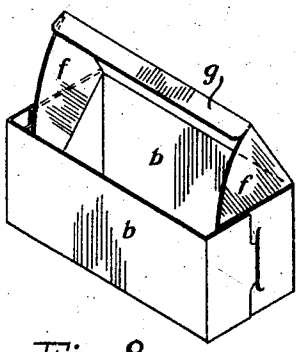


Fig. 8.

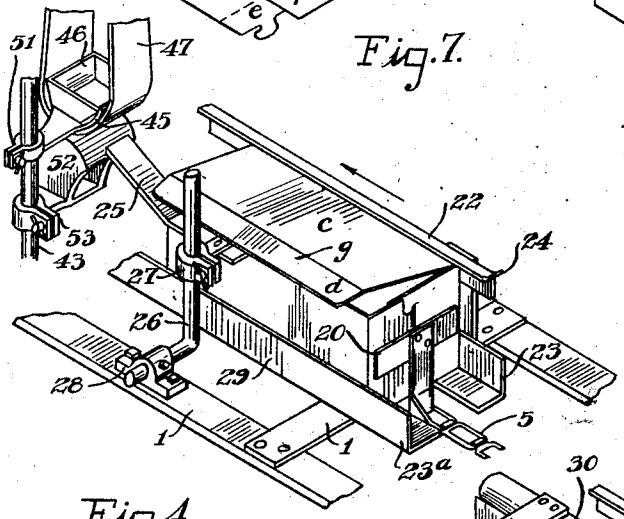


Fig. 4.

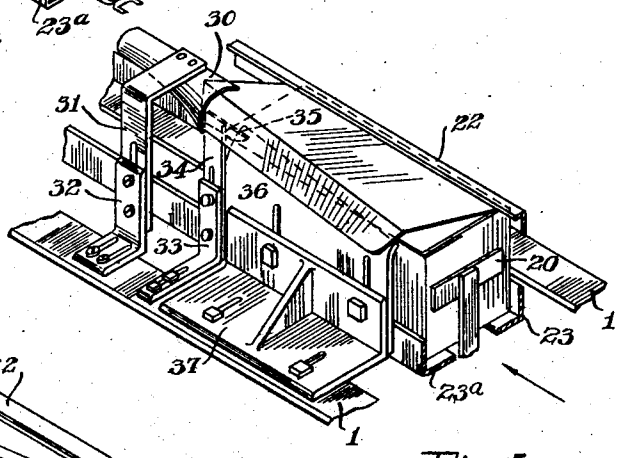


Fig. 5.

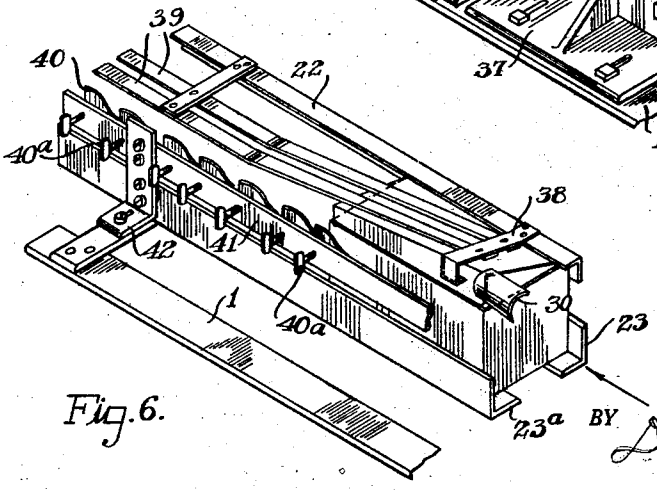


Fig. 6.

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Patented Aug. 16, 1927. 1,639,282

UNITED STATES PATENT OFFICE.

SAMUEL BERGSTEIN, OF MIDDLETOWN, OHIO, ASSIGNOR TO THE INTERSTATE FOLDING BOX COMPANY, OF MIDDLETOWN, OHIO.

BOX-SEALING MACHINE AND THE LIKE.

Application filed June 21, 1926. Serial No. 117,351.

This invention relates to improvements in box sealing machines.

The objects attained in the invention consist in a simple machine for closing and sealing a box of a well known type which, under the common practice, is not sealed after the contents have been placed in the box.

Sealing of the boxes is preferred for certain products, as pastry food products. The boxes, however, are used unsealed by certain large distributors of pastries in view of the difficulty experienced in sealing the boxes by ordinary methods or by available apparatus, the present invention being directed to overcoming the difficulty as well as being adapted for more general use. The improved box closing and sealing machine is also effective for speeding up filling and sealing the boxes, thus expediting the preparation of the products for distribution.

The invention in the preferred form illustrated in the accompanying drawings is adapted for either foot or hand operation and may readily be connected for power operation and modified suitably to adapt the same for boxes of varied forms of the general type shown in the drawings.

In the drawings:

Fig. 1 is a side elevation of the machine;

Fig. 2 is a view in elevation;

Fig. 3 is a plan view;

Figs. 4 and 5 and 6 are detail perspective views illustrating progressive steps of closing and sealing the boxes;

Fig. 7 is a view of a box blank;

Fig. 8 is a perspective view of the assembled box ready for the contents;

Fig. 9 is a detail view of the tape moistener;

Fig. 10 is a view of a modified construction for hand operation.

As here shown the machine comprises a suitable frame structure 1 at the opposite ends of which shafts 2, having secured thereto sprocket wheels 3, are supported in extension brackets 4 secured to the frame 1; the sprockets being operatively connected to an endless box carrier in the form of a chain 5 which traverses the machine in the direction of the arrow 6. The front shaft 2 is operatively connected to a treadle 7 pivoted on frame 1 by a bracket 8, by a chain 9 and sprocket wheels 10—11, a ratchet wheel 12, bell crank lever 13 carrying a pawl 14 coacting with ratchet 12, and a link 15 connecting the opposite arm of lever 13 to the treadle. Slots 16—17 in levers 7 and 13 respectively serve for adjusting the link connection 15 for regulating the movement of the treadle. A guide 18 supported on a bracket 19 extended from frame 1 acts to prevent side sway of the treadle.

The box carrier is provided at regularly spaced intervals on the chain 5 with a plurality of brackets 20, extended upwardly in the upper course of the carrier, the brackets being adjustable on the chain to suit their spacing one from another to boxes of variable lengths, the boxes moving lengthwise through the machine as best illustrated in Figs. 4, 5 and 6. The general type of box adapted for the machine is illustrated in Figs. 7 and 8, the several parts of the one-piece blank consisting of the bottom —*a*, sides *b*—*b*, lid *c*, sealing flap —*d*, interlocking end flaps *e*—*e* and free end flaps —*f*. As here shown the sealing flap is provided with a strip —*g* of double faced adhesive tape which is highly suitable for the method of sealing the boxes practiced on the machine.

A table 21 is supported in any suitable manner at the front of the machine to support the boxes as the contents are placed therein by the machine attendant, the blanks for the boxes being furnished flat as illustrated in Fig. 7. The first step of assembling the boxes and supplying the contents is done by hand. Upon receiving the contents the box remains open as illustrated in Fig. 8 and is placed on the box carrier between two adjacent brackets 20, the treadle being operated to advance the carrier the space of one box.

Upon movement of the carrier the boxes are first brought under the influence of upper and lower fixed angular guides 22—23 arranged along the course of the box carrier on the back side of the machine, the lower guide 23 and a corresponding guide 23ª on the opposite side of the machine serving as a support for the boxes to slide on. The upper guide has a flared or turned end 24 which engages the lid of the box and turns it in the manner illustrated in Fig. 4 with the sealing flap —*d* disposed over an upwardly inclined guide 25 which acts to direct the sealing flap into engagement with the sealing flap moistener, as best illustrated in Fig. 4, only the outer, taped surface —*g*

of the sealing flap receiving moisture as the flap is drawn through the device.

From the moistener the boxes are moved to the position illustrated in Fig. 5, with the sealing flap raised by a guide 36 over the edge of the adjacent side —*b* of the box and entering engagement with a flap deflector 35 and a curved guide 30, the deflector acting to turn the flap sufficiently to pass under the guide readily. The deflector has only line contact with the flap and guide 30 comes in contact only with the opposite edges of the flap so that the moistened adhesive surface of the flap does not have sufficient contact with these guiding devices to interfere with the free passing of the flap.

The final step of sealing the box is illustrated in Fig. 6 in which the box is passing out of engagement with guide 30 with the sealing flap in engagement with a flap insert guide 38 and inclined guides 39, the first acting to deflect the sealing flap inside the front side of the box and the second to press the lid down to full closed position as the box passes under the influence of a series of spring tensioned pressure devices 40 which act by pressure exerted on the side face of the box over the sealing flap to effect a sealed joint along the full length of the box, the instant responsiveness of the adhesive tape to the pressure resulting in effective sealing of the box.

It will be obvious that any suitable adhesive may be used, either applied to the box blank before the same is assembled, or applied to the sealing flap on the machine by substituting adhesive applying mechanism for the tape moistening mechanism. The adhesive tape, or its equivalent in quick acting adhesive, is preferred because of its cleanliness and the higher speed at which the boxes can be sealed.

To adapt the machine for boxes of variable sizes, larger and smaller as the case may be, guides 30 and 35 are mounted on vertically adjustable brackets 31—34 which in turn are mounted on brackets 32—33 respectively supported on frame 1 and adjustable transversely of the machine. In like manner the upper guide 22 is adjustable vertically on brackets (not shown) on the rear side of the machine; guide 25 is adjustable vertically and transversely on a rod 26 mounted in split bearings 27—28; guide 36 is adjustable vertically on a transversely adjustable bracket 37 supported on frame 1, and the pressure devices 40 mounted on a rail 41 are adjustable vertically on brackets 42 adjustable transversely of the machine on frame 1. Adjusting screws 40^a are provided in the side rail 41 for regulating the tension of the spring pressure devices 40.

The details of the adhesive moistening device are shown in Fig. 9, the same consisting of a bracket 55 secured to frame 1 which serves to support an angular shaped bracket 54 having an upwardly extended post —43, the part being adjustable in bracket 55 transversely of the machine. Supported on part 43 by brackets 50—51 are upper and lower guides 44—45 for a web 47 of material, as felt, for absorbing moisture and transferring the same to the adhesive coated sealing flap —*d* as the same is drawn over a guide 52 supported on post 43 by a bracket 53. Moisture is conducted to web 47 from a moisture tray 46 by suitable wicks 56 by capillary action, the web being moved more or less by the frictional engagement with the sealing flaps thus acting to maintain the required uniformity in conveying the moisture to the same.

The means illustrated in Fig. 10 for moving the boxes through the machine manually consists simply of a slidable block 57 having a hand grip 58 which is substituted for the endless carrier 5 and the treadle mechanism for actuating the carrier, the organization and operation of the machine in other respects being the same.

In the preferred form of the boxes, the method of preparing the box blanks for folding, filling and sealing on the machine is a step in the practice of the invention. The improved practice consists in the use of a special machine for applying the adhesive element, either double faced adhesive tape or a liquid adhesive, to the paper sheets before the box blanks are cut from the sheets, the application of the adhesive being regulated on the sheet according to the construction of the boxes to be made and the portions of the box blanks requiring adhesive for assembling the boxes. Thus the user of the boxes can be furnished with box blank stock, the blanks remaining flat and put up in convenient bundles for handling and shipping with the minimum of bulk. Also the adhesive applied to the blanks in advance, whether adhesive tape or liquid adhesive, is more sanitary and responds quicker in assembling the boxes than adhesive applied as the boxes are assembled for use which acts to foul the box assembling machines and requires time to set and relatively high pressure for making effective joints.

The practice of the invention, however, is not limited to any prescribed method or apparatus for rendering the sealing flaps of the boxes adhesive. Any suitable means or method may be employed for applying this element to the box blanks, as by applying the adhesive to the paper sheets before the box blanks are cut, or to the blanks after the same have been cut from the sheets and before the blanks are run on the box sealing machine, or as the same are run on the machine.

Having described my invention, I claim:

1. A box sealing machine including in

combination with means for moving boxes progressively with their lids and sealing flaps raised, devices for rendering the sealing flaps adhesive, guides acting to lower the lids and to direct the sealing flaps to said devices, a guide acting on the lids after the sealing flaps have been rendered adhesive for raising the flaps above the edges of the adjacent sides of the boxes, guides for deflecting said flaps into the plane of the boxes, a guide for fully closing said lids with the sealing flaps inside the boxes, and pressure devices acting on said flaps for sealing the boxes.

2. A box sealing machine including in combination with means for moving boxes progressively with their lids and sealing flaps raised, the following relatively fixed instrumentalities for closing and sealing the boxes, devices for rendering the sealing flaps adhesive, guides acting to lower the lids and to direct the sealing flaps to said devices, a guide acting on the lids after the sealing flaps have been rendered adhesive for raising the flaps above the edges of the adjacent sides of the boxes, guides for deflecting said flaps into the plane of the boxes, a guide for fully closing said lids with the sealing flaps inside the boxes and pressure devices acting on said flaps for sealing the boxes.

3. A box sealing machine including in combination with means for moving boxes progressively, with their lids and sealing flaps raised, the following relatively fixed instrumentalities spaced one from another along the course of the boxes for closing and sealing the same, devices for rendering the sealing flaps adhesive, guides acting to lower the lids and to direct the sealing flaps to said devices, a guide acting on the sealing flaps after the same have been rendered adhesive for raising the flaps above the edges of the adjacent sides of the boxes, guides for deflecting said flaps into the plane of the boxes, a guide for fully closing said lids with the sealing flaps inside the boxes, and pressure devices acting on said flaps for sealing the boxes.

4. A box sealing machine including in combination an endless carrier for moving the boxes with their lids and sealing flaps raised, the following instrumentalities spaced one from another along the course of the carrier and acting progressively to close and seal the boxes, devices for rendering the sealing flaps adhesive, guides acting to lower the lids and to direct the sealing flaps to said devices, a guide acting on the sealing flaps after the same have been rendered adhesive for raising the flaps above the edges of the adjacent sides of the boxes, a guide for deflecting said flaps into the plane of the boxes, a guide for fully closing said lids with the sealing flaps inside of the boxes, and pressure devices acting on said flaps for sealing the boxes.

5. A box sealing machine including in combination an endless carrier for moving the boxes with their lids and sealing flaps raised, a series of guides and pressure devices acting to render the sealing flaps adhesive, to raise and deflect the same into the plane of the boxes, to close the lids, and to effect adhesion between said flaps and adjacent sides of the boxes.

In testimony whereof, I affix my signature.

SAMUEL BERGSTEIN.