

June 10, 1941.

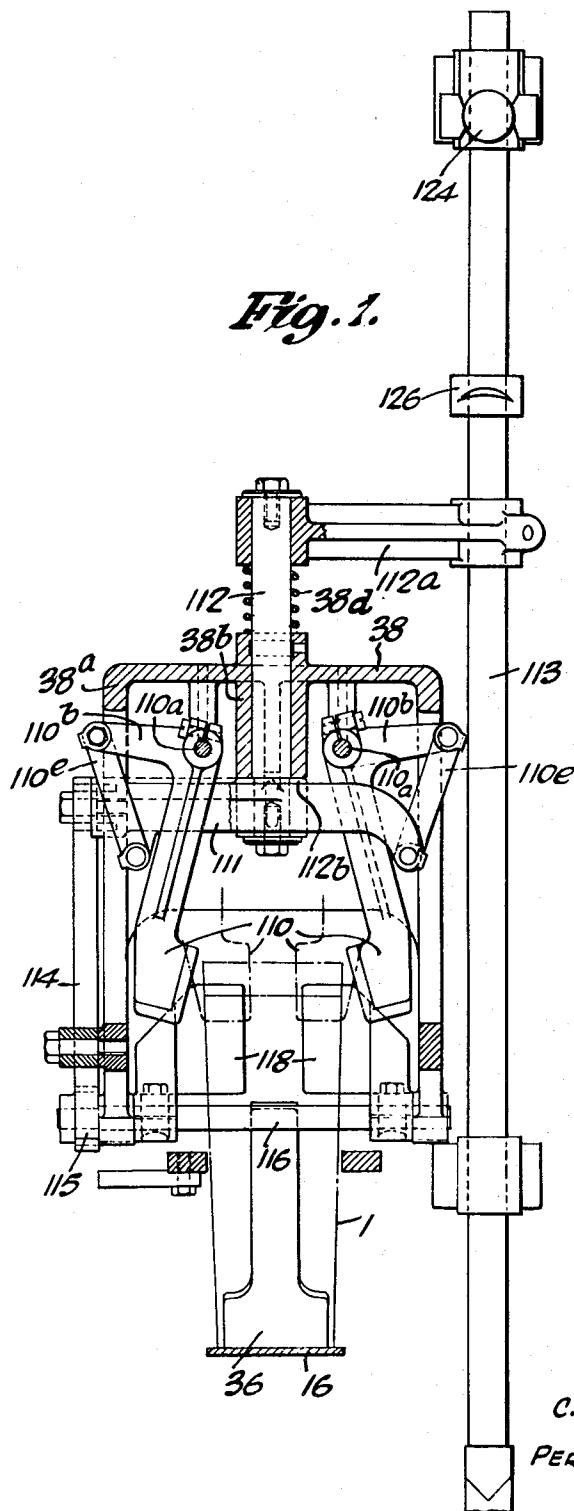
C. W. HARTMANN

2,245,193

MACHINE FOR SHAPING CARTONS

Filed April 27, 1940

3 Sheets-Sheet 1



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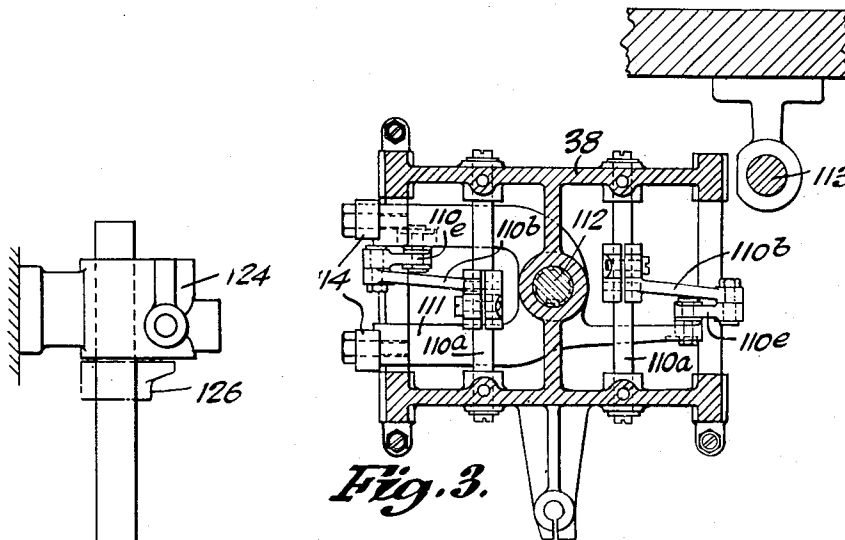


Fig. 3.

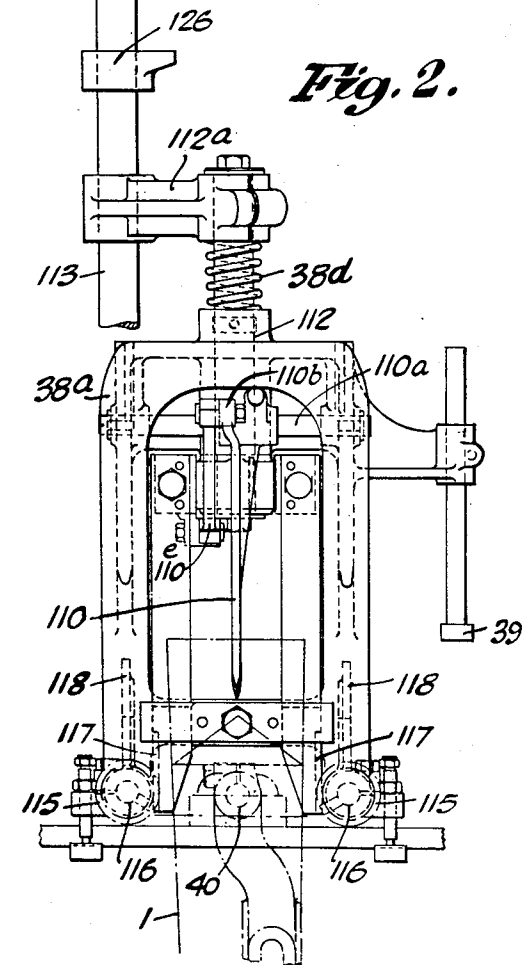


Fig. 2.

INVENTOR
C. W. HARTMANN
PER *Rayner & Co.*
ATTORNEYS

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C. W. HARTMANN

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Fig. 4.

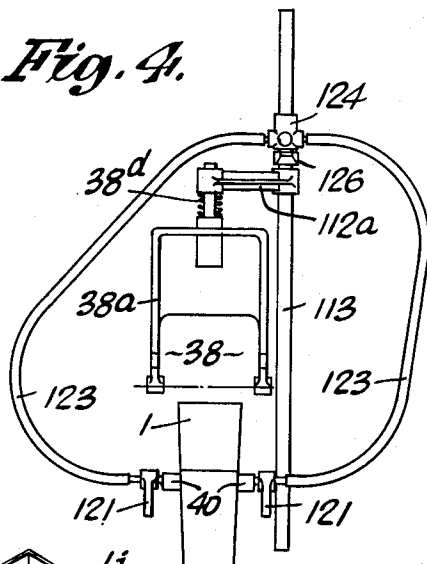


Fig. 5.

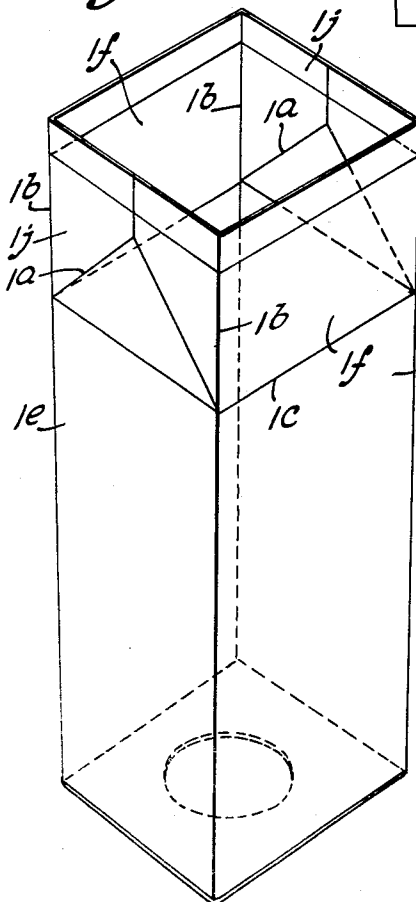
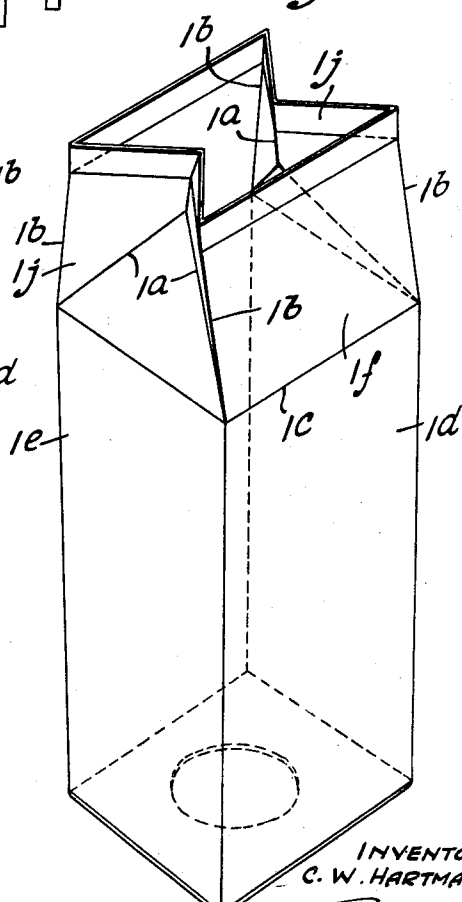


Fig. 6.



INVENTOR
C. W. HARTMANN
PER *Flanagan & Co.*
ATTORNEYS

UNITED STATES PATENT OFFICE

2,245,193

MACHINE FOR SHAPING CARTONS

Carl Wilhelm Hartmann, Lyngby, near Copenhagen, Denmark, assignor to Satona Limited, Edinburgh, Scotland

Application April 27, 1940, Serial No. 332,031
In Great Britain May 24, 1939

9 Claims. (Cl. 93—53)

This invention relates to machines for preparing cartons so that they may be readily and effectively closed when filled on suitable filling machines, and the invention is useful in connection with apparatus for use on machines which carry carton tubes through base closing and sealing means (e. g. as described in Patent No. 2,212,472) and from thence to a conveyor on which the cartons are carried mouth end uppermost towards a proofing stage or a filling stage or both. The object of this invention is to provide apparatus which will apply the requisite deformation to the mouth of each carton to ensure it folding readily when being sealed after filling. The invention is particularly suitable in the handling of cartons of the type in use for retailing liquids, in which a square section carton has on two opposed walls at its upper end two inverted Y shaped scorings and a continuous transverse scoring which joins the outer ends of the divergent limbs of the Y shaped scorings at the vertical corners of the carton, the mouth being closed by pinching towards each other concertina or pleat fashion the vertical limbs of the Y shaped scorings. The object of this invention is to provide means which will automatically pinch in the sides of the upper end of the cartons as they are carried by a suitable conveyor to the desired zone.

According to this invention apparatus for the purpose specified comprises members adapted to be automatically pressed against opposite sides of the carton tops when the cartons are located on a conveyor beneath them, and to automatically become disengaged from the cartons to allow of intermittent conveying movement of the conveyor, means adapted to operate against the exterior of the carton being provided to sustain the walls of the cartons against collapse during said pressing operation.

One embodiment of the present invention comprises a reciprocating cage or frame supporting fingers and adapted to be moved towards and away from a conveyor for the cartons, means being provided automatically pressing the fingers towards each other when they are located opposite sides of the carton top, and suction applying means being provided adapted to automatically sustain the walls of the carton against collapse during the pinching operation.

In order that this invention may be clearly understood and readily carried into effect drawings are appended hereto illustrating an embodiment thereof and wherein:

Figs. 1, 2 and 3 are respectively a side elevation,

end view and sectional plan of the mechanism for pleating and forming the open upper end of the cartons.

Fig. 4 is a side elevation of the pleating mechanism with suction means for supporting the carton sides.

Fig. 5 is a perspective view showing a carton just before its mouth is pre-creased or folded by the mechanism of the present invention, and

Fig. 6 is a perspective view showing the carton after its mouth has been pre-creased or folded.

Referring to the drawings the cartons in the fully open form shown in Fig. 5 are deposited by suitable mechanism singly into U shaped clips 36 on the upper track of an intermittently travelling conveyor 16 and are carried by such conveyor successively beneath a device 38 which pinches inwardly symmetrically V fashion the opposed parts 1j of the carton tops so that each carton top is definitely pre-creased or folded on previously scored lines, which as shown in Fig. 5 comprise a pair of opposed inverted Y shaped scorings 1a (the vertical limbs of which form the apices of the V folded parts 1j), outer corner scorings 1b, and horizontal scorings 1c.

This device 38 is reciprocated vertically from suitable mechanism and during its descent a pair of opposed fingers carried thereby are moved towards each other automatically to pinch inwards the opposed sides 1j of the appropriate carton. To ensure that the carton is firmly seated in the clip 36 during this operation it is tamped into the clip immediately before the partial closing operation, this being effected by a horizontal bar 39 projecting uni-laterally from the member 38 so as to abut against the rim of each carton immediately before it reaches the stage where it is operated upon by the device 38. Contemporaneously with this partial closing operation the two walls of the carton transverse to those which are operated upon by the said pair of fingers are restrained against collapse by engaging against opposite sides 1d, 1e thereof a pair of suction devices 40 which at the appropriate stage applies suction to the said pair of walls to constrain them against inward movement.

When each carton becomes located beneath the pinching device 38, the cage 38a of U-configuration comprising the body of this device, is lowered by the downward pull on a vertical rod 113, this rod having fixed to it the arm 112a from the free end of which depends a rod 112 on which is suspended the cage 38a. A coiled compression spring 38d is interposed between the free end of the arm 112 and a centre sleeve

38b of the cage, and the lower end of this centre rod 112 is provided with a head 112b which abuts against the lower end of the sleeve 38b. When the cage is lowered over a carton top, one limb of the cage abuts against a stop 113a and the vertical rod 113 continues its downward movement against the influence of the spring 38d and applies an inward swinging movement to a pair of pinching fingers 110 which engage the creased centre parts 1f of the carton top and pinches the opposed sides inwardly V-fashion. This inward movement of the pinchers 110 is effected by connecting to cranked extensions 110b of the pinching members links 110c pivoted to a cross bar 111 slidable vertically relatively to the cage 38a. The levers 110b pivot on pins 110a supported in lugs in the cage. Simultaneously with this inward pinching operation of the members 110, pairs of side plates 118 parallel with the plane of movement of the pinching fingers 110 are swung inwardly from a normal upward position so that their upper free ends move towards each other and thereby the flat sides 1f of the top of the carton are pressed towards each other about their scorings 1c inverted V fashion to complete the folding operation of the top of the carton. The plates 118 are fixed to and radiate from a pair of spindles 116 supported in bearings at the lower ends of the cage 118 and carrying a pair of pinions 115 which mesh with teeth 117 formed on the lower ends of two bars 114 depending from the cross bar 111. The cross bar 111 is of H-configuration to provide the requisite pair of limbs at one end to receive the upper ends of the two bars 114.

The two suction members 40 which engage opposite sides of the carton as before said are a pair of cups with suction orifices covered by reticulated plates, the cups being supported by a pair of nipples carried by a pair of slotted vertical arms 121 which are adjustably clamped in position by studs. The nipples receive conduits 123 extending from a valve device which automatically connects the cups to a source of suction when the cage 38a moves downwardly. This valve device comprises a housing 124 with a spring-loaded valve having a depending pin against which abuts a collar 126 on the vertical rod 113 to cut off the suction and connect the conduit 123 to atmosphere when the rod 113 is raised, the spring-loaded valve opening automatically as the rod descends.

Guide rails 36a are located opposite sides of the conveyor 36 to firmly support and accurately guide the cartons through this pinching-in stage. It will be evident that when the cage is raised that the pinching fingers 110 will be separated and the conveyor 16 which was stationary during this pinching operation will then be moved a sufficient distance to bring beneath the device 38 the next carton in succession.

This pre-creasing or folding operation is of great advantage in the wax-proofing of cartons because the cartons can be delivered to the wax coating apparatus from the conveyor 16 suitably creased so that when subsequently the cartons are filled and their tops pinched together and sealed the wax will not break away from the creases during closing, because the wax coating was applied to an already creased or partly closed carton.

I claim:

1. Apparatus for pre-folding or creasing the scored mouth ends of cartons comprising a conveyor for the cartons, pinching members above

the conveyor adapted to be automatically pressed against opposite sides of the carton tops when the cartons are located on said conveyor beneath said members, and to automatically become disengaged from the cartons to allow of intermittent conveying movement of the conveyor, and means adapted to operate against the exterior of the carton to sustain the walls of the cartons against collapse during the pressing operation.

2. Apparatus for pre-folding or creasing the scored mouth ends of cartons comprising a conveyor for the cartons, a reciprocating frame adapted to be moved towards and away from said conveyor for the cartons, a pair of fingers carried by said frame, means automatically pressing the fingers towards each other when they are located opposite sides of a carton top, and suction applying means adapted to automatically sustain the walls of the carton against collapse during the pinching operation.

3. Apparatus for pre-folding or creasing the scored mouth ends of cartons comprising a conveyor for the cartons, a vertically reciprocating frame immediately above said conveyor, a pair of fingers pivotally supported in said frame, a vertically reciprocating driven member having lost motion driving connection with said frame for imparting the vertical reciprocation to said frame and also adapted to impart carton pinching movements to said fingers during movement relatively to said frame, and suction applying means adapted to sustain the walls of each carton against collapse during the pinching operation.

4. Apparatus for pre-folding or creasing the scored mouth ends of cartons comprising a conveyor for the cartons, a vertically reciprocating frame immediately above said conveyor, a pair of fingers pivotally supported in said frame, a vertically reciprocating driven member having lost motion driving connection with said frame and also adapted to impart carton pinching movements to said fingers during movement relatively to said frame, suction applying means adapted to sustain the walls of each carton against collapse during the pinching operation, a guide on the frame through which said vertically reciprocating driving member slides, means yieldingly opposing downward movement of the driving member relatively to said frame, and means to arrest downward movement of the frame in advance of the completion of the downward movement of said driving member to obtain said relative movement.

5. Apparatus for pre-folding or creasing the scored mouth ends of cartons comprising a conveyor for the cartons, pinching members above the conveyor adapted to be automatically pressed against opposite sides of the carton tops when the cartons are located on said conveyor beneath said members, and to automatically become disengaged from the cartons to allow of intermittent conveying movement of the conveyor, further members adapted to be pressed inverted V fashion against opposite sides of the carton top transverse to the sides engaged by the said pinching members, and means adapted to automatically engage and operate against the exterior of the carton to sustain the walls of the cartons against collapse during the pressing operation and to automatically free the carton following the pinching operation.

6. Apparatus for prefolding or creasing the scored mouth ends of cartons comprising a conveyor for the cartons, a reciprocating frame

adapted to be moved towards and away from said conveyor for the cartons, a pair of fingers by said frame, means automatically pressing the fingers towards each other when they are located opposite sides of a carton top, a pair of opposed pivoted plates adapted to engage inverted V fashion with sides of the carton top transverse to the sides engaged by said fingers, means to move said plates in synchronism with said fingers, and suction applying means adapted to automatically sustain the walls of the carton against collapse during the pinching operation.

7. Apparatus for pre-folding or creasing the scored mouth ends of cartons comprising a conveyor for the cartons, a vertically reciprocating frame immediately above said conveyor, a pair of fingers pivotally supported in said frame, a vertically reciprocating driven member having lost motion driving connection with said frame and also adapted to impart carton pinching movements to said fingers during movement relatively to said frame, suction applying means adapted to sustain the walls of each carton against collapse during the pinching operation, a guide on the frame through which said vertically reciprocating driving member slides, means yieldingly opposing downward movement of the driving member relatively to said frame, means to arrest downward movement of the frame in advance of the completion of the downward movement of said driving member to obtain said relative movement, a pair of pivoted plates carried by opposite sides of the frame and adapted to engage sides of the carton tops transverse to the sides engaged by said fingers, and means adapted to press said plates inverted V fashion against the carton top during the pinching operation.

8. Apparatus for prefolding or creasing the scored mouth ends of cartons comprising a conveyor for the cartons, pinching members above

the conveyor adapted to be automatically pressed against opposite sides of the carton tops when the cartons are located on said conveyor beneath said members, and to automatically become disengaged from the cartons to allow of intermittent conveying movement of the conveyor, means to sustain the walls of the cartons against collapse during the pressing operation, and means automatically tamping down each carton against the conveyor in advance of the pinching operation.

9. Apparatus for pre-folding or creasing the scored mouth ends of cartons comprising a conveyor for the cartons, a vertically reciprocating frame immediately above said conveyor, a pair of fingers pivotally supported in said frame, a vertically reciprocating driven member having lost motion driving connection with said frame and also adapted to impart carton pinching movements to said fingers during movement relatively to said frame, suction applying means adapted to sustain the walls of each carton against collapse during the pinching operation, a guide on the frame through which said vertically reciprocating driving member slides, means yieldingly opposing downward movement of the driving member relatively to said frame, means to arrest downward movement of the frame in advance of the completion of the downward movement of said driving member to obtain said relative movement, a pair of pivoted plates carried by opposite sides of the frame and adapted to engage sides of the carton tops transverse to the sides engaged by said fingers, means adapted to press said plates inverted V fashion against the carton top during the pinching operation, and an abutment on said frame adapted to engage the tops of the cartons to tamp them firmly in position in advance of the operation of said fingers.

CARL WILHELM HARTMANN.