Jan. 30, 1962 U. BAUDER 3,018,702

MACHINE FOR FORMING LINED CONTAINERS

Filed Feb. 11, 1960 2 Sheets-Sheet 1

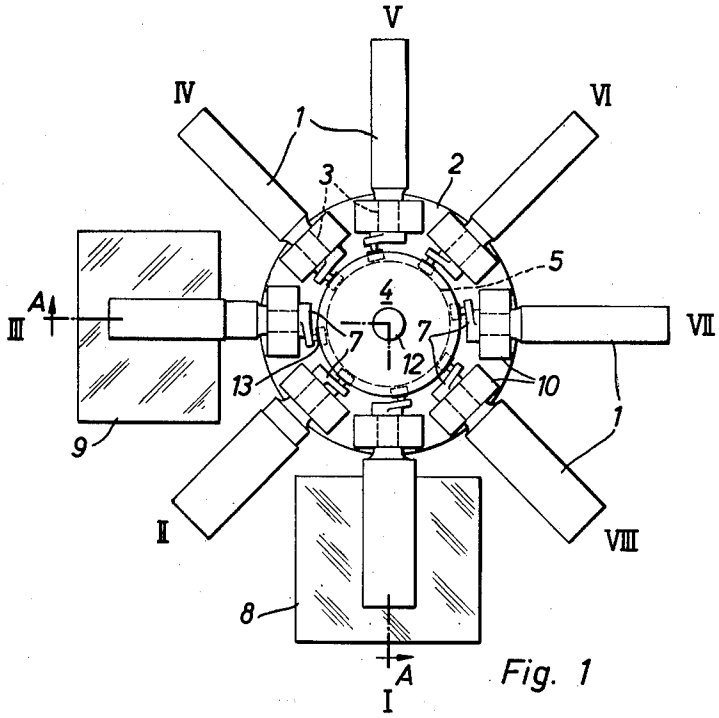


Fig. 1

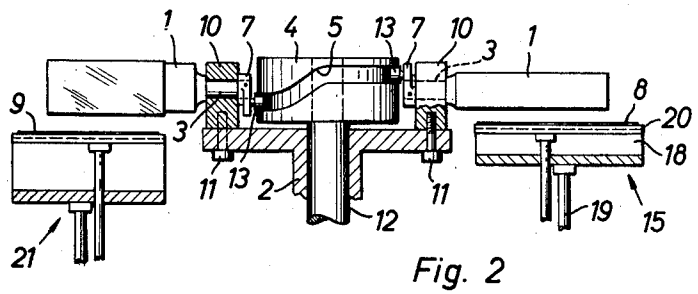


Fig. 2

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MACHINE FOR FORMING LINED CONTAINERS

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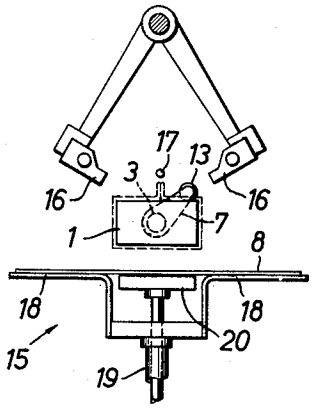


Fig. 3

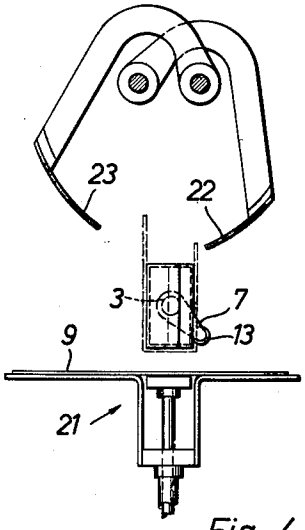


Fig. 4

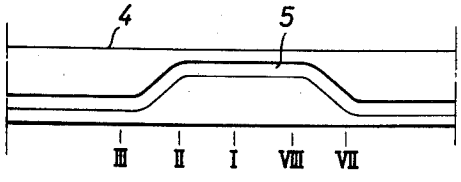


Fig. 5

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MACHINE FOR FORMING LINED CONTAINERS

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3 Claims. (Cl. 93—44.1)

This invention relates to a machine of the general type illustrated and described in United States Patents Nos. 2,168,543 and 2,364,406 for forming lined packaging containers, such as bags and cartons having an internal bag or liner, or the like, said containers being formed from blanks around a plurality of folding mandrels having a rectangular shape in section and arranged on an endless circulating conveyor device, for example a mandrel wheel.

Experience has shown that it would frequently be desirable to mutually offset the longitudinal seams, for example of an inner bag and an outer carton, suchwise that the longitudinal seam of the outer carton is located at the narrow side of the package and the longitudinal seam of the inner bag at the wide side of the package. The ground for this desideratum is as follows. On the one hand, the longitudinal seam, when located at the narrow side of the inner bag, will run through one of the bottom tabs of the bag and will be impaired during the folding of the same. On the other hand, the folding mandrels must be arranged edge up, because of the arrangement of the tools and of the narrow restricted distances between the mandrels in the case of multiple mandrel wheels, at least during the folding of the outer carton if this is not to knock against the adjacent mandrel during folding. In the case of the machines hitherto used, the aforesaid conditions require that the inner bag, which has previously been folded around the same mandrel, must likewise have its longitudinal seam at the top, and that as a consequence thereof the drawbacks referred to will arise, particularly in the case of so-called Finseal seams, in which inside is bonded against inside.

In order to meet the aforesaid deficiences, in the present invention the folding mandrels are arranged on the conveyor device of the machine, for example on a mandrel wheel, so as to be rotatable through at least 90° about their respective longitudinal axes.

This arrangement of the folding mandrels enables them to be turned, first during the folding of the inner bag or liner transversely in relation to their edge-up position, and so that the wide sides thereof are disposed horizontally to allow the longitudinal seam of the inner bag to be formed at the upper wide side, and then to be turned, after the inner bag has been folded, back into the edge-up position in which, as normal, the outer carton or outer bag is formed with a longitudinal seam running along the upper narrow side.

An embodiment of the equipment of a machine according to this invention is illustrated in the accompanying drawings, in which

FIGURE 1 is a plan view of a mandrel wheel,

FIGURE 2 is a sectional view of the mandrel wheel taken along line A—A of FIGURE 1,

FIGURE 3 is a front elevational view of folding tools for forming the inner bag or liner,

FIGURE 4 is a front elevational view of folding tools for forming the outer bag or container, and

FIGURE 5 is a development of the cylindrical cam shown in FIGURE 2, and illustrating the configuration of the cam groove.

As shown in the drawings, the mandrel wheel of the present embodiment of a machine for manufacturing lined containers comprises eight folding mandrels 1 which

are radially arranged on an intermittently rotating hub 2. Each mandrel has a rectangular shape in section. With its one end which is formed as a stub shaft 3, each folding mandrel 1 is rotatably supported in a bearing block 10, so that it can be rotated about its longitudinal axis. The bearing blocks 10 are fixedly mounted at equal distances from each other on the hub 2 by means of screws 11. In order to assure that the folding mandrels 1 are rotated only at a predetermined point and by a predetermined amount, a cylindrical cam 4 is rigidly mounted on a stationary shaft 12 above the hub 2. The cylindrical cam 4 comprises a cam groove 5 in which are guided the ends of crank arms 7 provided with rollers 13. The crank arms 7 are fixed on the ends of the stub shafts 3 of the folding mandrels 1. The cam groove 5 is formed in such a way that the folding mandrels 1 are rotated through 90° about their longitudinal axis between the stations VII—III in such a manner that their wide or broad sides come to lie in a horizontal plane.

When the mandrel 1 is in this position, a blank 8 from which is to be formed the inner bag or liner is folded from below around the folding mandrel 1 on station I (FIG. 3), by means of a folding box 15. The folding box comprises two folding plates 18 which are bent at an angle of 90° and are mounted on a rod 19 adapted to reciprocate in an up and down direction, and a pressure plate 20 which is likewise arranged for up and down movement. Following this, heat sealing jaws 16 are operated by well known means to fold the marginal portions of the blank into an upstanding longitudinal seam and weld the edges of these marginal portions inside to inside. In order to prevent that the marginal portions of the blank come to lie one upon the other during the formation of the longitudinal seam, a suitable rail 17 is provided above the folding mandrel 1. The marginal portions of the blank first come to bear with their inner sides against the rail 17, whereupon they come into direct mutual contact with their inner sides.

Upon further rotation of the mandrel wheel, the folding mandrel 1 moving to station III is again rotated through 90° about its longitudinal axis, so that it assumes its edge-up position. With the folding mandrel 1 in this position, and after the bottom of the inner bag or liner has been formed on station II by means of folders and welded in the usual well known way, the outer bag or container 9 is folded around the finished liner surrounding the mandrel 1 and formed into a sleeve on station III (FIG. 4). This is accomplished by means of a folding box 21 and with the cooperation of folding slides 22, 23 which fold and seal the protruding marginal portions of the blank 9 of the outer bag one on top of the other.

After this, the outer bag or container 9 is finished on stations IV—VI by folding and sealing the bottom in the manner well known to the man skilled in the art, and the completed lined container is then drawn off the folding mandrel on station VII by suitable and known means.

What I claim is:

1. A machine for forming lined containers comprising a hub intermittently rotatable about a vertical axis, a plurality of container-forming mandrels each having a cross-section equal to the internal cross-section of a lined container, a stub shaft rotatably mounting each mandrel on said hub to extend radially therefrom along the longitudinal axis of the mandrel, a crank arm rigidly fixed to the end of each stub shaft nearest said hub, said crank arm having a roller at its free end, and a stationary cylindrical cam member mounted coaxially above said hub and having a cam track about its periphery engaging the roller of each crank arm, the cam track of said cam member being adapted to turn said stub shafts through an

angle of substantially 90° during their intermittent passage about said cam member, whereby a liner blank may be folded about each mandrel in one position thereof and the edges of the liner blank may be sealed along one longitudinal face of said mandrel and a box blank may be folded about each mandrel having a liner folded thereon and its edges sealed along a longitudinal face of said mandrel at substantially 90° to that along which the edges of the liner are sealed.

2. A machine for forming lined containers as claimed in claim 1, wherein said intermittently rotatable hub moves each mandrel to successive stations around the axis of said hub, the cam track of said cam and said crank arm being adapted to turn each mandrel with a major longitudinal face thereof in horizontal position at a first of said sucessive stations, a box folder is positioned beneath the mandrel at such first station to fold a liner blank about said mandrel, a pair of heat sealing jaws is operatively disposed above the mandrel at such first station for folding the marginal portions of the liner blank into an upstanding longitudinal seam and welding the edge portions thereof inside to inside, a second box folder is positioned beneath the mandrel at a subsequent station at which said mandrel has been turned through 90° to fold a box blank about the mandrel with the welded liner thereon, and a pair of folding slides is positioned above the mandrel at such subsequent station for folding and sealing the protruding marginal portions of the box blank.

3. A method of forming lined containers upon mandrels, said method comprising positioning a container-forming mandrel with its longitudinal axis at right angles to a vertical axis, intermittently rotating the mandrel about the vertical axis to a succession of stations, turning the mandrel about its longitudinal axis through an angle of 90° between one station and a succeeding station, folding a liner blank about the mandrel at one station, there sealing the marginal portions of the liner blank into an upstanding longitudinal seam, folding a box blank about the mandrel with the welded liner thereon at a subsequent station after the mandrel has been turned about its longitudinal axis through 90°, and there sealing the marginal portions of the box blank to form the lined box with the longitudinal seams of the liner and the box extending parallel to each other and along adjacent longitudinal sides of the formed box.

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