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(54) Static guiding mechanism for interlocking carton panels.

(57) A mechanism for interlocking a pair of panels (f, m) of a wrap-around type carton (c), includes an elongate central forming block (w) having contoured opposed side faces (16, 18) about which the panels to be interlocked are progressively caused to fold during longitudinal movement relative thereto so that the panels are folded into edge facing relationship with one another. A pair of elongate flanking blocks (V, VI) are disposed adjacent the opposed side faces so as to provide a fissure (22, 26) therebetween through which respective ones of the panels are caused to move. The surface (20, 24) of the flanking blocks juxtaposed the side faces of the forming block are contoured to maintain the panels in close relationship with respect to the central forming block and to induce said progressive folding.

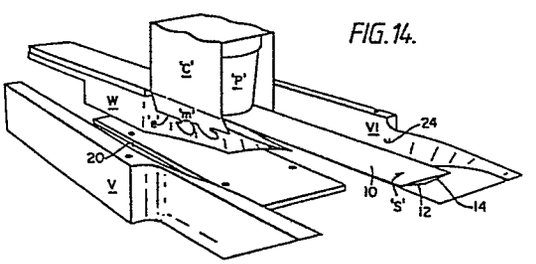

FIG. 14.

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STATIC GUIDING MECHANISM FOR INTERLOCKING CARTON PANELS

This invention relates to a static guiding mechanism for folding and guiding and thence interlocking the bottom panels of a wrap-around type carton.

The invention is particularly concerned with interlocking panels of the sort in which one panel has locking tabs (the male panel) and another panel has locking slits (the female panel) which are interengaged by a relative sliding movement of those panels so that the locking tabs are inserted in the locking slits.

In a known guiding mechanism the panels are folded and guided by means of guide bars and a bottom 'forming' plate positioned between the guide bars so that together the panels are folded into their correct relative positions for locking.

However, in that construction difficulties have arisen in adjusting the mechanism correctly. This mainly is due to the fact that the guide bars have a multiplicity of adjustments. Each guide bar is attached to the frame of a packaging machine at two locations both of which locations are adjustable in three dimensions. Moreover, the forming plate also is adjustable independently of and relative to the guide bars.

The present invention provides a mechanism for interlocking a pair of panels of a wrap-around type carton which mechanism comprises an elongate central forming block having contoured opposed side faces about which the panels to be interlocked are progressively caused to fold during longitudinal movement relative thereto so that the panels are folded into edge facing relationship with one another, and a pair of elongate flanking blocks disposed adjacent said opposed side faces so as to provide a fissure therebetween through which the panels are caused to move; the surfaces of the flanking blocks juxtaposed said side faces of the forming block being contoured to maintain the panels in close relationship with respect to the central forming block and to induce said progressive folding.

An embodiment of the invention will now be described, by way of example, with reference to the accompanying drawings, in which:-

FIGURES 1 to 8 are cross-sectional views taken at successive locations along the length of the mechanism in the direction of travel of a wrap-around carton and show the bottom panels of the carton being progressively folded into position for interlocking.

FIGURES 10 to 13 are successive cross-sectional views similar to FIGURES 1 to 8 but showing the bottom panels being interlocked one with the other, and

FIGURE 14 is a perspective view of the mechanism in which the flanking blocks are shown detached from the central forming block.

Referring to the drawings, the mechanism comprises an elongate 'sword' S which is known per se and which has an upper surface 10 providing a platform on which product to be packaged e.g plastic cup 'p' is supported dur-

ing the panel locking operation. The undersurface of the sword has convergent faces 12, 14, respectively, and gradually reduces in cross-sectional thickness towards one end (in the direction of carton movement when in use) Thus, carton bottom panels progressively are formed about the undersurface of the sword and locked together and thereafter the products to be packaged are transferred from the upper surface of the sword to be supported by the interlocked carton bottom panels as the products and carton leave the free 'thin' end of the sword.

In FIGURES 1 to 13 of the drawings, the female bottom panel of a wrap-around carton 'c' is designated 'f' and includes locking apertures at 'a'. The male bottom panel is designated 'm' and includes locking tabs at its free edge 'e'.

The sword 's' is mounted atop a central elongate forming block 'w' which has side faces 16 and 18 contoured such that they progressively become more divergent along the length of the forming block whose cross-section also diminishes in like manner to the sword.

The mechanism further includes a pair of elongate flanking blocks 'V' and 'V1' respectively. Flanking block 'V' includes contoured inner face 20 which is juxtaposed the side face 16 of central forming block W so as to form a fissure 22 therebetween. Likewise, flanking block 'V1' includes contoured inner face 24 which is juxtaposed the side face 18 of the central forming block w so as to form fissure 26 therebetween.

The inner faces of the flanking blocks 20 and 24 are generally parallel to side faces 16 and 18 respectively, of the forming block and the relative positioning of the blocks is chosen so that the fissures are wide enough to receive the thickness of the carton bottom panels so that they slide relatively freely through the mechanism but at the same time are caused to follow the

folding path defined by the fissures.

The side face 18 of the central forming block includes a stepped portion 28 on which an upturned endmost portion of the female panel slides. The upturned portion is held thus in order to maintain the locking apertures at 'a' in opened condition ready for locking.

The progressive folding of the panels 'm' and 'f' can be seen with particular reference to FIGURES 1 to 8 which show the panels at various stages as they move towards one another whilst also folding to adopt a more horizontal attitude. Of course, this occurs as the angle of the planes passing through the fissures becomes greater with respect to the vertical.

At the position shown by FIGURE 8 the panels 'm' and 'f' are about to leave the forward (that is 'upstream' in terms of carton movement) end of the central forming block at which moment the panels are in position for interlocking. FIGURES 9 to 13 showing the progressive interlocking of the panels about the sword 'w' as the carton continues its forward movement until, when the locking components are properly engaged, the bottom panels (and product) leave the end of the sword. This occurs immediately after the condition shown by FIGURE 13.

The mechanism is particularly but not exclusively, suitable for use with panels having locking tabs and locking slits as disclosed in our co-pending British Patent Application No 8401610. In this event the central forming block may incorporate a static folding device as disclosed in our co-pending British Patent Application No 8416280 for folding over portions of such locking tabs prior to the locking procedure.

CLAIMS

1. A mechanism for interlocking a pair of panels (f, m) of a wrap-around type carton (c), which mechanism is characterised by an elongate central forming block (w) having contoured opposed side faces (16, 18) about which the panels to be interlocked are progressively caused to fold during longitudinal movement relative thereto so that the panels are folded into edge facing relatinship with one another, and by a pair of elongate flanking blocks (V, V1) disposed adjacent said opposed side faces so as to provide a fissure (22, 26) therebetween through which respective ones of the panels are caused to move, the surfaces (20, 24) of the flanking blocks juxtaposed said side faces of the forming block being contoured to maintain the panels in close relationship with respect to the central forming block and to induce said progressive folding.

2. A mechanism according to claim 1, further characterised in that each of the said central forming block and said flanking blocks reduce in cross-sectional thickness towards one and the same end in the intended direction of carton blank movement.

3. A mechanism according to claim 1 or claim 2, further characterised in that said opposed side faces of the forming block progressively become more divergent along the length of the forming block and in that said

juxtaposed surface of the flanking blocks are contoured such that angle of the planes passing through said fissures become greater with respect to the vertical so that the panels adopt a progressively more horizontal attitude as they follow the folding path defined by said fissures.

4. A mechanism according to any of the preceding claims, further characterised in that said flanking blocks extend beyond the downstream end of the central forming block in terms of the direction of carton blank movement.

5. A mechanism according to any of the preceding claims, further characterised in that an elongate platform (S) is disposed atop the central forming block on which product to be packaged in the carton is supported during the panel locking operation, said platform gradually reducing in cross-sectional thickness towards one end in the intended direction of carton blank movement.

6. A mechanism according to claim 5, further characterised in that said platform extends beyond said central forming block and is substantially co-extensive with said flanking blocks in the intended direction of carton blank movement and in that said platform has an undersurface provided by a pair of convergent faces about which said carton panels progressively are folded and locked together.

7. A mechanism according to any of the preceding claims further characterised in that the central forming block incorporates a static folding device as defined by claim 1 of British Patent Application No 8416280.

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FIG.1.

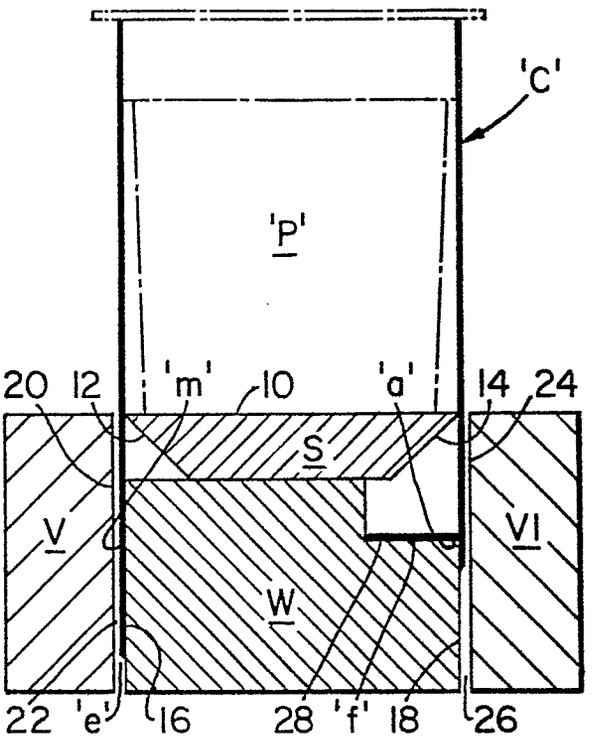

FIG.2.

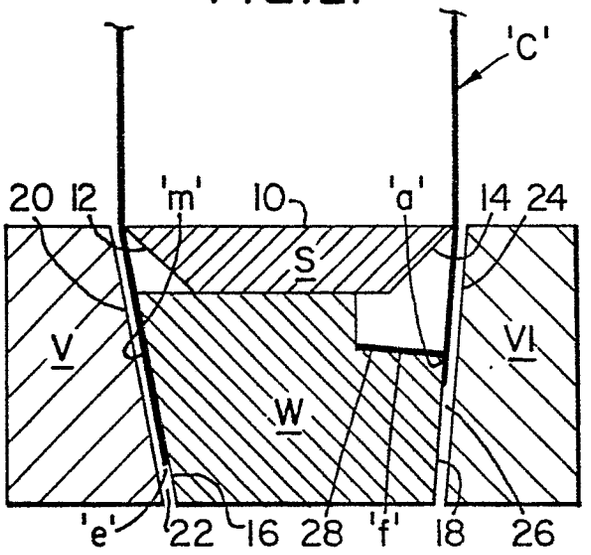

FIG.3.

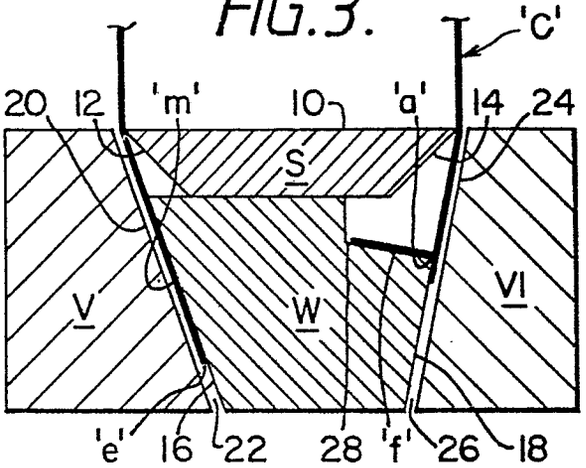

FIG.4.

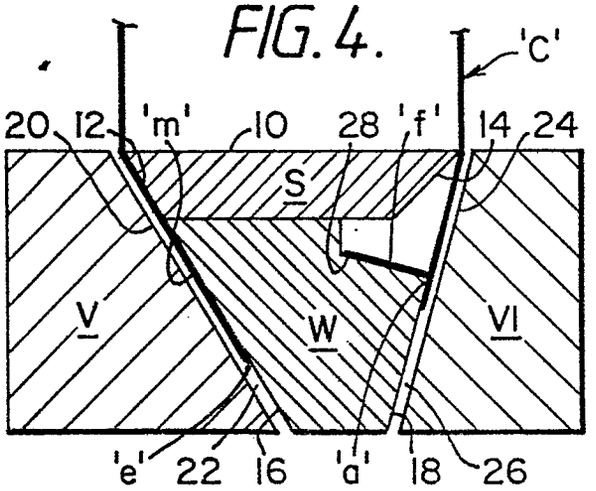

FIG.5

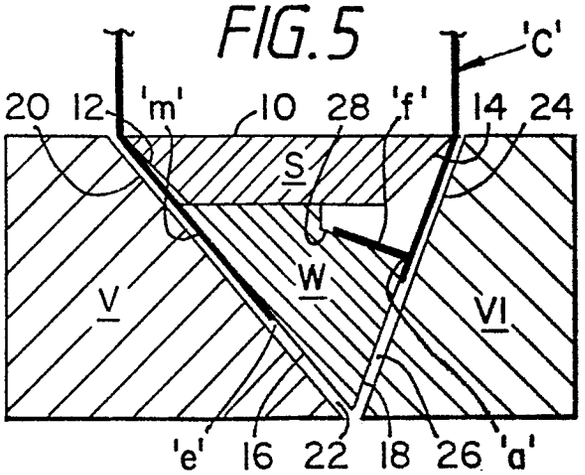

FIG.6.

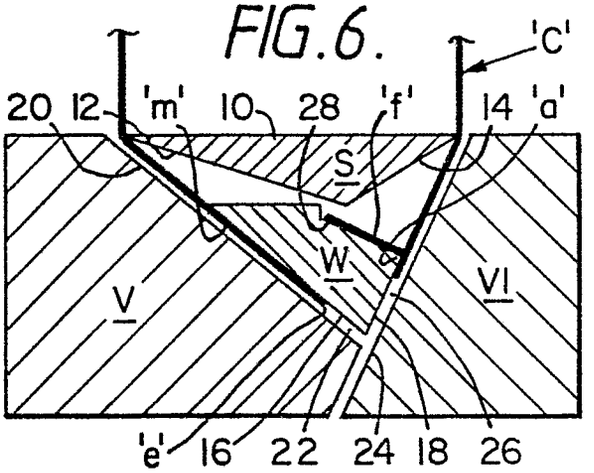

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FIG. 7.

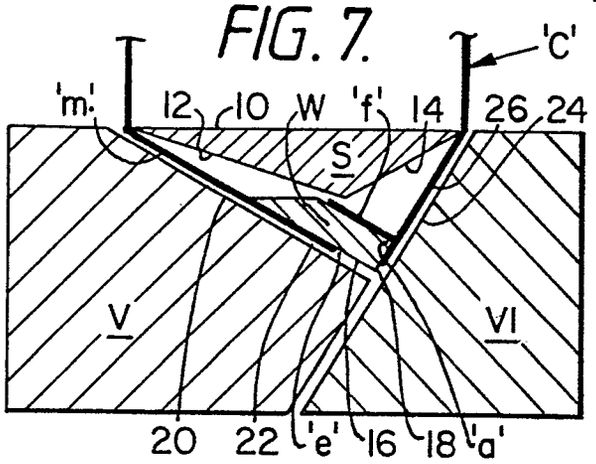

FIG. 8.

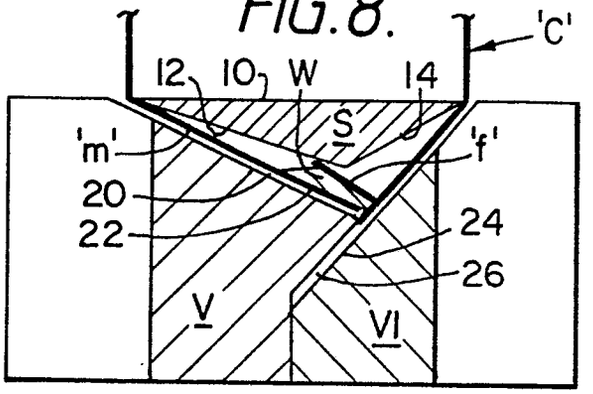

FIG. 9.

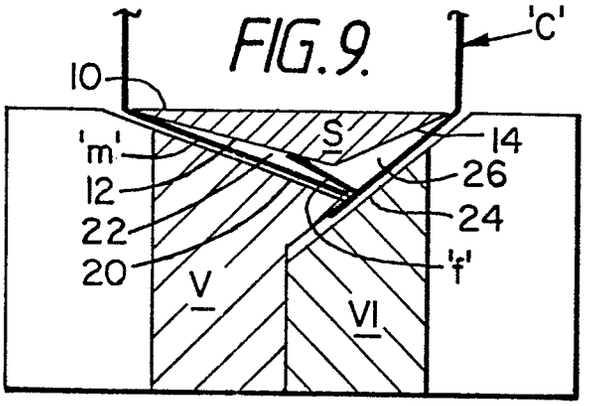

FIG. 10.

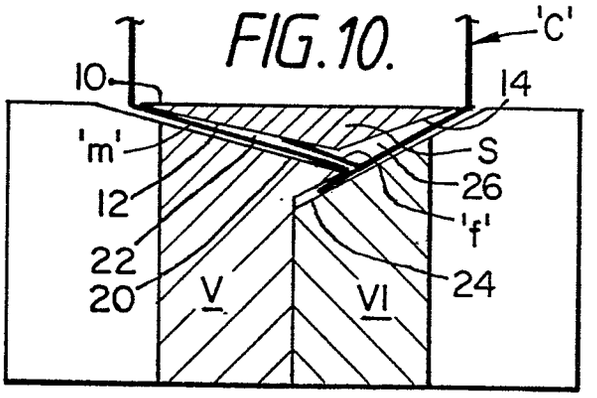

FIG. 11.

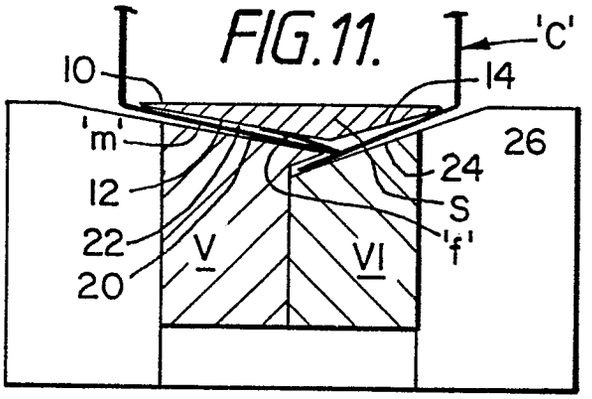

FIG. 12.

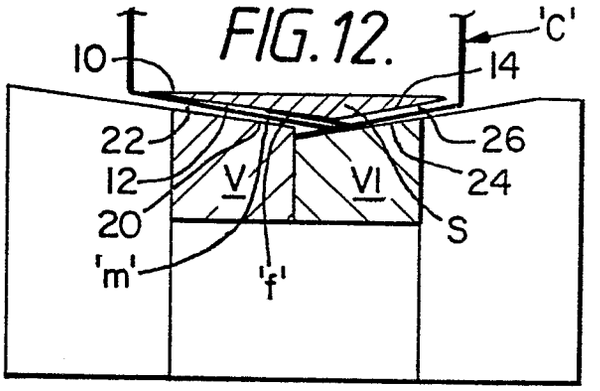

FIG. 13.

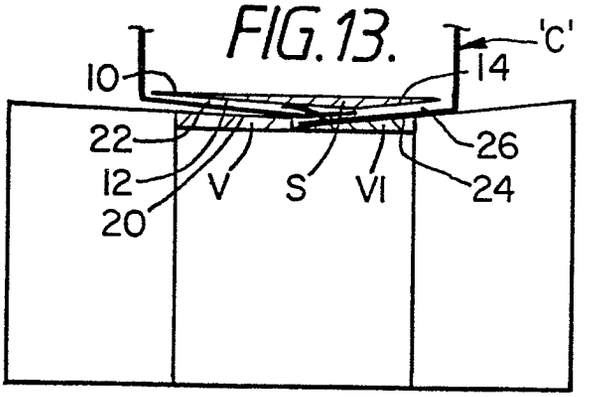

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FIG. 14.