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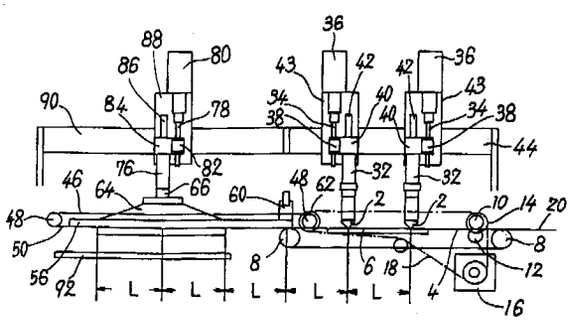
(54) Apparatus for discharging plastic bags from plastic bag making machine.

(57) According to the invention, an apparatus is provided for discharging plastic bags from a plastic bag making machine in which two superposed layers of plastic film are intermittently fed for a length and passed between heat knife means (2) and receiving means (6). The layers of plastic film are sandwiched between and heat cut by the heat knife means and the receiving means whenever intermittently fed, to thereby make plastic bags. The apparatus includes endless type suction or electrostatic belt means (46) disposed extending in a direction in which the plastic film layers are fed, and including lower surface means (50) positioned at a level substantially corresponding to a path along which the layers of plastic film are fed so that the plastic bags are successively absorbed or attracted on the lower surface means of the suction or electrostatic belt means. Belt drive means is provided for intermittently driving the suction or electrostatic belt means to advance the lower surface means thereof in the plastic film layers feed direction so that the plastic bags are intermittently fed by the suction or electrostatic belt means. In addition, plastic bag pusher means is disposed along at least one of the opposite edges of she suction or electrostatic belt means and guided for vertical movement between a stand by position above the lower surface means of the suction or electrostatic belt means and an operative position below the lower surface means. Pusher drive means is porvided for lowering the plastic bag pusher means to the operative position from the stand by position whenever the plastic bags are intermittently fed by the suction or electrostatic belt means, whereby the plastic bags are pushed down by the plastic bag pusher means to fall down from the suction or electrostatic belt means.

Fig.1



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BACKGROUND OF THE INVENTION

Field of the invention

The invention relates to an apparatus for discharging plastic bags from a plastic bag making machine.

Description of the Prior Art

A plastic bag making machine has been generally used for making household garbage bags from a continuous plastic film of material such as polyethylene. The plastic bag making machine includes a heat knife disposed over a receiving member. The plastic film is folded in two superposed layers, the layers of plastic film being horizontally and intermittently fed for a length and passed between the heat knife and the receiving member. The heat knife is lowered by a heat knife drive means whenever the layers of plastic bags are intermittently fed so that the layers of plastic film are sandwiched between and heat cut by the heat knife and the receiving member to make plastic bags. The heat knife extends widthwise of the layers of plastic film so that the layers of plastic film are heat cut widthwise thereof.

Upper and lower stacker belts has been also used for discharging the plastic bags from the plastic bag making machine, as disclosed in U. S. Patent No. 4,995,859. The plastic bags are succesively directed to and clamped between the upper and lower stacker belts which are driven by a drive motor so that the plastic bags are fed and discharged by the stacker belts. When discharged, the plastic bags collide at leading ends with a stopper plate so that the plastic bags are stopped by the stopper plate to fall down onto a table. The plastic bags are then stacked on the table.

However, the plastic bag is not always rectangular. It is often required to make trapezoidal plastic bag. When discharged by the stacker belts, the rectangular plastic bag has a leading end extending perpendicular to the discharge direction thereof, while the trapezoidal plastic bag has a leading end extending obliquely. Strange plastic bag other than the trapezoidal plastic bag also has a leading end extending obliquely. Accordingly, the trapezoid or other strange plastic bags are irregularly slanted when collide at leading ends with the stopper plate. The plastic bags then fall down onto the table to be irregularly stacked. It is therefore required to regularly stack the plastic bags when fall dawn onto the table. In addition, in making the trapezoidal plastic bags, the plastic bags have shapes in inverse relation one by one when fed and discharged by the stacker belts. The inverse plastic bags are therefore stacked one by one in one position on the table. It is also required to define two position on the table and regularly stack the plastic bags each having one shape in one position and the plastic bags each having the other shape in the other position.

Object of the invention

It is therefore an object of the invention to provide a new and improved apparatus for discharging plastic bags from a plastic bag making machine, which overcomes the problems described above.

Another object of the invention is to regularly stack the plastic bags including trapezoidal or other strange plastic bags.

The other object of the invention is to regularly stack the plastic bags in two or more positions respectively.

SUMMARY OF THE INVENTION

According to the invention, an apparatus is provided for discharging plastic bags from a plastic bag making machine in which two superposed layers of plastic film are intermittently fed for a length and passed between heat knife means and receiving means. The layers of plastic film are sandwiched between and heat cut by the heat knife means and the receiving means whenever intermittently fed, to thereby make plastic bags.

The apparatus includes endless type suction or electrostatic belt means disposed downstream of the heat knife means, extending in a direction in which the plastic film layers are fed, and including lower surface means positioned at a level substantially corresponding to a path along which the layers of plastic film are fed so that the plastic bags are successively absorbed or attracted on the lower surface means of the suction or electrostatic belt means. Belt drive means is provided for intermittently driving the suction or electrostatic belt means to advance the lower surface means thereof in the plastic film layers feed direction so that the plastic bags are intermittently fed by the suction or electrostatic belt means.

In addition, plastic bag pusher means is disposed along at least one of the opposite edges of the suction or electrostatic belt means and guided for vertical movement between a stand by position above the lower surface means of the suction or electrostatic belt means and an operative position below the lower surface means. Pusher drive means is porvided for lowering the plastic bag pusher means to the operative position from the stand by position whenever the plastic bags are intermittently fed by the suction or electrostatic belt means, whereby the plastic bags are pushed down

by the plastic bag pusher means to fall down from the suction or electrostatic belt means.

In a preferred embodiment of the invention, the suction belt means comprises a plurality of suction belts spaced widthwise from each other. The plastic bag pusher means comprises a plurality of spatulas disposed along the opposite edges of each of the suction belts. The plastic bags are fed by the suction belts, and engaged with and pushed down by the spatulas. The plastic bag pusher means may comprise a plurality of spatulas disposed along one of the opposite edges of each of the suction belts and a plurality of suction pads mounted on each of the spatulas. The suction pads are spaced from each other in the longitudinal direction of each of the spatulas. The plastic bags are fed by the suction bolts, engaged with and pushed down by the spatulas, and absorbed on and pushed by the suction pads.

A hanger beam extends widthwise of the suction belts in a position above the spatulas. A plurality of first vertical axes are disposed at the longitudinally central position of each of the spatulas. The first vertical axes are mounted on the hanger beam for movement in the longitudinal direction of the hanger beam. The spatulas are mounted on the first vertical axes for rotational movement thereabout and supported by the first vertical axes and the hanger beam. A second vertical axis is disposed at the longitudinally central position of the hanger beam and operatively connected to the pusher drive means. The hanger beam is mounted on and supported by the second vertical axis for rotational movement thereabout. Accordingly, the hanger beam can be rotationally moved to tilt it about the second vertical axis while the first vertical axes can be moved longitudinally of the hanger beam with the spatulas rotationally moved about the first vertical axes to adjust the positions and orientations of the spatulas when trapezoidal or other strange plastic bags are pushed down.

The suction or electrostatic belt means are intermittently driven synchronously with feed means for the layers of plastic film. The plastic bag pusher means is lowered to the operative position from the stand by position so that the plastic bags fall down from the suction or electrostatic belt means whenever the suction or electrostatic belt means are intermittently driven.

The heat knife means comprises n heat knives spaced from each other in the plastic film layers feed direction at a distance substantially corresponding to the length of the plastic bag. The layers of plastic film are intermittently fed with a stroke substantially corresponding to n times the length of the plastic bag, the layers of plastic film being heat cut by the heat knives respectively so that n plastic bags can be simultaneously made whenever heat cut.

The plastic bag pusher means comprises spatulas each having a length substantially corresponding to n times the length of the plastic bag and spaced from the most downstream heat knife at a distance substantially corresponding to the length of or several times the length of the plastic bag. The suction or electrostatic belt means are intermittently driven with a stroke substantially corresponding to n times the length of the plastic bag so that n plastic bags are simultaneously engaged with and pushed down by the spatulas whenever the suction or electrostatic belt means are intermittently driven. The plastic bag pusher means may comprise a plurality of suction pads disposed in a zone having a length substantially corresponding to n times the length of the plastic bags and spaced from the most downstream heat knife at a distance substantially corresponding to the length of or several times the length of the plastic bag. In this case, n plastic bags are simultaneously absorbed on and pushed down by the suction pad whenever the suction or electrostatic belt means are intermittently driven.

The heat knife means is disposed over the receiving means. The layers of plastic film are horizontally fed between the heat knife means and the receiving means. The heat knife means is lowered by heat knife drive means so that the layers of plastic film are sandwiched between and heat cut by the heat knife means and the receiving means.

The heat knife means comprises a plurality of heat knives each extending widthwise of the layers of plastic film. Third vertical axes are disposed at the longitudinally central position of each of the heat knives and operatively connected to the heat knife drive means. The heat knives are supported by the third vertical axes for rotational movement. Accordingly, the heat knives can be rotationally moved to tilt them about the third vertical axes to make trapezoidal or other strange plastic bags.

The receiving means comprises an endless type receiving belt made of fluorine-contained resin such as polytetrafluoroethylene.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings illustrate principals and preferred embodiment of the invention, and together with the description serve to explain the principals of the invention, in which:

Fig. 1 is a schematic side view of an apparatus for discharging plastic bags according to the invention,

Fig. 2 is an enlarged front view of rubber a roller of Fig. 1,

Fig. 3 is an enlarged front view partially in

section of a heat knife and a receiving belt of Fig. 1,

Fig. 4 is a schematic front view of suction belts and spatulas of Fig. 1,

Fig. 5 is a cross-section view or a suction belt and a suction bar of Fig. 1,

Fig. 6 is an enlarged side view partially in section of a spatula of Fig. 1,

Fig. 7 is a schematic plan view showing knives and spatulas of Fig. 1 for making and discharging rectangular plastic bags,

Fig. 8 is a schematic plan view showing knives and spatulas of Fig. 1 for making and discharging trapezoidal plastic bags,

Fig. 9 is a schematic front view of another embodiment of the invention showing spatulas and suction pads,

Fig. 10 is a schematic side view of a spatula and suction pads of Fig. 9.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to Fig. 1, there is illustrated an apparatus for discharging plastic bags from a plastic bag making machine according to the invention, the plastic bag making machine including two heat knives 2 disposed over the receiving means. The receiving means comprises an endless type receiving belt 4 and a receiving table 6, the receiving belt 4 being made of fluorine-contained resin such as polytetrafluoroet hylene. The receiving belt 4 is provided between and engaged with a pair of rollers 8 to extend horizontally. The reciving table 6 is disposed under the upper run of the receiving belt 4. A pair of rubber rollers 10 and 12 are disposed over and under the upper run of the receiving belt 4 so that the receiving belt 4 is sandwiched between the rubber rollers 10 and 12.

A timing pulley 14 is mounted on the shaft of the upper rubber roller 10, as shown in Fig. 2. The timing pulley 14 is operatively connected to a drive motor 16 by a timing belt 15 which is engaged with the timing pulley 14 so that the rubber roller 10 is driven by the drive motor 16 and the timing belt 18 to rotate clockwise in Fig. 1. The under rubber roller 12 is operatively connected to the rubber roller 10 by gears to rotate counterclockwise in Fig. 1. The receiving belt 4 is driven by the rubber rollers 10 and 12 and circulatingly moved between the rollers 8. Two superposed layers of plastic film 20 are sandwiched between and fed by the rubber roller 10 and the receiving belt 4 to advance leftward in Fig. 1. The rubber roller 10 and the receiving belt 4 are intermittently driven with a stroke so that the the layers of plastic film 20 are intermittently fed for a length and passed between the heat knives 2 and the receiving belt 4. The heat knives 2 are spaced from each other in a direction in which the layers of plastic film 20 are fed, at a distance substantially corresponding to the length of the plastic bag, the heat knives 2 each extending widthwise of the layers of plastic film 20.

The heat knives 2 are each connected to a hanger beam 22 via a plurality of space plates 24 as shown in Fig. 3, the hanger beam 22 being fited into a holder 26 and supported by bolts 28 for limited upward movement against buffer means comprising air cylinders 30 which are mounted on the holder 26. A plurality of vertical axes are disposed at the longitudinal central position of each of the heat knives 2, the vertical axes comprising shafts 32 to which the holder 26 is secured.

The heat knives 2 are driven by heat knife drive means which comprises a ball screw 34 operatively connected to a servo motor 36. The ball screw 34 is threadedly engaged with a nut member 38 secured to a slide 40 which is engaged with a guide rail 42 for vertical movement. The slide 40 includes an aperture formed therein in which the shaft 32 is fitted for rotational movement so that the heat knife 2 is supported by the shaft 32 and the slide 40 for rotational movement about the shaft 32. The servo motor 36 and the guide rail 42 are mounted on a side plate 43 which is engaged with and supported by a guide rail 44 for sliding movement along the guide rail 42 in a direction in which the layers of plastic film 20 are fed, to adjust the space between the heat knives 2. In the apparatus shown in Fig. 1, two heat knives 2 are spaced from each other in the plastic film layers feed direction at a distance substantially corresponding to the length L of the plastic bags.

A plurality of endless type suction belts 46 are disposed downstream of the heat knife 2 to extend in a direction in which the layers of plastic film 20 are fed. The suction belts 46 comprise timing belts spaced widthwise from each other as shown in Fig. 4, the suction belts 46 being each provided between and engaged with a pair of timing pulleys 48. The suction belts 46 are disposed above the receiving belt 4 so that the suction belts 46 each has an overlapping end portion with the receiving belt 4 and includes lower surface 50 which is flush with the upper surface of the receiving belt 4 and positioned at a level substantially corresponding to a path along which the layers of plastic film 20 are fed. The timing pulleys 48 are mounted on a pair of shaft 52 for movement along the shafts 52 and fixed by screw means at predetermined positions.

The suction belts 46 each includes a number of apertures 54 formed therein, the apertures 54 being spaced in the longitudinal direction of the suction belts 46. A suction bar 56 is disposed between the upper and lower runs of each of the suction belts 46, the suction bar 56 including an

elongated opening 58 which extends and opens along the lower run of the suction belt 46. The suction bar 56 is mounted on and supported by a hose nipple 60, the opening 58 being connected to a vacuum pump via the hose nipple 60 for generating a suction effect in the apertures 54 in the suction belt 46 via the opening 58 in the suction bar 56.

The suction belts 46 are driven by belt drive means which comprises a timing pulley 62 mounted on the shaft 52 of the timing pulleys 48. The timing belt 18 for the rubber roller 10 is engaged with the timing pulley 62 so that the suction belts 46 are intermittently driven synchronously with the rubber roller 10 and the receiving belt 4 by the drive motor 16 and the timing belt 18, to advance the lower surfaces 50 in plastic film layers feed direction.

The apparatus includes plastic bag pusher means comprising a plurality of spatulas 64 disposed along the opposite edges of each of the suction belts 46. The spatulas 64 are guided for vertical movement between a stand by position above the lower surfaces 50 of the suction belts 46 and an operative position below the lower surfaces 50. A hanger beam 66 extends widthwise of the suction belts 46 in a position above the spatulas 64. A plurality of vertical axes are disposed at the longitudinal central position of each of the spatulas 64, the vertical axes each comprising a bolt 68 which is inserted into an aperture formed in the spatula 64, the bolt 68 having a head 70, as shown in Fig. 6. A nut member 72 is received in a channel 74 formed in the hanger beam 66 and threadedly engaged with the bolt 68 so that the spatula 64 is connected and secured to the hanger beam 66 by the bolt 68 and the nut member 72. When loosening the bolt 68, the nut member 72 can be slidingly moved along the channel 74 of the hanger beam 66 so that the bolt 68 is moved longitudinally of the hanger beam 66. The spatula 64 can be rotationally moved about the bolt 68. A vertical axis is disposed at the longitudinal central position of the spatulas 64, the vertical axis comprising a shaft 76 to which the hanger beam 66 is secured.

The spatulas 64 are driven by pusher drive means which comprises a ball screw 78 which is operatively connected to a servo motor 80. The ball screw 78 is threadedly engaged with a nut member 82 secured to a slide 84 which is engaged with a guide rail 86 for vertical movement. The slide 84 includes an aperture formed therein in which the shaft 76 is fitted for rotational movement so that the hanger beam 66 is supported by the shaft 76 and slide 84 for rotational movement about the shaft 76. The servo motor 80 and the guide rail 86 are mounted on a side plate 88 which is engaged with and supported by a guide rail 90 for sliding movement along the guide rail 90 in a direction in which the layers of plastic film 20 are fed, to adjust the position of the spatulas 64. In the apparatus shown in Fig. 1, the spatulas 64 each has a length substantially corresponding to two times the length L of the plastic bag, the spatulas being spaced from the most downstream heat knife 2 at a distance substantially corresponding to two times the length L of the plastic bag.

In addition, a table or discharge conveyor 92 disposed below the suction belts 46.

In the apparatus, the layers of plastic film 20 are intermittently fed by the rubber roller 10 and the receiving belt 4 with a stroke substantially corresponding to two times the length L of the plastic bag. The ball screws 34 are rotated by the servo motors 36 whenever the layers of plastic film 20 are intermittently fed. The nut members 38 is moved integrally with the slides 40 by the ball screws 34, the slides 40 being moved along the guide rails 42, so that the shafts 32, the holder 26, the hanger beam 22 and the heat knives 2 are vertically moved. The heat knives 2 are lowered toward the receiving belt 4 so that the layers of plastic film 20 are sandwiched between and heat cut by the beat knives 2 and receiving belt 4, the receiving belt 4 being supported by the table 6, to thereby make plastic bags. The heat knives 2 are then raised from the receiving belt 4 to the stand by position. The layers of plastic film 20 are heat cut by the heat knives 2 respectively so that two plastic bags are simultaneously made whenever heat cut. The heat knives 2 extend widthwise of the layers of plastic film, the layers of plastic film being heat cut widthwise thereof, so that the rectangular plastic bags are mede as shown in Fig. 7.

The plastic bags are intermittently fed along the receiving belt 4 with a stroke substantially corresponding to two times the length L of the plastic bag. The suction belts 46 are also intermittently driven, synchronously with the receiving belt 4, with a stroke substantially corresponding to two times the length L of the plastic bag. In the zone of the suction bar 56, a suction effect is generated in the apertures 54 in the suction belts 46 so that the plastic bags are succesively absorbed on the lower surfaces 50 of the suction belts 46 and intermittently fed by the suction belts 46. Accordingly, two plastic bags are absorbed on the lower surfaces 50 of the suction belts 46 and fed to a position below the spatulas 64 whenever the suction belts 45 are intermittently driven.

The ball screw 78 is rotated by the servo motor 80 synchronously with the servo motors 36 for the heat knives 2, whenever the plastic bags are intermittently fed. The nut member 82 is moved integrally with the slide 84 by the ball screw 78, the slide 84 being moved along the guide rail 86, so

that the shaft 64, the hanger beam 66 and the spatulas 64 are vertically moved. The spatulas 64 are lowered from the stand by position above the lower surfaces 50 of the suction belts 46 to the operative position below the lower surfaces, whereby the plastic bags are pushed down by the spatulas 64 to fall down from the suction belts 46 to the table or discharge conveyor 92. The spatulas 64 are then raised from the operative position to the stand by position. Accordingly, two plastic bags are simultaneously engaged with and pushed down by the spatulas 64 whenever the suction belts 46 are intermittently driven to regularly stack the plastic bags in two positions on the table or discharge conveyor 92.

In making trapezoidal plastic bags, the heat knives 2 are rotationally moved about the shaft 32, as shown in Fig. 8. The layers of plastic film 20 are heat cut by the heat knives 2 to make the trapezoidal plastic bags. The plastic bags are then fed along the receiving belt 4 and succesively absorbed on and intermittently fed by the suction belts 46. The plastic bags have shapes in inverse relation one by one. Two plastic bags are simultaneously engaged with and pushed down by the spatulas 64 whenever intermittently fed. Accordingly, the apparatus can regularly stack the plastic bags each having one shape in one position and the plastic bags each having the other shape in the other position on the table or discharge conveyor 92. As to the spatulas 64, the hanger beam 66 is rotationally moved about the shaft 76 while the bolts 68 are moved longitudinally of the hanger beam 66 with the spatulas 64 rotationally moved about the bolts 68 to adjust the positions and orientations of the spatulas 64. Accordingly, the plastic bags are conveniently engaged with and pushed down by the spatulas 64.

Another embodiment is shown in Figs. 9 and 10, which includes plastic pusher means comprising a plurality of spatulas 64 disposed along one of the opposite edges of each of the suction belts 46. The spatulas 64 each includes a ledge 94 formed on the one side thereof, a plurality of suction pads 96 being received and mounted in a elongated groove formed in the ledge 94 for movement. The suction pads 96 are spaced from each other longitudinally of the spatulas 64. The plastic bags are engaged with and pushed down by the spatulas 64 and the suction pads 96 whenever intermittently fed by the suction belts 46. In addition, the suction pads 96 are connected to a vacuum pump via a flexible tube 98 so that the plastic bags are absorbed on the suction pads 96. The suction pads 96 may be connected to a compressor via the tube 98 to supply air to the suction pads 96 so that the plastic bags fall down from the suction pads 96 after pushed down. The suction pads 96 can be moved along the elongated groove in the ledge to adjust the space of the suction pads 96 according to the length of the plastic bag.

Electrostatic belts may be substitute for the suction belts 46 so that the plastic bags are succesively attracted on the lower surfaces of the electrostatic belts. Three or more heat knives 2 may be spaced from each other in the plastic film layers feed direction at a distance substantially corresponding to the length L of the plastic bag. The layers of plastic film may intermittently fed with a stroke substantially corresponding to three or more times the length L of the plastid bag, the layers of plastic film being heat cut by the heat knives respectively so that three or more plastic bags can be simultaneously made whenever heat cut. The spatulas 64 may each have a length substantially corresponding to three or more times the length L of the plastid bag so that three or more plastic bags are simultaneously engaged with and pushed down by the spatulas. A plurality of suction pads may disposed in a zone having a length substantially corresponding to three or more times the length L of the plastic bags so that three or more plastic bags simultaneously absorbed on and pushed down by the suction pads.

Claims

1. An apparatus for discharging plastic bags from a plastic bag making machine in which two superposed layers of plastic film are intermittently fed for a length and passed between heat knife means and receiving means, the layers of plastic film being sandwiched between and heat cut by the heat knife means and the receiving means whenever intermittently fed, to thereby make plastic bags, said apparatus comprising:

endless type suction or electrostatic belt means disposed downstream of said heat knife means, extending in a direction in which the plastic film layers are fed, and including lower surface means positioned at a level substantially corresponding to a path along which the layers of plastic film are fed so that the plastic bags are successively absorbed or attracted on the lower surface means of said suction or electrostatic belt means;

belt drive means for intermittently driving said suction or electrostatic belt means to advance the lower surface means thereof in the plastic film layers feed direction so that the plastic bags are intermittently fed by said suction or electrostatic belt means;

plastic bag pusher means disposed along at least one of the opposite edges of said suction or electrostatic belt means and guided

for vertical movement between a stand by position above the lower surface means of said suction or electrostatic belt means and an operative position below the lower surface means; and

pusher drive means for lowering said plastic bag pusher means to said operative position from said stand by position whenever the plastic bags are intermittently fed by said suction or electrostatic belt means, whereby the plastic bags are pushed down by said plastic bag pusher means to fall down from said suction or electrostatic belt means.

2. An apparatus as set forth in claim 1, wherein said suction belt means comprises a plurality of suction belts spaced widthwise from each other, said plastic bag pusher means comprising a plurality of spatulas disposed along the opposite edges of each of said suction belts, the plastic bags being fed by said suction belts, and engaged with and pushed down by said spatulas.

3. An apparatus as set forth in claim 1, wherein said suction belt means comprises a plurality of suction belts spaced widthwise from each other, said plastic bag pusher means comprising a plurality of spatulas disposed along one of the opposite edges of each of said suction belts and a plurality of suction pads mounted on each of said spatulas, said suction pads being spaced from each other in the longitudinal direction of each of said spatulas, the plastic bags being fed by said suction belts, engaged with and pushed down by said spatulas, and absorbed on and pushed by said suction pads.

4. An apparatus as set forth in claim 2 or 3, further comprising a hanger beam extending widthwise of said suction belts in a position above said spatulas, a plurality of first vertical axes disposed at the longitudinally central position of each of said spatulas, said first vertical axes being mounted on said hanger beam for movement in the longitudinal direction of said hanger beam, said spatulas being mounted on said first vertical axes for rotational movement thereabout and supported by said first vertical axes and said hanger beam, a second vertical axis disposed at the longitudinally central position of said hanger beam and operatively connected to said pusher drive means, said hanger beam being mounted on and supported by said second vertical axis for rotational movement thereabout, whereby said hanger beam can be rotationally moved to tilt it about said second vertical axis while said first vertical axes can be moved longitudinally of said hanger beam with said spatulas rotationally moved about said first vertical axes to adjust the positions and orientations of said spatulas when trapezoidal or other strange plastic bags are pushed down.

5. An apparatus as set forth in claim 1, wherein said suction or electrostatic belt means are intermittently driven synchronously with feed means for said layers of plastic film, said plastic bag pusher means being lowered to said operative position from said stand by position so that the plastic bags fall down from said suction or electrostatic belt means whenever said suction or electrostatic belt means are intermittently driven.

6. An apparatus as set forth in claim 5, wherein said heat knife means comprises n heat knives spaced from each other in the plastic film layers feed direction at a distance substantially corresponding to the length of the plastic bag, the layers of plastic film being intermittently fed with a stroke substantially corresponding to n times the length of the plastic bag, the layers of plastic film being heat cut by the heat knives respectively so that n plastic bags can be simultaneously made whenever heat cut.

7. An apparatus as set forth in claim 6, wherein said plastic bag pusher means comprises spatulas each having a length substantially corresponding to n times the length of the plastic bag and spaced from the most downstream heat knife at a distance substantially corresponding to the length of or several times the length of the plastic bag, said suction or electrostatic belt means being intermittently driven with a stroke substantially corresponding to n times the length of the plastic bag so that n plastic bags are simultaneously engaged with and pushed down by said spatulas whenever said suction or electrostatic belt means are intermittently driven.

8. An apparatus as set forth in claim 6, wherein said plastic bag pusher means comprises a plurality of suction pads disposed in a zone having a length substantially corresponding to n times the length of the plastic bags and spaced from the most downstream heat knife at a distance substantially corresponding to the length of or several times the length of the plastic bag, said suction or electrostatic belt means being intermittently driven with a stroke substantially corresponding to n times the

length of the plastic bag so that n plastic bags are simultaneously absorbed on and pushed down by said suction pad whenever said suction or electrostatic belt means are intermittently driven.

9. An apparatus as set forth in claim 1, wherein said heat knife means is disposed over said receiving means, the layers of plastic film being horizontally fed between said heat knife means and said receiving means, said heat knife means being lowered by heat knife drive means so that the layers of plastic film are sandwiched between and heat cut by said heat knife means and said receiving means.

10. An apparatus as set forth in claim 9, wherein said heat knife means comprises a plurality of heat knives each extending widthwise of the layers of plastic film, third vertical axes being disposed at the longitudinally central position of each of said heat knives and operatively connected to said heat knife drive means, said heat knives being supported by said third vertical axes for rotational movement, whereby said heat knives can be rotationally moved to tilt them about said third vertical axes to make trapezoidal or other strange plastic bags.

11. An apparatus as set forth in claim 1, said receiving means comprises an endless type receiving belt made of fluorine-contained resin such as polytetrafluoroethylene.

Fig.1

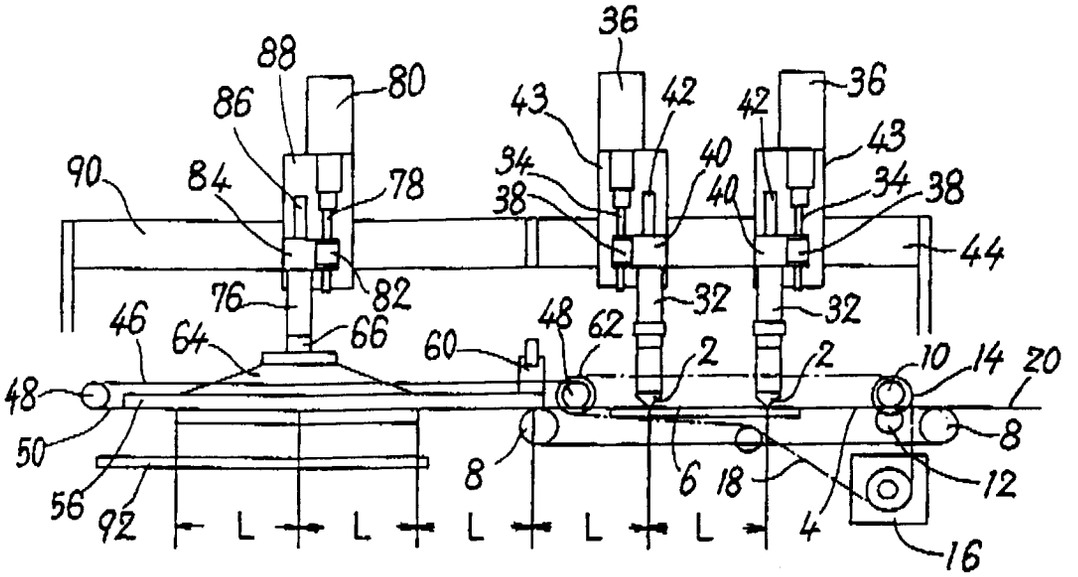


Fig.2

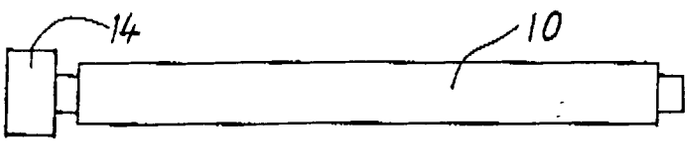


Fig.3

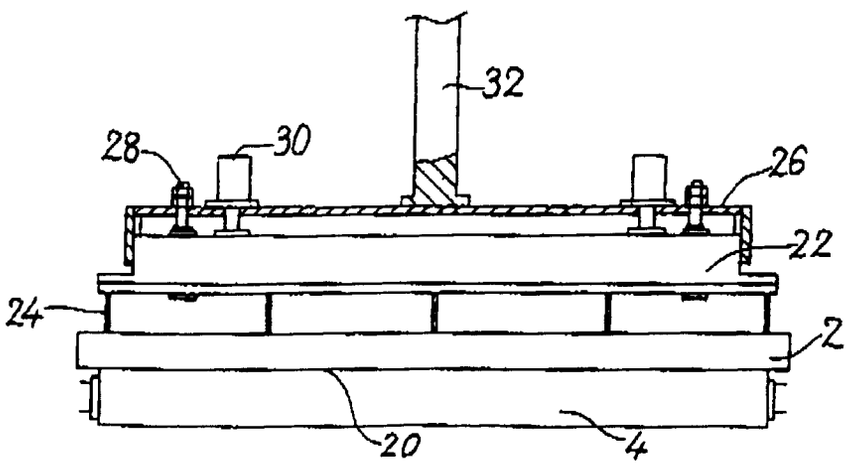


Fig.4

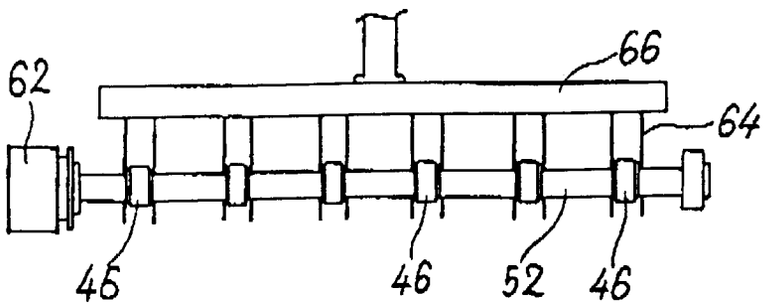


Fig.5

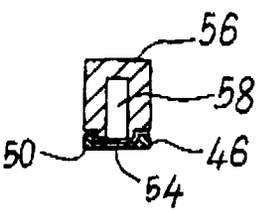


Fig.6

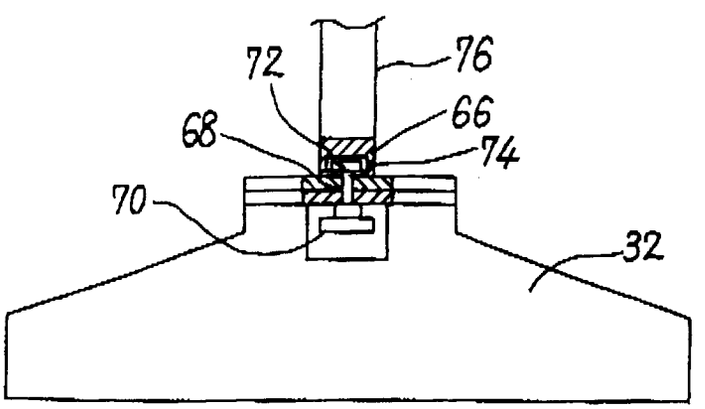


Fig.7

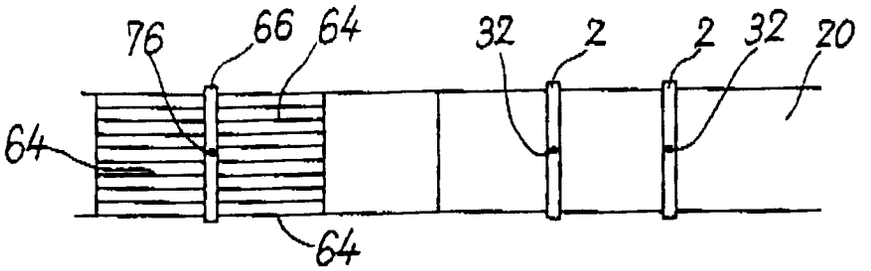


Fig.8

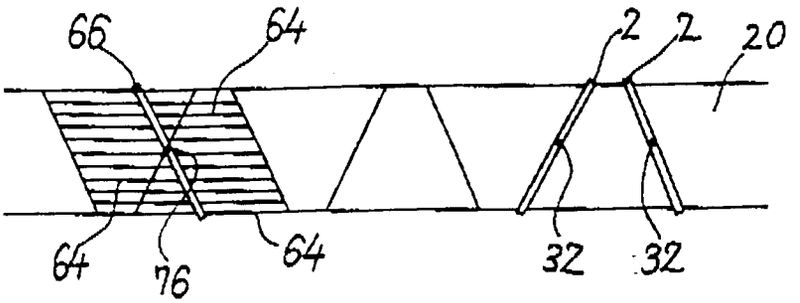


Fig.9

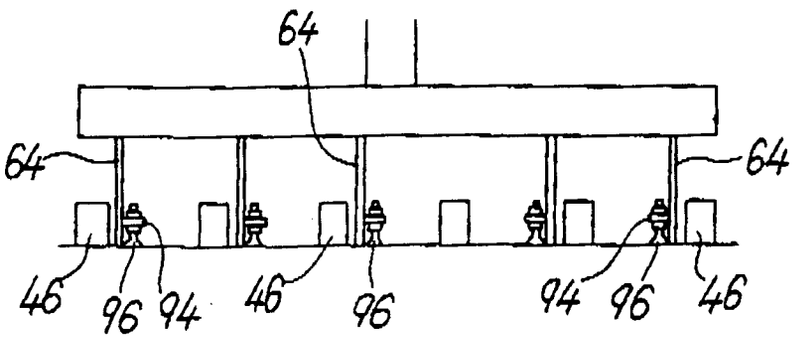
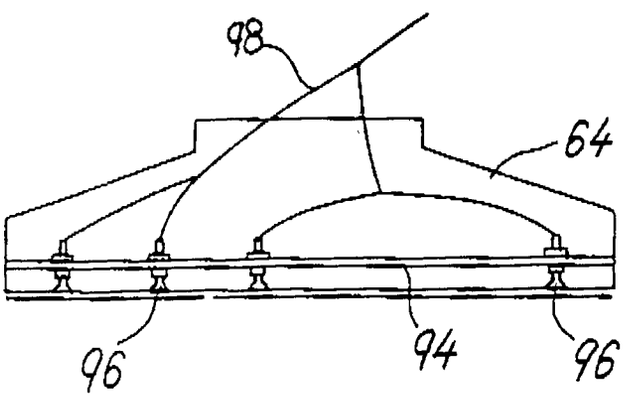


Fig.10



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EUROPEAN SEARCH REPORT

Application Number

EP 92 11 2611

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	US-A-3 024 921 (GAUBERT) * the whole document * ---	1,2	B65H29/32 B31B19/98
X	US-A-3 820 779 (DERITEND ENGENEERING) * the whole document * ---	1,2	
A	DE-A-3 928 023 (LAMBRECHT) -----		

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

B65H
B31B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	17 NOVEMBER 1992	LONCKE J.W.

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