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(54) **A CONICAL CRIMPING AND SEALING MACHINE AND THE OPERATION METHOD THEREOF**

(57) The invention relates to a high capacity conical bending and sealing machine and the operating method thereof, the method comprising the process steps of loading, feeding, guiding, crimping, gluing and/or crimping the packaging paper into the machine, which was developed for the qualified and efficient production of all conical packages produced from paper raw material.

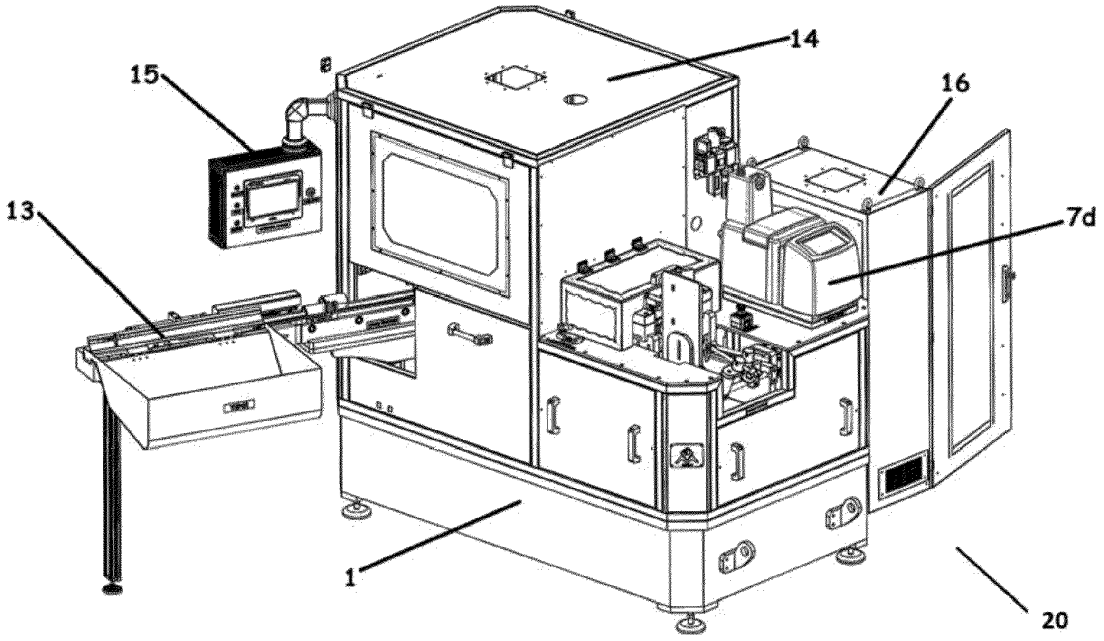

Figure 1

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Description

Technical Field

[0001] The invention relates to a conical crimping and sealing machine.

[0002] The invention specifically relates to a high production capacity conical bending and sealing machine and the operating method thereof, the method comprising the process steps of loading, feeding, guiding, crimping, gluing and/or folding the packaging paper into the machine, which was developed for the qualified and efficient production of all conical packages produced from paper raw material.

[0003] The said machine is used in the production of all conical packages produced from paper raw materials, such as the packaging of conical ice cream cones used in the ice cream industry, conical biscuit packaging used in the chocolate industry, conical paint filtering cones used in the paint industry, and inner conical bobbins in the yarn industry.

Background of the Invention

[0004] Comet folding machines are machines that perform the cutting, crimping and stacking of conical comet packages on their own. The said machines have low speeds and therefore low production capacities.

[0005] In the state of the art, conventional machines imported from China, Korea and Germany were analyzed. These machines are loaded with stacks of paper that have been pre-cut with a punch machine. The papers are stacked at a horizontal angle of approximately 70 degrees. A chamber was made according to its external form, supporting the paper from the bottom. On the sides, there are bars supporting the paper. In addition, after the papers are placed in the chamber, weights are placed on the back of them in the outer form of paper to make them weight. claws are provided on the feeding system side of the loading chamber, i.e. at the point where the paper is to be fed. The function of these claws is to keep the products at an angle without falling. During feeding, the paper is freed from these claws and taken in sequence. In addition, air is supplied vertically without passing through the feeding system due to the products sticking to each other. In this way, it was intended to open the gap between the products. However, this system has a number of general disadvantages. For example, chambers need to change as product sizes change. Therefore, product changeover times and adjustments take a long time. In addition, when the claws are long, the product separates from the chamber and tears occur in the product, especially when accelerating to high speeds, and when the claws are short, there is a problem of double product pick-up. In addition, there is air consumption due to the continuous supply of air from the chamber to the products in the exit zone.

[0006] In another known state of the art, the US patent application numbered "US3065676A" was examined. The invention discloses a packaging which is rotated by packaging it around a cavity using a conical mandrel and a machine which forms a conical container in this way. During the winding process, a presser foot cone holds the blank firmly against the mandrel to form a smooth and uniformly shaped and sized container. A cutting tool then crushes the sharp end of the container into a smooth, rounded tip.

[0007] However, receiving more than one product, tearing of the product when accelerating to high speeds, when working with thin or slippery products on these machines, damaging the product surface while creating the conical shape, adhesion of the product in a crooked, misaligned manner cause a decrease in packaging quality and efficiency. On the other hand, safety problems arise as a disadvantage of working with hot glue.

[0008] As a result, due to the above-mentioned problems and the inadequacy of the existing solutions on the subject, it has become necessary to make a development in the relevant technical field.

Object of the invention:

[0009] The most important object of the invention is to enable the production of more qualified and efficient conical packaging.

[0010] Another important object of the invention is to provide a conical crimping and sealing machine with high speed and production capacity.

[0011] Yet another important object of the invention is to solve the problem of multiple product intake (double intake, double feeding) and damage to the product surface during the transfer of thin or slippery packaging papers in the machine.

[0012] Still another object of the invention is to solve the problem of distorted transfer of the packaging without alignment, especially at increased speeds, in conical crimping and sealing machines.

[0013] Another important object of the invention is to open the distance between the products moving in the machine so that they can be transmitted to the positioning conveyor at the appropriate time.

[0014] Another important object of the invention is to prevent machine stoppage and packaging quality problems caused by glue contamination on the conical mold as a result of transferring the packaging paper to the product crimping molds in the wrong form and angle.

[0015] A further object of the invention is to enable the crimping of thinner and more print-sensitive products.

[0016] The most important advantage of the invention is that the products move continuously by going to the right position at the right time instead of going to a certain position quickly and waiting there, since the product is fed continuously without being made to START-STOP by the software thanks to the codes specially written for the conical bending and sealing machine.

[0017] An important advantage of the invention is that

the gap distance between the product loading gauge and the coating is kept the same, by means of the smooth rotation of the drum without runout and the prevention of belt stretching.

[0018] The structural and characteristic features and all the advantages of the invention will be more clearly understood by means of the figures given below and the detailed description written with reference to these figures. Therefore, the evaluation should be made by taking into account these figures and the detailed description.

Description of the figures:

[0019]

FIGURE -1; is a drawing showing the external isometric view of the inventive conical bending and sealing machine.

FIGURE -2; is a drawing showing the interior view of the inventive conical bending and sealing machine.

FIGURE -3; is a drawing showing the internal isometric view of the inventive conical bending and sealing machine.

FIGURE -4; is a drawing showing the external isometric view of the inventive conical bending and sealing machine.

FIGURE -5; is a drawing showing the isometric view of the inventive product crimping and gluing system and the product mouth cutting system.

FIGURE -6; is a drawing showing the isometric view of the inventive product crimping and gluing system and the product mouth cutting system.

FIGURE -7; is a drawing that gives an isometric view of the inventive product bottom guidance system.

FIGURE -8; is a drawing showing the inventive product loading system and product feeding system.

FIGURE -9; is the drawing showing the inventive product loading drum.

FIGURE -10; is a drawing showing the top view of the inventive product transfer belt and the product timer carrier nail.

FIGURE -7; is a drawing that gives an isometric view of the inventive product bottom folding system.

FIGURE -12; is a drawing showing the inventive product crimping and gluing system, product bottom guiding system and product bottom folding system.

FIGURE -13; is the drawing showing the appearance of the inventive product loading chamber.

FIGURE -14; is a drawing that gives an isometric view of the inventive product loading chamber.

Reference numbers:

[0020]

1. Machine body
2. Product loading chamber
2a. Product loading edge alignment plate
2b. Product loading gauge
2c. Product support legs
2d. Product loading drum
2e. Product loading belts
2f. Product overprint conveyor
2g. Product positioning sensor
2h. Product loading roller
2i. Product ear part channel
3. Product feeding system
3a. Product feeding cams
3b. Product feeding disks
4. Product positioning conveyor
4a. Product transfer belts
4b. Product timer belt claws
4c. Product carrier center plate
4d. Product overprint plate
5. Product gluing conveyor
5a. Product overprint roller system
5b. Product transfer belt
5c. Conveyor length adjustment mechanism
5d. Gluing sensor
6. Product transfer guide system
6a. Glue side guide system
6b. Movable counter guide system
7. Product gluing system
7a. Gluing nozzle
7b. Nozzle positioning system
7c. Glue positioning sensor and encoder
7d. Glue feeding tank
8. Product mouth cutting system
8a. Knife safe zone positioning system
8b. Blade tension and drive system
8c. Blade back and forth positioning system
8d. Knife angle positioning
9. Product bottom guidance system
9a. Bottom guide mold
9b. Bottom guide movement eccentric system
9c. Bottom guide 3 axis adjustable table
10. Product crimping and gluing system
10a. Bottom crimping unit motion eccentric system
10b. Bottom crimping unit movable body
10c. Upper crimping unit movable body
10d. Belt tensioning system for crimping units
10e. Servo motor drive system for crimping units
10f. Upper crimping unit vacuum rotary head system

10g. Upper crimping conical mold
10h. Bottom crimping conical mold
10i. Chip suction pipeline
10j. Upper crimping unit blowing rotary head system
10k. Bottom crimping unit positioning wedge
10l. Bottom crimping unit pressure adjustment spring
10m. Product crimping and gluing system x Octagonal movable table
10n. Product crimping and gluing system c Octagonal movable table
10o. Product crimping and gluing system body
11. Product output tape system
12. Product separation system
13. Product stocking system
14. Security cabin
15. Operator Control panel
16. Electrical panel
17. Product bottom folding system
17a. Bottom folding sheet
17b. Bottom folding motion eccentric system
17c. Bottom folding table with 7 axis adjustment
18. packaging paper ear part
19. Packaging paper reference surface
20. Conical crimping and sealing machine
21. Packaging paper

Description of the invention:

[0021] The invention specifically relates to a high capacity conical bending and sealing machine and the operating method thereof, the method comprising the process steps of loading, feeding, guiding, crimping, gluing and/or folding the packaging paper into the machine, which was developed for the qualified and efficient production of all conical packages produced from paper raw material.

[0022] The inventive conical crimping sealing machine (20) comprises:

- **Product loading edge alignment plate (2a),** which ensures alignment of the paper by contacting the packaging paper reference surface (19); **product loading gauge(2b),** which cuts the front of the product loading drum (2d) and allows the products to pass one by one as the drum rotates; **product support legs (2c),** which support and hold the packaging papers from the opposite side of the movement direction, **product loading drum (2d)** where packaging papers are stacked; **product loading belts (2e),** which ensure that the packaging papers are delivered to the product feeding system (3); at least one **product upper pressure conveyor (21),** which provides pressure on the packaging papers to prevent them from moving angularly and to be fixed while moving on the product loading belt (2e); **product positioning sensor (2g),** which allows determining the position of packaging papers as they move on product loading belts; at least one **product loading roller (2h)** that prevents downward stretching under the product loading belts (2e); **product loading chamber (2), which contains the product ear section channel (2i)** that encloses the packaging paper ear section (18) and ensures that the packaging paper (21) is delivered to the loading belts (2e) in a straight manner, without changing its angle,

- **product feeding system (3),** which includes at least one product feeding cam (3a) and at least one product feeding disc (3b), allowing the products to be delivered synchronously to the product positioning conveyor (4) by opening the gaps at the appropriate time,

- **product positioning conveyor (4),** which includes two product transfer belts (4a), at least one product timer belt claws (4b), product carrier center plate (4c), the product upper pressure plate (4d) and enables the product to be conveyed to the gluing conveyor (5),

- **product gluing conveyor (5)** which prevents the angular rotation of the packaging papers during transportation and ensures that the product is conveyed towards the crimping and gluing unit (10), and includes product pressure roller system (5a), product transfer belt (5b), conveyor length adjustment mechanism (5c), gluing sensor,

- **product transfer guide system (6),** which guides the product so that it can be glued in a linear manner while it is transferred to the packaging paper on conveyors, and which includes the product glue side guide system (6a) that aligns the product and the moving counter guide system (6b), ensures that the edges of the flowing packaging paper are guided, aligned and do not fall down. An embodiment of the inventive conical crimping sealing machine (20) comprises :

- **Product loading edge alignment plate (2a),** which ensures alignment by contacting the packaging paper reference surface (19); **product loading gauge(2b),** which cuts the front of the product loading drum (2d) and allows the products to pass one by one as the drum rotates; **product support legs (2c),** which support and hold the packaging papers from the opposite side of the movement direction, **product loading drum (2d)** where packaging papers are stacked; **product loading belts (2e),** which ensure that the packaging papers are delivered to the product feeding system (3); at least one **product upper pressure conveyor (2f),** which provides pressure on the packaging papers to prevent them from moving angularly and to be fixed while moving on the product loading belt (2e); **product position-**

ing sensor (2g), which allows determining the position of packaging papers as they move on product loading belts; at least one **product loading roller (2h)** that prevents downward stretching under the product loading belts (2e); **product loading chamber (2), which contains the product ear section channel (2i)** that encloses the packaging paper ear section (18) and ensures that the packaging paper (21) is delivered to the loading belts (2e) in a straight manner, without changing its angle,

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- **product gluing system (7)** which allows fluid glue to flow linearly onto the paper while the packaging paper is transferred on conveyors, and which comprises the pneumatic piston, product positioning sensor and encoder (7c), which moves the system upwards and moves it away from the hot surface adjustment zone when the machine stops or a security breach occurs, and/or,

- **product crimping and gluing system (10)** which includes a servo motor, which enables the upper crimping conical mold (10g) and the lower crimping conical mold (10h) to rotate on their own axis, and includes a movable lower crimping conical mold (10h) and a movable upper crimping conical mold (10g) containing vacuum holes whose position is adjusted according to the feedback from the sensor (6) and a lower crimping unit positioning wedge (10k) that adjusts the distance between these molds, and/or,

- **product bottom folding system (17)** which allows the paper to be folded inward from the tip of the conical tip in order to avoid any openings at the bottom of the product during the product folding and gluing process, and which includes of bottom folding sheet (17a), bottom folding motion eccentric system (17b) and bottom folding 7-axis adjustable table (17c) and/or,

- **product bottom guidance system (9)** which includes bottom guide mold (9a), bottom guide movement eccentric system (9b) and bottom guide system three-axis adjustable table (9c) and/or,

- **product mouth cutting system (8)** comprising disc blade driven by servo motor, blade safe zone positioning system (8a), which ensures that the blade automatically comes to a safe position and enters a closed chamber when the safety cover is opened, and a blade angle positioning system (8d) that allows the angle of the upper crimping conical mold (10g) and the lower crimping conical mold (10h) to change when the product dimensions change. and/or,

- **the product exit belt system (11),** which rotates at a certain speed according to the arrival speed of the product and carries the interlocking products forward, and/or,

- **product separation system (12)** containing a sensor, which enables the packages to be separated by being counted by the sensor while being thrown onto the band by the upper folding conical mold (10g) and/or,

- **product storage system (13)** that allows products to accumulate in the chamber and/or,

- **security cabinet (14)** with opening doors and integrated security sensor and/or,

- **operator control panel (15)** for managing all systems of the conical crimping sealing machine (20) and/or,

- **electrical panel (16)** integrated on the conical crimping sealing machine (20).

[0023] Before packaging papers (21) are loaded into the conical crimping and sealing machine (20), these papers are cut into different sizes and forms by the machine operator using a punch cutting machine. These packaging papers are then loaded into the product loading cham-

ber (2).

[0024] The packaging paper (21) is loaded in the product loading chamber (2) onto the product loading drum (2d). The packaging papers (21) are supported and held by product support legs (2c), which support and hold the packaging papers from the side opposite to the direction of movement. This product is vibrated by connecting a vibration motor on the supporting legs (2c). This vibration is used to separate the packaging paper that was previously cut on the punch machine and which may stick to each other during cutting.

[0025] As can be seen in Figure 9, some of the packaging papers (21) loaded into the machine, which were previously cut with a punch machine, have a packaging paper ear (18). This area is protruding from the edge of the product parallel to the direction of advancement/movement. Due to this ear/protrusion, the packaging paper (21) rotates angularly as it advances and it is therefore impossible to convey the packaging paper (21) firstly to the product feeding system (3) and then to the product crimping and sealing system (10) in an orderly manner. This situation causes the inability to produce with the flat feeding method. For these reasons, the product loading edge alignment system and the product loading edge alignment plate (2a) were developed.

[0026] The way the product loading edge alignment system works is as follows. The packaging paper moves in the direction of the arrow shown in Figure 9 in the picture as it approaches the drum in the product loading chamber (2). The product is then conveyed by the product loading drum (2d) onto the product loading belts (2e). Through the loading belts (2e) the product is conveyed to the feeding system (3). As the product progresses in this way, the ear section is taken into a special product ear section channel (2i), which is clearly shown in Figures 13 and 14. While the packaging paper ear portion (18) moves in this channel (2i), the packaging paper (21) is delivered flat, without angle, to the loading belts (2e), with the packaging paper reference surface (19) touching the alignment plate (2a). The product is secured at the top by the overpressure conveyor (2f) while on the loading belts (2e). In the product positioning conveyor (4), the product is held by the upper pressure plate (4d) and angularly corrected as it is contacted by the timer belt claws (4b). Therefore, preventing the angular rotation problem caused by the ear (18) is as critical as the product feeding system (3). The product loading edge alignment system and plate (2a) for the section up to the product feeding system (3) solves this problem.

[0027] The product loading drum (2d) contains a material with a higher coefficient of dynamic friction than metal integrated in the area where it contacts the packaging paper. The drum (2d) can also be coated with this high coefficient of friction material. The material integrated/coated on the drum contains rubber with a hardness of 40-60 shore A. In one embodiment of the invention, the coating material in question is linatex rubber. Linatex has paper-holding properties and is resistant to abrasion.

[0028] There is a gap between the upper center point of the drum (2d) and the product loading gauge (2b) equal to the thickness of the product to be passed. This gap is precisely adjusted according to the thickness of the packaging paper (21).

[0029] The product loading gauge (2b) is adjusted to the edge angle of the packaging paper (21) and contacts the products stacked in parallel. The product loading gauge (2b) cuts in front of the product loading drum (2d), allowing the products to pass through one by one as the drum (2d) rotates. In this way, the stacked packaging papers (21) are fed one by one onto the product loading belts (2e).

[0030] The product loading drum (2d) is circular in shape and has a diameter between 200-400 mm. This value can be, for example, 312 mm. In this way, it comes into point contact with the packaging paper (21). The point contact of the packaging paper (21) with the drum (2d) ensures that the papers contact the drum in sequence. By means of this feature, the double receiving (feeding) problem is prevented. Machine speed is also increased in this way. This is the most important reason for using a circular drum (2d) instead of a flat belt in the present invention. In addition, in belt feeding systems, the product loading roller (2h) diameters that turn the belt can be made in limited sizes. Therefore, the area covered by the product loading gauge (2b) is limited.

[0031] A product loading roller (2h) is used in the product loading chamber (2) to prevent the product loading belt (2e) from stretching underneath. These product loading rollers (2h) have a diameter between 65-80 mm. This value has a diameter of 70 mm, for example.

[0032] At the same time, as mentioned above, the product loading drum (2d) contains a material with a higher coefficient of dynamic friction than metal integrated in the area where it contacts the packaging paper. The coating material of the coated drum (2d) and the coated belt (2e) is the same material. The integrated/coated material contains rubber with a hardness of 40-60-shore (chor) A. In one embodiment of the invention, the coating material in question is linatex rubber. Linatex has paper-holding properties and is resistant to abrasion.

[0033] The drum (2d), which has a larger diameter and is coated, has more contact surface than the roller (2h) through which the coated belt (2e) passes. The advantage of this is that the drum rotates smoothly without runout and the gap distance between the product loading gauge and the pavement is kept the same, avoiding stretching caused by the belt. Therefore, the problem of double receiving / double feeding / receiving more than one product (double receiving / double feeding) is prevented. The production capacity of the machine has also been increased in this way.

[0034] The product feeding drum (2d) and product loading belts (2e) continuously rotate and transfer the packaging paper according to the size of the packaging paper loaded into the machine and the determined production capacity of the machine. As the products travel

on the loading belts (2e), their position is determined by the product positioning sensor (2g). At the same time, the packaging paper (21) is pressed by the product overpressure conveyor (21) and fixed between the product loading belts (2e) and the product loading rollers (2h) in order to prevent angular movement of the packaging paper (21) as it moves along the product loading belt (2e). As a result of this process, the products are moved in parallel at a certain interval towards the product feeding cams (3a). The position information determined by the product positioning sensor (2g) and the position of the feeding cams (3a) are formulated in software to ensure that the packaging paper (21) is transferred between the feeding cams (3a) and the feeding discs (3b) at the right time and in the appropriate position. This is because the position of the packaging paper exiting between the drum (2d) and the gauge (2b) varies. By coordinating between the operator control panel (15), the product positioning sensor (2g) and the servo motor, the packaging paper (21) is sometimes accelerated and sometimes decelerated to the right position at the right time.

[0035] The product feeding system is controlled by (3) servo motors. Product feeding cams (3a) can be produced in variable sizes according to the product length to be produced in the machine. The product feeding disks (3b) are in continuous contact with the packaging paper (21). The product feeding disks (3b) have a polymer coating with a higher coefficient of dynamic friction than metal. This allows the product to adhere to the disks (3b). When the outermost surfaces of the product feeding cams (3a) and the product feeding disks (3b) touch each other, the packaging paper is transferred to the positioning conveyor (4). With this contact, the product is held between the feeding cam (3a) and the disk (3b) and is fed forward at a certain interval. The coating integrated on the product feeding disks (3b) contains material with a hardness in the range of 70-80 shore A. In one embodiment of the invention, said coating material may comprise polyurethane. The outer diameter of the coated product feeding disks (3b) is 100-110 mm. In one embodiment of the invention, the outer diameter of the product feeding disks (3b) is 105 mm.

[0036] The product feeding cams (3a) contact the product at a certain proportion of the circumference. When in contact, the packaging paper (21) moves forward, while in the empty part, i.e. the non-contact part, the product is fed by the drum (2d) between the cam (3a) and the disk (3b). In this way, the problems of not being able to glue on the packaging papers (21), which come into contact with each other as they move along the drum (2d) and loading belts (2e), and insufficient time for crimping and gluing in the crimping unit are solved.

[0037] With the product feeding system (3), the products can be conveyed to the positioning conveyor (4) at the appropriate time and the ideal cycle time for production is achieved. The feeding system (3) feeds the product on the product positioning conveyor (4) before it reaches the belt claws (4b), prevents the product from hitting the claws and ensures that the product enters the product positioning conveyor (4) synchronously. The ideal cycle time is the cycle time of the successive belt claws (4b) on the product positioning conveyor (4). This time varies according to the machine operating speed. One product is fed between the belt claws (4b). One more product is fed when new claws come into the feed position. The time between these two operations is our cycle time. If the products were fed without opening the distance between them, the products would go one after the other and more than one product would be fed between the belt claws (4b).

[0038] The product positioning conveyor (4) is controlled by a servo motor which drives the product feeding system (3). The product positioning conveyor (4) advances the packaging paper on two transfer belts (4a) and the product carrier center plate (4c) towards the gluing conveyor (5). Equally spaced product timer belt claws (4b) are provided on the product transfer belts (4a).

[0039] As shown in Figure 10, the product timer belt claws (4b) can be adjusted according to the spring-shaped section of the packaging paper (21). In this way, it transfers the packaging paper (21) in an orderly and smooth manner while transporting it, while at the same time correcting and timing products that arrive skewed up to a certain proportion. The packaging paper (21) does not come into contact with the product transfer belts (4a). The packaging paper is moved by the product timer belt claws (4b) to the product gluing conveyor (5) by the product timer belt claws (4c) on the product carrier center plate (4c) and the edges of the packaging paper in the product transfer guide system (6). At this stage, the products are pressed by the flexible upper pressure plate (4d) as they move on the product carrier center plate (4c) and inside the product transfer guides (6). The upper printing plate (4d) is made of food grade plastic. The product here has a upper printing plate (4d) made of astrolon.

[0040] The packaging paper is transferred from the product positioning conveyor (4) to the product gluing conveyor (5). The product gluing conveyor (5) is driven and controlled by rollers that turn the product transfer belts (4a) in the product positioning conveyor (4). In this section, the roller diameters of the gluing conveyor (5) have been selected larger than the roller diameters of the product positioning conveyor (4) in order to speed up the packaging paper as it exits the product positioning conveyor (4) and to further open the gap between them. The gluing conveyor (5) is driven by rollers that turn the product transfer belts (4a). For this reason, the rotation speed of the gluing conveyor is aimed to be higher than the positioning conveyor in this section, since the linear rotation speeds will be the same if the roller diameters are chosen the same. The reason for this is that as the product spacing exits the positioning conveyor (4), the linear velocity increases due to the angular rotation of the product-carrying carrier claws (4b) as it is the last point of the conveyor. If the product continues at the same speed, the feet hit the product and disrupt its position.

For this reason, the gluing conveyor rotates faster, accelerating the product entering it even faster and preventing it from hitting the rear claws.

[0041] The product gluing conveyor (5) is equipped with a product transfer belt (5b). The product transfer belt (5b) is flat and without claws. The packaging paper (21) moves on the product transfer belt (5b) towards the crimping and sealing unit (10).

[0042] As the products slide on the belt (5b), they are pressed by independent spring-loaded overprint rollers (5a).

[0043] As the glued packaging paper enters the crimping and gluing system (10), it moves in relative motion as it is crimped between the two molds due to the conicity. Due to this relative movement, a gluing conveyor (5) is added to the machine.

[0044] There should be no pressure on the packaging paper during this relative movement. In case of pressure, the glue gets on the upper printing roller system (5a). For this reason, the point where the product upper printing roller system ends must be adjusted according to the length of the packaging paper.

[0045] Product gluing conveyor (5) is made with length adjustment. In this way, when the size of the packaging paper changes, the end point of the product gluing conveyor can be adjusted according to the mold after the product crimping and gluing system (10) has been adjusted on the c-axis and x-axis (10m and 10n). It is also designed in such a way that the extreme product upper pressure roller (5a) can approach and move away from the upper and lower crimping conical molds (10h, 10g). With the movement of the roller in the product printing system, all kinds of crimping can be done easily regardless of the product length.

[0046] Furthermore, the clearance distance between the upper and lower crimping conical molds (10h, 10g) and the product gluing conveyor (4) can be easily adjusted in this way. In addition, the position-adjustable roller diameter, which is close to the upper and lower crimping conical molds (10h, 10g), has been reduced in order to get closer to the cone. In this way, the packaging paper moves in this way to the upper and lower crimping conical molds (10h, 10g).

[0047] The product gluing conveyor (5) consists of a single belt and there is no support leg on it. So when the packaging paper starts to move angularly, there will be no foot to bump into coming from behind. However, since there is no foot when transferring the packaging paper, there is a product upper pressure roller system (5a) at the top of the product so that the paper position is not disturbed, and this system presses on the packaging paper.

[0048] The main reason why the product gluing conveyor (5) is clawless and the upper pressure rollers (5a) on it are length-adjustable is that while the product goes between the gluing conveyor (5) and the upper pressure roller (5a), glue spills on the gluing line before entering the crimping and gluing system (10).

[0049] The edges of the product flowing on the product positioning (4) and gluing conveyors (5) move in the product transfer guide system (6) to guide the edges and prevent them from falling down.

[0050] The product transfer guiding system (6) consists of 2 separate systems. Glue side guide system (6a) and movable counter guide system (6b). The glue side guiding system (6a) guides and aligns the packaging paper for linear gluing of the product as it is transferred on conveyors. As the width of the packaging paper increases, the product crimping and sealing system (10) moves to the reverse position and the movable counter guide system (6b) moves to the reverse position. In this way, the machine systems can be adjusted according to the packaging paper size.

[0051] The packaging paper is glued onto the product as it moves on the gluing conveyor (5) and in the product transfer guiding systems (6) towards the crimping and gluing system (10). There is a product gluing system (7) that performs the gluing process.

[0052] The system performs the gluing process by transferring glue from the glue feed tank (7d) to the glue nozzle (7a). As the packaging paper flows, liquid glue is deposited on it in a linear manner. In order to inform the product gluing system (7) whether the product has arrived on the gluing conveyor (5), a positioning sensor and encoder (7c) are added on the lower conveyor. In this way, unnecessary gluing and sticking is avoided. In addition, since the glue nozzle surface is hot, there is a danger of hand burns when the operator adjusts the machine. The nozzle positioning system (7b) is automatically moved upwards by means of a pneumatic piston when the machine stops. In this way, the hot surface is removed from the adjustment zone.

[0053] The product crimping and sealing unit (10) of the present invention is basically based on the principle that the upper crimping conical mold (10g) and the lower crimping conical mold (10h) crimp the product. According to geometric rules, it is necessary to use molds with a conical form in order to curl a product in a conical shape. Lower crimping unit positioning wedge (10k) is available to adjust the gap between the two molds. Thanks to the positioning wedge (10k) of the lower crimping unit, deformation of the surface of the product is prevented at high speeds.

[0054] In the conical crimping and sealing machine subject to the invention, 2 conical molds (10g, 10h), upper and lower, are used for crimping. These two molds rotate on their own axis with servo motor drive systems (10e). Furthermore, the lower crimping conical mold (10h) is moved angularly by the eccentric system (10a) which moves the lower crimping unit. The angular movement separates and reconnects the two patterns. This separation is necessary for the product to enter between the upper crimping conical mold (10g) and the lower crimping conical mold (10h) and for the crimped product to be transferred to the product exit belt system (11). When the lower crimping conical mold (10h) is in the open po-

sition, the packaging paper coming on the product gluing conveyor (5) is sucked and captured by the vacuum holes on the upper crimping conical mold (10g).

[0055] The vacuum pressure is transferred to the upper crimping conical mold (10g) via the vacuum rotary head system (10f) in the upper crimping unit. The position of the vacuum holes ensures that the product positioning conveyor (4) meets the incoming product in the correct position. Once captured, the lower conical mold (10h) closes angularly. The conical paper sandwiched between the upper and lower crimping conical mold (10g, 10h) is pressed well and the glue is expected to adhere. The upper-lower conical molds (10g and 10h) need to rotate 4 turns on their axis to adhere.

[0056] At the same time, product bottom guiding (9) takes place. The purpose of the product bottom guiding system (9) is to shape the end of the product before the bottom fold fold folds the product so that the bottom fold is smooth. It also gives the curled product the tip form. Another purpose is to fold the paper from the end of the conical tip inward so that there is no opening at the bottom of the product during the product crimping and gluing process. The bottom guiding system includes a bottom guiding mold (9a). This mold is designed to shape the conical tip. The bottom guiding movement is driven by the eccentric system (9b). This system is controlled by servo motor. With this movement, the upper crimping conical mold (10g) goes down and opens the way so that the product does not get stuck while throwing. The product bottom guiding system (13) is precisely adjusted according to the product condition with the bottom guiding triaxial adjustment table (13c).

[0057] Again, there is a bottom folding (17) process that takes place at the same time as these processes. The purpose of the inventive product bottom folding system (17) is to fold the paper from the end side of the conical tip inwardly so that there is no opening at the bottom of the product during the product crimping process and gluing process. As can be seen in Figure 12, this process is carried out by the bottom folding sheet (17a) and the bottom folding movement is carried out by the eccentric system (17b). With this movement, the upper crimping conical mold (10g) goes down and opens the way so that the product does not get stuck while throwing. At the same time this system is connected to the bottom folding 7 axis adjustable table (17c). In this way, the folding setting is quickly and conveniently adjusted for each individual product.

[0058] The end crimping and gluing unit (10), bottom guiding (9) and bottom folding systems (17) of the machine are controlled by the machine's software and operate synchronously. In this way, the movement of the bottom guiding mold (9a) in connection with the lower conical mold (10h) is prevented and direct intervention to the bottom guiding mold (9a) is provided. In addition, the bottom guiding mold (9a) was prevented from vibrating due to knocking on the conical molds (10g, 10h) and thus damaging the printing colors of the products. With the software, the systems can be controlled and timed with separate servo motors, which is advantageous. With the advantage obtained, the quality of the products has been increased by preventing paint damage in end forming and bottom tapping.

[0059] The lower bending conical mold (10h) subject to the invention is angularly movable. This ensures that the product does not come into contact with each other when it is caught by the upper crimping conical mold (10g) and when it is removed from the upper crimping conical mold (10g). This angular movement is provided by the eccentric movement (10a) of the lower crimping unit. In addition, the product pressure is adjusted with the lower crimping unit pressure adjustment spring (10l) and the closing point can be adjusted with the positioning wedge (10k). In this way, we prevent the upper and lower crimping conical molds (10g, 10h) from hitting each other. At the same time, the upper limit of the mold pressure can be set by the operator. In this way, the crimping process of thinner and pressure-sensitive products can be realized.

[0060] While the crimping process takes place between the upper and lower crimping conical molds (10g, 10h), the web cutting system (8) is activated at the same time.

[0061] On the upper crimping conical mold (10g), the knife removes the sawdust from the mouth of the product and straightens it. After the trimming process, the chips are drawn by the chip suction pipeline (101) and fed to the line. The disk blade is driven in the cutting system (8). According to the product diameter and blade diameter, the speed adjustment is made automatically by the automation. At the same time, the position of the blade on the upper crimping conical mold (10g) is automatically adjusted by the blade forward-backward positioning system (8c). At the same time, by means of the safe zone positioning system (8a), when the safety cover is opened, the blade automatically moves into a safe position and enters a closed chamber. In addition, the angle of the upper crimping conical mold (10g) and lower crimping conical mold (10h) can change when the product changes. For this reason, the blade angle can be changed manually with the blade angle positioning system (8d).

[0062] After the time required for product adhesion has elapsed, chip cutting is finished and the bottom operations are finished, the lower crimping conical mold (10h) moves angularly and the lower crimping conical mold (10h) opens and separates from the upper crimping conical mold (10g).

[0063] After all the processes are finished, the conical shaped product, which is wrapped on the upper crimping conical mold (10g) after the crimping and gluing process is finished, is sent compressed air to the ejection holes on the mold through the upper crimping unit blowing rotary head system (10j) connected to the conical mold. As a result, the packaging is ejected onto the product exit belt system (11). This process is repeated over and over again. Furthermore, the product crimping and gluing sys-

tem (10), in which all these operations take place, is connected to a body (10o). This body is mounted on a table (10m and 10n) moving in c and y axis. In this way, the end points of the molds (10g and 10h) can always be reset from the same point and different lengths and angles can be produced on this machine. At the same time, even if the mold (10g and 10h) sizes change, new production can be started without disturbing the conveyors, glue side guiding, bottom guiding settings, since the body (10o) can be completely retracted and rotated angularly. This shortens the time for mold changes for different products.

[0064] The packs intertwine and accumulate on the product exit belt system (11). The product exit belt system (11) rotates at a certain speed according to the arrival speed of the product, and carries the intertwined products forward. In this way, the point where the products fall on the belt does not change. Products are counted by a sensor as they are ejected onto the belt by the upper crimping conical mold (10g). The number of products sent on the belt is reported to the automation system. The product separation system (12) is activated to separate the products that are intertwined on the belt according to the number determined by the operator. As soon as the desired quantity is captured in the by-product separation system (12), the pneumatic separator in the product separation system (12) enters between the two products. From that point, it then pulls the products in the forward direction, towards the product storage system (13).

[0065] The product separation system (12) is activated to separate the products, which are intertwined on the output belt system, according to the number determined by the operator.

[0066] It then returns to its old position and waits for the quantity to accumulate for the new trade. The products, which are drawn onto the product storage system (13), come onto the tilting plate. The tipping plate moves angularly to tilt the products into the chamber. The products thus accumulate in the chamber. Since the chamber is designed at an angle, the products roll towards the lowest point.

[0067] In this way, production is realized. All the above-mentioned systems of the machine are managed by the operator control panel (15). The safety cabinet (14) is integrated on the main body (1). A safety sensor is also integrated in the opening doors of the safety cabin. When the covers are opened while the machine is running, the system switches to safe mode. There is an electrical panel (16) integrated on the machine.

[0068] In addition, the operator intervention hatch (19) at the front of the machine is automatically driven to enable quick intervention. The button opens when pressed and closes when pressed again.

[0069] Thanks to the codes specially written for the conical crimping and sealing machine subject to the invention, the product is fed continuously with the software, without START-STOP. In this way, the products are transferred in a stable manner. The software uses position information from sensors and servo motors to continuously correct errors. Instead of moving quickly to a certain position and waiting there, products move continuously by moving to the right position at the right time. All sensors and servo motors are controlled by a PLC to ensure synchronization. This ensures better quality and more efficient production.

[0070] The working method of the conical crimping and gluing and crimping machine subject to the invention detailed above includes the following process steps.

- supporting and holding the packaging papers loaded on the product loading drum (2d) by the product support legs (2c),
- Separating the packaging papers adhering together with the vibrated product support legs (2c),
- the product loading drum (2d) starting to rotate,
- the packaging papers touching the product loading drum (2d) in a sequential point contact,
- the product loading gauge (2b) cutting the front of the product loading drum (2d) and ensuring that the packaging papers pass one by one as the drum (2d) rotates,
- the packaging paper reference surface (19) coming into flat contact with the alignment plate (2a),
- the packaging paper (21) being delivered flat, without angle, to the loading belts (2e), while the packaging paper ear portion (18) moves in this channel (2i), with the packaging paper reference surface (19) touching the alignment plate (2a).
- the packaging paper (21) being pressed by the product overpressure conveyor (21) and fixed between the product loading belts (2e) and the product loading rollers (2h) in order to prevent angular movement of the packaging paper (21) as it moves along the product loading belt (2e).
- the position of the packaging paper being determined by the product positioning sensor (2g) as it moves along the product loading belts,
- the product feeding drum (2d) and product loading belts (2e) continuously rotating and transferring the packaging paper according to the size of the packaging paper loaded into the machine and the determined production capacity of the machine,
- the packaging paper running parallel to the product feeding cams (3a) at a certain interval,
- the position information determined by the product

positioning sensor (2g) and the position of the feeding cams (3a) being formulated in software to ensure that the packaging paper (21) is transferred between the feeding cams (3a) and the feeding discs (3b) at the right time and in the appropriate position,

- packaging paper being held onto the product feeding disks (3b),
- the packaging paper being transferred to the positioning conveyor (4), when the outermost surfaces of the product feeding cams (3a) and the product feeding disks (3b) touch each other,
- transporting the packaging paper on the product positioning conveyor (4), the two transfer belts (4a) and the product carrier center plate beam (4c),
- the packaging papers moving on the product carrier center plate (4c) and the edges moving towards the gluing conveyor (5) by the product timer belt claws (4b) within the product transfer guide system (6); and meanwhile printing being done on the packaging papers by the flexible upper printing plate (4d),
- the packaging papers being pressed by independent spring-pressed product upper pressure rollers (5a) while moving towards the crimping and gluing unit (10) on the product transfer belt (5b) on the product gluing conveyor (5),
- the edges of the packaging paper flowing on the product positioning conveyor (4) and the product gluing conveyors (5) being guided and move in the product transfer guide system (6) so that they do not fall down,
- gluing on the packaging paper by the product gluing system (7), while the packaging paper moves through the product transfer guide system towards the product crimping and gluing system (10),
- the packaging paper coming on the product gluing conveyor (5) entering between the upper conical mold (10g) and the lower conical mold (10h), and being captured by the vacuum holes on the upper conical mold (10g), while the lower crimping conical mold (10h) is in the open position,
- angular closure of the lower conical mold (10h) from the moment the packaging paper being captured,
- adhesion of the glue by pressing the conical packaging paper sandwiched between the upper and lower crimping conical molds (10g and 10h),
- the simultaneous activation of the web cutting system (8) while the crimping takes place between the upper and lower conical molds (10g and 10h),
- the blade on the upper bending conical mold (10g) removing the sawdust from the mouth of the product and smoothing it,
- rotation of the lower and upper bending conical molds (10g and 10h) on their own axes for adhesion,
- shaping the end of the product before folding the product with the bottom guidance system (9),
- folding the packaging paper inwards from the tip of the conical tip with the product bottom folding system (17) in order to avoid any openings at the bottom of the product during the product crimping and sealing process, and giving an end form to the crimped packaging paper,
- angular movement and opening of the lower crimping conical mold (10h) and separation from the upper crimping conical mold (10g),
- the packaging paper entering the conical shape wrapped on the upper folding conical mold (10g),
- throwing the conical shaped packaging paper by sending compressed air to the ejection holes on the mold, thanks to the blowing rotary head system (10j) connected to the upper folding conical mold (10g),
- counting the packages by a sensor while they are thrown onto the belt by the upper crimping conical mold (10g),
- a certain number of separated packages, shaped like a cone, interlocking with each other and accumulating on the product exit belt system (11),
- the product exit belt system (11) rotating at a certain speed according to the arrival speed of the packages and carrying the interlocking packages forward,
- the pneumatic separator in the product separation system (12) entering between the two products, when the desired quantity is captured,.

Claims

1. A conical crimping and sealing machine **characterized by comprising;**

   - **Product loading edge alignment plate (2a),** which ensures alignment by contacting the packaging paper reference surface (19); **product loading gauge(2b),** which cuts the front of the product loading drum (2d) and allows the

products to pass one by one as the drum rotates; **product support legs (2c),** which support and hold the packaging papers from the opposite side of the movement direction, **product loading drum (2d)** where packaging papers are stacked; **product loading belts (2e),** which ensure that the packaging papers are delivered to the product feeding system (3); at least one **product upper pressure conveyor (21),** which provides pressure on the packaging papers to prevent them from moving angularly and to be fixed while moving on the product loading belt (2e); **product positioning sensor (2g),** which allows determining the position of packaging papers as they move on product loading belts; at least one **product loading roller (2h)** that prevents downward stretching under the product loading belts (2e); **product loading chamber (2), which contains the product ear section channel (2i)** that encloses the packaging paper ear section (18) and ensures that the packaging paper (21) is delivered to the loading belts (2e) in a straight manner, without changing its angle,

- **product feeding system (3),** which includes at least one product feeding cam (3a) and at least one product feeding disc (3b), allowing the products to be delivered synchronously to the product positioning conveyor (4) by opening the gaps at the appropriate time,
- **product positioning conveyor (4),** which includes two product transfer belts (4a), at least one product timer belt claws (4b), product carrier center plate (4c), the product upper pressure plate (4d) and enables the product to be conveyed to the gluing conveyor (5),
- **product gluing conveyor (5)** which prevents the angular rotation of the packaging papers during transportation and ensures that the product is conveyed towards the crimping and gluing unit (10), and includes product pressure roller system (5a), product transfer belt (5b), conveyor length adjustment mechanism (5c), gluing sensor,
- **product transfer guide system (6),** which guides the product so that it can be glued in a linear manner while it is transferred to the packaging paper on conveyors, and which includes the product glue side guide system (6a) that aligns the product and the moving counter guide system (6b), ensures that the edges of the flowing packaging paper are guided, aligned and do not fall down

2. A conical crimping and sealing machine (20) according to Claim 1, **characterized by** comprising a vibration motor connected to product support legs (2c).

3. A conical crimping and sealing machine (20) according to Claim 1, **characterized in that** there is a space equal to the thickness of the product to be passed between the upper center point of the drum (2d) and the product loading gauge (2b).

4. A conical crimping and sealing machine (20) according to Claim 1, **characterized in that** the product loading drum (2d) has a diameter between 200-400 mm.

5. A conical crimping and sealing machine (20) according to Claim 4, **characterized in that** the product loading drum (2d) has a diameter of 312 mm.

6. A conical crimping and sealing machine (20) according to Claim 1, **characterized in that** the product loading drum (2d) contains a material with a higher coefficient of dynamic friction than metal, integrated in the area where it contacts the packaging paper.

7. A conical crimping and sealing machine (20) according to Claim 1, **characterized in that** the product loading drum (2d) contains rubber with a hardness value in the range of 40-60 shore A of the material integrated/coated in the area where it contacts the packaging paper.

8. A conical crimping and sealing machine (20) according to Claim 7, **characterized in that** the product loading drum (2d) contains linatex rubber integrated/coated material in the area where it contacts the packaging paper.

9. A conical crimping and sealing machine (20) according to Claim 1, **characterized in that** the product loading belts (2e) contain rubber with a hardness value in the range of 40-60 shore A of the material integrated/coated in the area where it contacts the packaging paper.

10. A conical crimping and sealing machine (20) according to Claim 9, **characterized in that** the product loading drum (2d) contains linatex rubber integrated/coated material in the area where it contacts the packaging paper.

11. A conical crimping and sealing machine (20) according to Claim 1, **characterized in that** the product loading roller (2h) has a circular shape.

12. A conical crimping and sealing machine (20) according to Claim 1, **characterized in that** the product loading roller (2h) has a diameter between 65-80 mm.

13. A conical crimping and sealing machine (20) according to Claim 12, **characterized in that** the product loading roller (2h) has a diameter of 70 mm.

14. A conical crimping and sealing machine (20) according to Claim 1, **characterized in that** there is a polymer coating on the product feeding discs (3b) with a higher dynamic friction coefficient than metal.

15. A conical crimping and sealing machine (20) according to Claim 1, **characterized in that** the material integrated/coated on the product feeding disks (3b) contains material with a hardness of 70-80 shore A.

16. A conical crimping and sealing machine (20) according to Claim 15, **characterized in that** the material integrated/coated on the product feeding disks (3b) contains polyurethane.

17. A conical crimping and sealing machine (20) according to Claim 1, **characterized in that** the outer diameter of the product feeding disks (3b) has a value in the range of 100-110 mm.

18. A conical crimping and sealing machine (20) according to Claim 1, **characterized in that** the outer diameter of the product feeding disks (3b) is 105 mm.

19. A conical crimping and sealing machine (20) according to claim 1, **characterized in that** the product feeding system (3) is controlled by a servo motor.

20. A conical crimping and sealing machine (20) according to claim 1, **characterized in that** it comprises a product positioning conveyor (4) controlled by a servo motor driving a product feeding system (3).

21. A conical crimping and sealing machine (20) according to claim 1, **characterized in that** the product timer belt claws (4b) are equally spaced on the product transfer belts (4a).

22. A conical crimping and sealing machine (20) according to claim 1, **characterized in that** the product upper pressure plate (4d) is made of food-grade plastic.

23. A conical crimping and sealing machine (20) according to claim 1, **characterized in that** the product upper pressure plate (4d) is made of astrolon.

24. A conical crimping and sealing machine (20) according to claim 1, **characterized in that** the packaging paper includes product positioning belt claws (4b) which can be adjusted according to the spring-shaped part.

25. A conical crimping and sealing machine (20) according to claim 1, **characterized in that** it comprises product overpressure roller system (5a) with a larger value than the roller system in the product positioning conveyor (4), which allows the packaging papers to accelerate a little more and the distance between them to increase a little more as they leave the positioning conveyor (4).

26. A conical crimping and sealing machine (20) according to claim 1, **characterized in that** the product transfer belt (5b) is a flat belt without claws.

27. A conical crimping and sealing machine (20) according to claim 1, **characterized in that** it comprises a product gluing conveyor (5) adjustable in length to accommodate different pre-cut packaging paper sizes.

28. A conical crimping and sealing machine (20) according to claim 1, **characterized in that** it comprises a product transfer guide system (6) using wear-resistant spring steel material.

29. A conical crimping and sealing machine (20) according to claim 1, **characterized in that** it comprises a PLC for controlling and synchronizing sensors and servo motors.

30. A conical crimping and sealing machine according to any one of the preceding claims, **characterized by**;

- **product gluing system (7)** which allows fluid glue to flow linearly onto the paper while the packaging paper is transferred on conveyors, and which comprises the pneumatic piston, product positioning sensor and encoder (7c), which moves the system upwards and moves it away from the hot surface adjustment zone when the machine stops or a security breach occurs, and/or,
- **product crimping and gluing system (10)** which includes a servo motor, which enables the upper crimping conical mold (10g) and the lower crimping conical mold (10h) to rotate on their own axis, and includes a movable lower crimping conical mold (10h) and a movable upper crimping conical mold (10g) containing vacuum holes whose position is adjusted according to the feedback from the sensor (6) and a lower crimping unit positioning wedge (10k) that adjusts the distance between these molds, and/or,
- **product bottom folding system (17)** which allows the paper to be folded inward from the tip of the conical tip in order to avoid any openings at the bottom of the product during the product folding and gluing process, and which includes of bottom folding sheet (17a), bottom folding motion eccentric system (17b) and bottom folding 7-axis adjustable table (17c) and/or,
- **product bottom guidance system (9)** which includes bottom guide mold (9a), bottom guide

movement eccentric system (9b) and bottom guide system three-axis adjustable table (9c) and/or,

- **product mouth cutting system (8)** comprising disc blade driven by servo motor, blade safe zone positioning system (8a), which ensures that the blade automatically comes to a safe position and enters a closed chamber when the safety cover is opened, and a blade angle positioning system (8d) that allows the angle of the upper crimping conical mold (10g) and the lower crimping conical mold (10h) to change when the product dimensions change. and/or,
- **the product exit belt system (11)**, which rotates at a certain speed according to the arrival speed of the product and carries the interlocking products forward, and/or,
- **product separation system (12)** containing a sensor, which enables the packages to be separated by being counted by the sensor while being thrown onto the band by the upper folding conical mold (10g) and/or,
- **product storage system (13)** that allows products to accumulate in the chamber and/or,
- **security cabinet (14)** with opening doors and integrated security sensor and/or,
- **operator control panel (15)** for managing all systems of the conical crimping sealing machine (20) and/or,
- **electrical panel (16)** integrated on the conical crimping sealing machine (20)

31. An operation method for a conical crimping and sealing machine according to Claim 30, **characterized by** comprising the process steps of;

- supporting and holding the packaging papers loaded on the product loading drum (2d) by the product support legs (2c),
- Separating the packaging papers adhering together with the vibrated product support legs (2c),
- the product loading drum (2d) starting to rotate,
- the packaging papers touching the product loading drum (2d) in a sequential point contact,
- the product loading gauge (2b) cutting the front of the product loading drum (2d) and ensuring that the packaging papers pass one by one as the drum (2d) rotates,
- the packaging paper reference surface (19) coming into flat contact with the alignment plate (2a),
- the packaging paper (21) being delivered flat, without angle, to the loading belts (2e), while the packaging paper ear portion (18) moves in this channel (2i), with the packaging paper reference surface (19) touching the alignment plate (2a).
- the packaging paper (21) being pressed by the product overpressure conveyor (2f) and fixed between the product loading belts (2e) and the product loading rollers (2h) in order to prevent angular movement of the packaging paper (21) as it moves along the product loading belt (2e).
- the position of the packaging paper being determined by the product positioning sensor (2g) as it moves along the product loading belts,
- the product feeding drum (2d) and product loading belts (2e) continuously rotating and transferring the packaging paper according to the size of the packaging paper loaded into the machine and the determined production capacity of the machine,
- the packaging paper running parallel to the product feeding cams (3a) at a certain interval,
- the position information determined by the product positioning sensor (2g) and the position of the feeding cams (3a) being formulated in software to ensure that the packaging paper (21) is transferred between the feeding cams (3a) and the feeding discs (3b) at the right time and in the appropriate position,
- packaging paper being held onto the product feeding disks (3b),
- the packaging paper being transferred to the positioning conveyor (4), when the outermost surfaces of the product feeding cams (3a) and the product feeding disks (3b) touch each other,
- transporting the packaging paper on the product positioning conveyor (4), the two transfer belts (4a) and the product carrier center plate beam (4c),
- the packaging papers moving on the product carrier center plate (4c) and the edges moving towards the gluing conveyor (5) by the product timer belt claws (4b) within the product transfer guide system (6); and meanwhile printing being done on the packaging papers by the flexible upper printing plate (4d),
- the packaging papers being pressed by independent spring-pressed product upper pressure rollers (5a) while moving towards the crimping and gluing unit (10) on the product transfer belt (5b) on the product gluing conveyor (5),
- the edges of the packaging paper flowing on the product positioning conveyor (4) and the product gluing conveyors (5) being guided and move in the product transfer guide system (6) so that they do not fall down,
- gluing on the packaging paper by the product gluing system (7), while the packaging paper moves through the product transfer guide system towards the product crimping and gluing system (10),
- the packaging paper coming on the product gluing conveyor (5) entering between the upper conical mold (10g) and the lower conical mold

(10h), and being captured by the vacuum holes on the upper conical mold (10g), while the lower crimping conical mold (10h) is in the open position,

- angular closure of the lower conical mold (10h) from the moment the packaging paper being captured,
- adhesion of the glue by pressing the conical packaging paper sandwiched between the upper and lower crimping conical molds (10g and 10h),
- the simultaneous activation of the web cutting system (8) while the crimping takes place between the upper and lower conical molds (10g and 10h),
- the blade on the upper bending conical mold (10g) removing the sawdust from the mouth of the product and smoothing it,
- rotation of the lower and upper bending conical molds (10g and 10h) on their own axes for adhesion,
- shaping the end of the product before folding the product with the bottom guidance system (9),
- folding the packaging paper inwards from the tip of the conical tip with the product bottom folding system (17) in order to avoid any openings at the bottom of the product during the product crimping and sealing process, and giving an end form to the crimped packaging paper,
- angular movement and opening of the lower crimping conical mold (10h) and separation from the upper crimping conical mold (10g),
- the packaging paper entering the conical shape wrapped on the upper folding conical mold (10g),
- throwing the conical shaped packaging paper by sending compressed air to the ejection holes on the mold, thanks to the blowing rotary head system (10j) connected to the upper folding conical mold (10g),
- counting the packages by a sensor while they are thrown onto the belt by the upper crimping conical mold (10g),
- a certain number of separated packages, shaped like a cone, interlocking with each other and accumulating on the product exit belt system (11),
- the product exit belt system (11) rotating at a certain speed according to the arrival speed of the packages and carrying the interlocking packages forward,
- the pneumatic separator in the product separation system (12) entering between the two products, when the desired quantity is captured

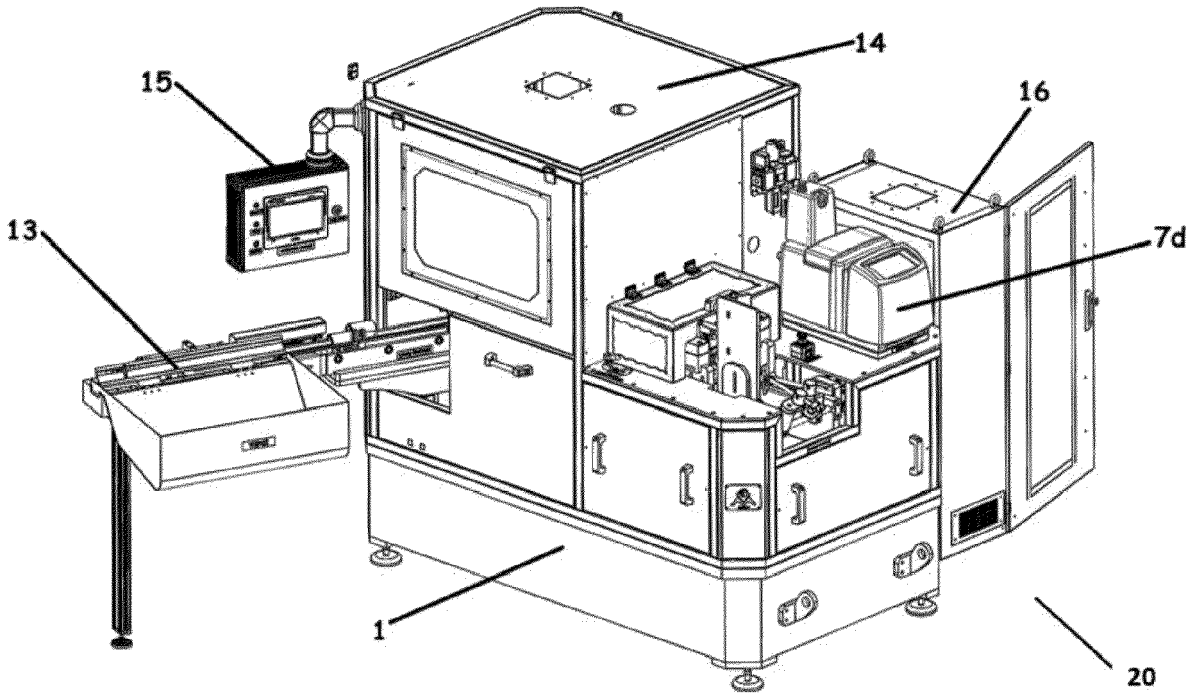


Figure 1

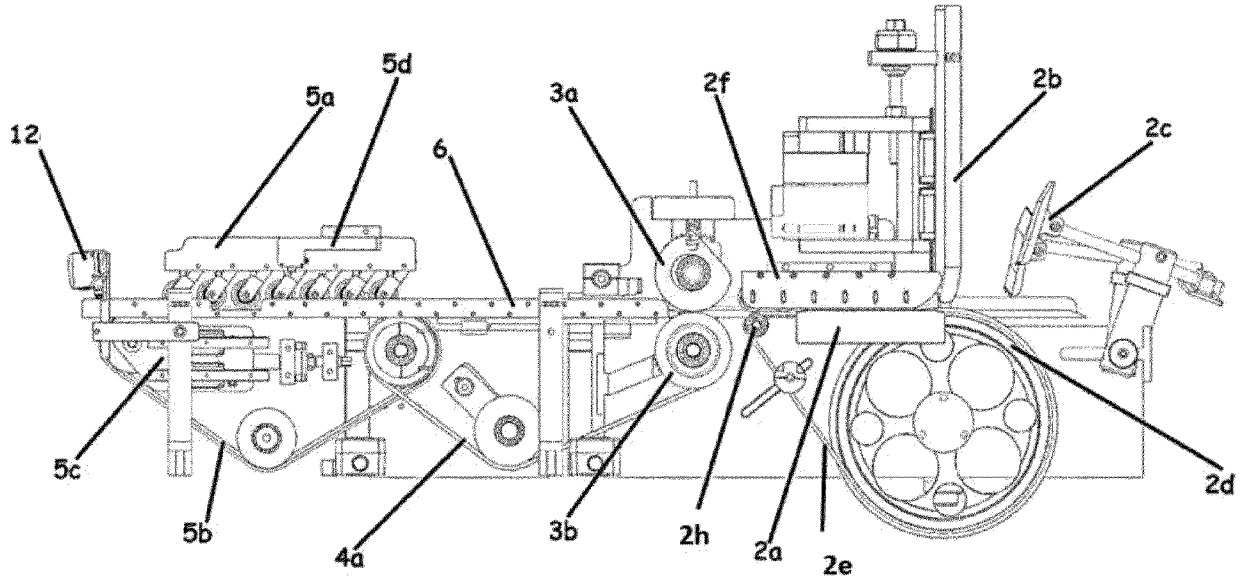
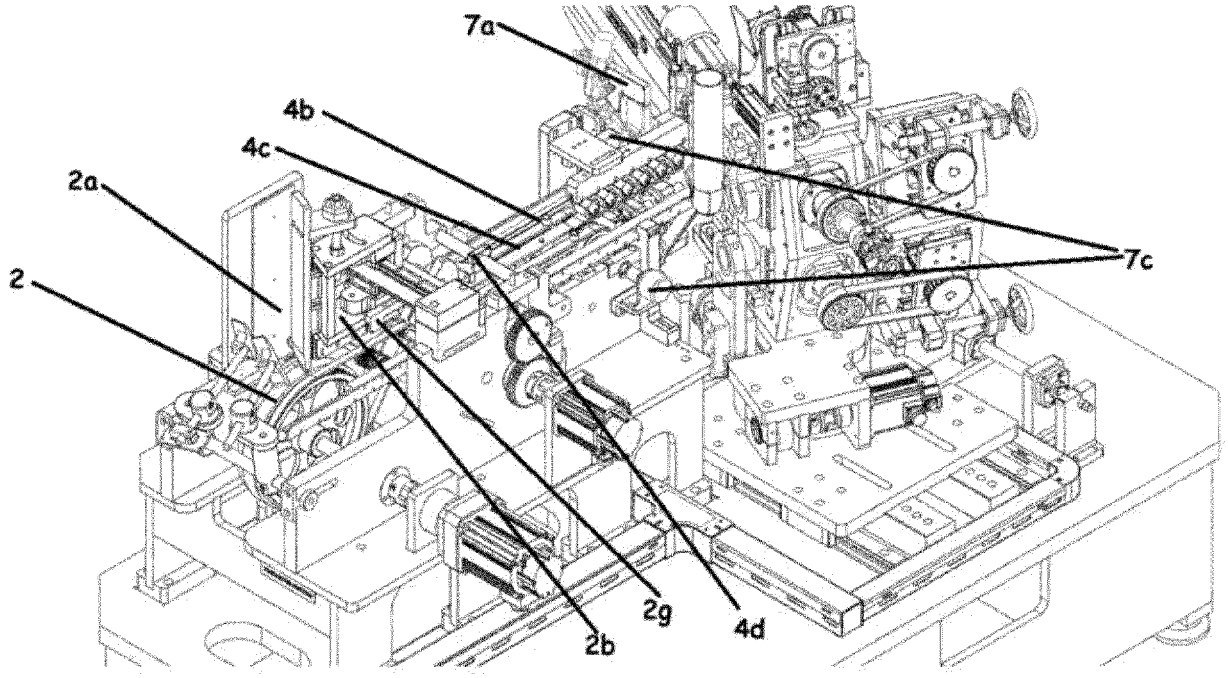


Figure 2



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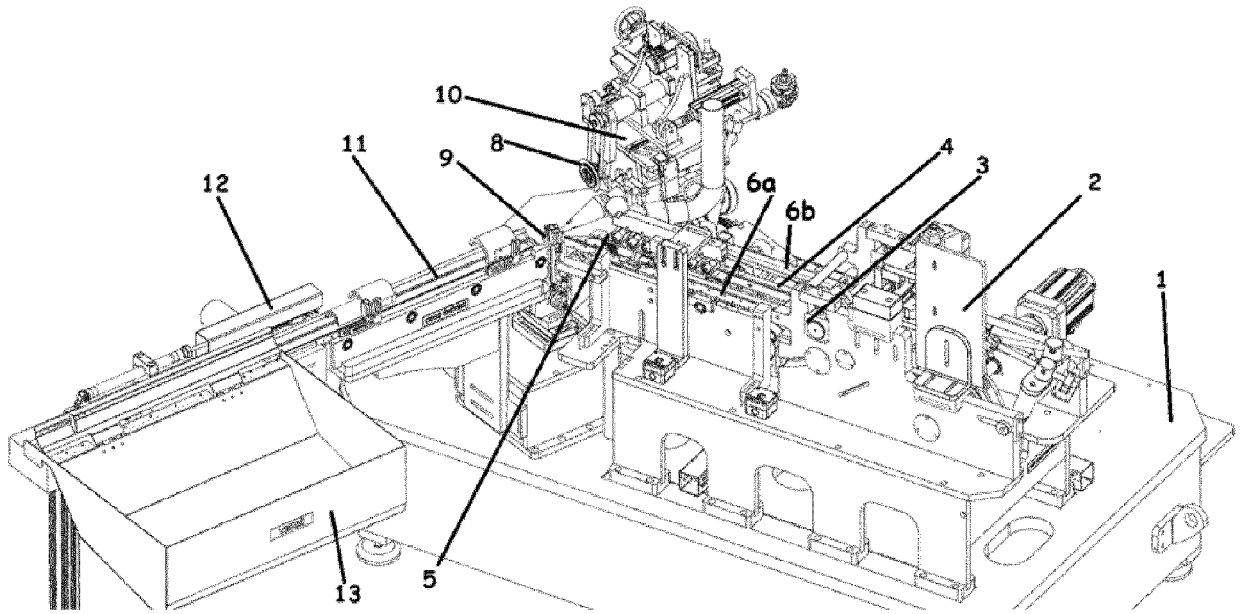

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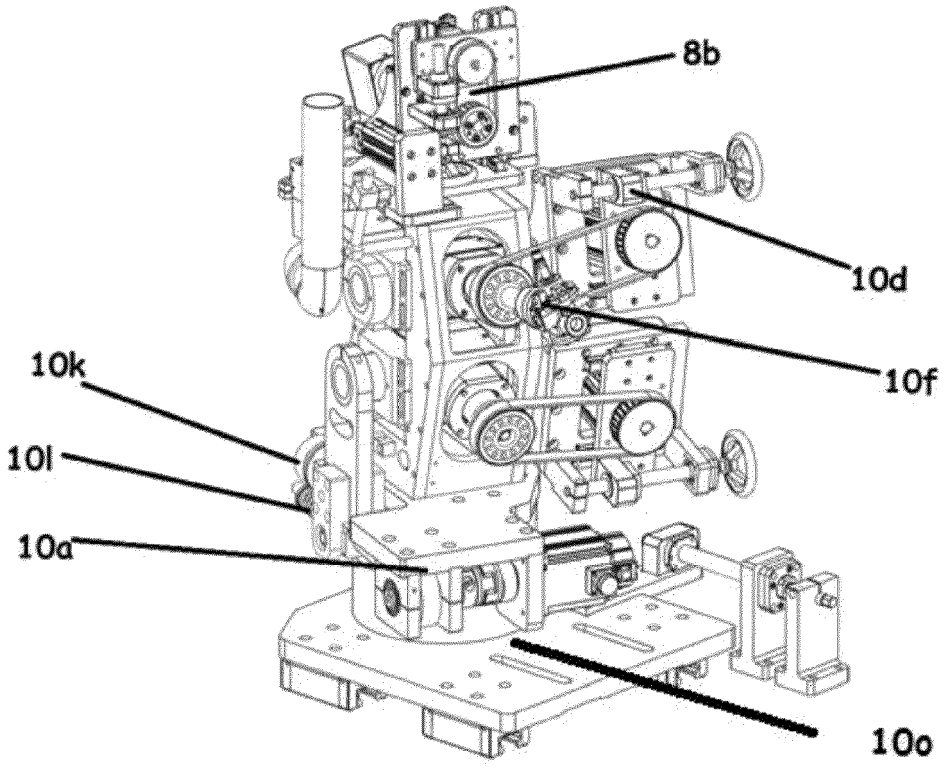

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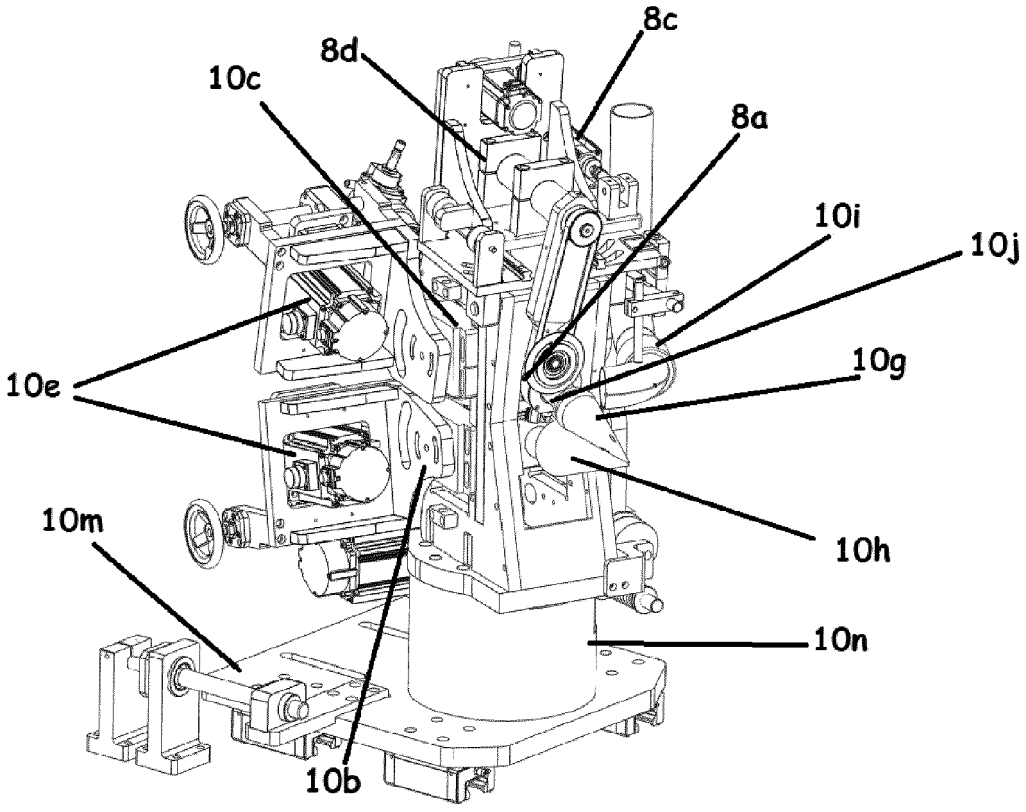

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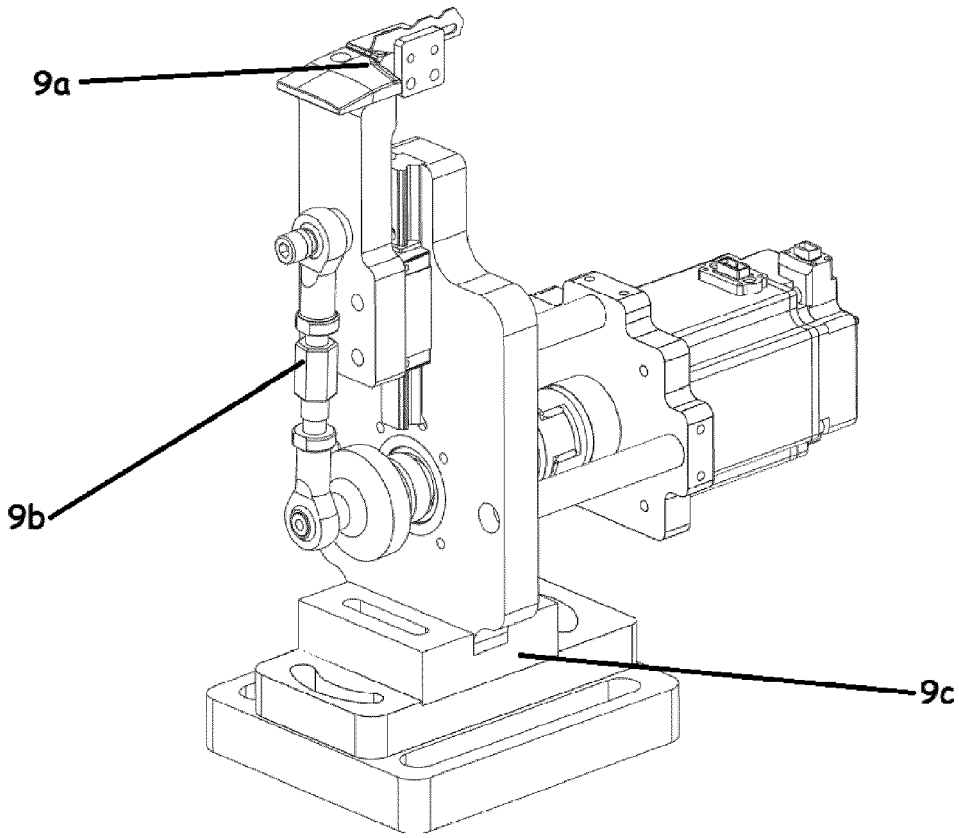

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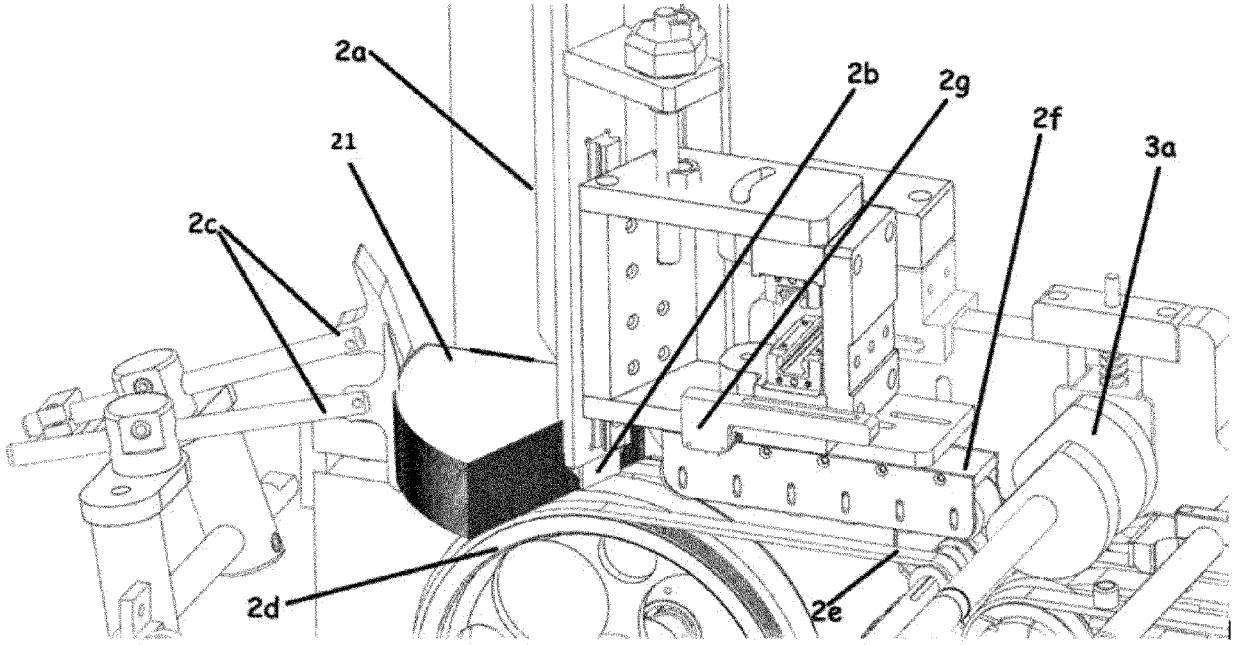

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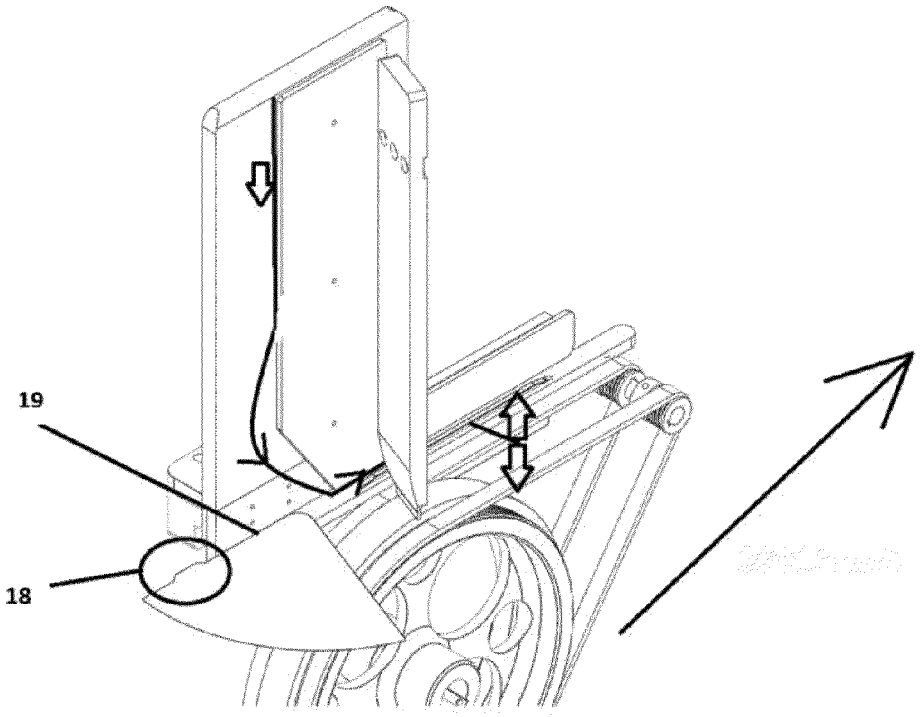

Figure 9

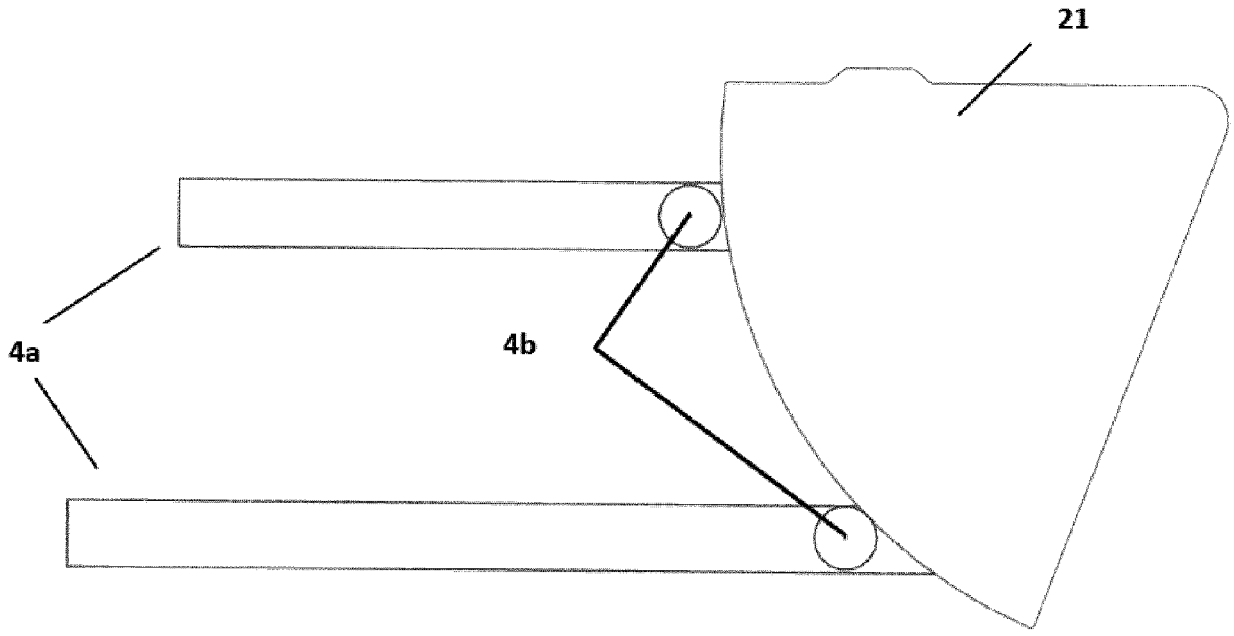

Figure 10

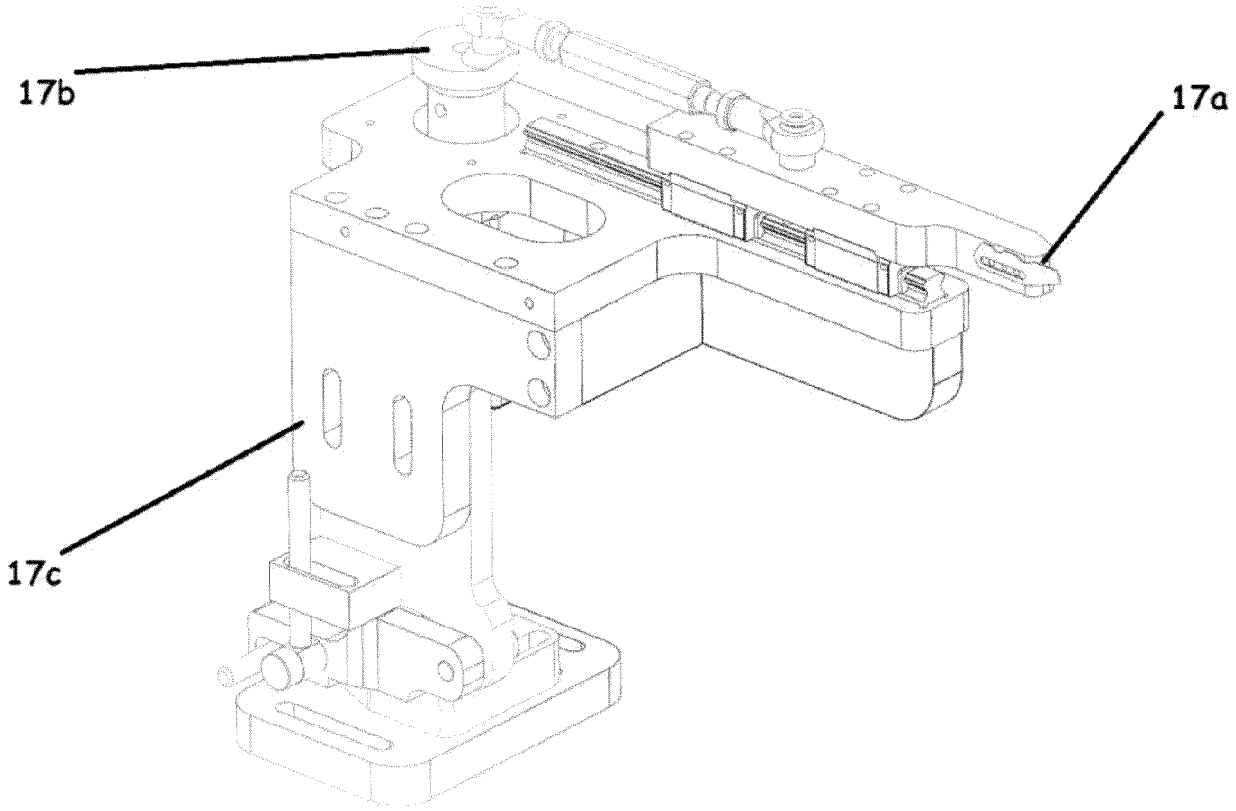

Figure 11

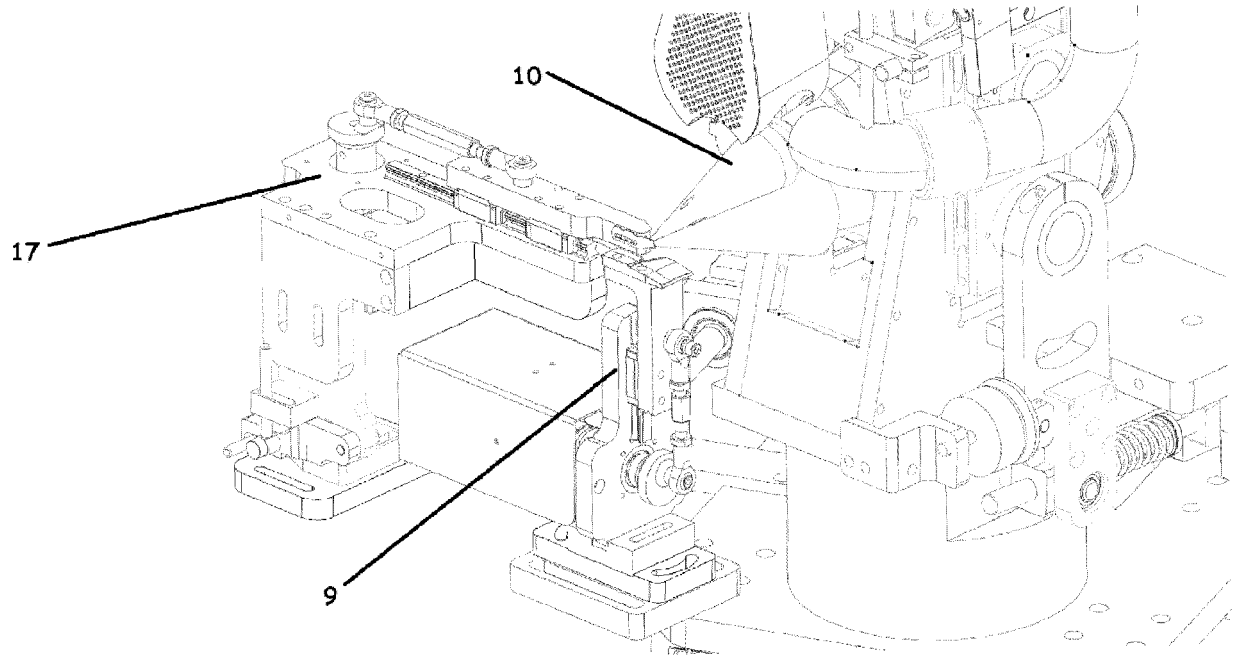

Figure 12

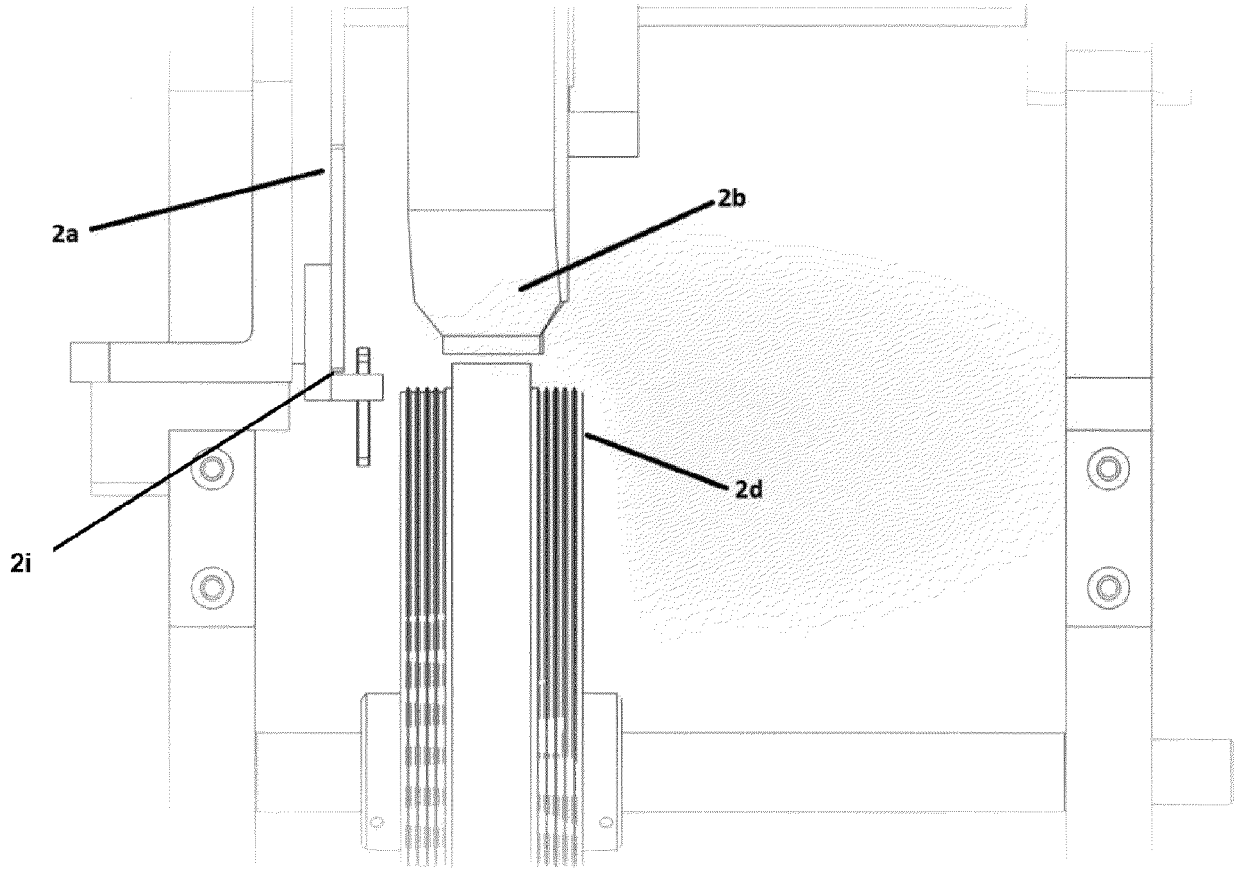

Figure 13

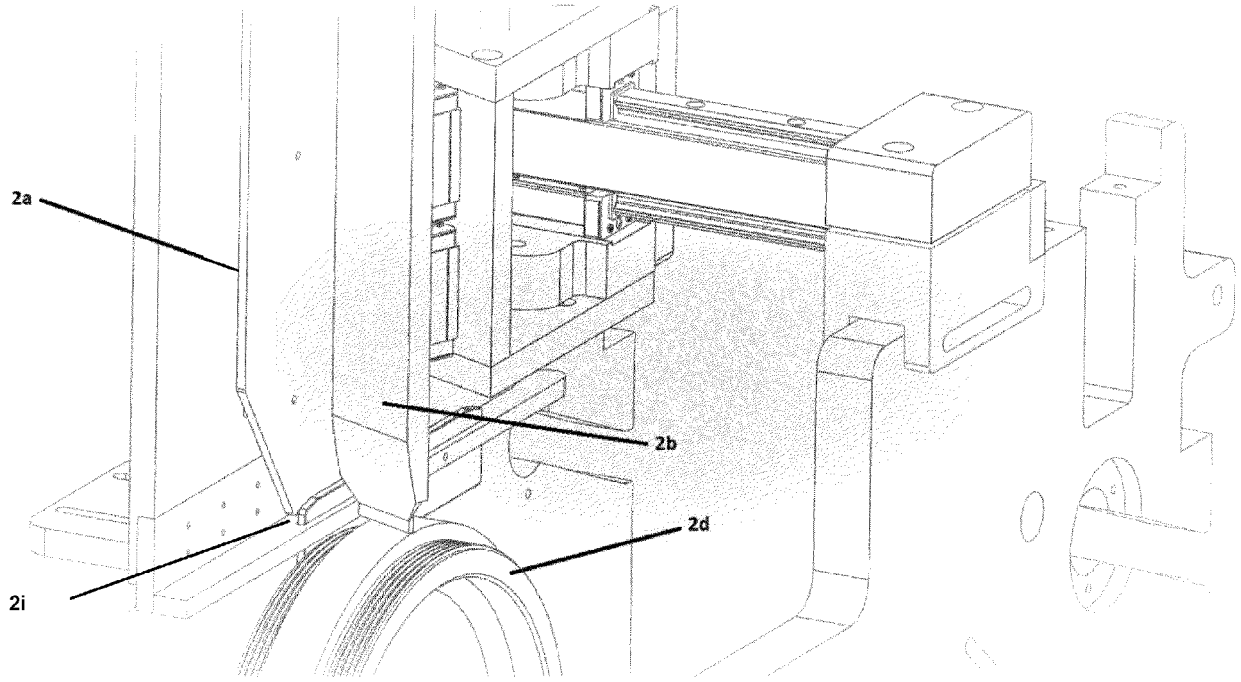

Figure 14

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EUROPEAN SEARCH REPORT

Application Number
EP 23 21 4976

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	EP 3 439 861 B1 (MONDI AG [TR]) 30 November 2022 (2022-11-30) * the whole document *	1-31	INV. B31B50/04 B31B50/06 B31B50/62
A	KR 2013 0089073 A (KONG NAM EOK [KR]) 9 August 2013 (2013-08-09) * figures *	1-31	B31C7/08 ADD. B31B110/10
A	WO 2021/096452 A1 (MONDI KALE NOBEL AMBALAJ SANAYI VE TICARET ANONIM SIRKETI [TR]) 20 May 2021 (2021-05-20) * the whole document *	1-31	
A	CN 217 415 071 U (ZHONGSHAN DAYUAN IND CO LTD) 13 September 2022 (2022-09-13) * figures *	1-31	

TECHNICAL FIELDS SEARCHED (IPC)

B31B
B31C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	10 May 2024	Cardoso, Victor

CATEGORY OF CITED DOCUMENTS

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10-05-2024

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 3439861 B1	30-11-2022	EP 3439861 A1	13-02-2019
		ES 2936788 T3	22-03-2023
		FI 3439861 T3	31-01-2023
		PL 3439861 T3	13-03-2023
		TR 201708349 A2	21-12-2018
		US 2020016861 A1	16-01-2020
		WO 2018226182 A1	13-12-2018
KR 20130089073 A	09-08-2013	NONE	
WO 2021096452 A1	20-05-2021	EP 4021717 A1	06-07-2022
		US 2023002094 A1	05-01-2023
		WO 2021096452 A1	20-05-2021
CN 217415071 U	13-09-2022	NONE	

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Patent documents cited in the description

- US 3065676 A **[0006]**