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(54) Machine for packaging pourable food products

Maschine zum Verpacken fliessfähiger Nahrungsmittel

Machine d'emballage de produits alimentaires fluides

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(56) References cited:
WO-A-2004/041697
DE-U1- 29 618 023
US-A- 4 538 396
US-A- 5 916 373
US-A- 6 148 831
US-B1- 6 666 002

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Description

[0001] The present invention relates to a machine for packaging pourable food products.

[0002] As is known, many pourable food products, such as fruit juice, pasteurized or UHT (ultra-high-temperature treated) milk, wine, tomato sauce, etc., are sold in packages made of sterilized packaging material.

[0003] A typical example of this type of package is the parallelepiped-shaped package for liquid or pourable food products known as Tetra Brik Aseptic (registered trademark), which is made by folding and sealing normally laminated strip packaging material. The laminated packaging material comprises layers of fibrous material, e.g. paper, covered on both sides with heat-seal plastic material, e.g. polyethylene. In the case of aseptic packages, the side of the packaging material eventually contacting the food product in the package also has a layer of oxygen-barrier material, e.g. aluminium foil or a layer of EVOH, which in turn is covered with a layer of heat-seal plastic material.

[0004] Packaging machines for producing packages of the above type are known, in which the web of packaging material is unwound off a reel and fed along a predetermined path by rollers and guide members or similar.

[0005] Along the path, the web of packaging material is fed through an aseptic environment where it is sterilized by applying a liquid sterilizing agent such as hydrogen peroxide, which is subsequently evaporated by heating and/or by radiation of appropriate wavelength and intensity.

[0006] The web of packaging material is then fed through a sterile chamber, in which it is maintained in a sterile-air environment and fed vertically through a number of successive forming assemblies, which interact with the packaging material to fold it gradually from strip form into the form of a cylinder. The forming assemblies normally comprise respective roller folding members defining a number of compulsory passages for the packaging material varying gradually in section from an open C to a substantially circular section.

[0007] The folding members interact with the web of packaging material to superimpose opposite lateral portions of the web, which are then heat sealed to form a tube of packaging material.

[0008] Beforehand, a sealing strip of heat-seal plastic material is applied to a longitudinal edge of the inner plastic layer of the packaging material, and the packaging material is heat sealed along the strip to form said tube.

[0009] The tube is then filled with the sterilized or sterile-processed food product, and is sealed and subsequently cut along equally spaced cross sections to form pillow packs, which are folded mechanically to form respective finished packages of predetermined shape.

[0010] Alternatively, the packaging material may be cut into blanks, which are formed into packages on forming spindles, and the packages are filled with the food product and sealed. One example of this type of package is the so-called "gable-top" package known by the trade name Tetra Rex (registered trademark).

[0011] Packages of the type briefly described above are normally fitted with opening devices by which to unseal the package and pour out the food product.

[0012] One known opening device comprises a "pull tab", which is applied over a hole in the packaging material, and is removable to open the package.

[0013] In one known production method, a succession of holes is formed in the strip packaging material, and, on the side eventually facing inwards of the package, the holes are sealed with respective "patches" defined by small sheets of heat-seal plastic material. The pull tabs are applied on the opposite side of the packaging material, and are heat sealed to the respective patches, so that respective free grip portions project from the packaging material.

[0014] The pull tabs comprise an aluminium oxygen-barrier layer; and a layer of heat-seal plastic material, normally polyethylene, which is sealed to the patch. Consequently, when the pull tab is pulled off, the part of the patch sealed to the tab is pulled off with it, thus exposing the hole.

[0015] Alternatively, the pull tabs may be applied directly to a so-called "prelaminated" hole in the packaging material, i.e. a hole formed in the layer of fibrous material, before this is covered with the other packaging material layers, which close the hole hermetically and aseptically, while at the same time being easily pierced.

[0016] In both cases, the pull tabs are normally applied flat to the packaging material, and are subsequently folded to superimpose the free grip portion on the portion sealed to the packaging material. The folding operation is performed in two steps: a first step, in which the grip end is raised with respect to the packaging material by an air jet directed parallel to the plane of the material and crosswise to its travelling direction; and a second step, in which the raised tab is folded mechanically by contact with appropriately shaped guide surfaces.

[0017] Though highly reliable and efficient, machines of the type described still leave room for further improvement.

[0018] In particular, the Applicant has observed that deposits of waste particles, such as polyethylene fibres and dust, on the packaging material may result in malfunctioning of the stations downstream from the reel, particularly those for applying the longitudinal sealing strip to the edge of the packaging material web, and for folding the pull tabs.

[0019] WO 2004/041697 discloses a machine for packaging pourable food products, as defined in the preamble of claim 1.

[0020] It is an object of the present invention to provide a machine for packaging pourable food products, designed to eliminate the aforementioned drawback.

[0021] According to the present invention, there is provided a machine for packaging pourable food products, as claimed in Claim 1.

[0022] A preferred, non-limiting embodiment of the present invention will be described by way of example with reference to the accompanying drawings, in which:

Figure 1 shows a schematic view in perspective of a machine for packaging pourable food products in accordance with the present invention;
Figure 2 shows a larger-scale view in perspective of a detail in Figure 1;
Figure 3 shows a front view of the Figure 2 detail;
Figure 4 shows a section along line IV-IV in Figure 3;
Figure 5 shows a top plan view of the Figure 2 detail.

[0023] Number 1 in Figure 1 indicates as a whole a packaging machine for continuously producing sealed packages 2 of a pourable food product, such as pasteurized or UHT milk, fruit juice, wine, etc., from a web 3 of packaging material unwound off a reel 4 and fed along a forming path P.

[0024] More specifically, web 3 is guided along path P by guide members 5, e.g. rollers or similar, and is fed successively through a number of work stations, of which are shown schematically : a station 6 for applying a longitudinal sealing strip to web 3; a station 7 for folding removable opening devices (known in itself and not shown) applied beforehand to web 3; and a station 8 for forming packages 2 from web 3.

[0025] Stations 6, 7 and 8 are all known and are only described briefly below as required for a clear understanding of the present invention.

[0026] More specifically, station 6 applies a sealing strip of heat-seal plastic material (not shown) to a longitudinal edge 12 of web 3, which is then heat sealed along the sealing strip, inside station 8, to define a vertical tube 11.

[0027] Station 7 acts on the removable opening devices applied to web 3 to set them to the as-used configuration, i.e. to the configuration in which they can be pulled off by the user.

[0028] Station 8 comprises a fill device 9 for continuously pouring the sterilized or sterile-processed food product into tube 11 of packaging material; and a jaw-type forming assembly (not shown) for gripping, sealing, and cutting tube 11 along equally spaced cross sections to form a succession of packages 2.

[0029] According to an important aspect of the present invention, machine 1 also comprises a cleaning device 15 for removing any impurities from web 3, and located along path P, downstream from reel 4.

[0030] Device 15 is preferably interposed between reel 4 and station 6.

[0031] With particular reference to Figure 2, device 15 comprises a supporting bracket 18 fixed to a portion 13 of a supporting structure (not shown as a whole) of machine 1; and two fluid, preferably air, dispensing units 14 fitted to bracket 18 and acting on opposite sides of web 3 - in the example shown, at longitudinal edge 12 - to remove any impurities from web 3.

[0032] More specifically, bracket 18 comprises a first portion 23 substantially in the form of a rectangular plate and fixed to portion 13 of the supporting structure of machine 1; and a second portion 17 in the form of a C-shaped plate, lying in a plane substantially perpendicular to that of portion 23, and integrally supporting units 14.

[0033] More specifically, portion 17 comprises two parallel arms 20 separated to permit passage of web 3; and a portion 22 connecting arms 20, and from which portion 23 projects in the form of an extension.

[0034] Each unit 14 comprises a plate 19 secured to a respective arm 20 of bracket 18; a conduit 16 formed inside plate 19 to create an air stream by which to remove any impurities from web 3; and a blower 25 communicating fluidically with conduit 16 and supplied with air in a manner not shown.

[0035] Plates 19 are substantially prismatic, are parallel to each other, and are symmetrical with respect to an axis A, which, in use, is perpendicular to path P and parallel to the plane of web 3.

[0036] Towards axis A, plates 19 have respective lateral walls 24 defining a substantially prismatic chamber 21 through which web 3 is fed in use.

[0037] More specifically, chamber 21 communicates along axis A, on one side, with the outside atmosphere to permit passage of web 3 along path P, and, on the opposite side, with a waste conduit 26 for collecting the impurities removed from web 3 by both assemblies 14.

[0038] Each blower 25 projects from respective plate 19 on the axially opposite side to web 3.

[0039] Each conduit 16 (Figure 4) is formed inside a respective plate 19, is connected fluidically to respective blower 25 by a respective inlet section 38, and comprises, from inlet section 38 to chamber 21, a first portion 32 parallel to axis A, a second portion 33 perpendicular to axis A, and a third portion 34 having a narrower air flow section than portions 32 and 33.

[0040] Each portion 34 is inclined with respect to axis A towards waste conduit 26, and feeds air directly into chamber 21 to remove and direct to waste conduit 26 any impurities on both faces of web 3 facing plates 19.

[0041] Each portion 34 communicates fluidically with chamber 21 by means of a respective recess 27 formed in wall 24 of respective plate 19 and for guiding the air to waste conduit 26. More specifically, proceeding along wall 24 of each plate 19 towards waste conduit 26, each recess 27 comprises a first edge 28 extending outwards of axis A and defining an outlet of portion 34 into chamber 21 and perpendicular to portion 34; and a second edge 29 perpendicular to first edge 28 and extending towards axis A.

[0042] Waste conduit 26 has an air outlet section 39 of device 15 facing chamber 21. The inlet sections 38 of blowers 25 and the outlet section 39 of waste conduit 26 are located on the opposite side of device 15 to web 3, and outlet section 39 is interposed between inlet sections 38 of the two units 14.

[0043] Each plate 19 is secured to bracket 18 in a di-

rection perpendicular to axis A and parallel to path P.

[0044] With reference to Figures 2 to 5, each plate 19 is fixed to respective arm 20 of bracket 18 by bolts 35, which slide, perpendicularly to axis A and in the plane of portion 17 of bracket 18, inside oval slots 36 in portion 17, to adjust the position of device 15 with respect to web 3.

[0045] Each plate 19 is fitted with two strips 37 of material suitable for defining a sliding contact with web 3, e.g. silicone or Teflon, etc., and which extend inside chamber 21, perpendicularly to axis A and parallel to plate 19, to guide web 3 along path P.

[0046] In actual use, by means of slots 36, the position of plates 19, and therefore of units 14, can be adjusted with respect to web 3 and perpendicularly to axis A, so that web 3 is centred inside chamber 21 and guided along path P by strips 37 with no undesired friction.

[0047] Each blower 25 supplies respective conduit 16 with air, which, after flowing successively along respective portions 32 and 33, is accelerated sharply at respective narrow-section portion 34.

[0048] By virtue of the shape of edges 28 and 29 of each recess 27, the air is directed from portions 34 to waste conduit 26.

[0049] According to a known fluid-dynamic effect, acceleration of the air at each narrow-section portion 34 produces a fall in air pressure in portion 34.

[0050] A pressure difference is thus produced between the air in each portion 34 and the air about web 3 in chamber 21, and such as to detach any impurities from web 3 and feed them, together with the air, to waste conduit 26.

[0051] The advantages of machine 1 according to the present invention will be clear from the foregoing description.

[0052] In particular, device 15 is easy to fit to machine 1, is cheap and compact, and provides for effectively and continuously removing any waste particles on web 3, to prevent malfunctioning of machine 1 and production stoppages.

[0053] Clearly, changes may be made to machine 1 as described and illustrated herein without, however, departing from the scope of the accompanying Claims.

[0054] In particular, device 15 may be designed otherwise than as described and shown, so as to interact with areas of web 3 other than longitudinal edge 12. For example, to operate directly on the area to which the removable opening devices are applied - usually along the centerline - plates 19 and conduits 16 may be appropriately sized, parallel to axis A, to permit air flow from the centerline to the edge of web 3 adjacent to waste conduit 26.

[0055] In an alternative not shown, as opposed to fluid dispensing units 14, cleaning device 15 may comprise respective suction units for removing waste particles on web 3 of packaging material.

Claims

1. A machine (1) for packaging pourable food products, comprising a feed station (4) for feeding a sheet packaging material (3) along a predetermined forming path (P), along which said packaging material (3) is transformed into a succession of sealed packages (2), and impurity removing means (15) for removing any impurities on said packaging material (3), and located downstream from said feed station (4) along said forming path (P);
said impurity removing means (15) comprising flow generating means (14) for generating, on at least one surface (12) of said packaging material (3), a flow of fluid, and at least one dispensing conduit (16) for dispensing fluid at a pressure differing from the pressure about said packaging material (3), so as to remove said impurities from the packaging material (3);
said impurity removing means (15) defining a chamber (21), through which said packaging material (3) is fed in use, and which communicates fluidically with said dispensing conduit (16) and with a catch vessel (26) for collecting said impurities;
characterized in that said flow generating means comprise at least one blower (25) for supplying said dispensing conduit (16) with fluid;
in that said chamber (21) has an axis (A) perpendicular to said forming path (P) and parallel to the plane of the sheet packaging material (3) when passing through the chamber (21);
in that said dispensing conduit (16) communicates with said chamber (21) at a narrow-section portion (34) so as to produce therein, in use, an acceleration of the fluid and a fall in pressure; and
in that said narrow-section portion (34) is oriented towards said catch vessel (26) and communicates fluidically with said chamber (21) by means of a recess (27), which is formed in a wall (24) delimiting said chamber (21) on a side of said axis (A) and is adapted to guide and direct said fluid towards said catch vessel (26) along a direction orthogonal to said forming path (P); said recess (27) comprising:

   - a first edge (28) extending outwards of said axis (A), defining an outlet of said narrow-section portion (34) into said chamber (21) and perpendicular to the narrow-section portion (34); and
   - a second edge (29) perpendicular to said first edge (28) and extending towards said axis (A).

2. A machine as claimed in Claim 1, **characterized by** comprising an application station (6) for applying a sealing strip to a longitudinal edge (12) of said packaging material (3); and in that said impurity removing means (15) are located upstream from said application station (6) for applying said sealing strip.

3. A machine as claimed in Claim 1 or 2, **characterized by** comprising a folding station (7) for folding removable opening devices fitted to said packaging material (3); and in that said impurity removing means (15) are located upstream from said folding station (7).

4. A machine as claimed in any one of the foregoing Claims, **characterized in that** said flow generating means (14) comprise at least two said dispensing conduits (16) for dispensing fluid on opposite sides of said packaging material (3) with respect to said forming path (P).

5. A machine as claimed in Claim 4, **characterized in that** said dispensing conduits (16) are formed in respective plates (19), whose lateral walls (26) define said chamber (21).

6. A machine as claimed in any one of the foregoing Claims, **characterized by** comprising adjusting means (35, 36) for adjusting the position of said impurity removing means (15) with respect to said packaging material (3).

7. A machine as claimed in any one of the foregoing Claims, **characterized by** comprising guide means (37) for guiding said packaging material (3) and located along said forming path (P), close to the operating area of said impurity removing means (15).

8. A machine as claimed in Claim 7, **characterized in that** said guide means (37) are carried by said impurity removing means (15).

Patentansprüche

1. Eine Maschine (1) zum Verpacken fließfähiger Nahrungsmittel, die eine Zuführstation (4) zum Zuführen eines Verpackungsfolienmaterials (3) entlang einem vorbestimmten Formungspfad (P), entlang dem das Verpackungsmaterial (3) in eine Abfolge von verschlossenen Verpackungen (2) umgewandelt wird, und Verunreinigungsentfernungsmittel (15) zum Entfernen aller Verunreinigungen auf dem Verpakkungsmaterial (3) umfasst und die stromabwärts von der Zuführstation (4) entlang dem Formungspfad (P) angeordnet ist;
wobei die Verunreinigungsentfernungsmittel (15) flußerzeugende Mittel (14) zur Erzeugung, auf mindestens einer Oberfläche (12) des Verpackungsmaterials (3), eines Fluidflusses, und mindestens eine Ausgabeleitung (16) zur Ausgabe von Fluid bei einem Druck, der sich von dem Druck um das Verpakkungsmaterial (3) herum unterscheidet, so dass die Verunreinigungen von dem Verpackungsmaterial (3) entfernt werden, umfassen;
wobei die Verunreinigungsentfernungsmittel (15) eine Kammer (21) definieren, durch die das Verpakkungsmaterial (3) bei Gebrauch hindurchgeführt wird und die fluidisch mit der Ausgabeleitung (16) und mit einem Auffanggefäß (26) zum Sammeln der Verunreinigungen kommuniziert;
dadurch gekennzeichnet, dass die flußerzeugenden Mittel mindestens ein Gebläse (25) zum Versorgen der Ausgabeleitung (16) mit Fluid umfassen;
dadurch, dass die Kammer (21) eine Achse (A) senkrecht zu dem Formungspfad (P) und parallel zu der Ebene des Verpackungsfolienmaterials (3) beim Passieren der Kammer (21) aufweist;
dadurch, dass die Ausgabeleitung (16) mit der Kammer (21) in einem engen Teilabschnitt (34) kommuniziert, so dass darin bei Gebrauch eine Beschleunigung des Fluids und ein Druckabfall erzeugt werden; und
dadurch, dass der enge Teilabschnitt (34) in Richtung des Auffanggefäßes (26) orientiert ist und fluidisch mit der Kammer (21) mittels einer Aussparung (27) kommuniziert, die in einer Wand (24) ausgebildet ist, die die Kammer (21) auf einer Seite der Achse (A) begrenzt und dazu ausgelegt ist, das Fluid in Richtung des Auffanggefäßes (26) entlang einer Richtung senkrecht zu dem Formungspfad (P) zu lenken und zu dirigieren; wobei die Aussparung (27) folgendes umfasst:

- eine ersten Kante (28), die sich von der Achse (A) nach außen erstreckt, die einen Auslass aus dem engen Teilabschnitts (34) in die Kammer (21) und senkrecht zu dem engen Teilabschnitt (34) definiert; und
- eine zweite Kante (29) senkrecht zu der ersten Kante (28) und sich in Richtung der Achse (A) erstreckend.

2. Eine Maschine nach Anspruch 1, **dadurch gekennzeichnet, dass** sie eine Applikationsstation (6) zum Anbringen eines Verschlussstreifens an einer Längskante (12) des Verpackungsmaterials (3) umfasst; und **dadurch**, dass die Verunreinigungsentfernungsmittel (15) stromaufwärts von der Applikationsstation (6) zum Aufbringen des Verschlussstreifens angeordnet sind.

3. Eine Maschine nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** sie eine Faltstation (7) zum Falten von entfernbaren, an das Verpackungsmaterial (3) angepassten Öffnungsvorrichtungen umfasst; und **dadurch**, dass die Verunreinigungssentfernungsmittel (15) stromaufwärts von der Faltstation (7) angeordnet sind.

4. Eine Maschine nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die flußerzeugenden Mittel (14) mindestens zwei der

Ausgabeleitungen (16) zur Ausgabe von Fluid auf, bezüglich des Formungspfades (P), gegenüberliegenden Seiten des Verpackungsmaterials (3) umfassen.

5. Eine Maschine nach Anspruch 4, **dadurch gekennzeichnet, dass** die Ausgabeleitungen (16) in entsprechenden Platten (19) ausgebildet sind, deren Seitenwände (26) die Kammer (21) definieren.

6. Eine Maschine nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** sie Einstellmittel (35, 36) zum Einstellen der Position der Verunreinigungsentfernungsmittel (15) bezüglich des Verpakkungsmaterials (3) umfasst.

7. Eine Maschine nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** sie Führungsmittel (37) zum Führen des Verpackungsmaterials (3) und angeordnet entlang des Formungspfades (P) in der Nähe des Betriebsbereichs der Verunreinigungsentfernungsmittel (15) umfasst.

8. Eine Maschine nach Anspruch 7, **dadurch gekennzeichnet, dass** die Führungsmittel (37) von den Verunreinigungsentfernungsmitteln (15) getragen werden.

Revendications

1. Machine (1) de conditionnement de produits alimentaires fluides, comprenant un poste d'alimentation (4) destiné à alimenter un matériau de conditionnement en feuille (3) suivant un trajet de mise en forme prédéterminé (P), le long duquel ledit matériau de conditionnement (3) est transformé en une succession d'emballages scellés (2), et des moyens d'élimination d'impureté (15) destinés à éliminer toutes impuretés sur ledit matériau de conditionnement (3), et situés en aval par rapport audit poste d'alimentation (4) suivant ledit trajet de mise en forme (P) ;
lesdits moyens d'élimination d'impureté (15) comprenant un moyen de production d'écoulement (14) destiné à produire, sur au moins une surface (12) dudit matériau de conditionnement (3), un écoulement de fluide, et au moins un conduit de distribution (16) destiné à distribuer un fluide à une pression différente de la pression autour dudit matériau de conditionnement (3), de manière à éliminer lesdites impuretés dudit matériau de conditionnement (3) ;
lesdits moyens d'élimination d'impureté (15) définissant une chambre (21), à travers laquelle ledit matériau de conditionnement (3) est délivré en utilisation, et qui communique de manière fluidique avec ledit conduit de distribution (16) et avec une cuve de récupération (26) destinée à collecter lesdites impuretés ;
caractérisée en ce que ledit moyen de production d'écoulement comprend au moins un ventilateur (25) destiné à alimenter ledit conduit de distribution (16) avec un fluide ;
en ce que ladite chambre (21) comporte un axe (A) perpendiculaire audit trajet de mise en forme (P) et parallèle au plan du matériau de conditionnement en feuille (3) lorsqu'il passe à travers la chambre (21) ;
en ce que ledit conduit de distribution (16) communique avec ladite chambre (21) au niveau d'une partie de section étroite (34) de manière à produire, en utilisation, dans cette dernière, une accélération du fluide et une chute de pression ; et
en ce que ladite partie de section étroite (34) est orientée vers ladite cuve de récupération (26) et communique de manière fluidique avec ladite chambre (21) au moyen d'une cavité (27), qui est formée sur une paroi (24) délimitant ladite chambre (21) sur un côté dudit axe (A) et est adaptée de manière à guider et diriger ledit fluide vers ladite cuve de récupération (26) suivant une direction orthogonale audit trajet de mise en forme (P) ; ladite cavité (27) comprenant :

un premier bord (28) s'étendant vers l'extérieur dudit axe (A), définissant une sortie de ladite partie de section étroite (34) dans ladite chambre (21) et perpendiculaire à la partie de section étroite (34) ; et
un second bord perpendiculaire (29) audit premier bord (28) et s'étendant vers ledit axe (A).

2. Machine selon la revendication 1, **caractérisée par le fait qu'**elle comprend un poste d'application (6) destiné à appliquer une bande de scellement sur un bord longitudinal (12) dudit matériau de conditionnement (3) ; et en ce que lesdits moyens d'élimination d'impureté (15) sont situés en amont par rapport audit poste d'application (6) afin d'appliquer ladite bande de scellement.

3. Machine selon la revendication 1 ou 2, **caractérisée par le fait qu'**elle comprend un poste de pliage (7) destiné à replier des dispositifs d'ouverture amovibles assemblés sur ledit matériau de conditionnement (3) ; et en ce que lesdits moyens d'élimination d'impureté (15) sont situés en amont par rapport audit poste de pliage (7).

4. Machine selon l'une quelconque des revendications précédentes, **caractérisée en ce que** ledit moyen de production d'écoulement (14) comprend au moins deux conduits de distribution (16) afin de distribuer un fluide sur des côtés opposés dudit matériau de conditionnement (3) par rapport audit trajet de mise en forme (P).

5. Machine selon la revendication 4, **caractérisée en ce que** lesdits conduits de distribution (16) sont formés sur des plaques respectives (19) dont les parois latérales (26) définissent ladite chambre (21).

6. Machine selon l'une quelconque des revendications précédentes, **caractérisée en ce qu'**elle comprend des moyens de réglage (35, 36) afin de régler la position desdits moyens d'élimination d'impureté (15) par rapport audit matériau de conditionnement (3).

7. Machine selon l'une quelconque des revendications précédentes, **caractérisée par le fait qu'**elle comprend des moyens de guidage (37) destinés à guider le matériau de conditionnement (3) et situés le long dudit trajet de mise en forme (P), à proximité de la zone de travail desdits moyens d'élimination d'impureté (15).

8. Machine selon la revendication 7, **caractérisée en ce que** lesdits moyens de guidage (37) sont supportés par lesdits moyens d'élimination d'impureté (15).

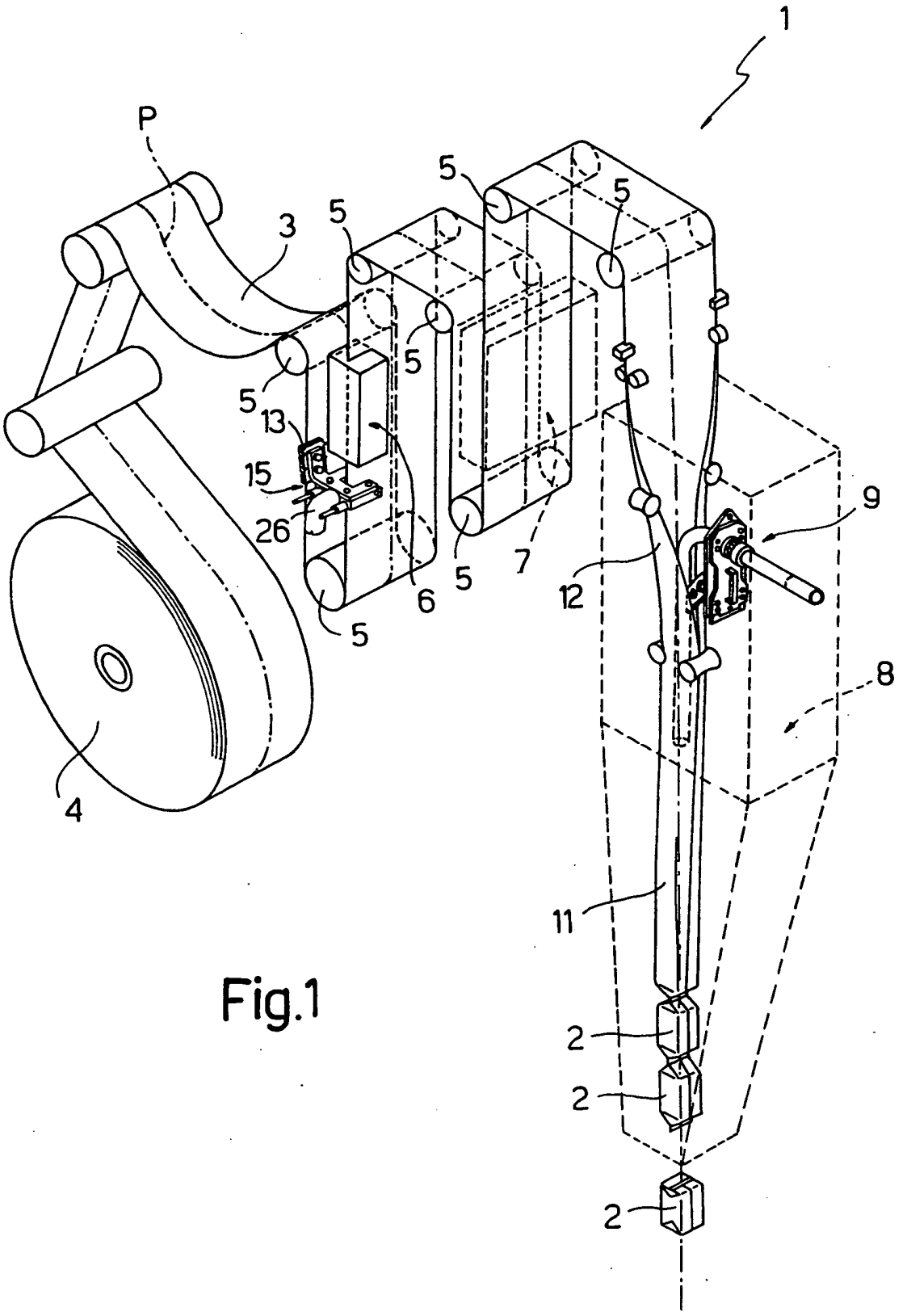


Fig.1

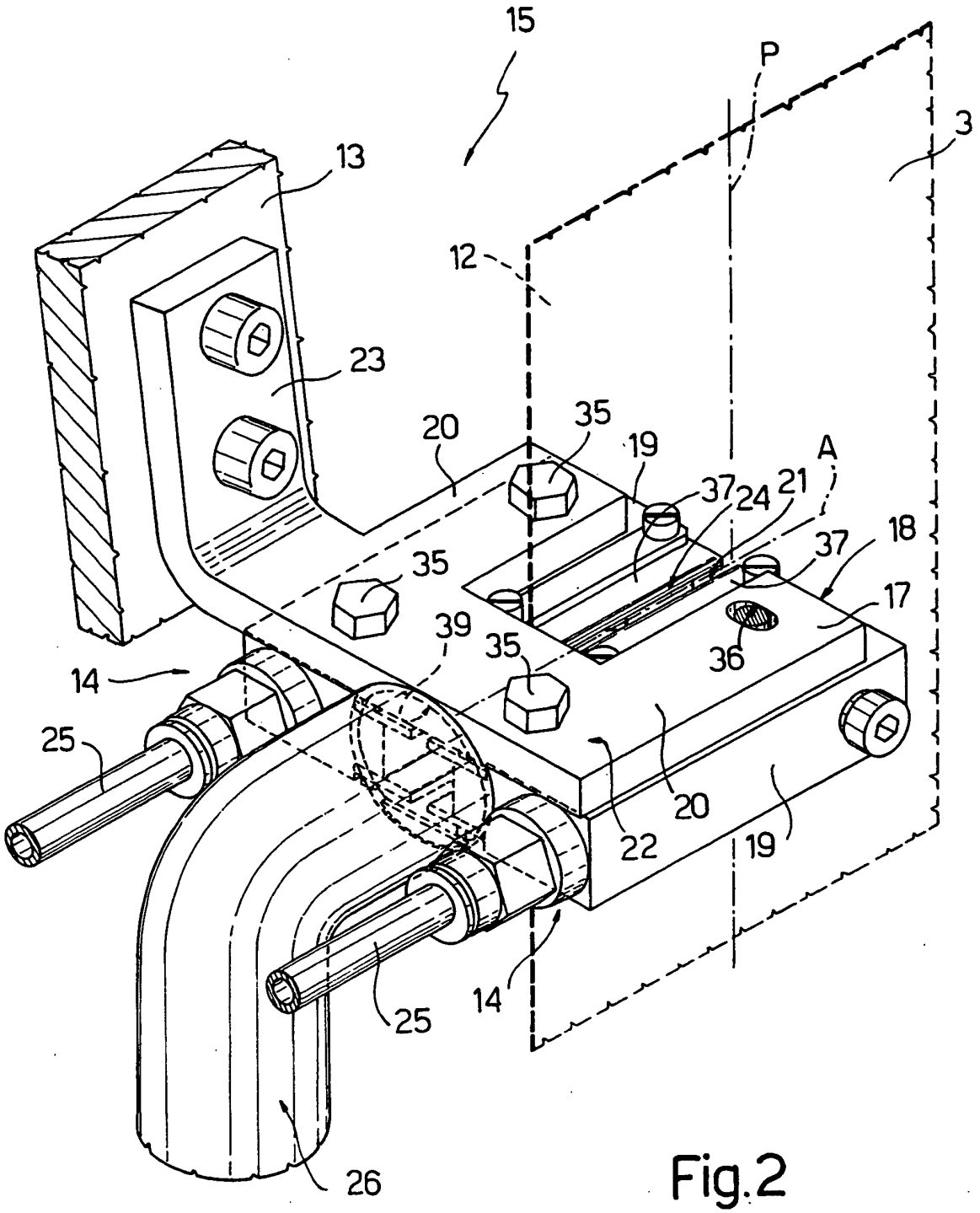

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Fig.2

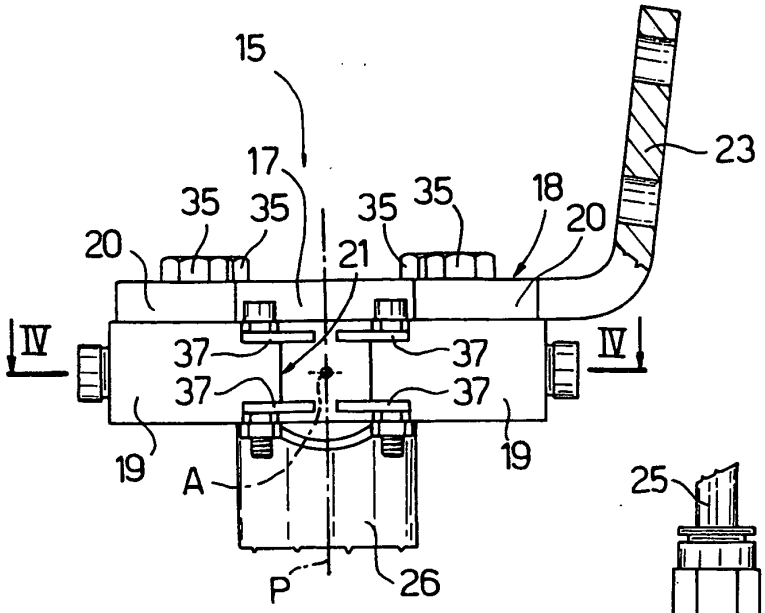


Fig.3

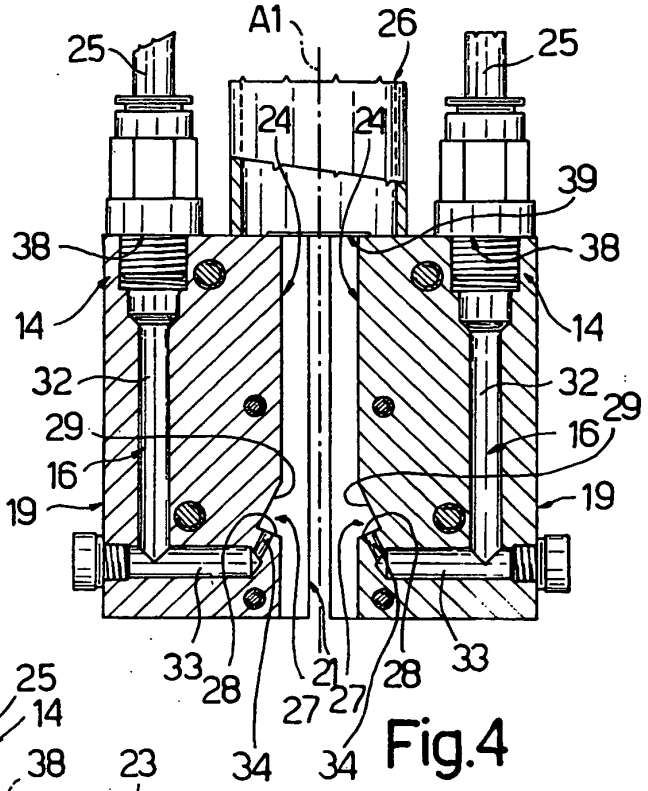


Fig.4

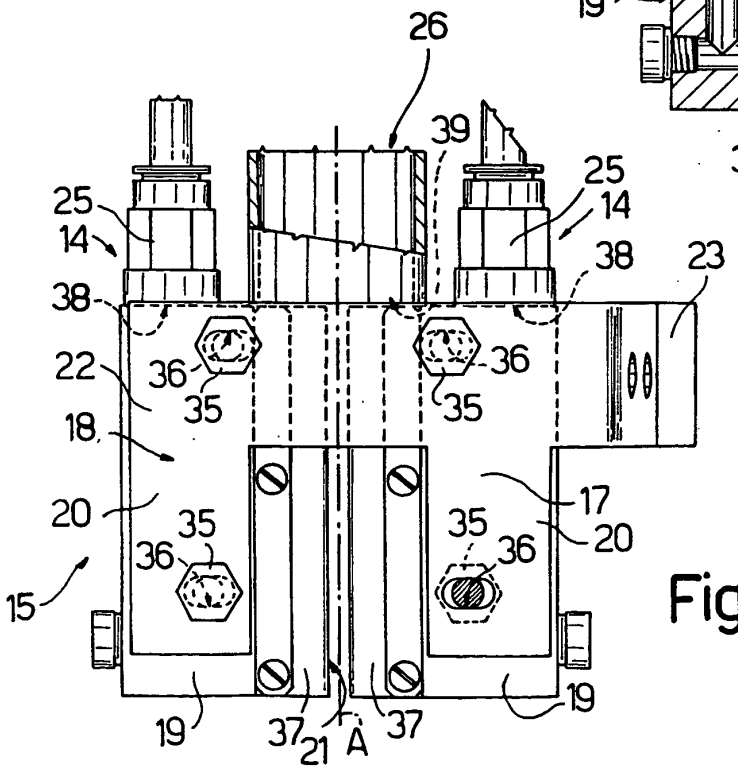


Fig.5

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- WO 2004041697 A **[0019]**