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54 **AN APPARATUS FOR OPENING AND CLOSING Laterally coherent, flat bag members for filling thereof.**

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Description

The present invention relates to an apparatus for opening and closing laterally coherent, flat bag members for filling thereof, and of the type specified in the introductory clause of claim 1.

With this type of apparatus it is possible, in a simple manner, to work with low cost bag members, as these may currently or in advance be prepared by folding of a sheet web and providing it with transverse welding/separation lines extending from the closed bottom edge of the folded web up to an area somewhat below the top edge thereof. The bag members thus formed may then be successively advanced to the said filling station simply by causing the coherent top edge portions to be advanced, and in the filling station the bag members can be opened by bringing away from each other the holding means of the respective opposed top edge areas, which can be brought together again after the filling, whereafter the filled bag members may be brought further to a sealing station, in which they are finally closed at their mouthing areas and are separated from the coherent web.

As a typical example of use, the packaging of root crops in sheet bags ready for sale can be mentioned.

It has been common practice that at its top edge the hanging sheet web has been slidably suspended in opposite guiding rails and has been advanced there along by means of a traction station arranged downstream of the filling station. The guiding rails can be round rods carrying cooperatively with channels provided along the opposed top edges of the web sides, or they may be constituted by respective twin rails exhibiting a longitudinal slot, along which the web sides can be carried by having at their top edges a thickening provided e.g. by an extrusion production of the web. With these examples the opening and closing of the bag member mouthings in the filling station may take place fully automatically by the opposed guiding rails being arranged in a diverging manner in front of this station and in a converging manner after the station, such that the opening and the subsequent closing of the mouthing areas will take place as a simple function of the very advancing of the web.

This, however, implies two considerable drawbacks, viz. that for one thing the upper edge areas of the sheet web have to be shaped in a particular manner and for another thing that the transverse separation lines between the bag members as prepared in advance can only extend up to a point at a relatively large spacing from the top edge of the web, as the upper areas cannot otherwise be widened corresponding to the mutual dis-

tance between the guiding rails during the passage of these areas along the widened rail length. It is a drawback that the side edge welding joints, thus, cannot project closely up to the top edge, because top filled material may then intrude into a neighboring bag member.

From US-A-4,945,714 a solution is known, by which the web top edges, without being particularly shaped, are gripped between two opposed conveying belts that are held together by means of a fixed rail located along one of these belts and spring biased pressing shoes pressing against the other belt for clamping the sheet web edge between the belts. This, however, does not provide for any safe carrying of the sheet web, and it is disadvantageous that for the advancing of the web it is required to use extra energy due to frictional engagement between the belts and the said pressing parts.

In this known prior art, which relates to the shaping and filling of bag members provided with a ziplock system adjacent to the bottom area of the bag members, the bag member web is at first advanced through the filling station with the topmost edge area of the web located between the said conveying belts, whereafter the conveying through the sealing station is effected by an engagement with another and lower placed pair of conveying belts with associated pressing means. The top sealing is effected by welding together the opposed top edge areas as projecting upwardly from these belts, and in order for this sealing to be effective it will be required that the previously produced, transverse welding/separation lines on the web should extend almost up to the top edge of the web. On this background, in the filling station it will not be possible to arrange for a current opening and closing of the bag member mouthings by a compulsory spreading and subsequent bringing together of the web top edges conditioned by the very advancing of the web, which, besides, would also be difficult to arrange for in connection with the particular conveying technique. Instead, use is made of a marked intermittent conveying, such that the bag members are successively brought to a complete stand-still in the filling station, at the middle of which there are provided opposed engagement means, which are permanently gripping over respective top edge portions of the opposed web sides by virtue of associated outer conveying belts, said engagement means through associated actuator means being operable to locally clamp the web top edges to the respective conveyor belts and to pull these from each other for forming a filling opening and to thereafter move together and release the pulled apart portions for reclosing of the bag member after the filling and prior to the said final top sealing thereof.

Altogether this is a very complicated technique, which will not even ensure a safe carrying engagement with the bag member web.

It is the purpose of the invention to provide an apparatus which is of a relatively simple design and is able to operate in a safe and suitable manner with the use of a sheet web material having in a cheap manner simply terminated upper edge portions.

In connection with the invention it has been recognized that the closing/opening principle disclosed in the said US-A-4,945,714 is very advantageously usable in combination with a special, also already known advancing system for web materials, viz. a so-called carrying or gripping chain, when such a gripping chain is used along each of the opposed edges of the double layer web being advanced. A gripping chain is a chain type, in which each or every second chain link is provided with a lateral fitting carrying a spring biased holding pin, which is held against a holding member and has a projecting portion, which, in cooperation with outer control cam means, is operable to temporarily lift the holding pin off the holding member, whereby it is possible to currently introduce a web edge to be held along an advanced chain run, forwardly to a position in which the web - or a remaining top edge portion thereof - can be pulled out of or released from its engagement with the gripping chain.

With the use of a chain of this type the web length may be advanced in a safely carried manner, without being prepared with any kind of special holding edge and without the conveying giving rise to any noticeable friction, because the simple web edges may be held without any pressure from outside. According to the invention the use of such gripping chains is particularly advantageous in connection with the principle of opening and closing as disclosed in said US-A-4,945,714, because the chains with their associated opposed web edges may readily be pulled away from each other and brought together again, without any special or additional gripping means for the web edges being required.

For good reasons it will be impossible to apply a top closing of the bag members above the gripping area as in said US-A-4,945,714, as the sealing will have to take place just beneath the holding zone of the holding pins. Correspondingly, the girding/separation lines at the sides of the bag members should not extend upwards beyond the gripping zone, but nevertheless they may extend quite far upwards, viz. far enough to provide for an improved upper side sealing compared with the first mentioned systems. The associated advantage can be optimized with the use of the opening and closing principle according to said US-A-4,945,714,

and this principle will be particularly easy to apply when the said gripping chains are used.

Accordingly the invention is characterized by the features specified in the characterizing clause of claim 1.

In the following the invention is explained in more detail with reference to the drawing, in which:

Fig. 1 is lateral view of a bag and filling machine according to the invention,

Fig. 2 is a schematic top view thereof,

Fig. 3 is an end view of a carrier chain used in the machine, and

Figs. 4 and 5 are top views of a preferred embodiment of the machine or apparatus according to the invention.

The machine shown in Figs. 1 and 2 is primarily a filling machine for handling flat bag members 2 that are supplied in a coherent row to a filling station 4, whereafter the filled bags are closed and separated from the coherent row. For the invention it is not particularly important in which manner the row of bag members has been produced, i.e. whether there is used a prefabricated bag web 6 prepared with a closed bottom edge 8 and with closed side edges along transverse separation lines 10 extending from the bottom to somewhat beneath the top edge of the bag web, such that the bag members 2 will be coherent at the top edge of the web, or whether such a preparation of the web takes place wholly or partly in the machine unit itself. What is important is that the filling station 4 successively receives flat bag members that are closed along the bottom and the sides, but open in the top in a manner such that the single bag members can be opened for filling by way of the carrier or transportation means cooperating with the top edge area of the bag members being operable to carry out an opening of this area.

According to Fig. 1 it is proposed to use a flat sheet hose that is reeled off from a supply roll 12 and is cut open at the top by means of a knife 14, while at a place of the moving track towards the filling station 4 there is provided a working station 16, in which the separation lines 10 and the associated side closures are made, but it will be appreciated that the web 6 with the bag members 2 can be produced in several other and elementary manners.

Along the top edge of the web 6 the opposed top edges thereof are movably held by an advancing system 18, which in accordance with the invention and as shown in Fig. 2 comprises two opposite chain conveyors 20 arranged immediately next to and along each other. Each of these conveyor chains is adapted to grip one of the opposed top edges of the advanced double layer web 6, such that both of these edges will be advanced in synchronism towards the filling station 4.

In this station, as shown in dotted lines in Fig. 2, the bag members are required to be opened by way of the opposed top edges of the bag members 6 being moved away from each other, whereafter they shall be brought together for the final top closing of the bag members once these have been filled. As mentioned, it is known to advance the upper bag edges through a permanent guiding system that will compulsorily bring the edges through the relevant outbulging parts of the paths of movement, but it will be an associated condition that those parts of the bag web that are located just above the separation lines 10, designated 22 in Fig. 1, have a vertical dimension allowing for the associated widening of the bag top, as this widening will be connected with a horizontal stretching of the areas 22. In turn this means that the separation lines 10 cannot extend overly closely up to the top edge, whereby the effective filling height of the single bag members will be correspondingly reduced.

As mentioned, this drawback may be remedied by arranging for the conveying path to be controllable so as to define a narrow path during the passage of the areas 22 through the filling station 4 and to assume the outbulging position only in the situations, where the successive bag members 2 have already been placed in the filling position, with the areas 22 located at either end thereof. When the means carrying the top edges of the bag sides are hereby brought to bulge out as shown in Fig. 2, this may take place without any special widening of the areas 22, whereby these areas may exhibit a minimal vertical dimension, i.e. the effective filling height of the bag members may be relatively large and the bag web may be prepared in a simple manner.

After the filling of a bag member 2 the widened track portions 24 are retracted into the straight path, and the bag web is advanced one step for delivering the filled bag member from the filling station and feeding a new bag member thereto, still without problems with respect to the small vertical dimension of the areas 22, as these are not brought to move through the widened filling area.

Thereafter or thereby the filled bag members 2 are fed to a closing station, in which a welding jaw or roller tool 26 produces a horizontal sealing line 28 between the upper ends of the separation lines 10, whereafter the top edge area of the bag web is cut by means of a vertically arranged knife 30, such that the filled bag members will successively be separated from the bag web for delivery as single units, e.g. for further conveying on a conveyor 32, Fig. 1. This conveyor may extend to underneath the filling station so as to support the loaded bag members all the way to their delivery.

If desired the apparatus shown may be provided with means for cutting off the upper portions of the bag member sides just above the upper sealing line 28, but such a cutting off may be found unnecessary, because the upwardly projecting part of the bag web is not very high.

According to the invention, special gripping chains 20 are used for the conveying of the bag web, these chains being provided with means for releasably clamping the top edge areas of the sheets forming the opposed sides of the bag web 6, i.e. without these top edge areas having to be provided with any price-raising channel or rib portion. Such a gripping chain of a known design is illustrated in Fig. 3. It comprises chain links 34 that can be advanced in a guiding and carrying rail 36, each or some of the links carrying a gripping device comprising a plate bracket 38, the opposed flanges of which have holes for a through-going clamp pawl 40 shaped as or from a plate strip and biased towards the left by means of a spring 42. Thus, the spring will hold the clamp pawl in a normal position, in which a clamp nose 44 on the pawl is held against a flange portion 47 of the bracket 38. At its opposite end the clamp jaw has a protruding end portion 46 which may cooperate with a cam surface for being pressed towards the right, thus bringing the clamp pawl into a released position as shown by dotted lines.

Thereby the two applied chains 20 may be controlled so as to grip the top edges of the opposed sheet webs as these are fed to the machine, preferably from the supply reel, while also the optionally cut off top edge strip at the delivery end of the machine may be brought to leave the machine successively, merely by a brief releasing of the clamp pawls 40 at the rear sprocket wheels of the chains.

At the filling station 4, as mentioned, the chains should be able to be brought away from each other upon a bag member being fed to the station, and this will only be a question of arranging the guiding rails 36 at this place in such a manner that they can be pulled out, through small bendings or in a flexible manner, to the outbulging configuration as shown at 24 in Fig. 2, e.g. in being pulled out by means of one or more push or pull cylinders. It will be natural to hold the guiding rails in stable positions at both sides of the filling station, but it can hardly be avoided that the produced bulging out will result in an attraction of the chains from one or both sides, preferably from the discharge side, but optionally by attraction from the feeding side and subsequent delivery to the discharge side; this should be taken into account with relation to the operation of associated tools such as 16 and 30, if applicable.

Figs. 4 and 5 illustrate a preferred design of the means, by which the opposed gripping chains at the filling station can be moved away from each other and be rejoined prior to the stepwise further advancing of the bag web. These means may simply consist of pivotally arranged guiding rail sections 50 which in a suitable co-controlled manner are pivotal between the positions shown in Figs. 4 and 5, by means of a suitable actuator system such as one or more working cylinders 52. The desired changes are achievable solely by these pivot movements, without further measures having to be taken with respect to the holding of the top edges of the opposed sheet web sides.

By the widening of the chain path a certain length of chain should be added, but this is easily possible by arranging one or the other set of sprocket wheels, preferable the rear wheels 54, so as to be displaceable in the longitudinal direction, such that in a controlled manner or just against the action of spring means the wheels may be displaced as required towards the filling station. Such a displacement is indicated in Fig. 5.

It should be repeated that the advantage of the invention is that the bag members can be brought to and from the filling area and opened widely therein, all in a very simple manner and although the bag members are only very little openable in the areas just above the separation lines.

Claims

1. An apparatus for opening and closing laterally coherent, flat bag members (2) for filling thereof, and of the type having means for gripping and advancing a bag member web through a filling station (4), in which the bag member mouthings are successively opened and closed, and further through a sealing and separation station having means (26,30) for sealing the bag members and for separating the same from the web as single bags, the advancing means comprising individual holding means (38-46) for the respective opposed, free mouthing edges of the bag web, said holding means being operable, in the filling station, to bring these mouthing edges outwardly from each other and thereafter together again, characterized in that the said holding means (38-46) additionally constitute movable gripping and advancing means, which, during temporary standstill in the filling station, cooperate with means (50) for a controlled bringing apart of these opposite advancing means and a following bringing together thereof for said opening and closing of the bag mouthings, said gripping and advancing means being respective gripping chains provided with externally

actuatable gripping members for clamping, by themselves, the mouthing edges of the opposed sides of the bag member web.

2. An apparatus according to claim 1 characterized in that the means for a controlled bringing apart of the advancing means in the filling station comprise outwardly pivotal sections (50) of guiding rails for the gripping chains.

Patentansprüche

1. Vorrichtung zum Öffnen und Verschließen seitlich verbundener flacher Beutel (2), zum Befüllen dieser Beutel und von der Art, die Elemente besitzt zum Greifen und Vorwärtsbewegen einer Beutelbahn durch eine Füllstation (4) hindurch, in der die Beutelöffnungen nacheinander geöffnet und geschlossen werden, und weiter durch eine Verschweiß- und Abtrennstation hindurch, die Elemente (26,30) zum Verschweißen der Beutel und zum Abtrennen derselben als einzelne Beutel von der Bahn besitzt, wobei die Vorwärtsbewegungs-Elemente einzelne Haltemittel (38-46) für die jeweiligen gegenüberliegenden, freien Öffnungsränder der Beutelbahn umfassen und die besagten Haltemittel in der Füllstation operabel sind, um diese Öffnungsränder nach außen auseinander- und anschließend wieder zusammenzubringen, dadurch gekennzeichnet, daß die besagten Haltemittel (38-46) darüberhinaus bewegbare Greif- und Vorwärtsbewegungs-Elemente darstellen, die während eines vorübergehenden Stillstands in der Füllstation mit Mitteln (50) zum kontrollierten Auseinanderbringen und darauffolgenden Zusammenbringen dieser gegenüberliegenden Vorwärtsbewegungs-Elemente kooperieren, für das besagte Öffnen und Schließen der Beutelöffnungen, wobei die besagten Greif- und Vorwärtsbewegungs-Elemente jeweils Greifketten sind, die mit von außen betätigbaren Greifgliedern zum Festklemmen der Öffnungsränder der gegenüberliegenden Seiten der Beutelbahn durch die Greifglieder selbst versehen sind.
2. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß die Mittel zum kontrollierten Auseinanderbringen der Vorwärtsbewegungs-Elemente in der Füllstation auswärts schwenkbare Abschnitte (50) von Führungsschienen für die Greifketten umfassen.

Revendications

1. Appareil pour ouvrir et fermer latéralement des organes (2) formant sac, plats, cohérents pour

leur remplissage, et du type présentant des moyens pour saisir et faire avancer une bande d'organes formant sac à travers un poste de remplissage (4), dans lequel les embouchures des organes formant sac sont successivement 5
ouvertes et fermées, et ensuite à travers un poste de séparation et de scellement présentant des moyens (26) pour sceller les organes formant sac et pour séparer ceux-ci de la bande sous forme de sacs individuels, les 10
moyens d'avance comprenant des moyens de maintien individuels (38-46) pour les bords d'embouchure respectifs, opposés, libres de la bande de sacs, lesdits moyens de maintien pouvant être actionnés, dans le poste de remplissage, pour amener ces bords d'embouchure vers l'extérieur l'un de l'autre et ensuite les ramener l'un vers l'autre, 15
caractérisé en ce que lesdits moyens de maintien (38-46) constituent de plus des moyens d'avance et de saisie mobiles qui, pendant l'arrêt temporaire dans le poste de remplissage, coopèrent avec des moyens (50) pour une séparation contrôlée de ces moyens d'avance opposés et une raménée suivante de ceux-ci 25
pour ladite ouverture et fermeture des embouchures des sacs, lesdits moyens d'avance et de saisie étant des chaînes de saisie respectives munies d'organes de saisie pouvant être actionnés extérieurement pour serrer, par eux-mêmes, les bords des embouchures des côtés opposés de la bande d'organes formant sac. 30

2. Appareil selon la revendication 1, 35
caractérisé en ce que les moyens pour une séparation contrôlée des moyens d'avance dans le poste de remplissage comprennent des sections (50), pouvant pivoter vers l'extérieur, de rails de guidage pour les chaînes de saisie. 40

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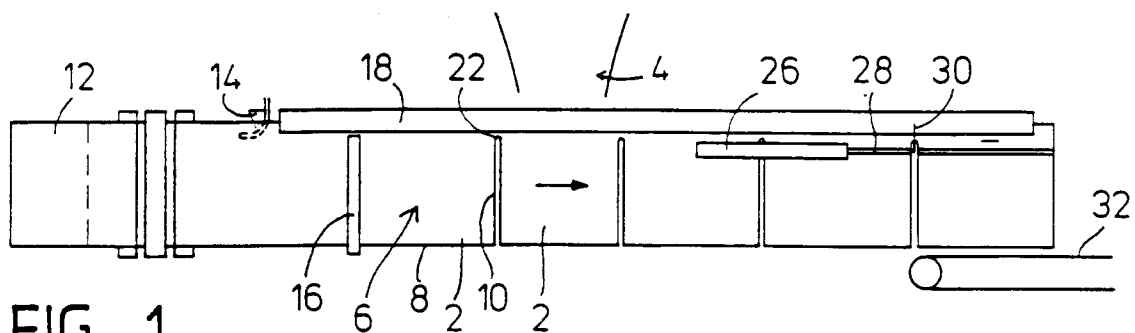


FIG. 1.

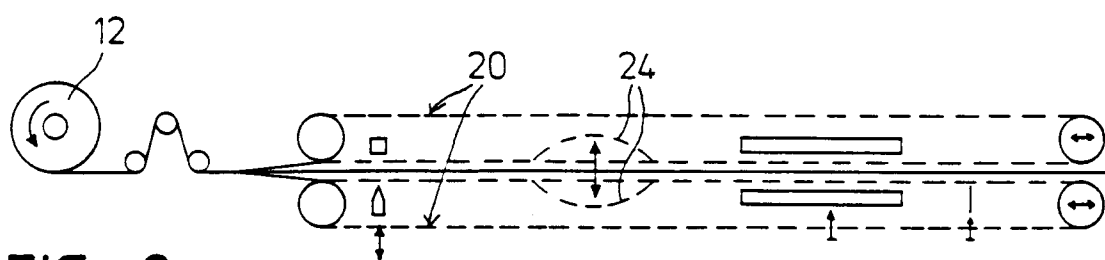


FIG. 2.

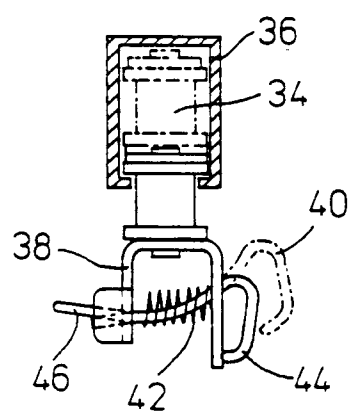


FIG. 3.

FIG. 4.

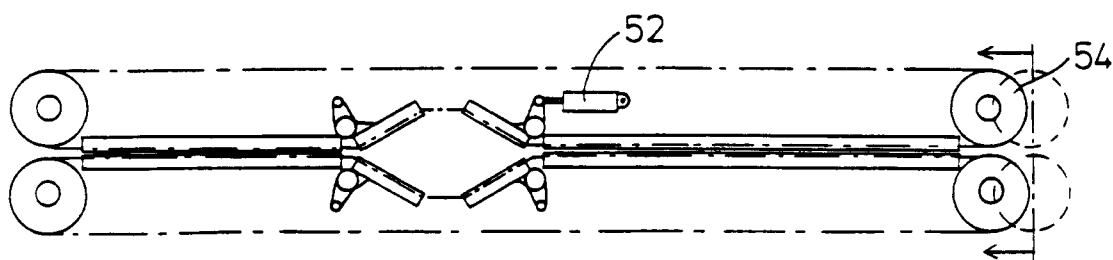
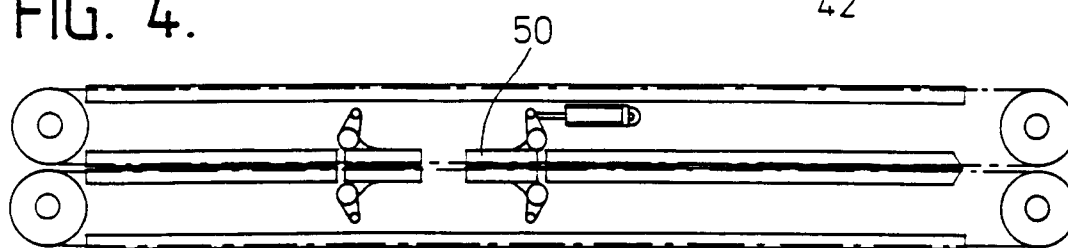


FIG. 5.