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⑤④ **Static guiding mechanism for interlocking carton panels.**

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⑤⑥ References cited:
US-A-2 780 900
US-A-3 049 847
US-A-3 061 985

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Description

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.

US-A-2 780 900 discloses a mechanism for interlocking a pair of panels of a wrap-around type carton, which mechanism comprises an elongate central forming block (149) having 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 by a tunnel (148) the interior of which is disposed adjacent said opposed side faces so as to provide a fissure therebetween through which respective ones of the panels are caused to move, the surfaces of the tunnel 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.

In the present invention two separate flanking blocks are utilised to form a pair of fissures and to receive respective ones of the carton base panels. The forming block of the present invention includes a stepped portion on which an upturned portion of one of the base panels is held in order to maintain locking apertures formed in that panel in opened condition to facilitate locking the base panels together. Moreover, in the present construction an elongate platform is provided atop the central forming block on which product to be packaged is supported during the base panel locking operation.

The present invention provides a mechanism for interlocking a pair of panels (f, m) of a wrap-around type carton (c), which mechanism comprises 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, 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 and wherein 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 and extending beyond said central forming block, said platform being substantially co-extensive with said flanking blocks in the intended direction of carton blank movement and having an undersurface provided by a pair of convergent faces (12, 14) about which said carton panels progressively are folded and locked together, said central forming block including a longitudinally extending stepped portion (28) on which an upturned portion of one of said pair of panels is held in order to maintain locking apertures (a) formed in that panel in opened condition to facilitate locking said panels together.

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 9 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 during 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 convergent along the length of the forming block whose cross-section also diminishes in like manner to that of 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 end-most 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 downstream 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 's' 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 comprises 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, 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 and wherein 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 and extending beyond said central forming block, said platform being substantially coextensive with said flanking blocks in the intended direction of carton blank movement and having an undersurface provided by a pair of convergent faces (12, 14) about which said carton panels progressively are folded and locked together, said central forming block, including a longitudinally extending stepped portion (28) on which an upturned portion of one of said pair of panels is held in order to maintain locking apertures (a) formed in that panel in opened condition to facilitate locking said panels together.

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 convergent 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.

Patentansprüche

1. Vorrichtung zum Verbinden eines Paares von Flächenabschnitten (f, m) einer Kartonverpackung vom Falthüllentyp (c), welche einen länglichen zentralen Formblock (w) mit konturierten, einander abgewandten Seitenflächen (16, 18) aufweist, um welche die miteinander zu verbindenden Flächenabschnitte während einer relativ zu den Seitenflächen erfolgenden Längsbewegung zunehmend gefaltet werden, so daß die Flächenabschnitte in gegenseitige Gegenüberlage ihrer Kanten gefaltet werden, sowie ein Paar länglicher Flankierungsblöcke (V, VI), die benachbart von den einander abgewandten Seitenflächen angeordnet sind, um dazwischen jeweils einen Spalt (22, 26) zu schaffen, durch welchen sich die jeweiligen Flächenabschnitte bewegen müssen, wobei die Oberflächen (20, 24) der Flankierungs-

blöcke, welche den Seitenflächen des Formblocks gegenüberliegen, in einer Weise konturiert sind, daß sie die Flächenabschnitte in enger Verbindung zu dem zentralen Formblock halten und das zunehmende Falten bewirken, und bei welcher auf dem zentralen Formblock eine längliche Plattform (S) angeordnet ist, von der in der Kartonverpackung zu verpackendes Produkt während des Verbindungsvorganges für die Flächenabschnitte getragen wird, bei der die Plattform sich in ihrer Querschnittsdicke zu einem Ende hin in der vorgesehenen Bewegungsrichtung der Verpackungszuschnitte graduell verringert, sich über den zentralen Formblock hinaus erstreckt und im wesentlichen koextensiv mit den Flankierungsblöcken in der vorgesehenen Bewegungsrichtung der Verpackungszuschnitte ist und eine durch ein Paar von Konvergenzflächen (12, 14) gebildete Unterseite aufweist, über welche die Flächenabschnitte zunehmend gefaltet und miteinander verbunden werden, wobei der genannte zentrale Formblock einen sich in Längsrichtung erstreckenden abgestuften Teil (28) einschließt, auf dem ein hochgestellter Abschnitt eines der Flächenabschnitte des Paares gehalten wird, um in diesem Flächenabschnitt ausgebildete Verschlusöffnungen (a) in offenem Zustand zu halten, um ein Verbinden der Flächenabschnitte miteinander zu erleichtern.

2. Vorrichtung gemäß Anspruch 1, dadurch gekennzeichnet, daß sich die Querschnittsdicke sowohl des zentralen Formblocks als auch der Flankierungsblöcke zu demselben Ende hin in der beabsichtigten Richtung der Bewegung der Verpackungszuschnitte verringert.

3. Vorrichtung gemäß Anspruch 1 oder 2, dadurch gekennzeichnet, daß die einander abgewandten Seitenflächen des Formblocks entlang dessen Länge konvergenter werden und daß die gegenüberliegenden Flächen der Flankierungsblöcke so konturiert sind, daß der Winkel der durch die genannten Spalte verlaufenden Ebene in der Vertikale größer wird, so daß die Flächenabschnitte eine zunehmend horizontalere Haltung annehmen, während die dem durch die genannten Spalte begrenzten Weg folgen.

4. Vorrichtung gemäß irgendeinem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß die Flankierungsblöcke über das untere Ende des zentralen Formblocks in bezug auf die Richtung der Bewegung des Verpackungszuschnitts hinausgehen.

Revendications

1. Mécanisme adapté pour verrouiller entre eux deux panneaux (f, m) d'un carton (C) du type carton d'enveloppement, lequel mécanisme est caractérisé par le fait qu'il comprend un bloc de formage et de façonnage (W), central et allongé, ayant des faces latérales opposées (16, 18) profilées sur lesquelles les panneaux devant être verrouillés entre eux sont progressivement amenés à se plier pendant un déplacement longitudinal par rapport à ces faces et de façon que ces

panneaux soient repliés pour que leurs bords viennent en regard l'un de l'autre, deux blocs de flanc (V, VI) allongés, disposés adjacents auxdites faces latérales opposées (16, 18) et de manière à fournir des fentes (22, 26) entre eux et ces dernières dans chacune desquelles un des panneaux est amené à se déplacer, les faces (20, 24) des blocs de flanc juxtaposées auxdites faces latérales (16, 18) du bloc de formage (W) étant profilées pour maintenir les panneaux en position rapprochée par rapport à ce bloc de formage et pour provoquer leur repliage progressif, ce bloc de formage (W) étant surmonté par une plateforme allongée (S) disposée sur son sommet et sur laquelle le produit devant être emballé dans le carton d'enveloppement (C) est supporté pendant l'opération de verrouillage entre eux des panneaux (f, m), cette plateforme (S) ayant une section transversale qui se trouve graduellement réduite en épaisseur dans le sens de déplacement de l'ébauche du carton d'enveloppement et en direction de son extrémité qui est située au-delà de celle du bloc de formage (W), cette plateforme s'étendant sensiblement sur la même longueur que celle des deux blocs de flanc (V, VI) dans le sens du déplacement de l'ébauche de carton et ayant une surface de dessous sous forme de deux faces convergentes (12, 14) sur lesquelles les panneaux du carton sont progressivement repliés et verrouillés ensemble, le bloc de formage central (W) étant pourvu d'une partie en gradins (28), s'étendant longitudinalement, sur laquelle une partie relevée de l'un des deux panneaux est soutenue en vue de maintenir en position ouverte les ouvertures de verrouillage (a) formées dans ce panneau, afin de faciliter le verrouillage des deux panneaux entre eux.

2. Mécanisme selon la revendication 1, caractérisé par le fait que le bloc de formage et de façonnage central (W) et les blocs de flanc (V, VI) ont leur section transversale réduite en épaisseur en direction de leurs mêmes extrémités et dans le sens du déplacement de l'ébauche de carton d'enveloppement.

3. Mécanisme selon l'une ou l'autre des revendications 1 ou 2, caractérisé par le fait que les faces latérales opposées (16, 18) du bloc de formage deviennent progressivement plus convergentes sur la longueur de ce bloc et que les faces (20, 24) des blocs de flanc, juxtaposées à ces faces latérales opposées (16, 18), sont profilées de manière que l'angle formé entre les plans passant dans les fentes (22, 26), situées entre ces faces, devienne de plus en plus grand par rapport à la verticale afin que les panneaux prennent progressivement une position plus horizontale que celle du chemin de repliage défini par ces fentes.

4. Mécanisme selon l'une quelconque des revendications 1 à 3, caractérisé par le fait que les blocs de flanc (V, VI) se prolongent au-delà de l'extrémité aval du bloc de formage (W), cette extrémité étant définie par le sens de déplacement de l'ébauche du carton d'enveloppement.

FIG.1.

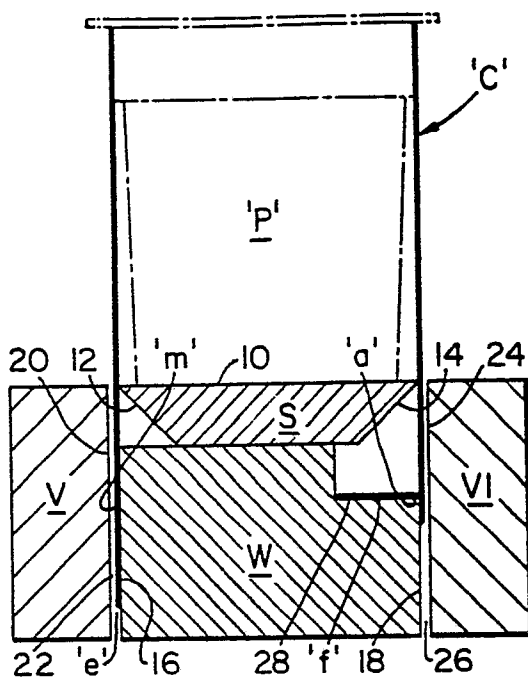


FIG. 2.

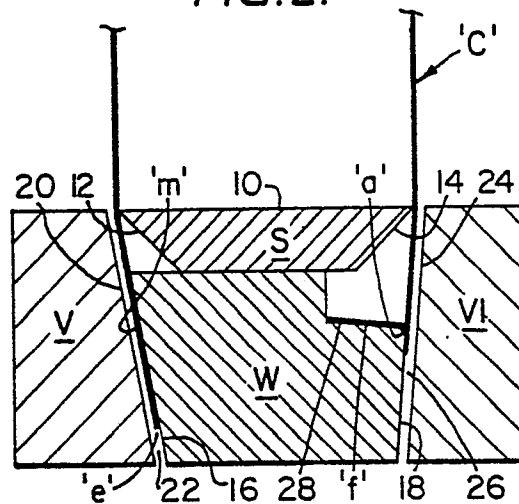


FIG.3.

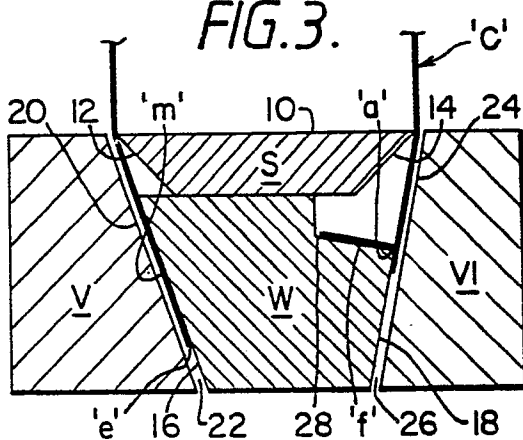


FIG. 4.

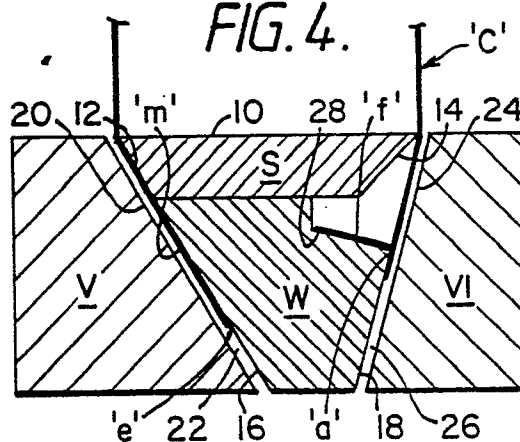


FIG. 5

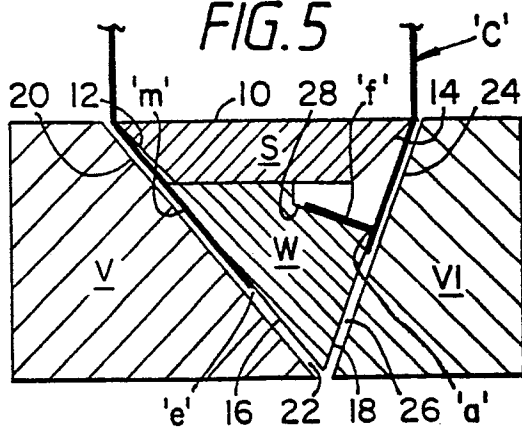
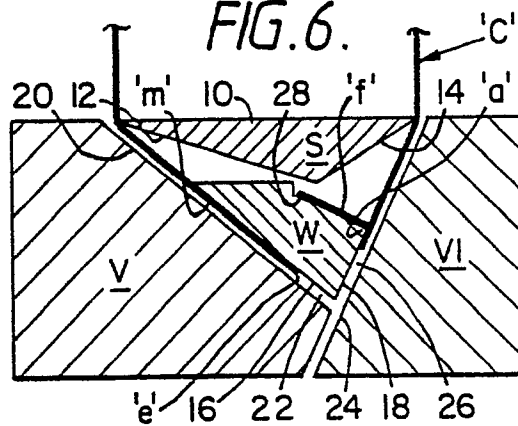


FIG. 6.



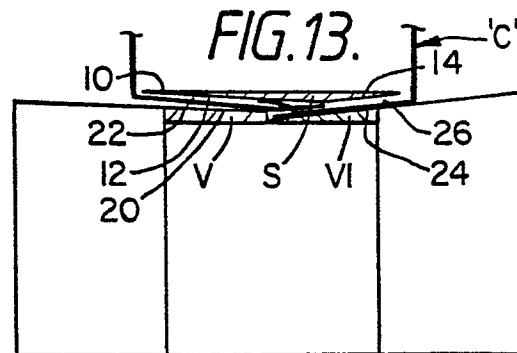
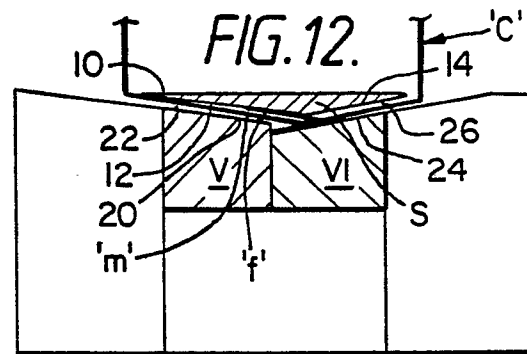
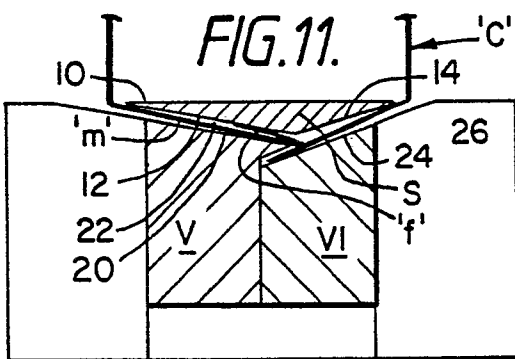
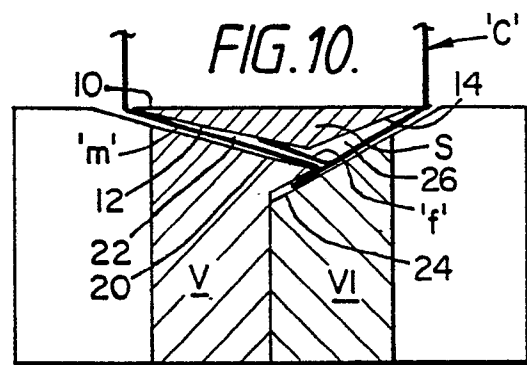
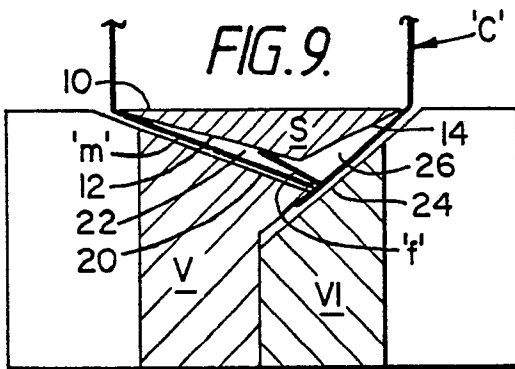
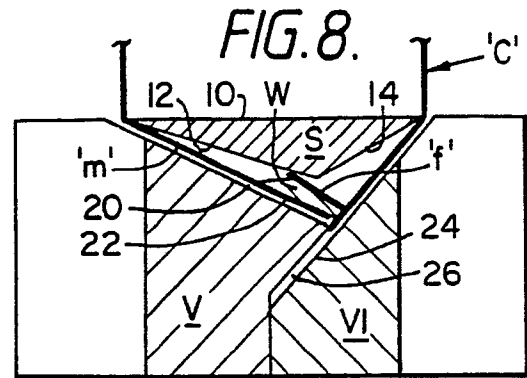
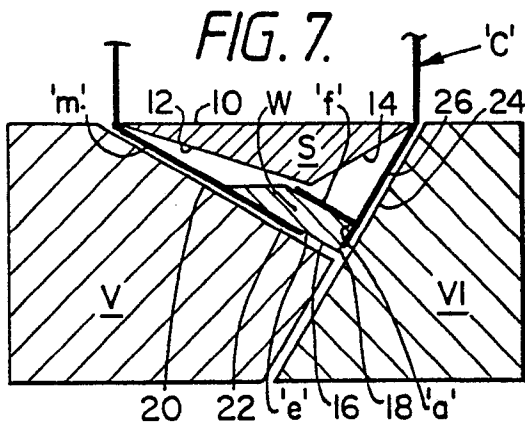


FIG. 14.

