

- [54] **METHOD AND MACHINE FOR
CONSTRUCTING A RECTANGULAR SIDED
PACKING AROUND AN OBJECT OF ANY
SHAPE**

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53/255

[51] **Int. Cl.**..... **B65b 5/02**

[58] **Field of Search** 53/29, 32, 34, 40, 191,
53/183, 192, 220, 221, 222, 228, 194, 207,
255; 93/47, 51 R

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[57]

ABSTRACT

Method and machine for making a rectangular-sided packing around an object having any shape. The method comprises making folds in a pre-cut and pre-marked blank of sheet material which put into final position with respect to each other four faces of the packing including two adjacent corners around a punch having the shape of the edges common to pairs of said faces. Then the punch is disengaged from the blank from one face of the blank which is not yet formed after which the object is to be packed is introduced in the blank and the remaining folds are made.

20 Claims, 15 Drawing Figures

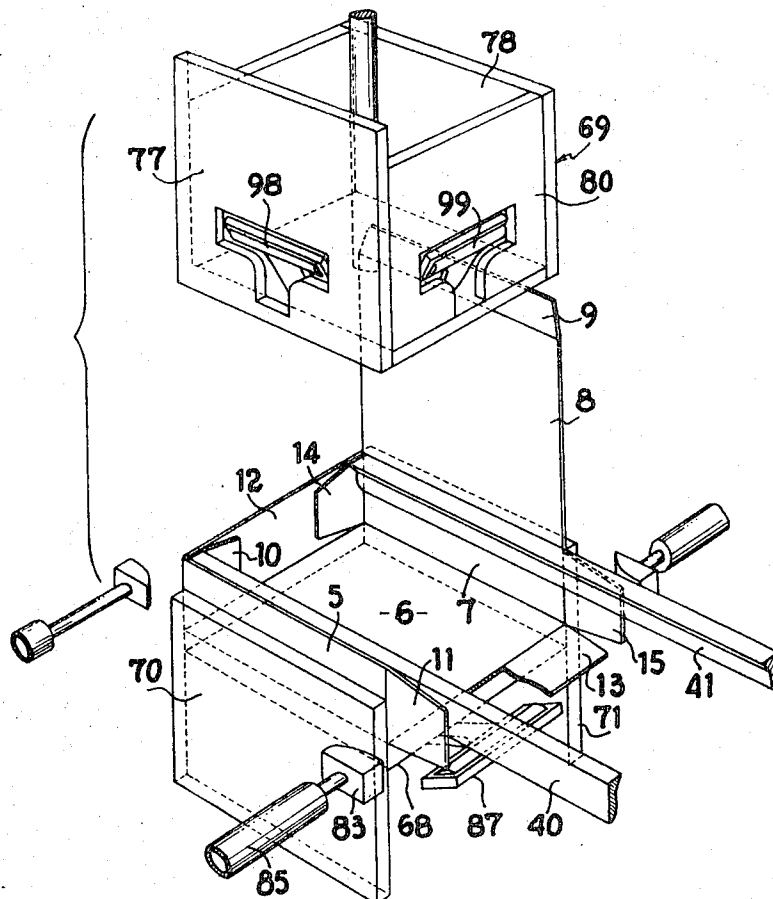


FIG. 1

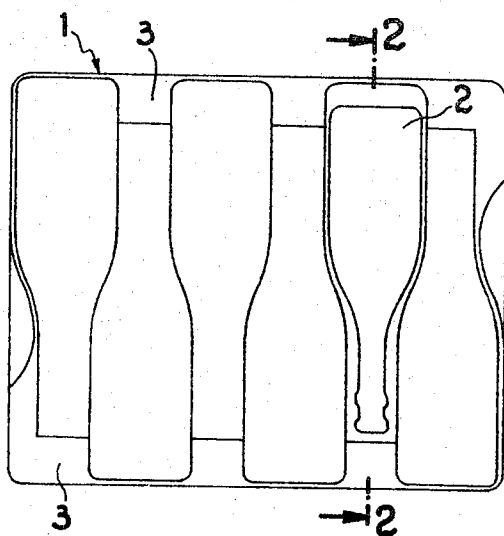


FIG. 2

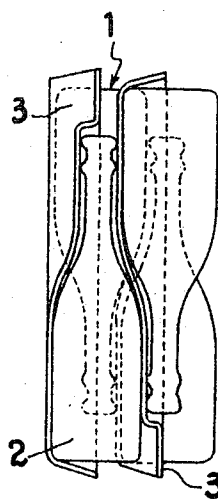


FIG. 3

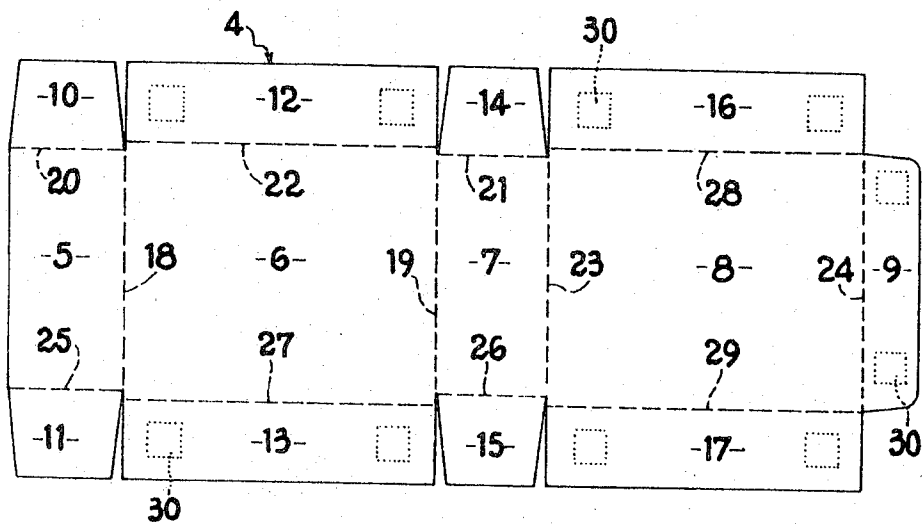


FIG. 4

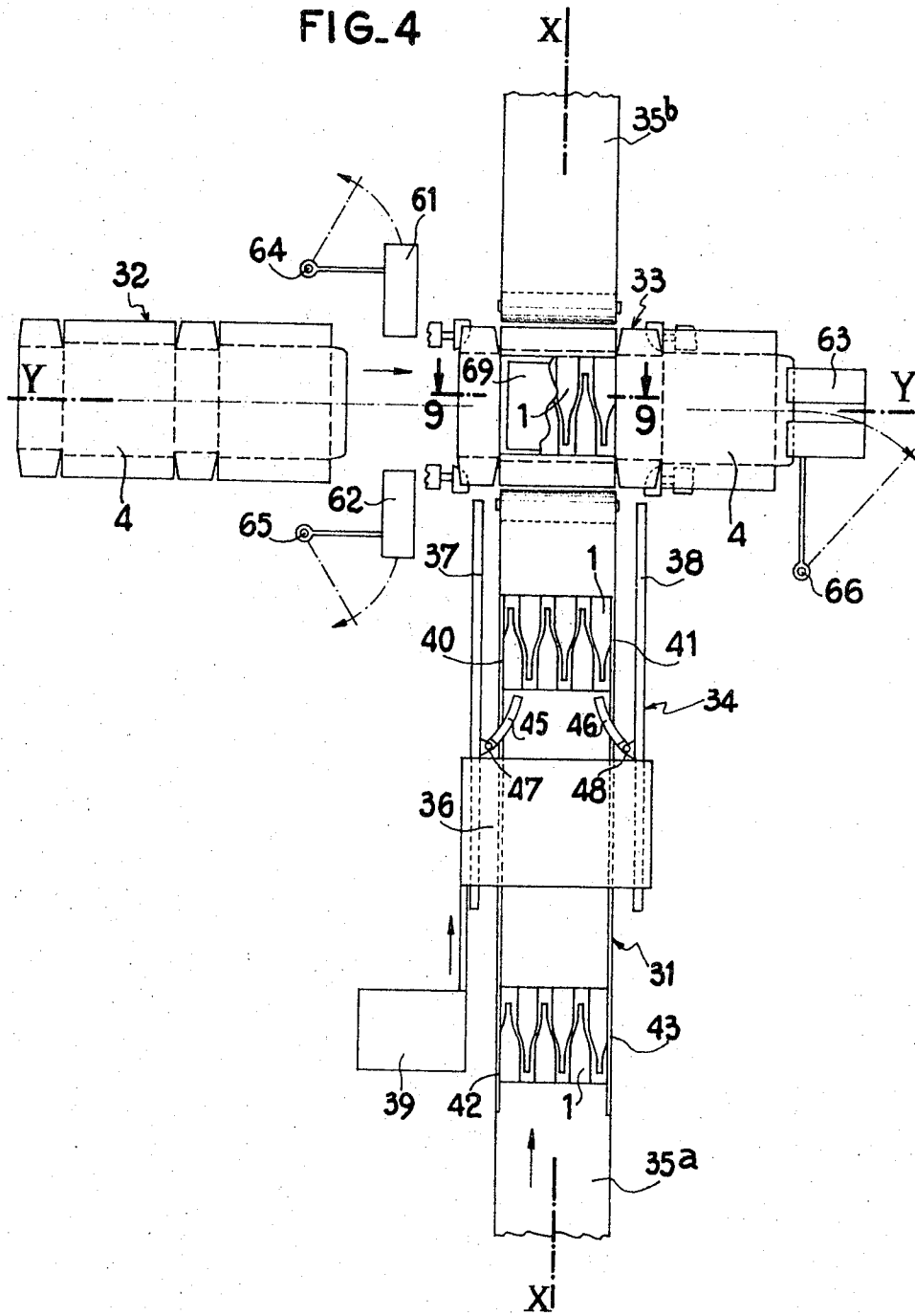


Fig. 5

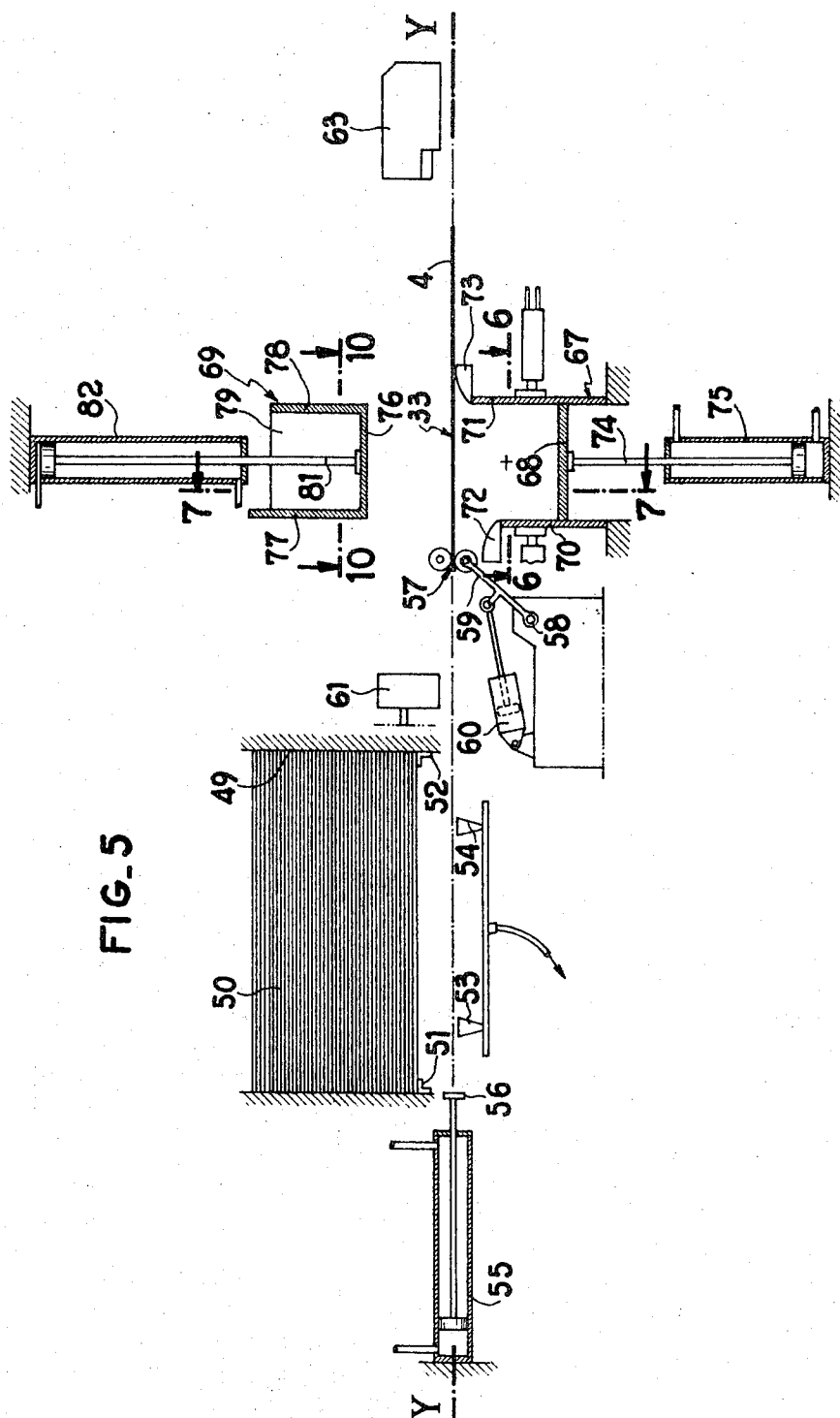


FIG. 6

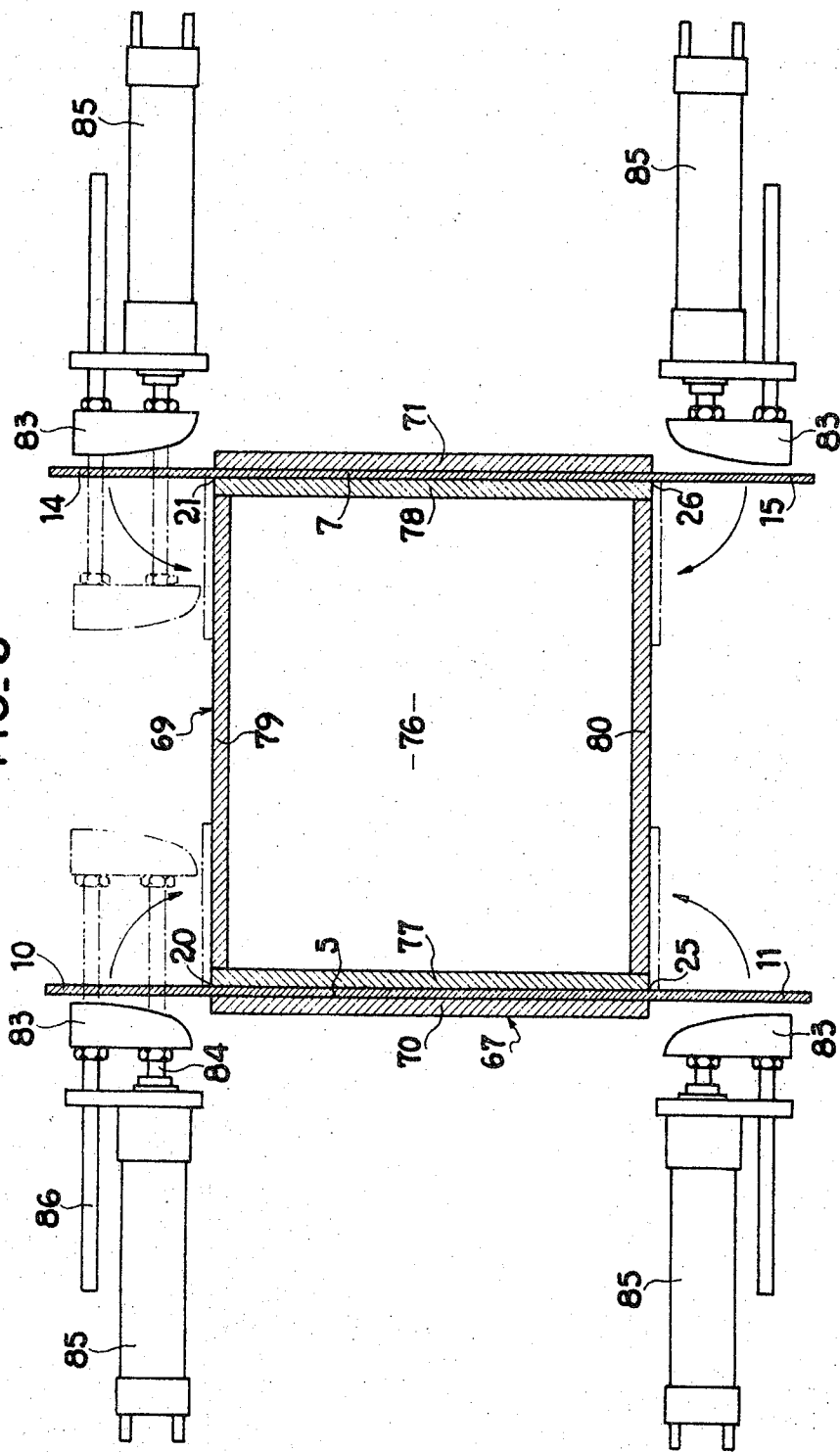


FIG. 9

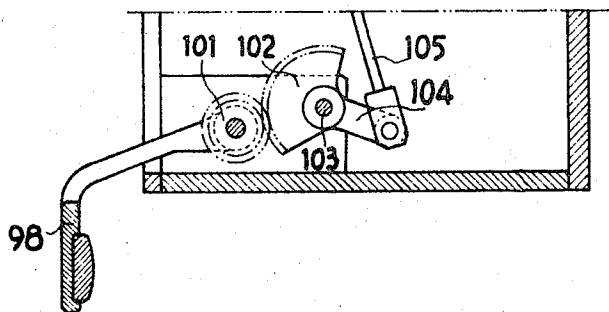
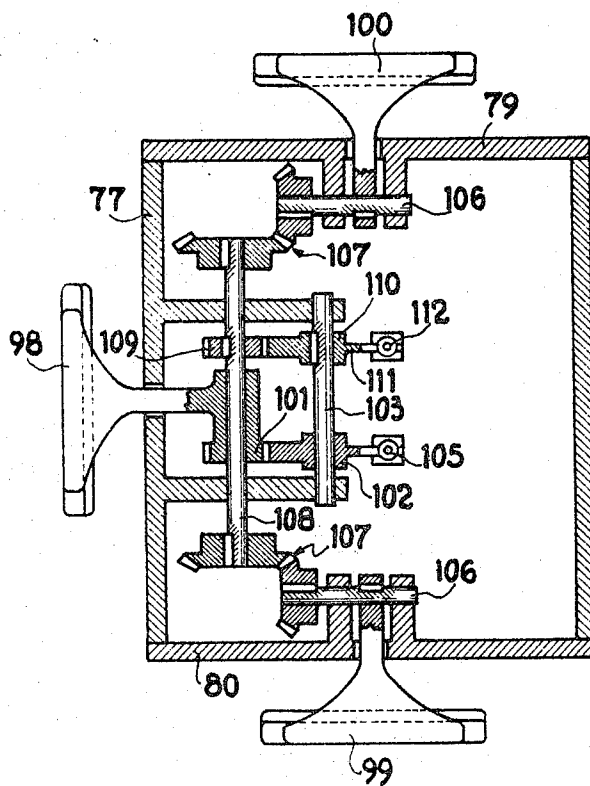
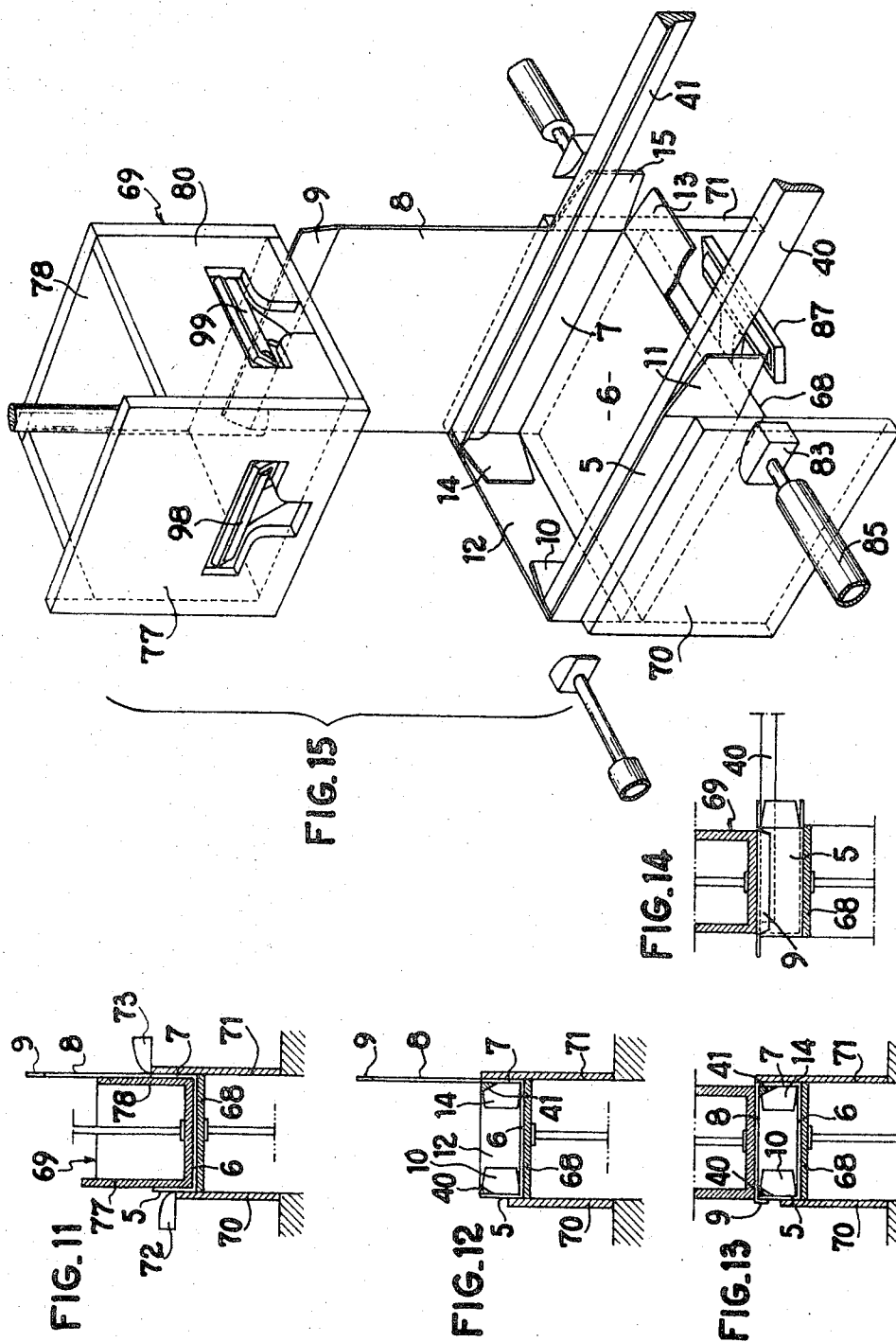


FIG. 10





METHOD AND MACHINE FOR CONSTRUCTING A RECTANGULAR SIDED PACKING AROUND AN OBJECT OF ANY SHAPE

The present invention relates to a method and machine for making a rectangular-sided packing around an object of any shape.

It is known that objects to be packed do not always have an ideal rectangular-sided geometric shape which enables them to be juxtaposed and stacked in larger cases also rectangular-sided. This is true in particular of bottles, but this example is not intended to be limitative.

It has already been proposed to prepare a packet constituted by one or more objects to be placed in a case and a filler disposed around the object or objects so as to impart to the assembly a roughly rectangular-sided contour and then construct around this packet a case of cardboard.

However, a drawback of this method is that the edges of the rectangular-sided structure to construct around the packet of objects are not materialized. It is therefore necessary to employ only relatively flexible cardboards with the result that a case is constructed which is lacking in stiffness. Furthermore, the edges constructed under these conditions may lack definiteness and therefore also lack stiffness. The case formed may then be weak and lend itself imperfectly to the packing of heavy objects and to the stacking of a plurality of cases one on top of the other.

An object of the present invention is to effect most of the folds corresponding to the edges of the case to be formed about dihedral corners so materialized that these folds are definite, well marked and rigid.

The invention provides a method for constructing a rectangular-sided packing around an object of any shape by folding a pre-cut and pre-marked blank of sheet material, comprising making folds which put into final position with respect to each other four faces of the packing comprising two adjacent corners around a punch having the shape of the edges common to pairs of said faces, disengaging the punch from the blank by a relative movement from a side of the blank which is not yet formed, introducing the object to be packed in the blank by a relative movement, and making the remaining folds.

In one advantageous embodiment of the invention, before effecting the remaining folds there are introduced in the blank by a relative movement elongated rigid elements which are disposed in the definitive place of two parallel edges of one face which is not yet placed in position, and then the folds which put this face in definitive position are effected, the rigid elements are withdrawn from the blank and the last folds are effected.

Thus the first folds effected are definite and rigid, since they are formed on the punch, the following folds are also definite and rigid since they are formed in the presence of the elongated rigid elements, and, as concerns the last folds, the case has at this moment sufficient stiffness to ensure that these operations no longer jeopardize the strength of the assembly or its appearance.

Another object of the invention is to provide a machine for carrying out said method.

The invention provides a machine for making a rectangular-sided packing around an object of any

shape by folding a pre-cut and pre-marked blank of sheet material, said machine comprising a frame, a punch which has at least four faces of a rectangular-sided figure, said four faces including two adjacent corners, a device for feeding a blank in a direction parallel to and under one of the non-parallel faces among said four faces of the punch, first mechanisms for folding the blank around edges common to pairs of said four faces, a device for relatively moving apart the punch and the blank, a device for feeding an object below the punch, and second mechanisms for folding the blank around complementary edges of a rectangular-sided figure constructed on the folds made by the first mechanisms.

Further features and advantages of the invention will be apparent from the ensuing description with reference to the accompanying drawings.

In the drawings:

FIG. 1 is plan view of an object to be placed in a case;

FIG. 2 is diagrammatic sectional view of the object taken on line 2—2 of FIG. 1;

FIG. 3 is a plan view of a pre-cut or blanked sheet of cardboard from which may be formed a case by means of a method and machine according to a particular embodiment of the invention;

FIG. 4 is a diagrammatic general assembly plan view of the machine according to the invention;

FIG. 5 is a diagrammatic sectional view of the machine taken on line Y—Y of FIG. 4;

FIGS. 6, 7, 9 and 10 are detail sectional views of the machine shown in FIGS. 4 and 5, taken on lines 6—6 and 7—7 of FIG. 5, line 9—9 of FIG. 4 and line 10—10 of FIG. 5;

FIG. 8 is a detail view of the lower right part of the machine shown in FIG. 5;

FIGS. 11—13 show different stages in the forming of the case and FIG. 14 is a left side view of the part of the machine shown in FIG. 13, and

FIG. 15 is a perspective view of the forming device at the end of the stage shown in FIG. 12.

The machine shown in FIGS. 4—10 is provided for forming a case of cardboard or card about a packet 1 of objects to be packed which is, as shown in FIGS. 1 and 2, for example constituted by two superimposed tiers of bottles which are disposed in each tier in head-to-toe relation on preformed interposed elements 3. Two or more tiers of interposed elements 3 loaded with bottles are then stacked so as to constitute a packet, two superimposed tiers of this packet inversely corresponding to each other. The construction of such a packet is the subject of French Patent Application No. 72,04,810, filed by the Applicants, Feb. 14, 1972.

The pre-cut or blanked sheet of cardboard or blank 4 shown in FIG. 3 has a generally rectangular shape and comprises a continuous centre strip constituted by five adjoining rectangular surfaces 5—9, the first surface 5 and the third surface 7 being of the dimension of the transverse lateral faces of the case to be made, and the second surface 6 and the fourth surface 8 having the dimension of the bottom face and cover of this case, the fifth surface 9 of small width being adapted to serve as a closing flap on the surface 5. The blank 4 further comprises eight lateral surfaces 10—17 which are connected in pairs, and respectively in the order of numbering, to each one of the surfaces 5—8 on each side thereof transversely of the length of the centre strip and

which therefore have the same dimension as the last-mentioned surfaces in the direction of this length but a dimension in the other direction which is less than the height of the case. The lateral surfaces are completely separated from each other by suitable cuts or cutaway portions. The surfaces 12, 13, 16 and 17 or flaps correspond, by their application in pairs one against the other, to the longitudinal lateral faces of the case to be formed, the other surfaces or tabs being adapted to overlap partially these lateral faces and having a certain cut-back (angle of their sides with respect to the axis of the blank less than 90°). The various surfaces 5-9 are defined from each other and from the lateral surfaces by pre-marked or pre-scored fold lines 18-29 which are numbered in the order of the folding to be effected (except for certain simultaneous folds in respect of which the numbers are however consecutive), these lines defining respectively the surfaces 5 and 6, 6 and 7, 5 and 10, 7 and 14, 6 and 12, 7 and 8, 8 and 9, 5 and 11, 7 and 15, 6 and 13, 8 and 16 and 8 and 17. The ten dotted areas 30 correspond to areas intended to receive a layer of adhesive and are disposed in pairs adjacent the ends, but with provision of a certain margin in both directions, of the flaps 12, 13, 16 and 17 and of the tongue portion 9.

The packing machine mainly comprises, as shown in FIGS. 4 and 5, a main production line 31 for feeding packets to be packed, forming the cases and discharging the packed packets disposed on a horizontal axis X-X, and a lateral production line 32 for feeding sheets of cardboard or card 4 disposed on a horizontal axis Y-Y perpendicular to the axis X-X and intersecting the line 31 at a packing station 33 for forming the cases. The main line 31 comprises upstream of the station 33, with respect to the direction of movement of the packets, a station 34 for feeding packets and downstream of the station 33 a belt 35^a for receiving and discharging the cases.

The packet feeding station 34 comprises essentially, as shown in FIG. 4, an introducer 36 which is movable in translation along the axis X-X along guides 37 and 38 which are fixed and integral with the frame of the machine, this movement being controlled by a drive mechanism 39. This introducer comprises a carriage in the form of a tunnel in which are capable of passing the packets which arrive from the upstream side and which carries two pairs of arms parallel to the axis X-X, one pair 40-41 extending in the downstream direction, that is to say toward the forming part or station 33, and the other pair 42-43 extending in the upstream direction as shown in FIGS. 8 and 14. These arms are in the form of substantially L-section members having two planar surfaces one of which is an upper horizontal surface and the other a vertical surface interconnected on an edge 44 and a curved connecting surface facing the other arm. The arms of each pair have a distance between the edges 44 equal to the width of a packet 1, or, more precisely, equal to the exact length of the bottom 6 and cover 8 of the sheets of cardboard 4. The pair of upstream arms 42-43 serve as a guide for the packets 1 which arrive from the upstream end on a rolling conveyor belt 35^a having an axis X-X.

The introducer also carries two finger members 45, 46 which are pivoted thereto by pins 47 and 48 and extend horizontally in the downstream direction, these finger members conveying in the normal position in the downstream direction and being capable of separating

so as to allow the passage of each packet 1 by pivoting about the pins 47 and 48.

The line 32 feeding sheets of cardboard comprises, as shown in FIG. 5, a hopper 49 which contains a stack 50 of precut or blanked sheets supported by members 51 and 52. Placed under this stack of sheets are two suction members 53 and 54 adapted to extract the sheets one by one and place them in the horizontal plane of transfer of the sheets containing the axis Y-Y. A jack or cylinder device 55 provided with a pusher member 56 and extending along the axis Y-Y is adapted to transfer the sheets to the case-forming station. Downstream of the hopper 49 with respect to the travel of the blanks, there is disposed a series of rollers 57 which includes lower drive rollers and is mounted to pivot about a pin 58 at the end of an arm 59 connected to a jack or cylinder device 60. The line 32 also includes three adhesive applying means 61, 62, 63 two of which are disposed upstream of the station 33 on each side of the axis Y-Y at a distance from the areas 30 of the sheets 4, and one downstream of the station 33 and on the axis Y-Y, these adhesive applying means being carried by arms which are pivotable about pins 64, 65 and 66 so as to be withdrawable so as to for example allow cleaning when the machine is out of operation.

The case-forming station 33 comprises a die 67 the bottom of which is constituted by a movable plate 68, a punch 69 and three folding mechanisms respectively associated with the die 67, with the plate 68 and with the punch 69.

The die 67 comprises two vertical plates 70 and 71 integral with the frame of the machine and disposed at a distance below the plane containing the axes X-X and Y-Y, both of them being parallel to the axis X-X and with a distance therebetween slightly greater than the length of the bottom 6 of the sheet 4 whereas the transverse dimension of the plates is equal to the width of this bottom 6, as shown in FIGS. 5 and 6. These two plates 70 and 71 are surmounted by two shaped members 72 and 73 whose upper surface has the shape of a cylinder which is roughly parabolic and has an axis parallel to the axis X-X. The members 72 and 73 are disposed outside the space between the plates so that the lower edge of each of said upper surfaces is tangent to the upper edge and inner face of the corresponding plates. The height of the plates 70 and 71 is such that the member 73 associated with the plate 71 disposed on the downstream side with respect to the movement of the sheets 4 along the axis Y-Y is disposed just below the plane of the axes X-X and Y-Y and that the other member 72 is markedly lower.

The movable plate 68 is horizontal and has the dimension of the bottom 6 of the sheet 4 and is slidable between the two plates 70 and 71 of the die and mounted on the end of a rod 74 or a vertical jack or cylinder device 75 which is integral with the frame of the machine below the die 67.

The punch 69 comprises a horizontal plate 76 having the dimensions of the bottom 6 of the sheet 4 and four vertical plates extending up from the sides of the plate 76, namely two plates 77 and 78 parallel to the axis X-X and two plates 79 and 80 parallel to the axis Y-Y. The assembly of the punch is carried by a rod 81 (fixed to the plate 76) of a vertical jack or cylinder device 82 integral with the frame of the machine above the case-forming station.

The folding mechanism associated with the die 67 comprises, as shown in FIG. 6, four shoes 83 each one of which is carried by a rod 84 of a jack or cylinder device 85 and by a guide rod 86 parallel to the rod 84 and mounted on the body of the jack. The jacks are fixed to the frame of the machine and have their axes parallel to the axis Y—Y and disposed on each side of the line 32 so that, in the withdrawn position of these jacks, the shoes are located on each side of the vertical sides of the two plates 70 and 71 of the punch, the shoes of the jacks in axial alignment being in facing relation. The shoes have a shaped surface having a vertical axis identical to that of the horizontal axis of the members 72 and 73, their convexity facing the centre of the station 33.

The folding mechanism associated with the plate 68 comprises, as shown in FIG. 7, two T-shaped levers 87 each of which has a foot portion pivotably mounted on a pin 88 parallel to the axis Y—Y. The two pins 88 are fixed under the plate 68 and the two levers 87 extend outwardly and define on their horizontal arms constituting the bar of the T-shape a convex-shaped surface 89. The pins 88 are integral with levers 90 pivoted to the end of the rod 91 of two jacks or cylinder devices 92 which are pivoted to the plate 68 and disposed in planes parallel to the axis X—X so that the levers 87, which extend outwardly in the withdrawn position of the jacks, are raised to a roughly vertical position when these jacks are extended.

The folding mechanism associated with the die 67 further comprises, as shown in FIG. 8, a cranked finger member 93 pivotable on a pin 94 which is parallel to the axis X—X and is secured outside the upper edge of the downstream plate 71 (with respect to the direction of movement of the sheets 4) of the punch. This pin 94 is integral with a lever 95 which is pivoted to the end of a rod 96 of a jack or cylinder device 97 connected to the plate 71 to pivot in a plane parallel to the axis Y—Y so that the finger member 93, which extends upwardly in the withdrawn position of the jack, is moved over the edge of the plate 71 when this jack is extended.

The folding mechanism associated with the punch 65 comprises, as shown in FIGS. 9 and 10, three levers 98, 99 and 100 whose shape is identical to that of the levers 87, the lever 98 being pivotable at its foot end on a horizontal pin parallel to the axis X—X and the levers 99 and 100 being pivotable on pins parallel to the axis Y—Y. These pins are disposed within the die so that the levers, which are capable of passing through notches of similar shape formed in the walls 77, 79 and 80 and presenting their arms horizontally, may swing over downwardly about the lower edges of these three walls. The lever 98 is integral with a gear 101 which is meshed with a toothed sector 102 freely rotatable on a shaft 103 and integral with an arm 104 which is pivoted to a rod 105 of a jack or cylinder device fixed to the punch. The levers 99 and 100 are integral with shafts 106 which are driven through bevel gears 107 by a common shaft 108 on which the ring 101 is rotatable and on which is keyed a gear 109 which is meshed with a toothed sector 110. The latter is keyed on the shaft 103 and integral with an arm 111 which is pivoted to a rod 112 of a jack or cylinder device fixed to the punch.

The machine just described operates in the following manner:

The sheets or blanks 4 are first fed to the station 33 by the action of the suction elements 53 and 54 which disengage the bottom sheet of the stack 50 from its supports 51 and 52 by imparting a deflection thereto and bringing it to the plane of the axes X—X and Y—Y then by the action of the pusher 56 which, moved by the jack 55, displaces the sheet until it is seized by the rollers 57 which terminate the positioning of the sheet 4 on top of the members 72 and 73, the bottom 6 being exactly above the plate 68 as shown in FIGS. 4 and 5. The shaped member 73 acts as a support in the course of this transfer during which the adhesive-applying means 61 and 62 apply adhesive to the areas 30 of the flaps 12, 13, 16 and 17. At the end of the travel of the sheet 4, the adhesive applying means 63 applies adhesive to the two areas 30 of the closing tongue portion 9.

The forming of the case from the sheet 4 thus placed in position at station 33 comprises the following three stages:

- a. The forming of the first five folds.
- b. The loading of the packet of objects 1 and advance of the stiffening arms 40 and 41 and then the forming of the following two folds before withdrawal of the stiffening arms.
- c. The forming of the last five folds and discharge of the case.

The first stage (a) includes three steps: the forming of the folds 18 and 19, the forming of the folds 20 and 21 and the forming of the fold 22.

The first step comprises the raising of the plate 68 until contact with the sheet in the plane of the axes X—X and Y—Y and simultaneously the lowering of the punch 69 into contact with the sheet which is thus clamped between the plate and the punch, then a lowering of the plate and punch together to a lower level. In this position the folding line 23 is flush with the upper edge of the plate 71 and the flap 5 extends beyond the upper edge of the plate 70 a distance which is roughly equal to the height of the tongue portion 9. During this descent, the part 5 and the parts 7, 8 and 9 of the sheet of cardboard slide, together with the flaps and the tabs adjacent these parts, on the shaped members 72 and 73 which initiate the folds. The profile of the upper surfaces of the members 72 and 73 guides the lowering of the sheet into the die upon descent of the punch and plate, these surfaces constraining the sheet to fold without parasitic breaking along the fold lines 18 and 19. Meanwhile, the series of rollers 57 is urged in the upstream direction by the jack 60 so as to clear the forming station and permit the progressive raising of the flap 5. At a given moment, the parts 5 and 7 are forced between the plates 77 and 78 of the punch and the plates 70 and 71 of the die. The folds 18 and 19 are then completely formed and the case is in the state shown in FIG. 11.

The second step comprises, the punch remaining in position, a forward movement of the two downstream shoes 83 (with respect to the direction of movement of the packets 1) under the action of their jacks 85 (FIG. 6). The tabs 10 and 14 of the sheet slide along the profile of these shoes 83 until completely folded over against the wall 79 of the punch, the curved shape of the shoes 83 causing the folds to be made progressively. The cut-back edges of these tabs avoid a scraping of the adhesive in areas 30 of the flap 12.

The third step comprises, the punch still being in position, a raising of the lever 87 which raises the lower flap 12 (downstream flap with respect to the direction of movement of the packets 1) against the tabs 10 and 14 which were already folded over in the preceding stage and then an application of adhesive by the mere bearing of this flap on these tabs 10 and 14 in the region of the coated areas 30 and finally a raising of the punch 77 which clears the space required for folding over the cover 8 and the tongue portion 9 in the course of the following stage.

The second stage (b) comprises four steps: the introduction of the packet of objects and stiffening arms, the forming of the fold 23, the forming of the fold 24 and the withdrawal of the stiffening arms.

In the first step, the packet 1 travels between the guides 42 and 43, moves through the introducer 36, separates the finger members 45 and 46 and is interposed between the stiffening arms 40 and 41. The introducer 36 then travels along the guides 37 and 38 and advances the two stiffening arms 40 and 41 and, through the finger members 45 and 46, the packet 1 to the station 33 into the already-formed case. The latter is then in the position shown in FIG. 12.

The second step comprises the pivoting of the finger members 93 which swings the cover 8 over the arm 41 (FIG. 8) and thus initiates the fold 19, then a lowering of the punch 77 which wedges the cover 8 between its lower plate 76 and the stiffening arms 40 and 41 which completes the forming of a clean fold 23.

The third step comprises the swinging of the lever 98 (FIGS. 9 and 10) out of the corresponding notch in the plate 77 of the punch so as to fold the closing tongue portion 9 around the stiffening arm 40 and then the application of adhesive by the mere bearing of the tongue portion 9 on the flap 5. The case is then in the state shown in FIGS. 13 and 14.

In the fourth step, the introducer 36 moves back along the guides 37 and 38 and withdraws its two stiffening arms 40 and 41 from the case while leaving the packet 1 in the case.

The third and last stage (c) comprises four steps: closure of the folds 25 and 26, the forming of the fold 27, the forming of the folds 28 and 29 and discharge of the case.

The first step is the repetition (FIG. 6) by the homologous shoes 83 of the step for forming the folds 20 and 21 of the first stage: the two upstream tabs 11 and 15 are brought against the packet 1.

The second step brings into action the upstream lever 87 (FIG. 7) of the plate 68 so as to raise the upstream lower flap 13 against the tabs 11 and 15 already brought against the packet in the preceding step, this step also terminating in the application of adhesive.

The third step comprises simultaneously folding down the two upper flaps 16 and 17 so as to finish the case by means of the levers 99 and 100 which are driven by the bevel gears 107 inside the punch 69, this step also terminating in the application of adhesive.

The fourth and last step comprises a raising of the punch 69 and passage of the encased or wrapped packet onto the discharging conveyor belt 35^p located downstream of the station 33 on the axis X—X.

It will be understood that all the operations described hereinbefore may be and are preferably rendered automatic and perfectly synchronized.

While the pre-marking of the fold lines is essential with this machine, since it is this which permits the localization of the last five folds effected, it will be observed that one of the essential advantages of the machine resides in the fact that the forming of the first seven folds benefits from the edges embodied by rigid parts which are preferably of steel. Thus it is possible to make these folds with all the desirable definiteness which in itself improves the appearance and above all the strength. The use of the stiffening arms permits providing the cover in a single thickness and securing by mere adhesion a tongue portion for closing the case on the side.

Having now described my invention what I claim as new and desire to secure by Letters Patent is:

1. In a method for making a packing having folded rectangular side wall portions around an object which may be incapable of affording a support when folding said wall portions, and comprising starting with a pre-cut and pre-scored blank of sheet material, folding up from a first portion of said blank at least a second blank portion and a third blank portion which adjoin said first blank portion so as to constitute two parallel wall portions of the packing interconnected by an intermediate wall portion of the packing, introducing the object to be packed in the thus partly formed packing and folding remaining portions of the blank to form the finished packing; the feature that, before folding said remaining portions of the blank, rigid support means defining two parallel edges are introduced into said partly-formed packing and positioned parallel to said two parallel wall portions so that said edges are placed in adjoining relation to said two parallel wall portions to support said two parallel wall portions along fold lines about which edges and fold lines two portions of the blank among said remaining portions are folded, said support means being withdrawn from the partly-formed packing before folding the remaining portions of the blank.

2. A method as claimed in claim 1, wherein at least said second and third blank portions are folded up from said first blank portion around a punch which is held against said first blank portion and defines two parallel edges about which edges said second and third blank portions are folded, the punch being withdrawn from the blank before said object is introduced, the direction in which the punch is withdrawn and the direction in which the object to be packed is introduced being perpendicular to each other.

3. A method as claimed in claim 2, wherein the direction in which the punch is withdrawn and the direction in which the rigid support means are introduced are perpendicular to each other, said object being introduced at the same time as the introduction of said support means.

4. A machine for making a packing having folded rectangular side wall portions around an object which may be incapable of affording a support when folding said wall portions, by folding a pre-cut and pre-scored blank of sheet material, said machine having a substantially median longitudinal plane and comprising a frame, a punch which defines at least four faces of a rectangular sided figure, a first and a second of said faces being located on opposite sides of and parallel to said longitudinal plane and to each other and a third and a fourth of said faces being perpendicular to each other and perpendicular to said parallel first and second faces, said punch defining at intersections of said

four faces edges and two adjacent trihedral corners which corners are located on opposite sides of said plane, a device for feeding a blank in a direction parallel to said third face to a packing station at which station the blank is positioned to be engaged by the third face of the punch, a device for relatively moving the punch and the blank toward and away from each other at said station, first mechanisms for folding at said station the blank around edges of the punch which edges are common to pairs of said four faces, a device for feeding an object to be packed to said packing station, movable rigid support means, a shifting device for placing said support means at said station and removing said support means for said station, said support means defining at said station two parallel rigid edges on opposite sides of said longitudinal plane in two planes respectively containing said first face and said second face of the punch, and second mechanisms comprising mechanisms for folding the blank about said two parallel edges of said support means at said station before withdrawal of said support means from said station by said shifting device.

5. A machine as claimed in claim 4, wherein the device for feeding an object feeds the object in a direction which is perpendicular to a direction in which the device for relatively moving the punch and the blank relatively moves the punch and blank.

6. A machine for making a packing having folded rectangular side wall portions around an object which may be incapable of affording a support when folding said wall portions, by folding a pre-cut and pre-scored blank of sheet material, said machine comprising a frame, a punch, a device for feeding a blank to a packing station, at which station the blank is positioned to be engaged by the punch, a device for relatively moving the punch and the blank toward and away from each other for bringing the punch to bear on a first portion of the blank at said station and for moving the punch away from the blank, first mechanisms for folding at least a second portion of said blank and a third portion of said blank adjoining said first portion of said blank against the punch when the punch engages the blank in said first blank portion, a device for feeding said object to said station after the punch has been moved away from the blank, two rigid support means defining two parallel edges and a device for shifting said support means to said station in positions in which said edges are in parallel planes adjacent said second and third blank portions after said second and third blank portions are folded by said first folding mechanisms, said shifting device being capable of withdrawing said support means from the blank, and second mechanisms for folding the remaining portions of the blank including a fourth portion of the blank adjoining said third portion which is folded against one of said two edges and a fifth portion which is folded against the other of said two edges.

7. A machine as claimed in claim 6, wherein the shifting device shifts the rigid support means along an axis perpendicular to an axis along which the punch and the blank are moved apart.

8. A machine as claimed in claim 6, wherein the rigid support means are bars carried by the device for feeding an object.

9. A machine as claimed in claim 4, wherein the punch has five faces of a rectangular-sided figure and the device for relatively moving the punch and the

blank relatively moves the punch and the blank in a direction perpendicular to said third face.

10. A machine as claimed in claim 4, wherein the device for relatively moving the punch and the blank is a jack having a rod connected to the punch.

11. A machine as claimed in claim 4, wherein the first folding mechanisms comprise a mechanism comprising a die having a bottom wall parallel to said third face of the punch and two walls perpendicular to said bottom wall and parallel to each other.

12. A machine as claimed in claim 11, wherein the bottom wall of the die is constituted by a plate, and a rod of a jack which is perpendicular to said plate of the die is integral with said plate.

13. A machine as claimed in claim 4, wherein the first folding mechanisms comprise a mechanism comprising two thrust shoes respectively adjacent said plane containing said first and second faces and adjacent a plane containing said fourth face and slidably mounted with respect to the frame of the machine and jacks which are perpendicular to said longitudinal plane and actuate said shoes.

14. A machine as claimed in claim 4, wherein the first folding mechanisms comprise a mechanism comprising a lever mounted with respect to the frame adjacent a plane containing said fourth face to pivot about an axis perpendicular to said longitudinal plane and jacks for actuating the lever.

15. A machine as claimed in claim 4 wherein the second folding mechanisms comprise a mechanism comprising a lever mounted with respect to the frame adjacent said plane containing said first face to pivot about an axis perpendicular to said longitudinal plane and a jack for actuating the lever.

16. A machine as claimed in claim 4, wherein the second folding mechanisms comprise a mechanism comprising three levers mounted on the punch to pivot about three axes, one of which axes is parallel to and adjacent said second face of the punch, the two other axes of said three axes being perpendicular to said longitudinal plane, and jacks for actuating the levers.

17. A machine as claimed in claim 4, wherein the second folding mechanisms comprise a mechanism comprising two thrust shoes contained in a plane on an opposite side of the punch to a plane containing said fourth face and slidably mounted with respect to the frame of the machine and jacks which are perpendicular to said longitudinal plane for actuating the shoes.

18. A machine as claimed in claim 4, wherein the second folding mechanisms comprise a mechanism comprising a lever mounted relative to the frame adjacent a plane on an opposite side of the punch to a plane containing said fourth face to pivot about an axis perpendicular to said longitudinal plane and jacks for actuating the lever.

19. A machine as claimed in claim 14, wherein the bottom wall of the die is constituted by a plate, and a rod of a jack which is perpendicular to said plate of the die is integral with said plate, and said lever is mounted to pivot on said plate of the die.

20. A machine as claimed in claim 15, wherein the first folding mechanisms comprise a mechanism comprising a die having a bottom wall parallel to said third face of the punch and two walls perpendicular to said bottom wall and parallel to each other, said lever being pivotably mounted on one of the walls of the die.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,851,439

Dated December 3, 1974

Inventor(s) Marcel Octave PILLON

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

In the heading:

The Assignees' name was misspelled, should read

--Pont-A-Mousson S.A. and Societe Des Emballages
Moules Sem--.

Signed and sealed this 15th day of April 1975.

(SEAL)

Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents
and Trademarks