Aug. 18, 1936. C. W. HARTMANN 2,051,555

METHOD AND APPARATUS FOR CLOSING AND SEALING CARTONS

Original Filed May 6, 1933 3 Sheets-Sheet 1

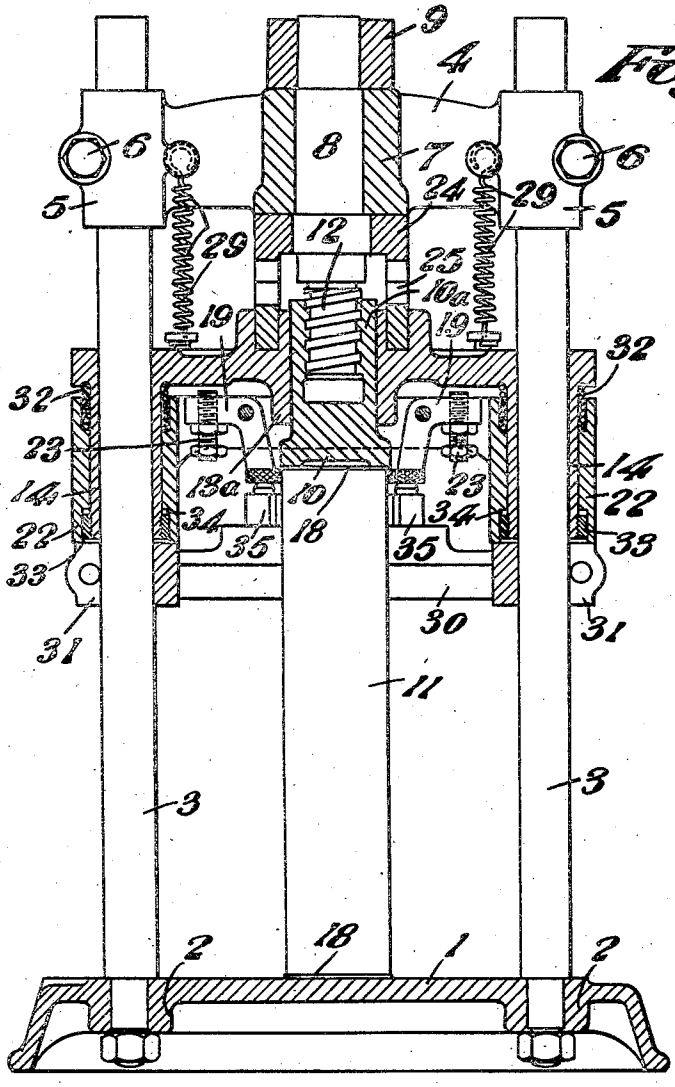


Fig. 1.

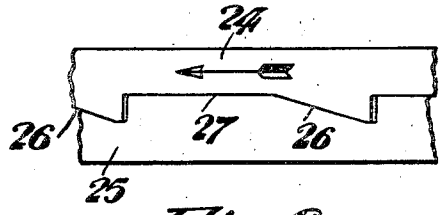


Fig. 6.

INVENTOR
CARL WILHELM HARTMANN.
PER Rayner & Co
ATTORNEYS.

Aug. 18, 1936. C. W. HARTMANN 2,051,555

METHOD AND APPARATUS FOR CLOSING AND SEALING CARTONS

Original Filed May 6, 1933 3 Sheets-Sheet 2

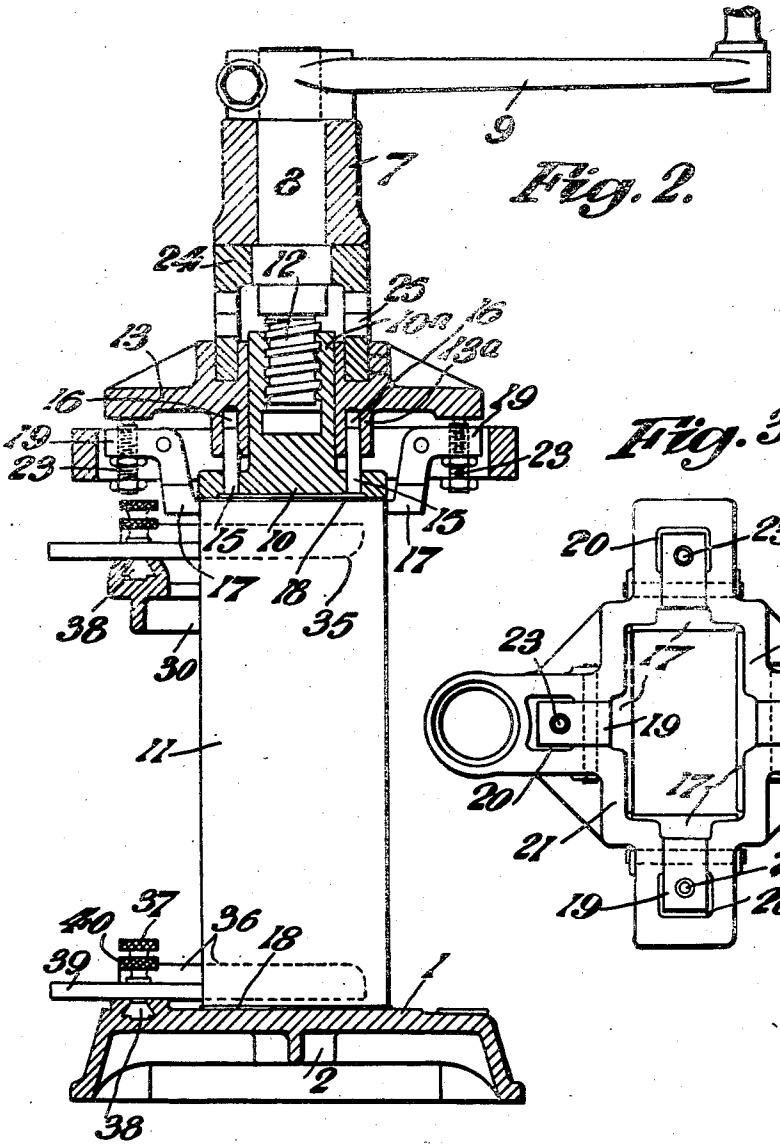


Fig. 2.

Fig. 3.

INVENTOR
CARL WILHELM HARTMANN

PER Rayner & Co
ATTORNEYS

Aug. 18, 1936. C. W. HARTMANN 2,051,555

METHOD AND APPARATUS FOR CLOSING AND SEALING CARTONS

Original Filed May 6, 1933 3 Sheets-Sheet 3

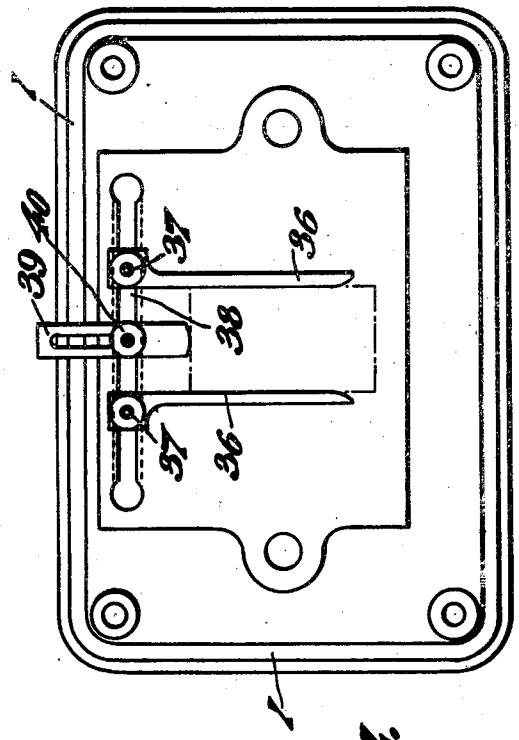


Fig. 4.

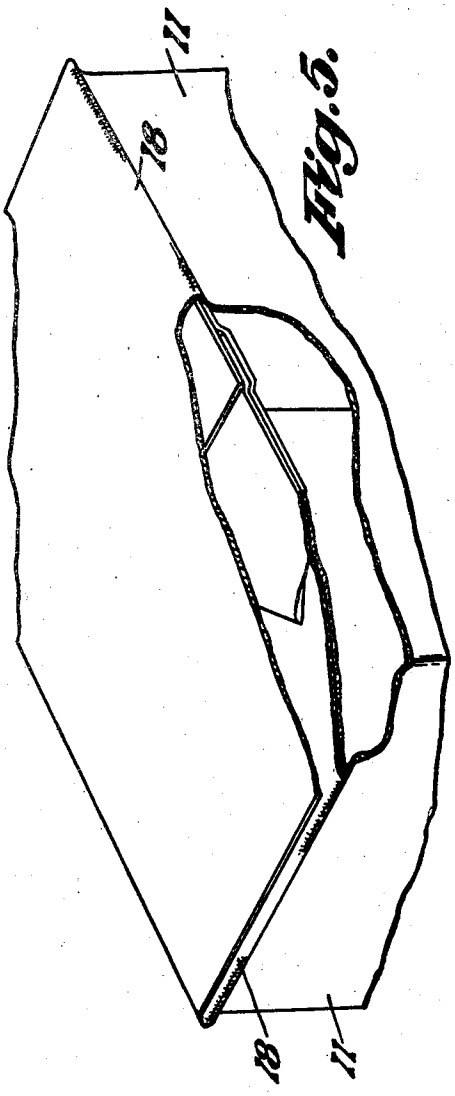


Fig. 5.

INVENTOR
CARL WILHELM HARTMANN
PER
ATTORNEYS

Patented Aug. 18, 1936 2,051,555

UNITED STATES PATENT OFFICE

2,051,555

METHOD AND APPARATUS FOR CLOSING AND SEALING CARTONS

Carl Wilhelm Hartmann, Lyngby, near Copenhagen, Denmark, assignor to Satona Limited, East Bank, Colinton, Midlothian

Application May 6, 1933, Serial No. 669,626. Renewed January 15, 1936. In Great Britain May 13, 1932

20 Claims. (Cl. 93—36.3)

This invention relates to a method and apparatus for closing cartons and like containers, for example cartons filled with a granular or other material and provided with adhesive coated flaps which are folded inwards upon each other and which require pressure applied to them to effect a proper airtight closure. Various apparatus have heretofore been proposed for this purpose in which filled cartons are successively placed upon a base and are located between side supports whilst a pressure applying member is pressed downwards against the inwardly folded flaps. However, such apparatus is concerned solely with applying the pressure appropriate to sealing the carton, whereas the object of this invention is to utilize the sealing or closing operation as part of an operation which will strengthen or enhance the rigidity of the sealed container and also enable an effective and substantial airtight seal to be obtained.

In the method of closing or sealing the carton or like container according to the present invention means is provided in conjunction with means for applying a sealing or closing pressure to the carton for impressing members into the sides of the carton adjacent to the end thereof to form a supporting ledge to sustain the closing pressure and to produce a laterally projecting reinforcing rib or lip at the end of the carton.

Although in describing this invention reference is made to the operation of closing or sealing cartons it is to be understood that such operation need not include the usual closing operation of folding down the closure flaps to effect a closure of the carton. The container may have been previously closed by having its closure flaps folded inwards and down, the said closing or sealing operation according to the invention serving to enhance the efficacy of the sealing or closing of the container and also strengthen the finished package.

A suitable apparatus for carrying out this invention briefly comprises a base upon which the container is adapted to be stood, an overhead press head member adapted to be urged downwards against one end of the container and a plurality of laterally operating pressure applying bars located so as to apply pressure laterally to vertical sides of the container in juxtaposition to one or both ends of the container, and which provide a supporting ledge to receive the sealing pressure on the end or ends of the container. The combined downward and lateral pressure produces narrow laterally projecting ribs at end or ends of the container.

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

Fig. 1 is a sectional front elevation view showing a carton located in the machine and the pressing operation in progress.

Fig. 2 is a sectional side elevation view of Fig. 1.

Fig. 3 is a detail plan view showing the member carrying the laterally pressing bars.

Fig. 4 is a detail plan view showing the base portion of the machine.

Fig. 5 is a broken part sectional perspective view of a closed carton after removal from the pressing machine, and

Fig. 6 is a broken detail side elevation view showing the cam surfaces for operating the laterally pressing bars.

Referring to the drawings the base of the machine in a dished plate 1 formed on its transverse centre line with two bosses 2 in which are secured the lower ends of a pair of cylindrical pillars 3 bridged at their upper ends by a cross head 4 normally fixed relatively to the said pillars but adjustable vertically by forming the ends of the cross head 4 as split collars 5 clamped by bolts 6 to the pillars in well known manner. The centre of this cross head 4 is formed with a large boss 7 bored axially to rotatably support a vertical spindle 8 to the upper end of which is fixed a radiating operating handle 9.

Rotation of the spindle 8 by the handle 9 effects a downward movement of a press head 10 against the upper end of the carton 11 placed upon the base 1, this being effected by forming a quick pitch square thread 12 on the lower end of the spindle 8 which thread is engaged in a correspondingly threaded inner part of an upstanding column 10a integral with the press head 10. The column 10a slides in a central boss 13a of a horizontal plate 13 which slides on the pillars 3 and is formed with depending sleeves 14 slidable on such pillars. The press head is held against twisting by means of vertical pins 15 slidable in recesses 16 in the lower annular face of the plate 13.

The function of the plate 13 is at the appropriate moment to press inwards against the sides of the carton 11 four horizontal bars 17 located in a plane slightly beneath the plane of the top of the carton so that as a result of

the downward pressure of the press head 10 the upper edges of the carton are gripped between the bars 17 and the press head whereby a narrow stiffening rib 18 (see Fig. 5) is formed around one end of the carton somewhat in the form of a narrow flange or beaded edge.

The bars 17 are carried by four symmetrically arranged inverted L shaped levers 19 located in U-shaped laterally directed recesses 20 in a substantially cruciform shaped frame 21 formed on two of its limbs with downwardly depending collars 22 slidable over the sleeves 14 of the plate 13. The levers 19 carry the bars 17 at the lower ends of their vertical limbs and their horizontal limbs carry studs 23 constituting adjustable stops for engagement with the plate 13.

The plate 13 is moved downwards by the engagement of cam surfaces in the opposed annular faces of a pair of rings 24 and 25, the upper 24 of which is fixed to the spindle 8 and the lower of which is fixed in the upper annular face of the boss 13a of the plate 13. Quite a small number of cam surfaces, for example only two, are formed in the opposing faces of these rings, and as shown in Fig. 6 the inclined faces 26 merge into horizontal flats 27 so that once the inclined faces engage the said flats continued rotation of the spindle 8 will not increase the lateral inward movement of the bars 17 although the downward pressure of the press head will be continued by reason of the fact that the bars 17 are pressed against the carton in advance of the pressing stage of the press head 10, the bars 17 forming a rigid ledge receiving the downward pressure of the press head resulting in the formation of the aforementioned ribs 18. The downward movement of the plate 13 is against the influence of tension springs 29 connected to the cross head 4 and to the said plate so that when the spindle 8 is rotated to raise the press head 10 from the carton 11, the cam surfaces of the rings 24 and 25 will return to such positions as will permit the plate 13 to be drawn upwards by the springs 29 simultaneously with the rising of the press head with the result that the levers 19 will be free to permit the bars 17 to swing away from the sides of the carton. During this initial pressure releasing operation the frame 21 is maintained stationary to ensure the stops 23 of the levers 19 being freed from the pressure of the plate 13 as otherwise there might be a tendency of the bars 17 to remain engaged with the carton so as to lift the carton. This condition is obtained by abutting the lower ends of the collars 22 against the ends of a bracket 30 clamped to the pillars 3 by integral split collars 31 against which the collars 22 abut, the requisite downward pressure of the collars 22 being effected by compression springs 32 located in the upper ends of the collars 22 and abutting against the plate 13, such spring being disposed about the sleeves 14. Plate 13 is now drawn upwardly and out of contact with stops 23 to free bars 17 which move out of engagement with the sides of the cartons. The lower ends of sleeves 14 are provided with annular rings 33 which have limited sliding movement in recesses 34a in collars 22. As sleeves 14 are withdrawn with plate 13, the rings engage the tops 34 of the recesses 34a and lift the collars 22, thereby lifting the bars 17 above the top of the treated carton. It is desirable to make the recesses 34a sufficiently deep to prevent lost motion between the movement of the plate member 13 and collars 22 to insure release of the bars 17 from the carton prior to any upward movement of the bars.

The cartons are placed between two pairs of side guides or supports upper and lower 35 and 36 respectively. These guides or supports are bars adjustably spaced by being clamped by bolts 37 formed with heads slidable in dovetail channels 38 in the bracket 30 and base plate 1. Adjustable rear stops 39 in the form of longitudinally slotted bars are clamped by bolts and nuts 40 to the bracket 30 and base plate 1, whereby the cartons are correctly located beneath the press head.

I claim:—

1. A machine for stiffening or reinforcing cartons or the like containers comprising a base upon which the container is adapted to be stood, an overhead press head member adapted to be urged downwards against one end of the container and a plurality of bars located beneath the press head and adapted to be urged laterally into vertical sides of the container in juxtaposition to the said end of the container, the said bars forming a ledge to receive the downward pressure of the press head so as to produce narrow laterally projecting ribs at said end of the container, levers carrying said bars, a plate beneath which said levers are located so as to be engaged by said plate, such plate being movable downwards in conjunction with the press but being movable also relatively thereto, downward movement of said plate against said levers swinging said levers in such direction as will press said bars against the sides of the container.

2. A machine for stiffening or reinforcing cartons or the like containers comprising a base upon which the container is adapted to be stood, an overhead press head member adapted to be urged downwards against one end of the container and a plurality of bars located beneath the press head and adapted to be urged laterally into vertical sides of the container in juxtaposition to the said end of the container, the said bars forming a ledge to receive the downward pressure of the press head so as to produce narrow laterally projecting ribs at said end of the container, levers carrying said bars, a plate beneath which said levers are located so as to be engaged by said plate, such plate being movable downwards in conjunction with the press, but being movable also relatively thereto, downward movement of said plate against said levers swinging said levers in such direction as will press said bars against the sides of the container, and means automatically moving said bars clear of the sides of the container consequent upon releasing the downward pressure of the press head.

3. A machine for stiffening or reinforcing cartons or the like containers comprising a base upon which the container is adapted to be stood, an overhead press head member adapted to be urged downwards against one end of the container and a plurality of bars located beneath the press head and adapted to be urged laterally into vertical sides of the container in juxtaposition to the said end of the container, the said bars forming a ledge to receive the downward pressure of the press head so as to produce narrow laterally projecting ribs at said end of the container, levers carrying said bars, a plate beneath which said levers are located so as to be engaged by said plate, such plate being movable downwards in conjunction with the press but being movable also relatively thereto, downward movement of said plate against said levers swing-

ing said levers in such direction as will press said bars against the sides of the container, a vertically slidable frame carrying said levers and movable with said plate, lost motion being provided between the said plate and frame so that the plate moves upwards in advance of the said frame to ensure complete separation of the bars from the container after the pressing operation.

4. A machine for stiffening or reinforcing cartons or the like containers comprising a base upon which the container is adapted to be stood, an overhead press head member adapted to be urged downwards against one end of the container and a plurality of bars located beneath the press head and adapted to be urged laterally into vertical sides of the container in juxtaposition to the said end of the container, the said bars forming a ledge to receive the downward pressure of the press head so as to produce narrow laterally projecting ribs at said end of the container, levers carrying said bars, a plate beneath which said levers are located so as to be engaged by said plate, such plate being movable downwards in conjunction with the press but being movable also relatively thereto, downward movement of said plate against said levers swinging said levers in such direction as will press said bars against the sides of the container, an operating spindle non-rotatably guided in said plate, a feed screw connecting said press head to said spindle, a cam device operated from said spindle effecting downward sliding of said plate against said levers, and spring means adapted to raise said plate subsequent to a pressing operation.

5. A machine for stiffening or reinforcing cartons or the like containers comprising a base upon which the container is adapted to be stood, an overhead press head member adapted to be urged downwards against one end of the container and a plurality of bars located beneath the press head and adapted to be urged laterally into vertical sides of the container in juxtaposition to the said end of the container, the said bars forming a ledge to receive the downward pressure of the press head so as to produce narrow laterally projecting ribs at said end of the container, levers carrying said bars, a plate beneath which said levers are located so as to be engaged by said plate, such plate being movable downwards in conjunction with the press but being movable also relatively thereto, downward movement of said plate against said levers swinging said levers in such direction as will press said bars against the sides of the container, a vertically slidable frame carrying said levers and movable with said plate, lost motion being provided between the said plate and frame so that the plate moves upwards in advance of the said frame to ensure complete separation of the bars from the container after the pressing operation, vertical guides on which said frame and plate are guided, tubular parts on said plate and frame disposed one within the other the outer parts sliding on said guides, abutments being formed on said tubular parts and springs being provided to bring the abutments together after partial initial upward movement of said plate for the purpose set forth.

6. A machine for stiffening or reinforcing cartons or the like containers comprising a base upon which the container is adapted to be stood, an overhead press head member adapted to be urged downwards against one end of the container and a plurality of bars located beneath the press head and adapted to be urged laterally into vertical sides of the container in juxtaposition to the said end of the container, the said bars forming a ledge to receive the downward pressure of the press head so as to produce narrow laterally projecting ribs at said end of the container, levers carrying said bars, a plate beneath which said levers are located so as to be engaged by said plate, such plate being movable downwards in conjunction with the press but being movable also relatively thereto, downward movement of said plate against said levers swinging said levers in such direction as will press said bars against the sides of the container, an operating spindle non-rotatably guided in said plate, a feed screw connecting said press head to said spindle, a cam device operated from said spindle effecting downward sliding of said plate against said levers, and spring means adapted to raise said plate subsequent to a pressing operation, vertical guides on which said frame and plate are guided, tubular parts on said frame and plate disposed one within the other the outer parts sliding on said guides, abutments being formed on said tubular parts and springs being provided to bring the abutments together after partial initial upward movement of said plate for the purpose set forth.

7. In the closing or sealing of paper cartons or the like containers having closure flaps, forming a laterally projecting reinforcing lip at the edges of an end of the carton formed by the folding of said flaps by applying pressure to the already closed carton in two dimensions in such manner as to distort the material of the carton into said lip at the corners of the carton appropriate to such end.

8. In the closing or sealing of cartons or the like containers having folded over closure flaps forming at the corner of the cartons formed by said folded over flaps a lip extending along said corners and projecting laterally, said lip being formed by applying lateral and endwise pressure to said carton against the sides and closed ends of the carton, the lateral pressure being applied close to said corners so as to sustain the endwise pressure.

9. Method of closing or sealing paper cartons consisting in locating the carton between spaced members disposed opposite opposing sides of the carton and in juxtaposition to one end of the carton, reducing the space between said members to an extent less than the normal width of the carton whereby the material of the carton is urged inwards near such end, and subsequently applying pressure against such end of the carton.

10. Method of closing or sealing paper cartons consisting in engaging opposite sides of the carton with abutments extending substantially the full width of such sides and located close to one end of the carton pressing the abutments into the sides of the carton so as to form a supporting ledge around the edges of the carton end, and applying endwise pressure to folded end flaps of said carton so as to seal the end thereof.

11. Method of stiffening or reinforcing cartons or like containers consisting in applying compression in a direction passing through the ends of the carbon and sustaining the sides and the end of the carton against such compression at points adjacent one end of the carton and substantially parallel with the edges of such end of the carton whereby such edges are pressed into ribs projecting laterally from the sides of the carton.

12. A machine for closing or sealing cartons or

the like container comprising a surface against which one end of the container is adapted to be abutted, a press head member adapted to be urged towards said surface against the other end of the container so as to compress the container in one direction and a plurality of bars located between the press head and said surface adapted to be urged laterally into vertical sides of the container in juxtaposition to the said end of the container, to sustain the side walls of the carton during its compression, the said bars forming a ledge to receive the pressure of the press head so that the material of the container at one end is forced over said bars to produce laterally projecting ribs at said end of the container.

13. The method of treating a closed end of a paper carton comprising pressing in side portions of the carton without distorting the end, and pressing down on the end to form a projecting rib made up of one thickness of the side and one thickness of the end.

14. The method of folding the closed end of a paper carton formed by overlapping flaps which comprises folding in a strip of the sides extending from the end to cause the strip to assume a position in juxtaposition to the end, said strip forming a contacting supporting ledge for the flaps of the end, and creasing the bends formed by the folding to strengthen the stability of the ledge.

15. The method of treating a closed end of a paper container carton, said end being formed by overlapping flaps which comprises the steps of folding in a narrow strip portion of the sides extending from the end, whereby the strip portion lies in juxtaposition to the end, said folded strip forming a horizontal supporting ledge for the inner flap of said end, and of creasing the bends produced by the folding to strengthen the ledge.

16. The method of reenforcing a paper carton end formed by overlapping flaps, comprising the steps of folding in a narrow strip portion of the sides extending from the flaps to form a projecting rib, and supporting said rib from one side while subjecting it to pinching pressure on the other side to crease the bends formed by the folding.

17. The method of reenforcing a paper carton end formed by folded flaps comprising forming a supporting ledge for the flaps by folding in a strip of the sides extending from the edges of the end to provide a ledge extending inwardly from the said edges and forming a support for the flaps.

18. A machine for sealing or closing paper cartons comprising means for supporting a carton, a plurality of bars arranged around said carton, mechanism for moving said bars laterally into contact with the vertical sides of the carton to fold in portions of the sides of the carton whereby the edge portions of the end of the carton with the folded portions form a projecting rib around the end, a press head member coacting with said bars to engage the projecting rib of the end to compress the same.

19. A machine for treating the closed end of a paper carton to form a projecting rib thereabout, comprising pressing means arranged around the side of the carton, means for moving the pressing means into pressing contact with the side of the carton in juxtaposition to the end thereof to fold in portions of the side of the carton whereby the folded portion forms a projecting rib around the end, and means for engaging the projecting rib to compress and set the same.

20. Method of closing or sealing paper cartons consisting in applying compression in a direction passing through the ends of the carton and sustaining the sides and the end of the carton against such compression at points adjacent one end of the carton and substantially parallel with the edges of such end of the carton whereby such edges are pressed into ribs projecting laterally from the sides of the carton.

CARL WILHELM HARTMANN.