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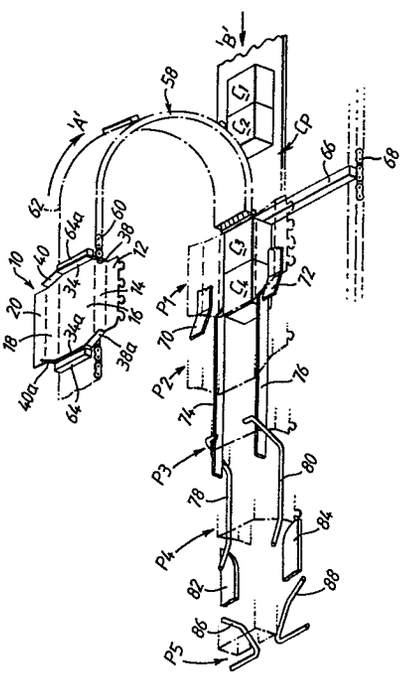
(71) Applicant: **THE MEAD CORPORATION, Mead World Headquarters Courthouse Plaza Northeast, Dayton Ohio 45463 (US)**

(72) Inventor: **Müller, Rolf, Brunostrasse 24, 5503 Konz (DE)**

(74) Representative: **Hepworth, John, J.M. Hepworth & Co. Furnival House 14/18 High Holborn, London, WC1V 6DE (GB)**

## (54) Method and machine for forming a wrap-around package.

(57) Machine and method for forming a wrap-around package accommodating a plurality of containers and of the type having a top panel (16) side wall panels (14, 18) and base panels (12, 20) providing a sleeve-like structure and end panel structures at each end of the sleeve including an end panel (34, 34a) and tuck panels (38, 38a : 40, 40a) joined to the end panel by gusset panels (46, 46a : 52, 52a). A first folding step deflects upwardly the side panels of the carton with respect to the top panel thereof in order to cause the tuck flaps to be folded into overlapping relationship with said panels. Thereafter, the side wall panels are caused to be folded downwardly with respect to the top panel whereby the tuck flaps are disposed between the containers being packaged and the side walls and finally the base panels are folded into overlapping relationship beneath the containers.

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# METHOD AND MACHINE FOR FORMING A WRAP-AROUND PACKAGE



This invention relates to a method and machine for forming a package of the wrap-around type accommodating a plurality of containers. The package is generally in the form of a sleeve but includes end panel elements at each end of the sleeve which restrain the endways movement of the containers to prevent them from becoming dislodged from the package.

In a known folding procedure, in order to form the package the end panel element at one end of the machine is folded downwardly relative to the top panel of the sleeve by means of a static folding rail provided on a suitable packaging machine. However, the opposite end panel element is folded into position by moving machine elements.

The machine of the present invention forms the folding operations on the package solely by means of static folding elements and substantially reduces the costs of such machinery.

*One aspect of the invention provides a machine for forming a wrap-around package accommodating a plurality of containers and of the type having a top panel, side wall panels, and base panels providing a sleeve-like structure and end panel structures at each end of the sleeve including an end panel and tuck panels joined to the end panel by gusset panels which machine is characterised by a folding section having a series of static folding elements, comprising folding plates to deflect upwardly the side panels of the carton with respect to the top panel thereof in order to cause the tuck flaps to be folded into overlapping relationship with said side panels, static guide bars to maintain the tuck flaps in said overlapping relationship, counter-fold bars to cause the side wall panels to be folded downwardly with respect to the top panel whereby the tuck flaps are disposed between the containers being packaged and said side walls and static fold bars to cause said base panels to be folded into overlapping relationship beneath said containers.*

*Another aspect of the invention provides a method of forming a wrap-around package accommodating a plurality of containers and of the type having a top panel, side wall panels and base panels providing a sleeve-like structure and end panel structures at each end of the sleeve including an end panel and tuck panels joined to the end panel by gusset panels which method is characterised by first deflecting upwardly the side panels of the carton with respect to the top panel thereof in order to cause said tuck flaps to be folded into overlapping realtionship with said side panels, thereafter causing the side wall panels to be folded downwardly with respect to the top panel whereby the tuck flaps are disposed between the containers being packaged and said side walls and finally causing said base panels to be folded into overlapping relationship beneath said containers.*

An embodiment of a machine according to the invention is described below, by way of example, with reference to the accompanying drawings in which:-

FIGURE 1 is a plan view of a blank which is folded by a machine and method according to the invention and,

FIGURE 2 is a schematic perspective view of the main machine parts which contribute to the folding operation.

Referring first to FIGURE 1 of the drawings, there is shown a blank 10 made from paperboard or similar foldable sheet material. The blank comprises, in series, a first base panel 12, a first side wall panel 14, a top panel 16 a second side wall panel 18 and a second base panel 20 hinged one to the next along fold lines 22, 24, 26 and 28, respectively.

Base panel 12 is formed with a row of projecting locking tabs 30 which are received in cooperating locking slits 32 provided in base panel 20 in known manner in order to form a wrap-around type package.

The blank further includes an end panel structure at each end of the top and side panels. The end panel structures comprise an end flap 34, 34a, hinged to top panel 16 along fold lines 36 and 36a and tuck flaps 38, 38a; 40, 40a, hinged to side wall panels 14 and 18, respectively along fold lines 42, 42a and 44, 44a.

End flap 34 is foldably connected to tuck flap 38 by an integral gusset panel 46 which is hinged to tuck flap 38 along oblique fold line 48 and is also hinged to end flap 34 along oblique fold line 50. End flap 34 likewise is foldably connected to tuck flap 40 by an integral gusset panel 52 which is hinged to tuck flap 40 along oblique fold line 54 and is also hinged to end flap 34 along oblique fold line 56.

Similarly, end flap 34a is foldably connected to tuck flap 38a by an integral gusset panel 46a which is hinged to tuck flap 38a along an oblique fold line 48a and is also hinged to end flap 34a along oblique fold line 50a. End flap 34a likewise is foldably connected to tuck flap 40a by an integral gusset panel 52a which is hinged to tuck flap 40a along fold line 54a which is hinged to tuck flap 40a along fold line 54a and is also hinged to end flap 34a along oblique fold line 56a.

To properly effect the following operation as required it is important that the angle '$\beta$' is less than 90°. The angle '$\alpha$' is a right angle. The other angles at which the fold lines are postioned at the package corners are not critical provided the end panels are held in a desired downward position in the completed package.

Referring now to FIGURE 2 of the drawings, the machine comprises a continuous blank feed conveyor 58 comprising parallel endless chains 60 and 62 which are driven in the direction of arrow 'A'. The blank feed conveyor is provided with a series of arrestor block pairs e.g 64,64a which extend transversely between the chains 60 and 62.

The arrestor block pairs are spaced apart so that a blank is applied, by suitable feed means (not shown), into the space between the blocks and is held between a pair of the blocks with its end panel structures displaced into an upright position with respect to the top and side walls of the blank. The blanks are thus conveyed into a folding section of the machine in which the blank feed conveyor moves directly above and parallel to a container feed path Cp. Container pairs e.g $C^1$,$C^2$;$C^3$,$C^4$ are moved into the folding section in the direction of arrow 'B' and are conveyed therealong by spaced chain driven flight-bars e.g 66,68 as is well known in the art. The blank feed conveyor 58 and the flight bars providing the

container feed are driven in timed relationship so that successive blanks are applied atop successive container pairs and thereafter are moved through the folding section of the machine in synchronism.

As each blank proceeds along the folding section of the machine it first strikes a pair of upwardly inclined static folding plates 70, 72. The folding plates 70,72 are positioned so that they cause the side panels and integral base panels of the blank on each side of the associated containers e.g $C^3$,$C^4$ to be folded upwardly about fold lines 24 and 26 relative to the top panel of the blank. It will be appreciated that when a blank enters the folding section of the machine the end panel structures adjacent the arrestor block extend downwards at the respective ends of the containers to be packaged. By virtue of the particular foldable connection between the tuck flaps and the end flaps, the upward deflection of the side walls automatically causes the tuck flaps to 'flick' inwardly in relation to the ends of the blank so that they lie in overlapping relationship with the sides of the adjacent containers. It will be appreciated that all the tuck flaps are now internal of the side walls and lie in overlapping relationship with respect to their associated gusset panels. (Blank position $P^4$ ).

The leading edges of the base panels 12, 20 of the blank then strike against inwardly and downwardly directed static fold bars 86 and 88 which cause the base panels 12 and 20 progressively to be folded about fold lines 22 and 28 into overlapping relationship beneath the bases of the containers during which the locking tabs 30 are caused to be inserted into registering locking slits 32 to complete the folding operation. (Blank position $P^5$ ).

Thus, it will be appreciated that each of the folding manipulations is effected by a static machine element in order to produce a wrap-around package with end flap panels at each of its ends.

## CLAIMS



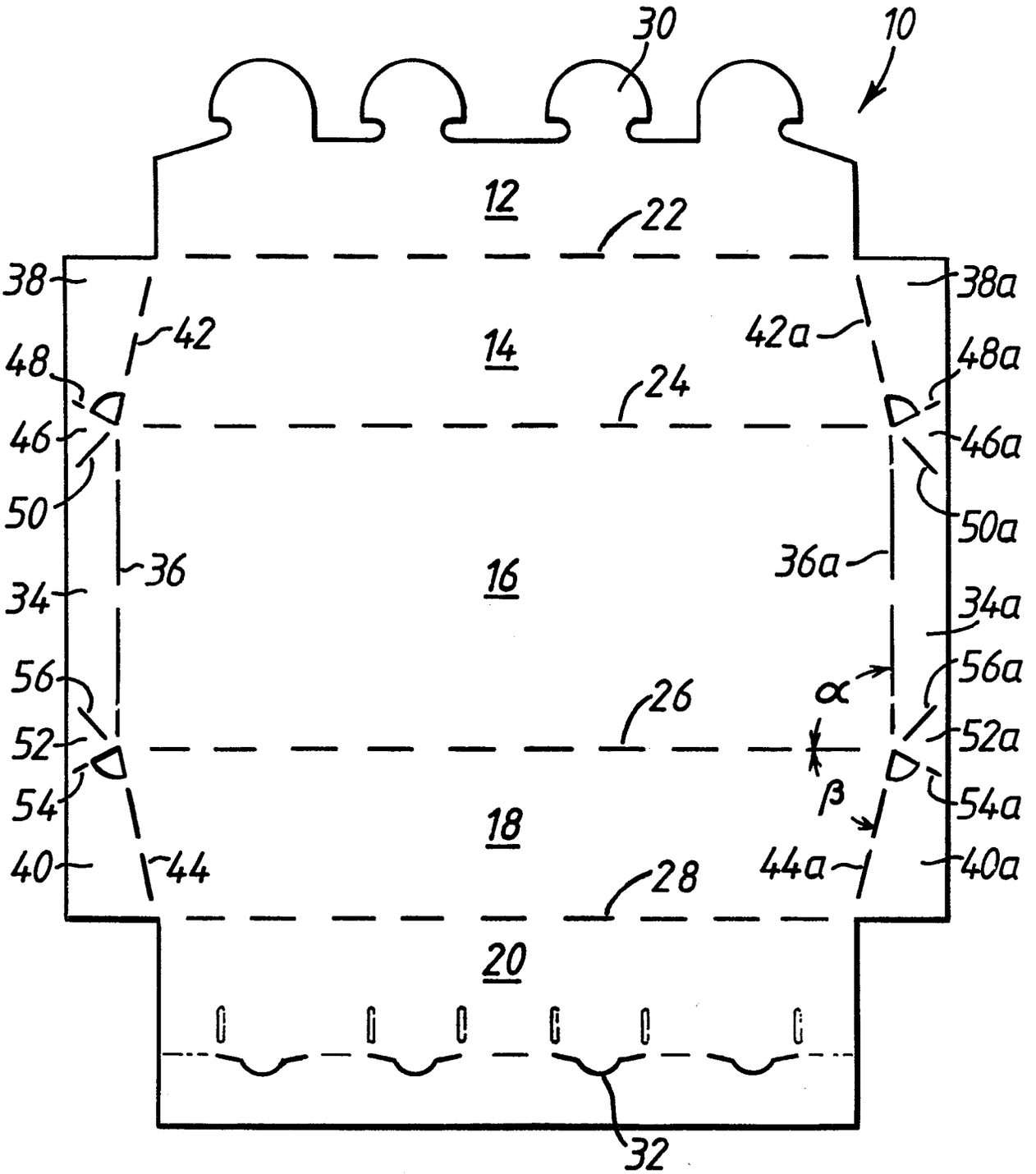
1. A machine for forming a wrap-around package accommodating a plurality of containers and of the type having a top panel (16), side wall panels (14,18) and base panels (12, 20) providing a sleeve-like structure and end panel structures at each end of the sleeve including an end panel (34,34a) and tuck panels (38,38a : 40, 40a) joined to the end panel by gusset panels (46,46a : 52,52a) which machine is characterised by a folding section having a series of static folding elements, comprising folding plates (70,72) to deflect upwardly the side panels of the carton with respect to the top panel thereof in order to cause the tuck flaps to be folded into overlapping relationship with said side panels, static guide bars (74,76) to maintain the tuck flaps in said overlapping relationship, counter-fold bars (78,80) to cause the side wall panels to be folded downwardly with respect to the top panel whereby the tuck flaps are disposed between the containers being packaged and said side walls and static fold bars (86,88) to cause said base panels to be folded into overlapping relationship beneath said containers.

2. A machine according to claim 1, further characterised in that the blank feed conveyor (58) conveys blanks successively through said folding section of the machine, said conveyor including a series of arrestor elements arranged in pairs (64, 64a), the elements of each pair

being spaced so as to hold between them a blank so that its end panel structures are displaced relative to the other panels of the blanks.

3. A method of forming a wrap-around package accomodating a plurality of containers and of the type having a top panel (16), side wall panels (14,18) and base panels (12, 20) providing a sleeve-like structure and end panel structures at each end of the sleeve including an end panel (34,34a) and tuck panels (38,38a : 40,40a) joined to the end panel by gusset panels (46,46a : 52, 52a) which method is characterised by first deflecting upwardly the side panels of the carton with respect to the top panel thereof in order to cause said tuck flaps to be folded into overlapping relationship with said side panels, thereafter causing the side wall panels to be folded downwardly with respect to the top panel whereby the tuck flaps are disposed between the containers being packaged and said side walls and finally causing said base panels to be folded into overlapping relationship beneath said containers.

FIG. 1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38
38a
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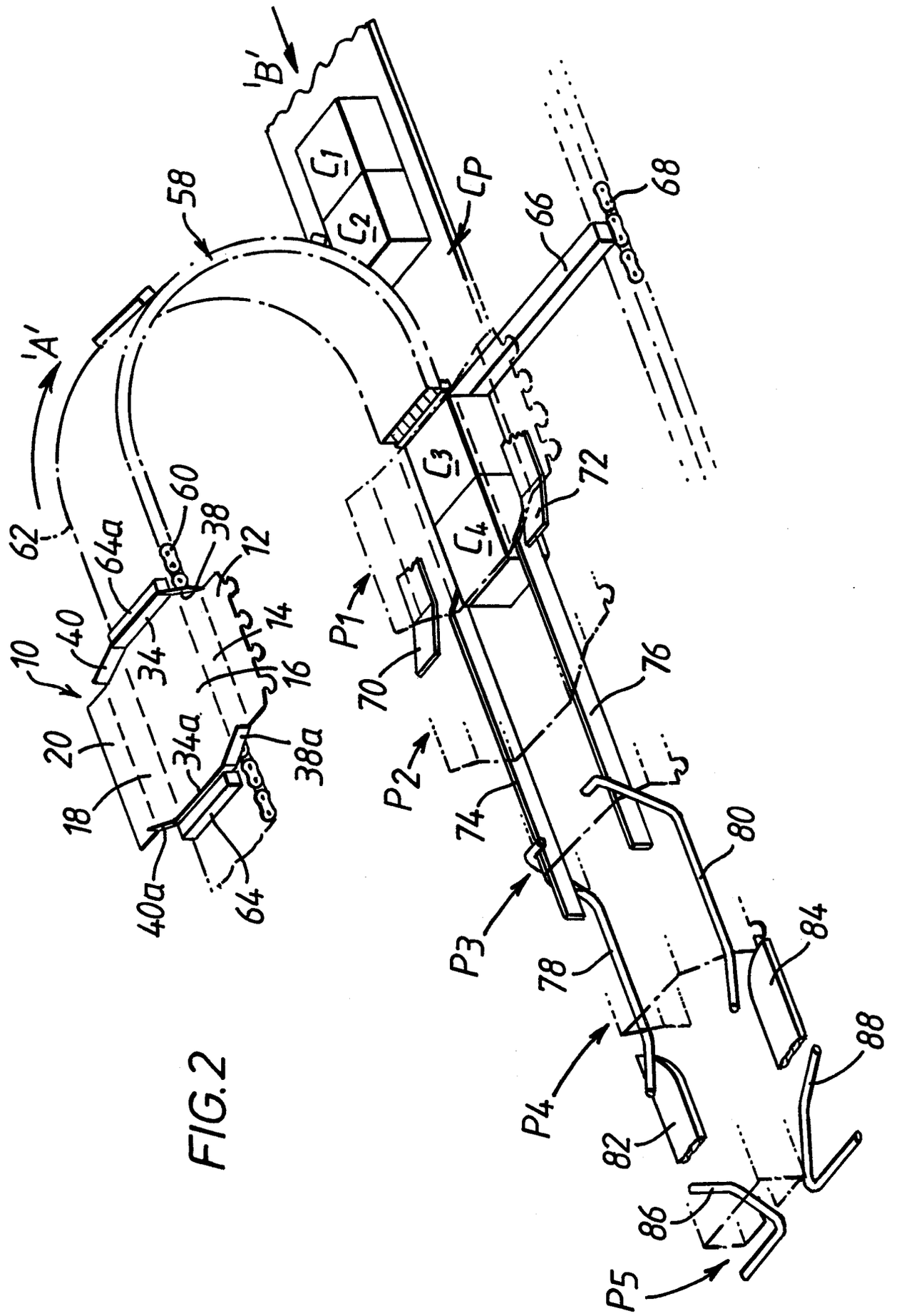
'B'
C1
C2
CP
58
66
68
'A'
62
64a
60
38
12
14
16
10
40
34
20
34a
38a
18
40a
64
C3
C4
72
P1
70
76
P2
74
80
P3
78
84
P4
82
88
86
P5

FIG.2