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(54) MACHINE FOR CLOSING FLEXIBLE CONTAINERS

MASCHINE ZUM VERSCHLIESSEN FLEXIBLER BEHÄLTER

MACHINE POUR FERMER DES CONTENANTS SOUPLES

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Description

Field of the invention

[0001] The present invention generally finds application in the field of product packaging machines and particularly relates to a machine for closing flexible containers.

Background art

[0002] In the field of food packaging, it is known to use containers or bags made of flexible material, such as plastic or paper, which have a neck with an opening designed to allow introduction and/or removal of one or more products, and to be re-closed using a tie, a band or any other rigid or semirigid sheet element.

[0003] The latter is wrapped in such a manner as to allow a user to re-open the bag and withdraw products through the opening.

[0004] Particularly, it is known to use bands or straps, usually known as clips, generally made of polymer or metal material, which are fed from a coil and cut to size immediately before the closing step, to encircle the bag neck, proximate the opening, and re-close it.

[0005] Typically, small to medium-sized retail businesses, such as bakeries or delicatessen stores use bag closing machines having a frame with a station for manual positioning of the bag neck, in which the closing step is carried out.

[0006] A housing for a closing band coil is located proximate the station and is unwound in a controlled manner using an intermittently-driven friction disk, to move one portion of predetermined length at a time next to the closing station.

[0007] The portion designed to encircle the bag neck is cut by a blade which is movable perpendicular to the closing band.

[0008] Then, the cut portion is pushed by the blade into the closing station, in which an abutment wall causes it to deform and encircle the bag neck, to close it.

[0009] In machines designed for this particular fields, all the movements of the various parts, such as the coil support, the friction disk, the knife and any accessory part, such as the stamping unit for transferring text to the band, are generally driven by pneumatic actuators.

[0010] A control unit may be provided for controlling air supply to the various devices, to coordinate their movements.

[0011] These solutions appear to be markedly disadvantageous, in that they require a special unit for supplying the machine with compressed air in the premises where packaging takes place, which apparently increases the overall costs and introduces restrictions in the installation of the machine.

[0012] Furthermore, coordination of the movements of the various parts is complex and not always accurate.

[0013] US 1 493 075 discloses a machine for closing

flexible containers having a stationary frame and all the features mentioned in the preamble of claim 1. This known machine is configured for closing bags having a mouth with no neck, and provides a means for gathering the portion of the bag close to the mouth before inserting it into a slot. Moreover the machine is actuated by a treadle.

[0014] US 3 455 010 discloses a bag clip applicator having means for compressing the portion of the bag close to the mouth and for securing a closure member about the compressed portion.

Disclosure of the invention

[0015] The object of the present invention is to obviate the above drawbacks, by providing a machine for closing flexible containers that is highly efficient and relatively cost-effective.

[0016] A particular object is to provide a machine for closing flexible containers that is portable and may be installed in any room, without requiring the provision of a compressed air supply unit beforehand.

[0017] A further object is to provide a machine for closing flexible containers that ensures synchronous movement of its parts using accurate and inexpensive means.

[0018] These and other objects, as better explained hereinafter, are fulfilled by a machine for closing flexible containers as defined in claim 1.

[0019] Advantageous embodiments of the invention are defined in accordance with the dependent claims.

Brief description of the drawings

[0020] Further characteristics and advantages of the invention will be more apparent upon reading the detailed description of a preferred, non-exclusive embodiment of a machine for closing flexible containers of the invention, which is described as a non-limiting example with the help of the annexed drawings, in which:

FIG. 1 is a perspective view of a machine according to the invention;

FIG. 2 is a lateral view of the machine of Fig. 1;

FIG. 3 is a top view of the machine of Fig. 1 with certain elements being omitted for a clearer view of its interior;

FIG. 4 is a top sectional view of a detail of the machine of Fig. 1;

FIG. 5 is a front view of the machine of Fig. 1;

FIG. 6 shows a container closing sequence.

Detailed description of a preferred embodiment

[0021] Referring to the above figures, a machine of the invention, generally designated by numeral 1, may be used to re-close containers or bags C made of polymeric material, paper or metal material, which have a neck N with an opening A for withdrawing products therefrom.

[0022] The containers C may be designed to contain products of any type, possibly food, with no particular limitation.

[0023] The machine 1 of the invention is portable and can be located in any room having a connection to the mains or any other voltage source.

[0024] As shown in Fig. 1 and Fig. 2, the machine 1 comprises a supporting frame 2 which can be installed on a floor and has a shaping or closing seat 3, allowing the neck N of the container C to be manually placed and closed therein.

[0025] The shaping seat 3 is located at the end of a slot 3' formed in the frame 2 to allow the neck N of the container C to be slid into the shaping seat 3.

[0026] The frame 2 also has a support 4 for a reel B of a band E or any other substantially band-shaped closing sheet element having suitable stiffness and deformability.

[0027] Such element may be substantially flat and made from a metal material, such as aluminum, or even a polymeric material, possibly with wire cores extending therethrough to increase its rigidity, while maintaining its deformability.

[0028] Typically, the closing band E may have a width of a few millimeters, e.g. from 3 mm to 10 mm.

[0029] Nevertheless, it shall be understood that the materials and sizes of the closing band E are indicated by way of example only and without limitation to the present invention, and that any commercially available closing element may be used therein.

[0030] The frame 2 further comprises a substantially horizontal support plate 5 having means 6 thereon for feeding the band E by unwinding the reel B and for guiding a portion P of the band E of predetermined length l to a cutting seat 7 located on the same plate 5, and in which the portion P of the band E to be cut will be substantially vertical.

[0031] The feeding means 6 are designed to translate at least one end section of the reel B in a first predetermined direction X substantially parallel to the top surface 8 of the plate 5. The plate 5 is preferably, but not necessarily horizontal.

[0032] The machine 1 further comprises cutting and pre-shaping means 9 for cutting and pre-shaping the portion P of the band E.

[0033] The cutting and pre-shaping means 9 are designed to operate in a second direction Y, to capture the portion P of the band E contained in the cutting seat 7, cause its separation from the reel B and push it into the shaping seat 3.

[0034] Second shaping means 10 are provided in the shaping seat 3 and in the plate 5, which are adapted to deform the cut and pre-shaped portion P and wrap it around the neck N of the container C, to close its opening A.

[0035] Both the means 6 for feeding and guiding the band E and the cutting means 9 are driven by actuator means 11 that are directly mounted to the frame 2 and

impart respective movements to such means.

[0036] According to a peculiar feature of the invention, the actuator means 11 are solely driven by a motor 15 and are designed to be connected to a voltage source 12, schematically shown in Fig. 2, to be solely supplied with voltage.

[0037] Advantageously, the actuator means 11 are operatively connected to the feeding means 6 and the cutting means 9 through first and second transmission means 13 and 14 respectively.

[0038] In a preferred, non-exclusive embodiment of the invention, the actuator means 11 include an electric motor 15 mounted to the frame 2 in any position and having a power supply.

[0039] Particularly, the motor 15 may be designed to be connected to any external voltage source 12, such as the mains in the premises in which the machine 1 is located from time to time, a voltage generator, possibly of movable type, or may be also powered by batteries.

[0040] It shall be understood that the type of electric motor as used in the present invention is in no way limited, and may be either conventional or linear.

[0041] In the illustrated configuration, the motor 15 has a power drive shaft, not shown, whose output is connected to the feeding means 6 and the cutting means 9 through the first and second transmission means 13, 14 respectively.

[0042] These means 13, 14 are designed to convert the rotary motion of the power drive shaft into respective movements of the feeding means 6 and cutting means 9.

[0043] In a further particularly advantageous aspect of the invention, a kinematic linkage 16 is provided, for mutually connecting the first transmission means 13 and the second transmission means 14 and to connect them to the electric motor 15, for synchronized drive thereof.

[0044] Particularly, the kinematic linkage 16 is designed to allow coordinated movement of the cutting means 9 and the feeding means 6.

[0045] Also, the kinematic linkage 16 may be designed to allow at least partially simultaneous movement of the feeding means 6 and the cutting means 9.

[0046] Thus, the translational motion of the cutting means 9 in the second direction Y will only occur, at least in the final section of the total travel from the cutting seat 7 to the forming and shaping seat 3, when the feeding means 6 have already carried the portion P to be cut into the cutting station 7.

[0047] In the illustrated configuration, the feeding and guide means 6 include a pulling element 17 which is designed to engage the portion P of the band E and carry it into the cutting station 7.

[0048] For example, the pulling element 17 includes a pair of friction disks 18 and 19 having respective peripheral sliding surfaces which are designed to contact opposite faces of the band E to assist sliding thereof and unwinding of the reel B.

[0049] The two disks 18 and 19, which may have any diameter ratio therebetween, are adapted to rotate about

first substantially parallel axes of rotation W, Z respectively, which are substantially vertical in the illustrated configuration. Particularly, a first disk 18 is a driving disk, and the other 19 may be driven and idly or frictionally mounted about its axis Z. The driving disk 18 is connected to the actuator means 11, e.g. to the power drive shaft of the motor 15, through the first transmission means 13.

[0050] The latter may include a first transmission element 20 interacting with the power drive shaft of the motor 15 through the kinematic linkage 16 and is adapted to rotate about a second axis of rotation K, substantially parallel to the first axes of rotation W, Z.

[0051] Furthermore, the first transmission means 13 include a first mechanism 13', e.g. a linkage, such as a crank-slider, cam, crank, or similar mechanism, to transfer the rotary motion of the first transmission element 20 to the driving disk 18 and cause unwinding of the reel B.

[0052] The cutting means 9 may include an elongate slider 21, which is designed to slide in a second direction Y above and parallel to the top surface 8 of the support plate 5.

[0053] Preferably, the first direction X and the second direction Y are substantially orthogonal to each other.

[0054] Particularly, the slider 21 is designed to move between a first rearward, inoperative limit position and a second forward limit position, in which it interacts with the portion P of the band E contained in the cutting station 7 to force it into the shaping seat 3.

[0055] The slider 21 has a substantially vertical blade 23 at its free end 22, and is connected at the other end 24 to the actuator means 11 through the second transmission means 14.

[0056] The kinematic linkage 16 may be adjusted for the starting section of the travel of the slider 21 from the first limit position to the cutting seat 7 to be covered at the same time as the band E is unwound, thereby reducing cycle times.

[0057] The second motion transmission means 14 may include a second transmission element 25 adapted to rotate about a third axis of rotation R which may be, by way of example, substantially parallel to the second axis of rotation K.

[0058] Furthermore, they include a second mechanism 14', also possibly a linkage, which connects the second transmission element 25 with the end 24 of the slider 21, to transfer the rotary motion of the motor 15 thereto and convert it into a reciprocating translational motion of the slider 21 in the second direction Y.

[0059] The transmission elements 20, 25 may consist of friction disks or gear wheels or more complex gearing systems, e.g. bevel gears, according to the direction in which the power drive shaft of the motor 15 extends.

[0060] The kinematic synchronization linkage 16 may include an annular connection element 26, such as a drive belt or chain, which partially encircles the peripheral surfaces of the transmission elements 20, 25 to cause coordinated movement thereof.

[0061] Particularly, one of the two transmission ele-

ments 20, 25, e.g. the second 25, may be directly connected with the power drive shaft, possibly through an intervening transmission or gearmotor, not shown, whereas the connection of the other transmission element 25, 20 with the power drive shaft is obtained through the annular connection element 26.

[0062] The sizes of the transmission elements 20, 25 and the connection element 26, as well as their relative positions, will allow coordination of the movements of the cutting means 9 and the feeding means 6, according to arrangements known to the skilled person, which will not be described in further detail.

[0063] As shown in Fig. 4, the second shaping means 10 may include a first shaping member 27 located in the cutting seat 7 and designed to impart a substantially U shape to the previously cut portion P of the band E, with the concave side facing towards the shaping seat 3.

[0064] The latter will in turn accommodate a second shaping element 28 having a substantially vertical abutment surface 29 transverse to the second direction Y with convex transverse ends 30.

[0065] The frame 2 may comprise a closing lid 31, which may be hinged to the support plate 5 or otherwise placed thereon to protect both the cutting means 9 and at least part of the feeding means 6, e.g. the friction disks 18 and 19. Conversely, the shaping seat 3 is located outside the lid 31.

[0066] Therefore, the latter will have a lateral aperture 32 for receiving the band E and a front aperture 33 for ejecting the blade 23 of the slider 21 and for allowing the cut portion P of the band E to move from the cutting seat 7 to the shaping seat 3.

[0067] The frame 2 also comprises a support column 34 for permanent or removable installation thereof on the floor of the room, for easy transportation thereof.

[0068] In a particular variant, the machine 1 may also include a stamping station 35 mounted at the side of the plate 5, which has means 36 for delivering a dyeing material, such as an ink or the like, to a transfer element 37 for transferring the dyeing material to the closing band E.

[0069] The transfer element 37 will pivot about a fourth axis of rotation between a first dyeing material withdrawing position to a second transfer position, in which it contacts a face of the closing band E, to transfer text, e.g. a date, or an image thereto.

[0070] The fourth axis of rotation, which may be substantially vertical, may be driven independent of the feeding means 6 and/or the cutting means 9.

[0071] Preferably, it is connected to the same actuator means 11, e.g. the same power drive shaft of the common electric motor 15 through third motion transmission means, not shown, possibly connected to the first and second motion transmission means 13, 14 through the kinematic linkage 16.

[0072] In operation, in order to close a container C that has been filled with one or more products, once the actuator means 11 are simply connected to the voltage source 12, the operator shall manually introduce the neck

N of the container S into the shaping seat 3.

[0073] Now, the actuator means 11 are actuated, e.g. by a simple switch or another control, which cause the power drive shaft to rotate and the cutting means 9 and the feeding means 6 to move in synchronism.

[0074] In practice, as the portion P of the band E to be cut is pulled in the first direction X to be introduced into the cutting seat 7, the slider 21 is translated in the second direction Y to carry the blade 23 into the cutting seat 7 and contact the portion P.

[0075] Thus, the blade 23 cuts the portion P of predetermined length l and continues its travel while pulling it first against the first shaping element 27 and then into the closing seat 7 until it contacts the abutment surface 29 of the second shaping element 28.

[0076] The U-shaped portion P has a pair of arms that are pushed against respective convex portions 30 of the abutment surface 29 to encircle the neck N of the container C and re-close it. The stamping step, if any, may be carried out before cutting.

[0077] The above description clearly shows that the invention fulfills the intended objects and particularly provides a machine for closing flexible containers that is portable and may be used in any room, without requiring the provision of a compressed air supply unit, but only the connection to a voltage source, such as the mains in the room.

[0078] The machine of the invention is susceptible of a number of changes and variants, within the inventive concept disclosed in the appended claims. All the details thereof may be replaced by other technically equivalent parts, and the materials may vary depending on different needs, without departure from the scope of the invention.

[0079] While the machine has been described with particular reference to the accompanying figures, the numerals referred to in the disclosure and claims are only used for the sake of a better intelligibility of the invention and shall not be intended to limit the claimed scope in any manner.

Claims

1. A machine for closing flexible containers, wherein each container (C) comprises an opening (A) for picking up the products collected therein, wherein each container has a neck (N) close to the opening (A), the container (C) to be closed by a semirigid and deformable closing band (E), the machine comprising:

- a supporting frame (2)
- a plate (5),
- a reel (B), on which the deformable closing band (E) is wound,
- the plate (5) having a slot (3') for inserting the neck (N) of the container (20) close to its opening (A) at once,

- a shaping seat (3) for shaping the closing band (E),
- a cutting seat (7) for cutting a portion (P) of the closing band (E) at a predetermined length,
- feeding means (6) for feeding the band (E) into said cutting seat (7) along a first direction (X),
- means (9) for cutting and shaping the portion (P) of the band (E),
- actuating means (11) for moving said feeding means (6) and said cutting and shaping means (9),

characterised in that:

- the plate (5) is horizontal and is anchored to the supporting frame (2),
- the slot (3') has an end, the shaping seat (3) being placed at said end of said slot (3'), and is for inserting the neck (N) of the container (C), wherein the shaping seat (3) is also for positioning and closing the neck (N) of the container (C),
- the means (9) for cutting and shaping the portion (P) of the band (E) are placed in the cutting seat (7),
- the actuating means (11) are exclusively actuated by an electric motor (15),
- said first direction (X) for feeding the band (E) being substantially parallel to the top surface of the plate (5), said cutting and shaping means (9) including an elongate slider (21) which is designed to slide in a second direction (Y) substantially horizontal and orthogonal to said first direction (X) to carry the cutting and shaping means (9) into said cutting seat (7) and contact said band portion (P) to cut said band portion (P), to force said cut portion (P) into to said shaping seat (3) and close it around the neck (N) of the container (C).

2. Machine as claimed in claim 1, **characterized in that** said electric motor (15) is mounted on said frame (2).

3. Machine as claimed in claim 1, **characterized in that** said actuating means (11) comprise first and second motion transmission means (13, 14) designed to connect said motor respectively to said feeding means (6) and to said first cutting and pre-shaping means (9) and said second shaping means (10), said first and second motion transmission means (13, 14) being synchronized by a kinematic linkage (16).

4. Machine as claimed in any preceding claim, **characterized in that** said feeding means (6) comprise a pulling element (17) designed to interact with the closing band (E) to translate it along said first direction (X) and bring the portion (P) to be cut into said cutting seat (7).

5. Machine as claimed in claim 4, **characterized in that** said pulling element (17) comprises at least one first friction disk (18) rotatable about a first rotation axis (W) and having a peripheral outer surface designed to come into contact with a surface of the closing band (E), said first friction disk (18) being mechanically associated to said first motion transmission means (13). 5
6. Machine as claimed in claim 5, **characterized in that** said first motion transmission means (13) comprise a first transmission element (20) interacting with said motor (15) and rotatable about a second rotation axis (K) and a first articulated kinematic motion (13') designed to connect said first transmission element (20) with said first friction disk (18) and to transfer thereto the motion of said motor (15). 10 15
7. Machine as claimed in any claim 3 to 6, **characterized in that** said slider (21) is movable between a rearward end position and a forward end position wherein it interacts with the portion (P) of the band (E), said slider (21) having an opposite end (24) fastened to said second motion transmission means (14) for receiving the motion from said actuating means (11). 20 25
8. Machine as claimed in claim 7, **characterized in that** said second motion transmission means (14) comprise a second transmission element (25) rotatable about a third rotation axis (R) and interacting with said motor (15) and a second articulated kinematic motion (14') designed to connect said second transmission element (25) with said slider (21) for transferring thereto the motion of said motor (15). 30 35
9. Machine as claimed in claim 8, **characterized in that** said kinematic linkage (16) comprises at least one annular connecting member (26) operatively coupled to said first and said second transmission elements (20, 25). 40

Patentansprüche

1. Eine Maschine zum Verschließen flexibler Behälter, wobei jeder Behälter (C) eine Öffnung (A) aufweist zur Aufnahme der darin enthaltenen Erzeugnisse und jeder Behälter einen Ansatz (N) aufweist für den Verschluss der Öffnung (A), der Behälter (C) von einem halbsteifen und verformbaren Verschlussband (E) zu schließen ist, wobei die Maschine umfasst:
- einen Stützrahmen (2),
 - eine Platte (5),
 - eine Spule (B), auf die das verformbare Verschlussband (E) aufgewickelt ist,

- wobei die Platte (5) einen Schlitz (3') aufweist für das sofortige Einfügen des Ansatzes (N) des Behälters (20) nahe zu seiner Öffnung (A),
- eine formende Anlage (3) zum Formen des Verschlussbands (E),
- eine schneidende Anlage (7) zum Schneiden eines Abschnitts (P) des Verschlussbands (E) auf eine vorbestimmte Länge,
- Zufuhreinrichtungen (6) für die Zufuhr des Bands (E) in die schneidende Anlage (7) entlang einer ersten Richtung (X),
- Einrichtungen (9) zum Schneiden und Formen des Abschnitts (P) des Bands (E),
- Betätigungseinrichtungen (11) zum Bewegen der Zufuhreinrichtungen (6) und der Einrichtungen (9) zum Schneiden und Formen,

dadurch gekennzeichnet, dass

die Platte (5) horizontal ist und verankert ist an dem Stützrahmen (2),

- der Schlitz (3') ein Ende aufweist und die Anlage (3) zum Formen an diesem Ende des Schlitzes (3') angeordnet ist, und zum Einfügen des Ansatzes (N) des Behälters (C) ist, wobei die Anlage (3) zum Formen auch zum Positionieren und Schließen des Ansatzes (N) des Behälters (C) ist
- die Einrichtungen (9) zum Schneiden und Formen des Abschnitts (P) des Bands (E) in der schneidenden Anlage (7) angeordnet sind,
- die Betätigungseinrichtungen (11) ausschließlich mittels einem elektrischen Motor (15) betätigt werden,
- die erste Richtung (X) zur Zufuhr des Bands (E) im Wesentlichen parallel ist zu der oberen Fläche der Platte (5), die Einrichtungen (9) zum Schneiden und Formen einen länglichen Schlitten (21) umfassen, der ausgelegt ist für das Gleiten in eine zweite Richtung (Y), die im Wesentlichen horizontal und rechtwinklig ist zu der ersten Richtung (X), um die Einrichtungen (9) zum Schneiden und Formen in die schneidende Anlage (7) zu befördern und den Bandabschnitt (P) zu berühren, um den Bandabschnitt (P) zu schneiden, den geschnittenen Abschnitt (P) in die formende Anlage (3) zu zwingen und ihn um den Ansatz (N) des Behälters (C) zu schließen.

2. Maschine gemäß Anspruch 1, **dadurch gekennzeichnet, dass** der elektrische Motor (15) auf dem Rahmen (2) montiert ist.
3. Maschine gemäß Anspruch 1, **dadurch gekennzeichnet, dass** die Betätigungseinrichtungen (11) erste und zweite Übertragungseinrichtungen (13, 14) umfassen, die ausgelegt sind, den Motor jeweils mit den Zufuhreinrichtungen (6) zu verbinden und

mit den ersten Einrichtungen (9) zum Schneiden und Vorformen und den zweiten Einrichtungen (10) zum Formen, wobei die ersten und zweiten Übertragungseinrichtungen (13, 14) synchronisiert sind mittels einer kinematischen Verbindung (16).

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4. Maschine gemäß einem vorhergehenden Anspruch, **dadurch gekennzeichnet, dass** die Zufuhreinrichtungen (6) ein Zugelement (17) umfassen, das ausgelegt ist mit dem Verschlussband (E) zusammen zu wirken um es entlang der ersten Richtung (X) zu bewegen und um den zu schneidenden Abschnitt (P) in die schneidende Anlage (7) zu bringen.

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5. Maschine gemäß Anspruch 4, **dadurch gekennzeichnet, dass** das Zugelement (17) mindestens eine erste Reibscheibe (18) aufweist, die drehbar ist um eine erste Drehachse (W) und eine periphere, äußere Fläche hat, die ausgelegt ist, um in Anlage zu kommen mit einer Fläche des Verschlussbands (E), wobei die erste Reibscheibe (18) mechanisch verbunden ist mit den ersten Bewegungs-Übertragungseinrichtungen (13).

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6. Maschine gemäß Anspruch 5, **dadurch gekennzeichnet, dass** die ersten Bewegungs-Übertragungseinrichtungen (13) ein erstes Übertragungselement (20) umfassen, das mit dem Motor (15) zusammen wirkt und drehbar ist um eine zweite Drehachse (K) und eine erste gelenkige, kinematische Bewegung (13'), die ausgelegt ist, das erste Übertragungselement (20) mit der ersten Reibscheibe (18) zu verbinden und dahin die Bewegung des Motors (15) zu übertragen.

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7. Maschine gemäß einem der Ansprüche 3 bis 6, **dadurch gekennzeichnet, dass** der Schlitten (21) beweglich ist zwischen einer rückwärtigen Endposition und einer vorderen Endposition, wobei er mit dem Abschnitt (P) des Bands (E) zusammen wirkt, wobei der Schlitten (21) ein gegenüber liegendes Ende (24) hat, das an den zweiten Bewegungs-Übertragungseinrichtungen (14) befestigt ist zur Aufnahme der Bewegung von den Betätigungseinrichtungen (11).

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8. Maschine gemäß Anspruch 7, **dadurch gekennzeichnet, dass** die zweiten Bewegungs-Übertragungseinrichtungen (14) ein zweites Übertragungselement (25) umfassen, das drehbar ist um eine dritte Drehachse (R) und mit dem Motor (15) zusammen wirkt und eine zweite gelenkige, kinematische Bewegung (14'), die ausgelegt ist, das zweite Übertragungselement (25) mit dem Schlitten (21) zu verbinden, um dahin die Bewegung des Motors (15) zu übertragen.

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9. Maschine gemäß Anspruch 8, **dadurch gekennzeichnet, dass** die kinematische Verbindung (16)

mindestens ein ringartiges Verbindungselement (26) aufweist, das funktional verbunden ist mit den ersten und zweiten Übertragungselementen (20, 25).

Revendications

1. Machine pour fermer des conteneurs souples, dans laquelle chaque conteneur (C) comprend une ouverture (A) pour prélever les produits contenus à l'intérieur, dans laquelle chaque conteneur comporte un col (N) situé près de l'ouverture (A), le conteneur (C) étant destiné à être fermé au moyen d'une bande de fermeture semi-rigide et déformable (E), la machine comprenant :

- un cadre de support (2),
- une plaque (5),
- une bobine (B) sur laquelle la bande de fermeture déformable (E) est enroulée,
- la plaque (5) comportant une fente (3') destinée à recevoir rapidement le col (N) du conteneur (20) près de l'ouverture (A) de celui-ci,
- un logement de façonnage (3) pour former la bande de fermeture (E),
- un logement de coupe (7) pour couper une partie (P) de la bande de fermeture (E) présentant une longueur prédéterminée,
- des moyens d'apport (6) conçus pour faire avancer la bande (E) dans ledit logement de coupe (7) le long d'une première direction (X),
- des moyens (9) de coupe et de façonnage, pour couper et façonner la partie (P) de la bande (E)
- des moyens d'actionnement (11) pour entraîner lesdits moyens d'apport (6) et lesdits moyens de coupe et de façonnage (9), **caractérisé en ce que:**
- la plaque (5) est horizontale et ancrée au cadre de support (2),
- la fente (3') a une extrémité, le logement de façonnage (3) étant placé à ladite extrémité de ladite fente (3') et est destinée à recevoir le col (N) du conteneur (C), dans laquelle le logement de façonnage (3) est destiné également au positionnement et à la fermeture du col (N) du conteneur (C),
- les moyens (9) de coupe et de façonnage de la partie (P) de la bande (E) sont situés dans le logement de coupe (7),
- les moyens d'actionnement (11) sont entraînés uniquement par un moteur électrique (15),
- ladite première direction (X) d'avancement de la bande (E) étant sensiblement parallèle à la surface supérieure de la plaque (5), lesdits moyens de coupe et de façonnage (9) comprenant un curseur allongé (21) destiné à glisser

- dans le long d'une deuxième direction (Y) sensiblement horizontale, et orthogonale à ladite première direction (X) pour amener les moyens de coupe et de façonnage (9) dans ledit logement de coupe (7) en contact avec ladite partie (P) de bande pour couper ladite partie (P) de bande, pour forcer ladite partie (P) coupée dans ledit logement de façonnage (3) et le fermer autour du col (N) du conteneur (C).
2. Machine selon la revendication 1, **caractérisée en ce que** ledit moteur électrique (15) est monté sur ledit cadre (2).
3. Machine selon la revendication 1, **caractérisée en ce que** lesdits moyens d'actionnement (11) comprennent de premiers et de seconds moyens de transmission de mouvement (13, 14) destinés à relier ledit moteur respectivement auxdits moyens d'alimentation (6) et auxdits seconds moyens de pré-façonnage (9) et auxdits seconds moyens de façonnage (10), lesdits premiers et seconds moyens de transmission de mouvement (13, 14) étant synchronisés entre eux par une liaison cinématique (16).
4. Machine selon n'importe laquelle des revendications précédentes, **caractérisé en ce que** lesdits moyens d'avancement (6) comprennent un élément de traction (17) destiné à interagir avec la bande de fermeture (E), pour la faire translater le long de ladite première direction (X) et amener la partie (P) à couper dans ledit logement de coupe (7).
5. Machine selon la revendication 4, **caractérisée en ce que** ledit élément de traction (17) comprend au moins un premier disque de friction (18) pouvant tourner autour d'un premier axe de rotation (W) et présentant une surface extérieure périphérique destinée à venir en contact avec une surface de la bande de fermeture (E), ledit disque de friction (18) étant mécaniquement associé auxdits premiers moyens de transmission de mouvement (13).
6. Machine selon la revendication 5, **caractérisée en ce que** lesdits premiers moyens de transmission de mouvement (13) comprennent un premier élément de transmission (20) interagissant avec ledit moteur (15) et pouvant tourner autour d'un deuxième axe de rotation (K) et un premier mécanisme cinématique articulé (13') destiné à relier ledit premier élément de transmission (20) avec ledit premier disque de friction (18) et à transférer le mouvement dudit moteur (15) à celui-ci.
7. Machine selon n'importe laquelle des revendications 3 à 6, **caractérisé en ce que** ledit curseur (21) est mobile entre une position terminale postérieure et une position terminale antérieure, dans laquelle il entre en interaction avec une partie (P) de la bande (E), ledit curseur (21) présentant une extrémité opposée (24) fixée auxdits seconds moyens de transmission de mouvement (14) pour recevoir le mouvement desdits moyens d'actionnement (11).
8. Machine selon la revendication 7, **caractérisée en ce que** lesdits seconds moyens de transmission de mouvement (14) comprennent un second élément de transmission (25) pouvant tourner autour d'un troisième axe de rotation (R) et venant en interaction avec ledit moteur (15) et un second mécanisme cinématique articulé (14') destiné à relier ledit second élément de transmission (25) avec ledit curseur (21) pour transférer le mouvement dudit moteur (15) à celui-ci.
9. Machine selon la revendication 8, **caractérisée en ce que** ladite liaison cinématique (16) comprend au moins un élément de liaison annulaire (26) accouplé de manière fonctionnelle auxdits premier et second éléments de transmission (20, 25).

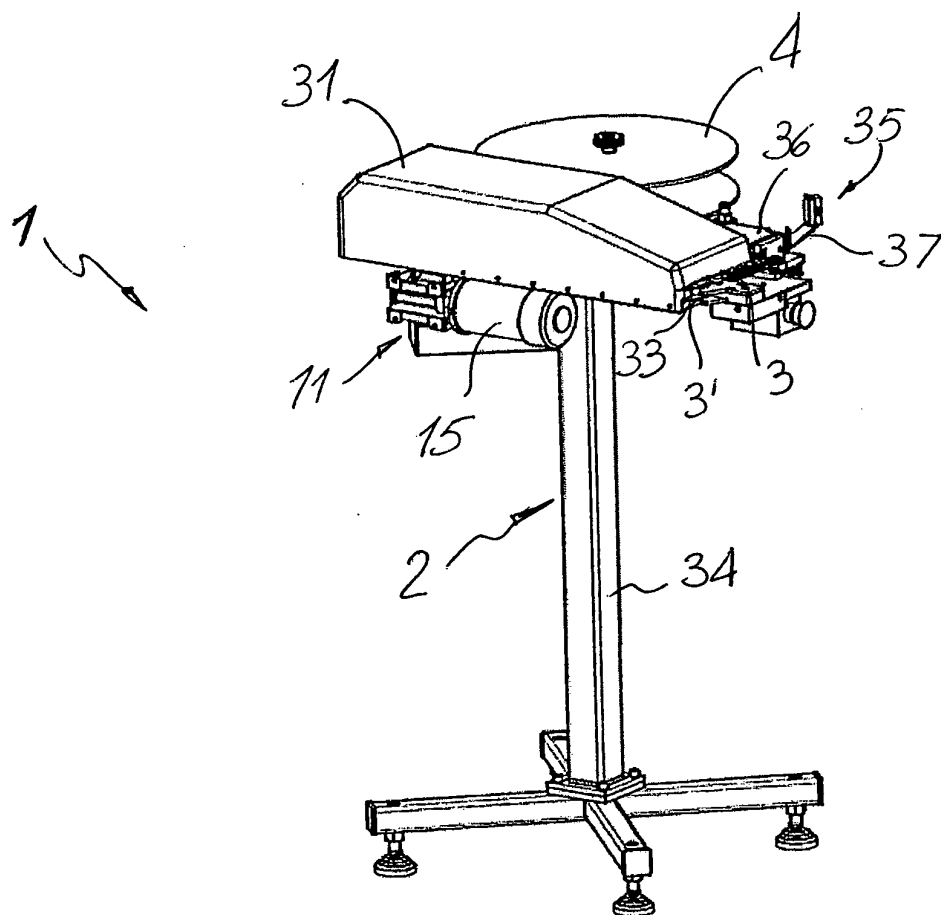


FIG. 1

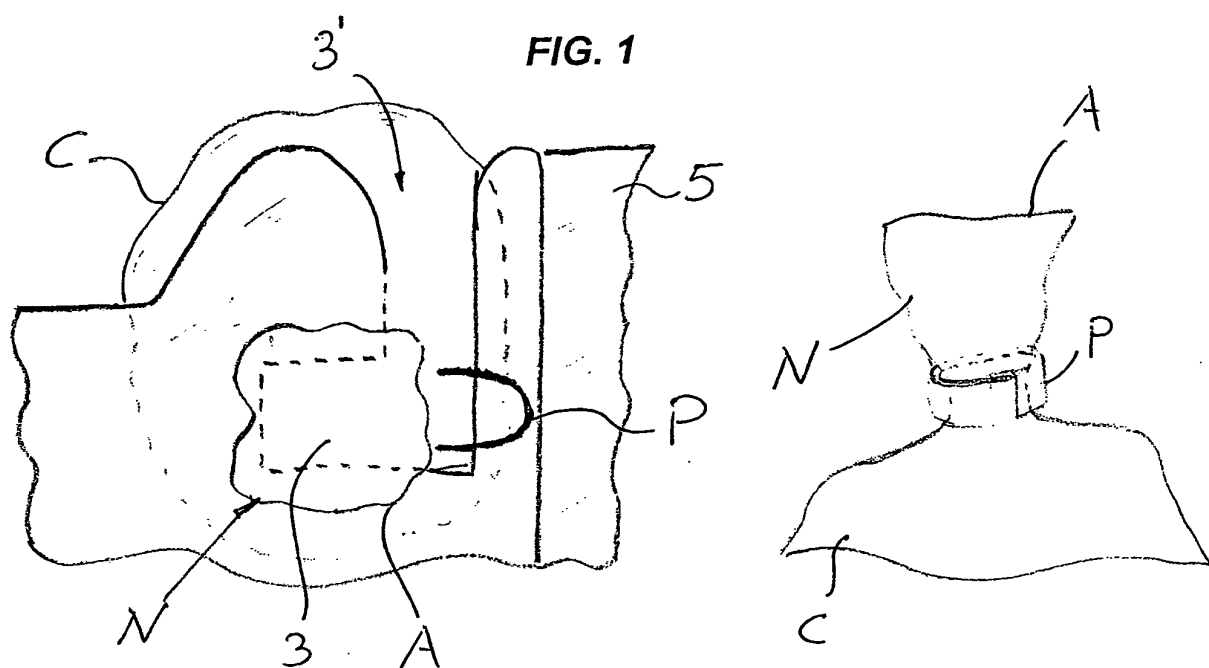


FIG. 6

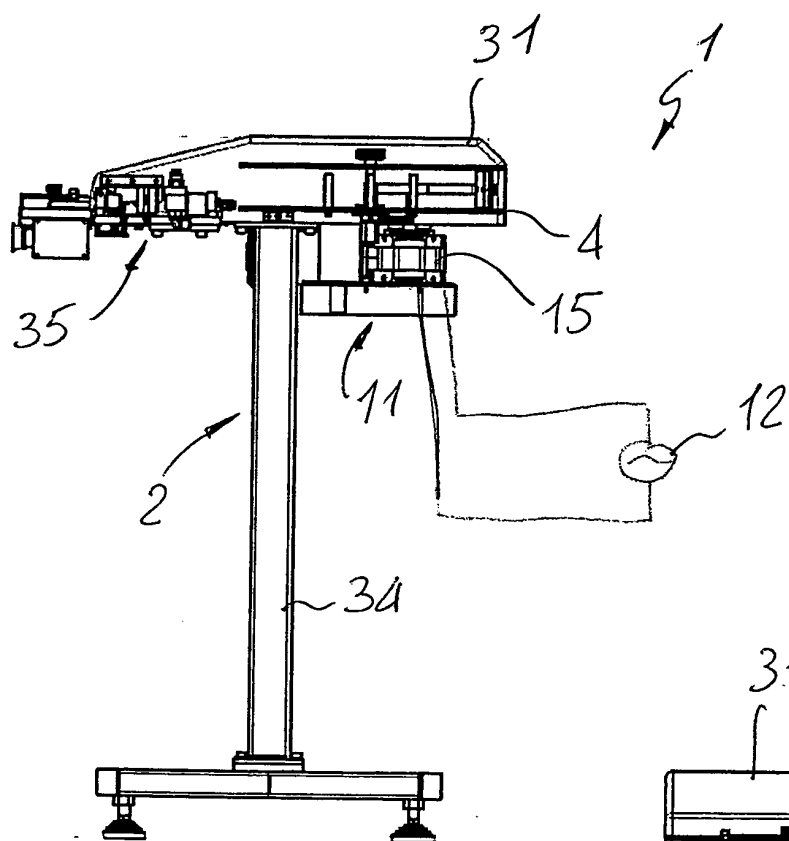


FIG. 2

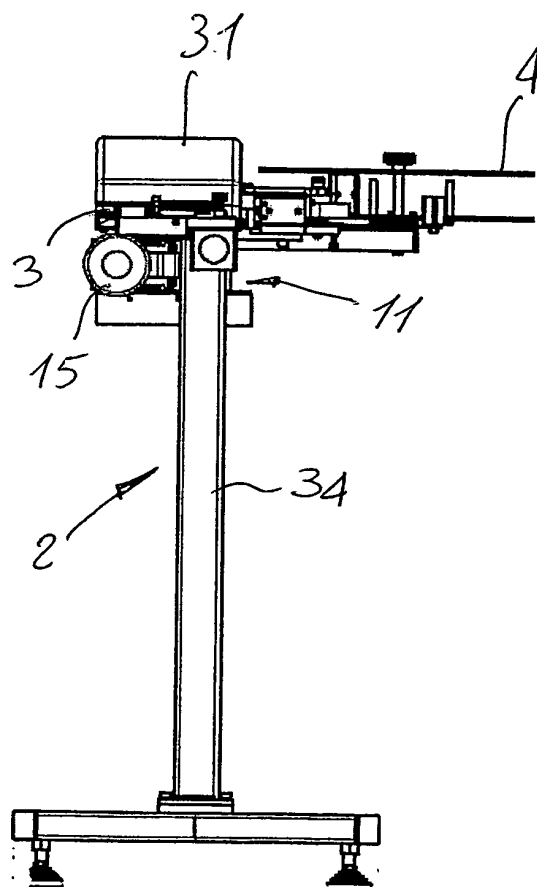


FIG. 5

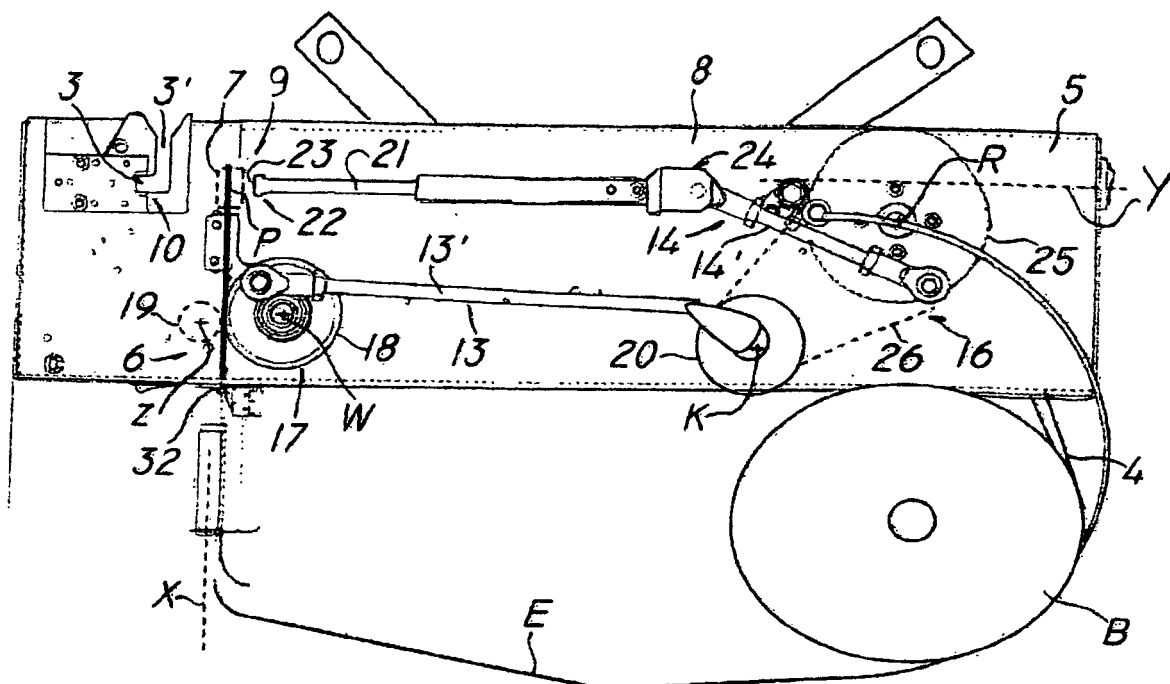


FIG. 3

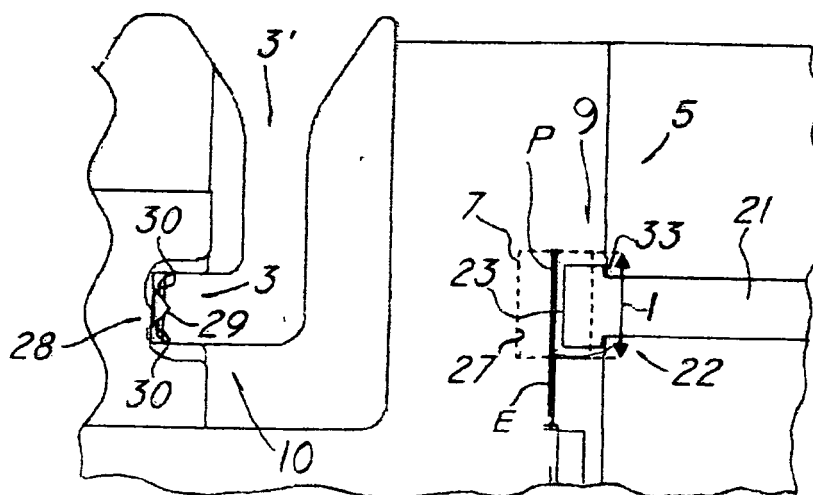


FIG. 4

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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