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(54) APPARATUS AND METHOD FOR PACKAGING ARTICLES INTO FLEXIBLE BAGS

VORRICHTUNG UND VERFAHREN ZUR VERPACKUNG VON ARTIKELN IN FLEXIBLE BEUTEL
APPAREIL ET PROCEDE POUR L'EMBALLAGE D'ARTICLES DANS DES SACS SOUPLES

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EP 2 534 053 B1

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DescriptionField of the invention

[0001] The present invention refers to the packaging of various types of articles into flexible plastic bags formed starting from a continuous web created by two superimposed flat layers mutually joined along at least one longitudinal edge.

[0002] Use of the term "plastic material" in referring to such webs is not intended to be limiting, in that it intends films of materials such as polyethylene and the like, but also coupled paper/plastic films, poly-coated paper or other poly laminates, provided that they are at least partially electrically insulating, for reasons that will be clarified below.

State of the prior art

[0003] From European patent EP-0926069B1 by the same Applicant a machine is known for packaging articles into bags of the above-said type comprising a fill-in station to which a continuous web is supplied intermittently and then cut transversely to form a desired length of web. A pair of heads arranged on opposite sides of the web and movable transversely closer together or farther apart carrying means for grasping and spreading apart the cut edges of the web, spacing them to allow introduction of the articles. These grasping means including, for each edge, an abutment member and a clamp member movable between a spaced open position and a juxtaposed closed position relative to the abutment member, for temporarily retaining the respective edge.

[0004] Although operation of the machines realized by the Applicant in practicing the above-said patent EP-0926069B1 is fully satisfactory, it was discovered in practice that in particular situations an inconvenience may occur concerning the fact that an edge of the web length arranged in correspondence to the fill-in station can occasionally escape from the corresponding grasping means both during the spreading phase and during the introduction of the articles. This requires almost constant visual monitoring by an operator, to permit manual interruption of the operation of the machine in such case and prevent dispersion of the articles outside of the bags.

[0005] US 4244159 discloses an apparatus according to the preamble of claim 1.

[0006] US-3864894A discloses an apparatus for clamping the mouth of a deformable bag so as to hold it open during filling, employing finger assemblies provided with detector devices in order to check the correct position of the bag and stop the machine if the position is incorrect. These detector devices consist of conventional micro switches carried by the finger assemblies grasping the walls of the bags.

Summary of the invention

[0007] The object of the present invention is that of providing a simple, yet efficient and functional solution for detecting possible anomalous situations for which, as was stated, no visual monitoring or manual interruption of the operation of the machine are required.

[0008] According to the invention, such object is achieved by an apparatus according to claim 1 and a method according to claim 4.

[0009] In operation the presence of the edge of the web length, which as was stated is of an electrically insulating material, maintains the switch open. On the contrary, absence of the web length edge causes closure of the switch and consequently the intervention of the electronic control unit, which envisions the automatic stopping of the operation of the machine.

Brief description of the drawings

[0010] The invention will now be described in detail with reference to the annexed drawings, provided by way of non-limiting example only, in which:

figure 1 is a schematic view in side elevation showing the fill-in station of a packaging machine according to the invention in a first operative position, and in which the relative electrical connections to the control unit are indicated diagrammatically, and figures 2 and 3 are views analogous to figure 1 that represent the fill-in station in a second operative condition and in two different situations, respectively.

Detailed description of the invention

[0011] With reference to figure 1, the fill-in station of the packaging machine according to the invention is of the type generally known from the previously cited patent EP-0926069B1, and for that reason will not be described in detail. For the purpose of the present invention it is sufficient to explain that it comprises two operating heads 1, 2 through which a continuous web of flexible heat-sealable material is supplied, typically plastic material, in all cases electrically insulating. The web can be, for example constituted by a flattened tubular film formed by two superimposed layers mutually joined along at least one lateral edge.

[0012] The fill-in station is provided with heat-sealing and cutting means, known and for simplicity not illustrated, by means of which sacks or bags (S) are formed periodically from the continuous web supplied intermittently to the fill-in station, first closed below, then filled from above with articles to be packaged, and finally sealed above after filling.

[0013] For the filling phase each bag S open above, is grasped and held in correspondence to its upper edges by the two heads 1, 2, maintained reciprocally juxtaposed in the condition represented in figure 1. Then the two

heads 1, 2 are reciprocally spaced apart transversally, for example moving head 2 with respect to head 1 as represented in figures 2 and 3, so to spread apart the edges of the bag S and allow introduction of articles.

[0014] For such purpose, each of the heads 1, 2 is provided with respective grasping means including a lower abutment member 3; 4 and an upper clamp 5, 6 movable vertically with respect to the corresponding lower abutment member 3, 4 between the raised open position, represented in figure 1, and the lowered closed position, represented in figures 2 and 3.

[0015] The abutments 3, 4 are conveniently constituted by adhesive pads apt to adhere to the edges of the bag S in the reciprocally juxtaposed condition of the two heads 1, 2 to allow then pinching of the relative clamp member 5, 6 following their movement from the raised to the lowered position, and the successive spreading apart by the reciprocal separation of the heads 1 and 2.

[0016] According to the distinctive characteristic of the invention each abutment member 3, 4 with the respective movable clamp member 5, 6 of each head 1, 2 defines a detector of the presence/absence of the corresponding edge of the bag S. In a particularly simple yet functional and reliable preferred embodiment, such detector is electrical and is more precisely constituted by a switch, the fixed contact of which is constituted by abutment member 3, 4 (that is, by an electrically conductive part thereof) and the movable contact of which is constituted by the clamp member 5, 6 (that is, by an electrically conductive part thereof).

[0017] The contacts 3, 5 and 4, 6 of each switch are connected electrically to the respective inputs of an electronic control unit 7 designed to control the operation of the machine.

[0018] In operation, when spreading apart of the edges of the bag S to allow introduction of the articles to be packaged, situations of the type represented in figures 2 and 3 can occur.

[0019] In the case of figure 3, which represents the normal operating condition, each of the edges of the bag S are correctly retained between the abutment members 3, 4 and the respective clamp members 5, 6, for which the bag S can be opened without problems. In such case the switches defined between the abutment 3 and the clamp 5 on head 1 and between the abutment 4 and the clamp 6 on head 2 are open, for which the relative electrical connection is interrupted by the presence of such edges. In this case, the control unit 7 does not intervene.

[0020] Instead, figure 2 illustrates an anomalous situation in which one of the edges, in this case the one corresponding to head 1, was not properly retained between the abutment 3 and the clamp 5, that is, for some reason it was disengaged. In that case, the switch constituted by the contacts associated with the abutment 3 and the clamp 5 close, causing the intervention of the electronic control unit 7.

[0021] The opening or closing of one and/or the other switch is detected by the control unit 7, which is then able

to discriminate between situations of correct and anomalous operation. In the second case the unit 7, in addition to generating a possible acoustic and/or visual alarm signal, automatically interrupts the operation of the machine and in particular the supply of articles into the bag S, the edges of which are not correctly held by heads 1 and/or 2.

[0022] Naturally, without prejudice to the underlying principle of the invention, the details of construction and the embodiments may vary, even appreciably, with reference to what has been described and illustrated, without departing from the scope of the invention as defined by the claims that follow.

[0023] Thus, for example, the detector of the presence/absence of the edges of the bag S associated with the heads 1, 2 may be constituted by different sensors, instead of electrical switches, also of more sophisticated types, apt to detect for example field variations or other electrical characteristics according to whether the edges of the bag S are correctly retained between the abutments 3, 4 and the relative clamps 5, 6.

Claims

1. Apparatus for the packaging of articles within flexible bags (S) made of plastic material starting from a continuous web formed by two superimposed flat layers mutually joined along at least one longitudinal edge, comprising a fill-in station (1, 2) at which the continuous web is delivered and transversely cut so as to form a web length of a desired size, and grasp means (3, 5; 4, 6) to retain and spread apart the upper edges of the web length to space them from each other enabling introduction of the articles into the bag (S), and wherein said grasp means include for each one of said edges an abutment member (3, 4) and a clamp member (5, 6) movable between a spaced opening position and an adjacent closed position relative to the abutment member (3, 4) for temporarily retaining the respective edge, **characterized in that** said grasp means (3, 4; 5, 6) also constitute a detector device to detect the presence or the absence of the corresponding edge of the web length, said detector device consisting of electrical switches whose contacts are constituted by or are part of said abutment members (3, 4) and clamp members (5, 6) and being operatively connected to a control unit (7).
2. Apparatus according to claim 1, **characterized in that** said control unit (7) is designed to interrupt operation of the machine when said detector device (3, 5; 4, 6) detects the absence of the edge of the web length.
3. Apparatus according to any of the preceding claims, **characterized in that** each abutment member (3, 4) comprises an adhesive pad.

4. Method for the packaging of articles within flexible bags (S) made of plastic material, comprising the steps of supplying a continuous web formed by two superimposed flat layers mutually joined along at least one longitudinal edge to a fill-in station (1, 2), cutting said continuous web transversely so as to form a web length of a desired size, providing grasp means (3, 5; 4, 6), wherein said grasp means (3, 5; 4, 6) include for each one of said edges an abutment member (3, 4) and a clamp member (5, 6) movable between a spaced opening position and an adjacent closed position relative to the abutment member (3, 4) for temporarily retaining the respective edge, grasping the upper edges of said web length and spreading them apart from each other to carry out introduction of the articles to be packaged, **characterized in that** during the step of grasping and spreading apart the upper edges of the web length, the presence or the absence of each edge is detected, so as to automatically enable or inhibit operation of the machine performing the method, by electrical switches whose contacts are constituted by or are part of said abutment members (3, 4) and clamp members (5, 6).

Patentansprüche

1. Vorrichtung zur Verpackung von Artikeln in flexiblen Beuteln (S) aus Kunststoff, ausgehend von einer Endlosbahn, die durch zwei übereinanderliegende flache Lagen, die an zumindest einer Längskante miteinander verbunden sind, ausgebildet ist, umfassend eine Befüllstation (1, 2), an der die Endlosbahn bereitgestellt und quer geschnitten wird, um eine Bahnlänge einer gewünschten Größe auszubilden, und Greifmittel (3, 5; 4, 6), um die oberen Bahnlängenkanten zu halten und auseinanderzuspreizen, um sie voneinander zu beabstanden und so die Einführung der Artikel in den Beutel (S) zu ermöglichen, und wobei die Greifmittel für jede der Kanten ein Anschlagbauteil (3, 4) und ein Klemmbauteil (5, 6), das zwischen einer in Bezug auf das Anschlagbauteil (3, 4) beabstandeten offenen Position und einer anliegenden geschlossenen Position bewegbar ist, um die jeweilige Kante vorübergehend zu halten, beinhalten, **dadurch gekennzeichnet, dass** die Greifmittel (3, 4; 5, 6) ferner eine Erfassungsvorrichtung bilden, um das Vorhandensein oder das Nichtvorhandensein der entsprechenden Bahnlängenkante zu erfassen, wobei die Erfassungsvorrichtung aus elektrischen Schaltern besteht, deren Kontakte durch die Anschlagbauteile (3, 4) und Klemmbauteile (5, 6) gebildet oder ein Teil derselben sind und mit einer Steuereinheit (7) wirkverbunden sind.
2. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die Steuereinheit (7) gestaltet ist,

den Betrieb der Maschine zu unterbrechen, wenn die Erfassungsvorrichtung (3, 5; 4, 6) das Nichtvorhandensein der Bahnlängenkante erfasst.

3. Vorrichtung nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** jedes Anschlagbauteil (3, 4) ein Klebekissen umfasst.
4. Verfahren zur Verpackung von Artikeln in flexiblen Beuteln (S) aus Kunststoff, umfassend die Schritte des Bereitstellens einer Endlosbahn, die durch zwei übereinanderliegende flache Lagen, die entlang zumindest einer Längskante miteinander verbunden sind, ausgebildet ist, an eine Befüllstation (1, 2), das quergerichtete Schneiden des Endlosbands, um eine Bahnlänge einer gewünschten Größe auszubilden, das Bereitstellen von Greifmitteln (3, 5; 4, 6), wobei die Greifmittel (3, 5; 4, 6) für jede der Kanten ein Anschlagbauteil (3, 4) und ein Klemmbauteil (5, 6), das zwischen einer in Bezug auf das Anschlagbauteil (3, 4) beabstandeten offenen Position und einer anliegenden geschlossenen Position bewegbar ist, um die jeweilige Kante vorübergehend zu halten, beinhalten, das Ergreifen der oberen Bahnlängenkanten und das Auseinanderspreizen derselben, um die Einführung der zu verpackenden Artikel auszuführen, **dadurch gekennzeichnet, dass** während des Schritts des Ergreifens und Auseinanderspreizens der oberen Bahnlängenkanten das Vorhandensein bzw. das Nichtvorhandensein jeder Kante erfasst wird, um den Betrieb der Maschine, die das Verfahren ausführt, durch elektrische Schalter, deren Kontakte durch die Anschlagbauteile (3, 4) und Klemmbauteile (5, 6) gebildet oder Teil derselben sind, automatisch freizugeben oder zu sperren.

Revendications

1. Appareil pour l'emballage d'articles à l'intérieur de sacs souples (S) réalisés en matière plastique, à partir d'une bande continue formée par deux couches plates superposées mutuellement assemblées le long d'au moins un bord longitudinal, comprenant une station de remplissage (1, 2) à laquelle la bande continue est distribuée et transversalement coupée afin de former une longueur de bande d'une taille souhaitée, et des moyens de préhension (3, 5 ; 4, 6) pour retenir et écarter les bords supérieurs de la longueur de bande afin de les espacer l'un de l'autre, permettant l'introduction des articles dans le sac (S), et dans lequel lesdits moyens de préhension comprennent pour chacun desdits bords, un élément de butée (3, 4) et un élément de serrage (5, 6) mobile entre une position d'ouverture espacée et une position fermée adjacente par rapport à l'élément de butée (3, 4) pour retenir temporairement le bord res-

pectif, **caractérisé en ce que** lesdits moyens de préhension (3, 4 ; 5, 6) constituent également un dispositif de détecteur pour détecter la présence ou l'absence du bord correspondant de la longueur de bande, ledit dispositif de détecteur se composant de commutateurs électriques dont les contacts sont constitués par ou font partie desdits éléments de butée (3, 4) et des éléments de serrage (5, 6) et étant opérationnellement raccordés à une unité de commande (7).

2. Appareil selon la revendication 1, **caractérisé en ce que** ladite unité de commande (7) est conçue pour interrompre le fonctionnement de la machine lorsque ledit dispositif de détecteur (3, 5 ; 4, 6) détecte l'absence du bord de la longueur de bande.
3. Appareil selon l'une quelconque des revendications précédentes, **caractérisé en ce que** chaque élément de butée (3, 4) comprend un coussinet adhésif.
4. Procédé pour l'emballage d'articles à l'intérieur de sacs souples (S) réalisés en matière plastique, comprenant les étapes consistant à amener une bande continue formée par deux couches plates superposées mutuellement assemblées le long d'au moins un bord longitudinal jusqu'à une station de remplissage (1, 2), couper ladite courroie continue transversalement afin de former une longueur de bande d'une taille souhaitée, prévoir des moyens de préhension (3, 5 ; 4, 6), dans lequel lesdits moyens de préhension (3, 5 ; 4, 6) comprennent pour chacun desdits bords, un élément de butée (3, 4) et un élément de serrage (5, 6) mobile entre une position d'ouverture espacée et une position fermée adjacente par rapport à l'élément de butée (3, 4) afin de retenir temporairement le bord respectif, saisir les bords supérieurs de ladite longueur de bande et les écarter l'un par rapport à l'autre pour procéder à l'introduction des articles à emballer, **caractérisé en ce que** pendant l'étape de préhension et d'écartement des bords supérieurs de la longueur de bande, la présence ou l'absence de chaque bord est détectée, afin de permettre ou d'empêcher automatiquement le fonctionnement de la machine réalisant le procédé, grâce à des commutateurs électriques dont les contacts sont constitués par ou font partie desdits éléments de butée (3, 4) et des éléments de serrage (5, 6).

FIG. 1

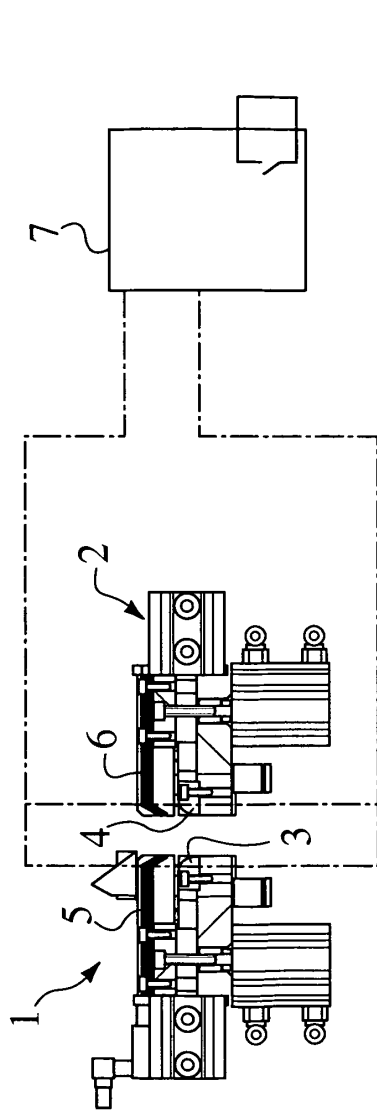


FIG. 2

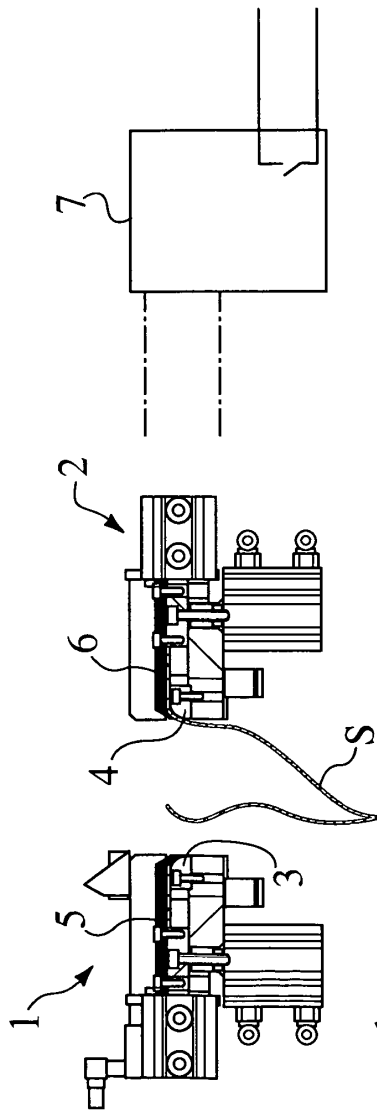
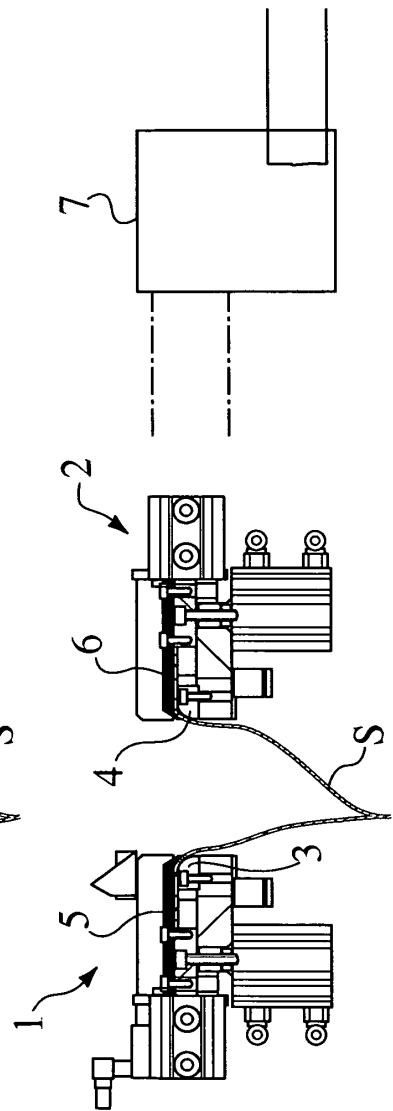


FIG. 3



REFERENCES CITED IN THE DESCRIPTION

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