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⑤④ **ARRANGEMENT FOR THE FORMING OF THE BOTTOM OF A PACKING CONTAINER.**

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Description

The present invention relates to an arrangement for the forming of the bottom of a packing container by means of folding and sealing of the bottom wall panels of the container in a packing machine of the type which comprises movable drivers for the transfer of tubular packing container blanks between different processing stations.

Milk, juices and other liquid foodstuffs are frequently packed at present in non-returnable packages of plastic-laminated paper material. For this purpose machines are used which wholly or partly form the packing container and fill and close it. A known type of non-returnable packages, the so-called gable top packages, are formed from semi-finished products or blanks which are tubular and of a substantially square cross-section. The blanks are divided by means of crease lines into four rectangular side wall panels as well as top and bottom wall panels, which in the machine are folded and sealed so as to form the top and bottom respectively of the packing container. When the blanks are fed to the machine they are placed on drivers or mandrels which transport the packing container blanks between different processing stations in the machine. The cross-sectional shape of the mandrels corresponds to the substantially square cross-sectional shape of the blank, and the mandrels are of such a length that the blank after its application to the mandrel extends with its bottom wall panels in front of the same. After application to the mandrel the blank is transferred first to a station for the pre-folding of the bottom wall panels, in which station the crease lines between the different bottom wall panels are "broken up" so as to become more flexible and facilitate the ultimate bottom formation. In the next station appropriate parts of the bottom wall panels are heated with the help of hot air so as to soften and activate the thermoplastic material layers serving as adhesive, whereupon in the next processing station the bottom folding panels are folded together so that a bottom is formed. Whilst the thermoplastic material is still warm the bottom wall panels finally are pressed together in the following station between the mandrel ends and a pressure device, so as to ensure a liquid-tight and reliable join between the different bottom wall panels. When the bottom has cooled down the packing container can be removed from the mandrel to be filled and closed at its upper end. The processing stations for the folding or forming of the bottom wall panels should be designed so that, in spite of their having to work at great speed, they do not deform or damage the wall panels which, owing to the warming up of the thermoplastic layers, are moreover of a reduced strength. To facilitate the folding it has been the rule therefore up to now to place, as mentioned above, a station for prefolding of the wall panels before the proper folding or forming station. By the partial folding down of the panels its is

possible, especially if it is done before the heating, to reduce the risk of any damage in the final forming. The need for a separate pre-folding station naturally is a disadvantage, since it renders the design as well as the function of the machine more expensive and more complicated. Furthermore, the presence of a pre-folding station has not completely eliminated the difficulties in the ultimate forming, but the latter continues to be a critical stage in the manufacturing of the packing container.

A number of different designs have been proposed for the active parts of the forming station. All the known ultimate forming stations operate with mandrels as a support or holding-up device and comprise elements which through linear, oscillating or rotating movements in a certain sequence urge the different bottom wall panels into "locked" position. The devices coming into contact with the bottom wall panels frequently are of complicated curved shapes so that they should act in spite of the high speed as gently as possible upon the wall panels on folding them down.

Although the abovementioned great efforts have produced workable designs, it has not been possible up to now by simple means to provide a folding or forming of the bottom without pre-folding the bottom wall panels in a separate station.

Furthermore, according to another known arrangement (US—A 3 398 659) two cooperating folding devices are provided on both sides of the plane of motion of the drivers and are capable of being driven in opposite directions about mutually parallel axes of rotation. The folding devices of this known arrangement consist of blades with a particular propeller-like shape which need a very correct adjustment, in order to avoid damaging panels of the container blank during the folding action.

The object of the invention is to find an arrangement of this type which is much more economical and practical in the field of high-speed folding devices.

Indeed, the invention shall also avoid pre-folding.

It is a further object of the present invention to provide an arrangement which is not subject to the aforementioned disadvantages, but which performs in a rapid, sure and accurate manner the folding in of the wall panels.

These and other objects have been achieved in accordance with the invention in that an arrangement of the type described in the introduction has been given the characteristic of claim 1. The rotatable axes of the devices are disposed at an angle β of between 10° and 30° in relation to the momentary radial position of the longitudinal axis of the drivers while the container blank is being processed by the folding devices.

A preferred embodiment of the arrangement in accordance with the invention is characterized moreover in that each folding device comprises two fingers which with a certain mutual displace-

ment project radially from the centre axis of the folding device.

The abovementioned design makes it possible to act gradually and gently upon the different bottom wall panels so that these are urged into correct folding-down directions. In processing the type of packing container blanks which comprise two opposite main bottom panels and triangular backfolding panels situated between these, the fingers of the folding device first act upon the backfolding panels to such an extent that the folding of the main bottom panels is facilitated, which makes possible the folding of a formerly completely square, not prefolding bottom blank.

Preferred embodiments of the arrangements in accordance with the invention have been given, moreover, the characteristics which are evident from sub-claims.

A preferred embodiment of the arrangement in accordance with the invention will not be described in detail with special reference to the enclosed schematic drawings which only show the details necessary for the understanding of the invention.

Fig. 1 shows the lower end of a packing container blank of a known type.

Fig. 2 shows the packing container blank according to fig. 1 with partly folded-down bottom wall panels.

Fig. 3 shows a side view of the arrangement in accordance with the invention as placed on a mandrel wheel in a known packing machine.

Fig. 4 shows on a larger scale the arrangement in accordance with the invention from the front.

Fig. 5 shows the arrangement in accordance with fig. 4 from the top.

Fig. 6a to 6f incl. show the successive forming of a packing container bottom by means of the arrangement in accordance with the invention.

Fig. 1 shows in perspective the lower end of a packing container blank turned up and down, of the type which the arrangement in accordance with the invention is intended to process. The packing container blank is punched from a laminated material sheet which comprises a central carrier layer of paper which is coated on either side with homogenous layers of thermoplastics. The materials sheet has been provided, moreover, with a pattern of weakening or crease lines which facilitate the folding of the sheet and the continued forming of the packing container blank to a packing container of the type which is usually called "ridge package" or "gable top package".

The packing container blank 1 is substantially tubular and comprises four side walls facing each other in pairs, a number of wall panels for the forming of a bottom and a top part, not shown on the drawing. The bottom part comprises a number of panels separated by means of crease lines. The two opposed sides of the packing container each pass at their upper end into rectangular bottom main panels 4 which are separated by means of a horizontal crease line 5 from the adjoining side wall panels 2 of the packing container blank. The rectangular bottom

main panels 4 are of a height substantially corresponding to half the width of the side wall panel 3. The bottom main panels 4 are limited in lateral direction by a crease line 6 which extends over the whole height of the packing container blank and also demarcates the side wall panels 2, 3 from each other. In height direction the one bottom main panel 4 is delimited by the lower boundary line 7 of the packing container blank whereas the opposite bottom main panel 4 extends a little outside this boundary line.

The two remaining opposed side wall panels 3 of the packing container blank 1 likewise pass into two substantially rectangular bottom panels, each of which, however, is divided by means of crease lines into three triangular panels, a centrally situated bottom side panel 8 thereof being substantially isosceles. The bottom side panel 8 is delimited from adjoining side wall panels 3 by means of a horizontal crease line 9 which constitutes a continuation of the crease line 5 and forms the base edge of the triangle 8 which coincides with the lower boundary edge of the side wall panel 3. The triangular bottom side panel 8 thus has a width corresponding to the width of the side wall panel 3 and a height corresponding to half the said width. The isosceles sides of the triangular bottom side panel 8 are formed by crease lines 10 each of which extends from a point of intersection between the crease lines 6 and 9 to a central point at the lower boundary edge 7 of the packing container blank. Between the bottom side panel 8 and the two rectangular bottom main panels 4 triangular backfolding panels 11 are provided, each being delimited by a part of crease line 6, crease line 10 and a part of the boundary edge 7 of the packing container blank.

When the bottom of the packing container blank 1 is to be formed by folding and sealing of the different bottom wall panels, the two bottom side panels 8 are first acted upon in direction towards each other so that they are folded down in direction towards the centre of the packing container blank with the crease line 9 as a hinge joint. At the same time the rectangular bottom main panels 4 are also acted upon via the backfolding panels 11 so that they are folded towards each other using the crease lines 5 as hinge joints. After completed folding together the two bottom main panels together will form a plane bottom surface which conceals the bottom side panels 8 and backfolding panels situated within. The dividing line between the two bottom main panels is covered by the portion of the one bottom main panel extending outside the boundary edge 7.

In fig. 3 is shown diagrammatically from the side a mandrel wheel 13 equipped with six radially projecting drivers 12 or mandrels, which is stepwise rotatable in the direction of the arrow 14, around its centre axis 15. The mandrel wheel 13 is of a conventional type as found in a great number of known packing machines. Around the periphery of the mandrel wheel 13, or more particularly along the plane of motion of the

drivers 12, a number of stations are provided for the handling and processing of the individual packing container blanks 1 transported between the different stations. More particularly, there is a feeding-in station 16 where a packing container blank 1 with the help of an element (not shown) is pushed onto a driver 12 to such a position that the transverse crease lines 5, 9 (fig. 1) are substantially at the level of the plane end of the mandrel. Each driver 12 has a substantially square cross-section whose size coincides with the inside free cross-sectional area of the packing container blank 1. After placing of the packing container blank 1 into the correct position on the mandrel the blank is retained in this position by means of conventional elements, not shown in the drawing.

The following station, seen in the direction of rotation 14 of the mandrel wheel 13, is a heating station 17 with a hot-air nozzle 18 which is straight opposite the projecting end wall panels on a packing container blank 1 placed on the station. The hot-air nozzle 18 is connected by means of a tube 19 to a fan and a heating device for the air. Via suitably located louvres in the hot-air nozzle the parts of the bottom wall panel of the packing container which are to be sealed to one another can now be heated to such a degree that the thermoplastic layers melt and can be made use of for a liquid-tight seal. After heating to a sufficient degree the mandrel wheel 13 is indexed a further 1/6th turn, during which movement the heated packing container blank passes the arrangement 28 in accordance with the invention which by means of the folding devices 20 acts upon the passing bottom wall panels and folds them down so that a bottom is formed. The arrangement or forming station 28 in accordance with the invention, which will be described in greater detail in the following, is supported by a frame 21 joined to the foundation of the machine, which also supports a driving arrangement 22 for the folding devices 20. Solidly connected to the frame 21 a guiding device 23 is provided in the form of two guide bars which extend from the folding devices 20 right to the following processing station which is a sealing station 24. After the packing container blank 1 has passed the folding devices 20 and the guiding devices 23, the originally projecting bottom wall panels have been folded down to the desired position, and whilst the heated thermoplastic layers are still soft a sealing now takes place with the help of a pressure device 25 which is displaceable in axial direction of the driver 12 between an inactive position at a distance from the end surface of the mandrel and an active position directly adjacent to the said end surface. The pressure device 25 has a substantially plane surface facing towards the end surface which presses together the folded-down bottom wall panels so that a reliable, liquid-tight seal is achieved.

After the sealing the mandrel wheel 13 is indexed again and the packing container blank is moved via an intermediary empty station 26 to a

feeding-out station 35, where the packing container blank is transported by means of driving elements (not shown) to a conveyor 27 which transports the blank further so as to be filled and for the upper end of the blank to be closed.

It is evident from fig. 3 that the two folding devices 20 of the forming station 28 in contrast to active parts of the other processing stations are not located right in front of a driver 12 when the mandrel wheel 13 has been indexed to a stationary position. Instead the two folding devices 20 are placed a little in front of the position wherein the driver 12 comes to a halt, and thus act upon the packing container blank placed onto the mandrel whilst the same is transported from the heating station 17 to the stationary position at the forming station 28. The expression "station" is thus somewhat inappropriate where the forming station 28 is concerned, but has been used nevertheless in the intention of simplifying and clarifying the description and the claims.

The forming station 28, and more particularly the design and location of its two folding devices 20 is illustrated in greater detail in fig. 4 and 5 which show the folding devices from the front, that is to say seen in the direction of movement of a packing container blank (fig. 4) and from the top (fig. 5 partly in section). In both figures the outline assumed by a passing packing container blank has been indicated by means of dot-dashed lines, and the direction of movement of the packing container blank, moreover, in fig. 5 by means of an arrow 29. The two folding devices 20 are placed on either side of a packing container blank passing the station and at a level with the bottom wall panel of the packing container to be folded in. The folding devices are each supported so that they can rotate on their vertical axes 30 which extend through the frame 21 to the driving arrangement 22 situated above the frame (fig. 3). The folding devices 20 are rotatable by means of the driving arrangement in opposite directions about the mutually parallel axes 30, and the respective directions of rotation of the folding devices are indicated by means of arrows 31 and 32 in fig. 5. The folding devices are situated on either side of the plane of motion of the drivers 12 or mandrel and with a mutual distance between the axes 30 which amounts substantially to double the width of the mandrel or driver 12.

Each folding device 20 comprises two projecting fingers 33, 34 which with a certain mutual displacement by the angle γ extend substantially radially from the centre axis of the folding device 20. Seen in the direction of rotation each folding device comprises a front finger 33 and a rear finger 34 which between them form an angle α of 30—60°, preferably 45°, in the horizontal plane. With the object of optimizing the operation of the arrangement the two rear fingers 34 are placed, as can be seen in fig. 4, in a lower plane than the two front fingers and are directed slightly upwards. The outer ends of the two rear fingers 34 can also be bent forwards a little in the direction

of motion of the fingers by an angle δ of preferably 5—15°.

From fig. 5 it is also evident that the front and rear fingers are of different length. The two rear fingers 34 which are intended to co-operate with the bottom main panels 4 of the packing container blank are of such a length that when they are in line with one another they almost meet at the longitudinal centre axis 12' of the passing mandrel or driver 12. The two front fingers 33, which are intended to co-operate with the two bottom side panels 8 of the packing container blank, are of a length which amounts to approx. 2/3rd of the rear fingers 34, which means that when by the rotation of the folding device 20 the two front fingers 33 are brought into such a position that they are in line with one another, they reach only by a distance which substantially corresponds to 1/4 of the width of the packing container blank inside the sides of a passing packing container blank facing the folding device. The front as well as the rear fingers are substantially cylindrical and are provided with smoothly rounded outer ends so as not to damage the material surface of the packing container blank.

The frame 21 supports beside the driving arrangement 22 and the two folding devices 20 also the guiding devices 23 which in the form of elongated curved guide bars extend substantially from the folding devices 20 to the sealing station 24 (fig. 3). The guiding devices 23 are situated with their front ends, seen in the direction of motion of the packing container blank, directly adjoining the folding devices 20 and slightly above the plane of motion of the front fingers 33, which means that the front as well as the rear fingers can pass without hindrance below the front ends of the guiding devices 23 on rotation of the folding devices 20.

During operation of the arrangement in accordance with the invention the two folding devices 20 are rotated with the help of the driving arrangement 22 in such a manner that the direction of motion of the fingers 33, 34 substantially coincides with the direction of motion of the processed packing container blank. The folding devices 20 are rotated furthermore synchronously with the rotation of the drivers 12 so that the fingers 33, 34 over the whole time will be in contact with and act upon the passing packing container blanks in a predetermined manner which will be described in more detail in the following.

Owing to the placing of the folding devices 20 in the plane of motion of the packing container blanks between the heating station 17 and the stopping position at the forming station 28, the two vertical folding device axes 30 will be at a certain angle β in relation to the packing container blank which just passes and is processed by the folding devices 20. This angle β preferably measures 10—30° relatively to the instantaneous angular position of the blank and the longitudinal axis 12' of the driver 12, resp., and the axes 30, as can be seen in fig. 3, are inclined in the direction

of motion of the packing container blank. The inclination of the axes 30 as well as the placing of the folding device and the length and design of the fingers are chosen so as to provide an optimum pattern of motion when folding in the different bottom panels of a passing packing container blank.

The function of the arrangement will now be described with special reference to fig. 6 which, in six different part figures a to f inclusive (each with a view from the top and a view from the side), shows schematically the gradual folding down of the bottom wall panels and the forming of the bottom of the packing container with the help of the arrangement in accordance with the invention. With the intention of facilitating the understanding of the different simultaneous movements of the packing container blank as well as of the processing elements, the packing container blank has been chosen as reference, that is to say the packing container blank is shown the whole time in the same position, whilst the position of the processing elements is successively altered, in spite of the fact that in practice, as is evident from fig. 3, the packing container blank describes a curved movement during the processing. In each part figure in fig. 6 the lower end of the packing container blank is shown from the side as well as from the end. In the end views the fingers 33, 34 of the folding devices 20 are illustrated, whereas in the side views only the points of contact of the fingers with the packing container blank are indicated.

In fig. 6a the actual packing container blank has been moved from the heating station 17 and in between the two continuously rotating folding devices 20. The shorter, front, fingers 33 of the folding devices with their outer ends have come into contact with the upper tips of the triangular bottom side panels 8, immediately below the boundary edge 7 of the packing container blank. The longer fingers 34 are still at a distance from the packing container blank and the forming of the bottom of the packing container blank has not yet started.

In fig. 6b the packing container blank has been moved partly in between the two forming devices 20 and the front fingers 33 of the forming devices have started to fold the bottom side panels 8 in the direction towards the longitudinal centre line of the mandrel 12, the crease lines 9 serving as hinge joints. The two rectangular bottom main panels 4 are acted upon via the backfolding panels 11 so that they too commence to be folded in the direction towards each other, the crease lines 5 serving as hinge joints. The two rear fingers 34 have come into contact with the rear bottom main panel 4, seen in the direction of motion of the packing container blank, and have started to act upon them at the edges defined by the crease lines 6. In this position the bottom of the packing container blank is of a shape corresponding to the shape shown in fig. 2.

In fig. 6c the packing container blank has been moved a little further clockwise (fig. 3) with the

help of the mandrel wheel 13 and now approaches the starting end of the stationary guiding device 23. The front fingers 33 of the folding devices 20 continue to act upon the two bottom side panels 8, but have been moved gradually from the upper corner of the bottom side panel 8 located at the boundary edge 7 in the direction of the corner which delimits the front crease line 6, seen in the direction of motion of the packing container blank. The movement of the points of contact between the two front fingers 33 and the bottom side panel 8 in the direction of motion of the packing container blank is bound up with the fact that the outer end of the fingers moves at a higher speed than the packing container blank and the gradual movement of the points of contact from the boundary edge 7 in the direction towards the crease line 9, that is to say in the direction towards the centre of the mandrel wheel 13 is caused by the inclination of the axes 30 in relation to the packing container blank. For the same reason the points of contact between the rear fingers 34 and the bottom main panel 4 of the packing container blank are moved in a similar manner, that is to say forwards in the direction of motion of the packing container blank and inwards towards the centre of the mandrel wheel 13.

Fig. 6d shows how the packing container blank has partly passed the two folding devices 20, its front fingers 33 having completely lost contact with the packing container blank, whereas the rear fingers 34 are still in contact with and act upon the rear bottom main panel 4 of the packing container blank in forwards-downwards direction (seen in the direction of motion of the blank). At the same time the two guide bars of the guiding device 23 have come into contact with the front of the two bottom main panels 4, which now actively contribute to the bottom wall panels being folded together in the direction of the desired folded down position.

In fig. 6e the two longer fingers 34 of the folding devices 20 are just about to leave the rear bottom main panel 4 at the time as this panel too glides in underneath the guiding devices 23, whose upwards-bent front end permits the two longer fingers 34 to pass out underneath the guide bars of the guiding device.

In fig. 6f the two folding devices 20 have completely lost contact with the packing container blank whose bottom wall panel is now acted upon only by the guiding device 23 which is responsible for the final folding together and retaining of the bottom wall panels in the folded-together position during the further movement of the sealing station, as is evident from fig. 3.

In the sealing station 24 the different bottom wall panels are pressed together in the folded-down position between the end surface of the mandrel 12 and the pressure device 25 so that the heated, thermoplastic outer layers of the packing container material are fused together and make possible a liquid-tight closing of the bottom of the packing container blank. After having passed the

empty station 26, which could possibly be used for cooling the sealed-up bottom, the packing container blank reaches the feeding-out station 35, where with the help of suction heads (not shown) it is removed from the mandrel 12 and transferred to the conveyor 27 which in a conventional manner moves the packing container blank past further stations where it is filled with contents and provided with a liquid-tight top part.

As mentioned earlier, it is advantageous from an operational point of view if the axes 30 of the folding devices 20 are inclined at a certain angle in relation to the packing container blank which is processed by the folding devices. Owing to this inclination of the axes 30 the points of contact of the fingers 33, 34 with the packing container blank will be moved gradually from a position near the outer boundary edge 7 of the packing container blank to a position nearer the outer end of the mandrel 12. As a result the folding down of the bottom wall panels of the packing container will be realized relatively slowly to begin with because of the great distance between the points of contact and the crease lines 5, 8 located at a level with the mandrel end which serve as hinge joints. During continued folding down this distance is gradually diminished which means that the folding down of the bottom wall panels is taking place at an increased speed until the contact between the bottom wall panels and the fingers 33, 34 ceases. As a result it is possible, in spite of high speed of operation, to avoid buckling damage to the wall panels which occurred relatively often in earlier known designs. The first contact between the rear, lower fingers 34 of the folding device and the bottom main panel 4 can be made gentler still if the outer ends of the fingers 34, as mentioned previously, are bent slightly forwards in the direction of motion, preferably at an angle of approx. 10° in relation to the main direction of the fingers. Thanks to this the contact between the fingers and the bottom main panel 4 will take place not simply along the crease lines 6 of the bottom main panel but more distributed over the surface which appreciably reduces the risk of buckling of the bottom main panel.

Owing to the fact that the folding down of the bottom wall panels is started through the contact between the outer ends of the shorter fingers and the upper corner of the bottom side panel 8, the risk of damage to the triangular bottom panels through buckling or being folded in the wrong direction is eliminated. Since the active outer end of the shorter fingers during the folding-in described a movement which by and large coincides with the folding-down movement of the bottom side panels, the folding is guided so effectively that any pre-folding of the bottom wall panels is no longer necessary which is a great advantage, since it makes it possible to eliminate the separate pre-folding station which previously was necessary. The placing of the folding devices 20 between two proper stations, or more particularly between two of the positions wherein a packing container blank is stationary during the indexing,

allows a further reduction in the number of stations to be made, so that in practice two stations will be adequate, namely apart from the feeding-in and feeding-out stations, a heating station and a sealing station. The sealing station could possibly be moved to a vertical position directly after the folding devices 20 (fig. 3) and the guiding devices 23 could be shortened to a corresponding extent which means that one more station will be available for other purposes.

Claims

1. Arrangement for forming the bottom of a packaging container (1) by folding and sealing the container's bottom wall panels (4, 8, 11) by means of a packaging machine of the type comprising movable drivers (12) for the transfer of tubular packaging container blanks (1) between different processing stations (16, 17, 28, 24, 26, 35), the said arrangement comprising two co-operating folding devices (20) provided on both sides of the plane of motion of the drivers (12) and capable of being driven in opposite directions about mutually parallel axes (30) of rotation, characterized in that the rotatable axes (30) of the folding devices (20) are disposed at an angle (β) of 10—30° in relation to the momentary position of the longitudinal axis (12') of the drivers (12) supporting the packaging container blank (1) while it is being processed by the folding devices (20).

2. Arrangement in accordance with claim 1, characterized in that every folding device (20) comprises two fingers (33, 34) which with a certain mutual circumferential displacement project radially from the centre axis of the folding device and between themselves form an angle (α) of 30—60°.

3. Arrangement in accordance with claim 1 or 2, characterized in that the fingers (33, 34) are inclined.

4. Arrangement in accordance with any of the preceding claims, characterized in that the folding devices (20) are capable, by means of a common drive mechanism (22), of being rotated synchronously with the movement of the drivers (12).

5. Arrangement in accordance with any of the preceding claims, characterized in that fixed guiding devices (23) for final forming and fixing of the formed packaging container bottom are arranged directly after the folding devices (20) viewed in the direction of movement of the drivers (12).

6. Arrangement in accordance with any of the preceding claims, characterized in that the front fingers (33) co-operating with the bottom side panel (8) of the blank (1) are of a length of about 2/3 of the rear fingers (34) co-operating with the bottom main panel (4) of the blank (1).

7. Arrangement in accordance with claim 6, characterized in that the rear fingers (34) are placed in a lower plane than the front fingers (33).

8. Arrangement in accordance with claim 6 or 7, characterized in that the rear fingers (34) are directed slightly upwards.

9. Arrangement in accordance with any of the claims 6—8, characterized in that the outer ends of the rear fingers (34) are bent forwards in the direction of motion of the fingers by an angle (δ) of between 5° and 15°.

Patentansprüche

1. Anordnung zur Formung des Bodens eines Verpackungsbehälters (1) durch Falten und Versiegeln der Bodenwandteile (4, 8, 11) des Behälters durch eine Verpackungsmaschine derjenigen Gattung, welche bewegbare Antriebsorgane (12) zum Transport rohrförmiger Verpackungsbehälterzuschnitte (1) zwischen verschiedenen Behandlungsstationen (16, 17, 28, 24, 26, 35) aufweist, bei der zwei miteinander zusammenwirkende Faltaggregate an beiden Seiten der Bewegungsebene der Antriebsorgane (12) angeordnet und in der Lage sind, in entgegengesetzten Richtungen um zueinander parallele Schwenkachsen (30) angetrieben zu werden, dadurch gekennzeichnet, daß die Schwenkachsen (30) der Faltaggregate (20) unter einem Winkel (β) von 10—30° in Bezug zur augenblicklichen Radialstellung der Längsachsen (12') der Antriebsorgane (12), die den Verpackungsbehälterzuschnitt (1) abstützen, während der Bearbeitung durch die Faltaggregate (20) angeordnet sind.

2. Anordnung nach Anspruch 1, dadurch gekennzeichnet, daß jedes Faltaggregat (20) zwei Finger (33, 34) aufweist, die mit einer bestimmten gegenseitigen Umfangsverschiebung radial von der Zentralachse der Faltaggregate vorstehen und zwischen denselben einen Winkel (α) von 30—60° bilden.

3. Anordnung nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß die Finger (33, 34) geneigt sind.

4. Anordnung nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß die Faltaggregate (20) mit Hilfe eines gemeinsamen Antriebsmechanismus (22) in der Lage sind, synchron mit der Bewegung der Antriebsorgane (12) geschwenkt bzw. verdreht zu werden.

5. Anordnung nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß ortsfeste Führungseinrichtungen (23) zum endgültigen Formgeben und Fixieren des geformten Verpackungsbehälterbodens unmittelbar hinter den Faltaggregaten (20) — in Bewegungsrichtung der Antriebsorgane (12) gesehen — angeordnet sind.

6. Anordnung nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß der Frontfinger (33), der mit dem unteren bzw. Boden-Seitenfeld (8) des Zuschnitts (1) zusammenwirkt, eine Länge von etwa 2/3 des hinteren Fingers (34) aufweist, welcher mit dem unteren bzw. Boden-Hauptfeld (4) des Zuschnitts (1) zusammenwirkt.

7. Anordnung nach Anspruch 6, dadurch gekennzeichnet, daß die hinteren Finger (34) in einer niedrigeren Ebene also die Frontfinger (33) angeordnet sind.

8. Anordnung nach Anspruch 6 oder 7, dadurch

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gekennzeichnet, daß die hinteren Finger (34) leicht nach aufwärts gerichtet sind.

9. Anordnung nach einem der Ansprüche 6—8, dadurch gekennzeichnet, daß die äußeren Enden der hinteren Finger (34) nach vorn in Bewegungsrichtung der Finger unter einem Winkel (δ) von zwischen 5 und 15° gebogen sind.

Revendications

1. Appareil de formage du fond d'un récipient d'emballage (1) par pliage et soudage des panneaux (4, 8, 11) de la paroi de fond du récipient, au moyen d'une machine d'emballage du type comprenant des organes d'entraînement mobiles (12) pour le transfert d'ébauches tubulaires (1) de récipient d'emballage entre différentes stations de traitement (16, 17, 28, 24, 26, 35), ledit appareil comprenant deux dispositifs de pliage associés (20) prévus de chaque côté du plan de déplacement des organes d'entraînement (12) et qui peuvent être entraînés en sens inverse autour d'axes de rotation (30) mutuellement parallèles, caractérisé en ce que les axes tournants (30) des dispositifs de pliage (20) sont inclinés d'un angle (β) de 10 à 30° par rapport à la position radiale momentanée de l'axe longitudinal (12') des organes d'entraînement (12) qui supportent l'ébauche (1) de récipient d'emballage pendant son traitement par les dispositifs de pliage (20).

2. Appareil suivant la revendication 1, caractérisé en ce que chaque dispositif de pliage (20) comprend deux doigts (33, 34) qui, avec un certain décalage circonférentiel mutuel, font saillie radialement à partir de l'axe principal du dispositif de pliage et forment entre eux un angle (α) de 30 à 60°.

3. Appareil suivant la revendication 1 ou 2, caractérisé en ce que les doigts (33, 34) sont inclinés.

4. Appareil suivant l'une quelconque des revendications précédentes, caractérisé en ce que les dispositifs de pliage (20) peuvent être mis en rotation, au moyen d'un mécanisme commun (22) d'entraînement, en synchronisme avec le mouvement des organes d'entraînement (12).

5. Appareil suivant l'une quelconque des revendications précédentes, caractérisé en ce que des dispositifs de guidage fixes (23), pour le formage final et la fixation du fond de récipient d'emballage formé, sont prévus directement après les dispositifs de pliage (20), dans la direction de déplacement des organes d'entraînement (12).

6. Appareil suivant l'une quelconque des revendications précédentes, caractérisé en ce que les doigts avant (33), coopérant avec le panneau latéral de fond (8) de l'ébauche (1), ont une longueur qui est environ des deux tiers de celle des doigts arrière (34) coopérant avec le panneau principal de fond (4) de l'ébauche (1).

7. Appareil suivant la revendication 6, caractérisé en ce que les doigts arrière (34) sont placés dans un plan inférieur à celui des doigts avant (33).

8. Appareil suivant la revendication 6 ou 7, caractérisé en ce que les doigts arrière (34) sont dirigés légèrement vers le haut.

9. Appareil suivant l'une quelconque des revendications 6 à 8, caractérisé en ce que les extrémités extérieures des doigts arrière (34) sont pliées vers l'avant dans la direction de déplacement des doigts, d'un angle (δ) compris entre 5° et 15°.

40

45

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55

60

65

8

Fig. 1

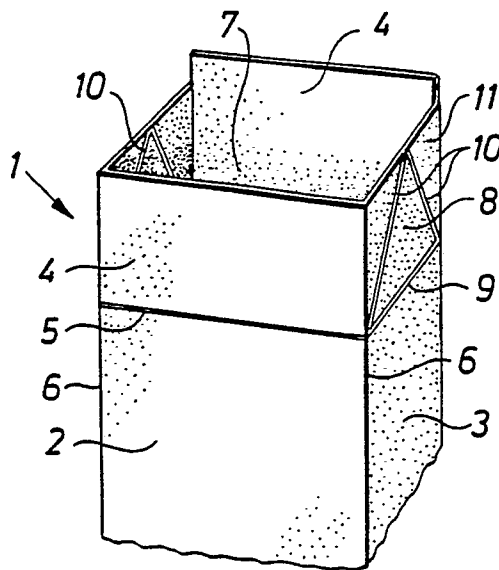


Fig. 2

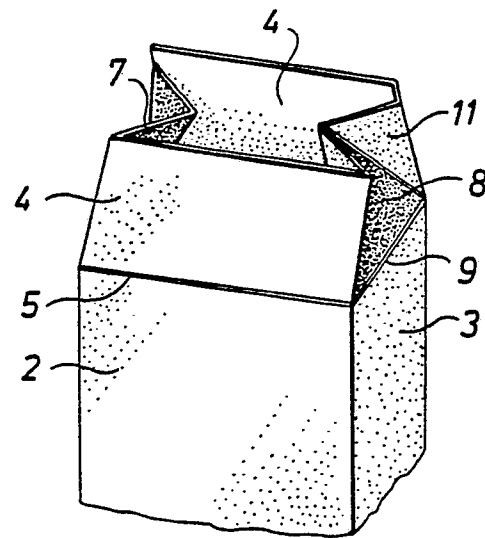


Fig. 3

