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(54) METHOD AND CONTROL FOR MEASURING THE QUANTITY OF A COATING FILM

VERFAHREN UND STEUERUNG ZUM MESSEN DER MENGE EINES BESCHICHTUNGSFILMS

PROCÉDÉ ET COMMANDE POUR MESURER LA QUANTITÉ DU FILM DE REVÊTEMENT

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Description

[0001] The invention relates to a process for measuring quantity of film serving for wrapping loads and if desired for regulating as well the quantity of film, using an equipment as defined in the description, which equipment comprises a controlling computer.

[0002] The process is realized with special equipment which is described in the description. In our age, the manufacturers economize on the usage of package materials not only for the reasons of economy but also for the reasons of environment saving, as well as for economy of material and energy.

[0003] The form of packing immediately contacting with the product, storing it, protecting it against light, air, vapor, or protecting the environment against the product, is regarded as primary packing.

[0004] The secondary packing is usually a collective packaging, which clamps together several primary packing units to a package, which can be easily handled or forwarded for a person. As regards the secondary packages, there are generally such points of view considered that it should be lifted with two hands by a person; in accordance with the rules of work safety of the most of countries, the package should not let the goods to fall to pieces, it should protect the product even in case of unloading and reloading several times, and it should fit into the car-boot of an average car. The secondary package as function has another very important role that it should include such a number of product units in primary packages and in such positions that utilizes the surface of the pallet used in the given region or by the business in one layer in the best possible way. The dimensions of the pallets are adapted to the transportation possibilities of the region, should it be ship, plane, railroad or road transport. The dimensions and orientation of the secondary package units are chosen in ideal case so, that they approach the dimensions of length and width of the pallet in one layer in the best possible way from below. It is advantageous to keep the length and width of the layers formed from the secondary package units within those dimensions of the pallet, because if a package unit hangs out from the contours of the pallet, as it is highly probable that it will be damaged during the loadings on the one hand, but, on the other hand, it is worth to utilize the area on the pallet in the best possible way from the points of view both of logistics and economy. Generally, the secondary package should not protect the product against light, vapor or air, it is primarily destined to keep the primary packages together. Some of these package forms, not pretending to the completeness, should be mentioned such as shrink-wrapping (usage of heat-shrinking endless film on the previously arranged primary packages) or collecting box and wrap-around (typically in case of drinks in rectangular boxes).

[0005] The secondary packages usually lose their function in the trade process at the level of retail trade, where the buyers bring home the products only in primary

package and the major part of the material of secondary packages is recycled. The same circulation applies to the tertiary packages, as well.

[0006] The stretch film package applied for wrapping of lateral and/or upper surfaces of loads formed on pallets is usually tertiary package, more rarely secondary and only in extraordinary cases primary package.

[0007] The wrapping with stretch-film, as packaging process, is usually the last technological stage in the manufacturing plants; it is destined to keep the load together and to protect it against dust, precipitation and acts against property. It has only minimal aesthetic function, it is hardly utilized as surface for advertisement. Consequently, the wrapping with stretch-film, as cost, belongs mostly to the logistics, it represents requirement rather than added value, and the quantity of film used for a load unit should be minimal, meeting the requirements of properties, density, those of primary and secondary packages of the products, as well as the quality of transport, in ideal case.

[0008] The production plants usually know their average yearly consumption of film, regarding its distribution in time as even, or, in case of seasonal production, the film consumption can be proportional to the number of loads on the delivered pallets. It approaches the reality only in the case when the height of loads does not change. If the stretch-film wrapping machine uses a unit of film quantity to wrap a load of unit of height then it will use approximately twice as much film to wrap a load of two units of height at the same settings. Consequently, the number of loads on the delivered pallets does not give the trustworthy quantity of film used to wrap a unit of load formed on a pallet.

[0009] There is a great number of unit load wrapping apparatuses known in the practice.

[0010] Using a machine as described in the German publication of registration number DE 3633680 the load is put on a table and a shrink hood made of a shrinkable film is put on the load.

[0011] The load wrapped with the shrink hood is rotated by the table and a burner nozzle fastened on a vertically moving carriage shrinks the upper and lower parts of the shrink hood circularly and the lateral part along a screw line performing a programmed movement.

[0012] The application of the shrink hood provides appropriate protection to the load owing to the wrapping the upper part of the load.

[0013] The disadvantage of the machine is that the shrink hood must be made previously and put onto the load. The manufacturing of the cap requires manual labor, in addition the specific demand of film is great, as well as the energy requirement of the shrinking is also great enough.

[0014] The specific demand of film of the wrapping with stretchable film amounts approximately one fifth part of that of the shrink hood and the indispensable high energy requirement of the shrinking does not arise.

[0015] The common distinctive features both of the

simplest hand-operated machines and the fully automated ones applied for the stretch wrapping with stretchable film are that they have a table for turning a load and a carriage applicable for the vertical movement of the film reel.

[0016] The above mentioned structural units of the machines make possible that the pre-stretched film wraps the load along a screw line as result of the turning movement of the load and the vertical movement of the film. The stretch of the film, the overlap and the number of film windings can be changed depending on the properties of the load and the requirements of fastening.

[0017] The patent description of registration number of HUP 210302 discloses a very advantageously applicable machine enabling the stretch wrapping of loads with stretchable film also on the top surface of the load with the film applied for the wrapping of lateral surface.

[0018] The solution ensures the perfect protection of the goods through continuity of the stretched film, rendering unnecessary putting on a shrink hood in this way. The essence of the machine according to the solution is that the film applied for stretch wrapping the lateral surface of the load by winding up along a screw line is led above the load and tilted from vertical position to horizontal one during the rotation of the load.

[0019] The film is then tilted back to the vertical position during a descending movement and the wrapping of the upper part is made in this way.

[0020] The machine according to the patent has a base frame, a table mounted in it and a mast fastened on the base frame.

[0021] A carriage vertically moving the film is mounted on the mentioned mast and bushings are formed on the carriage.

[0022] A shaft is inserted into the bushing and a reel of film is connected to the one end and a tilting actuator is connected to the other end of the shaft.

[0023] A sensor for the vertical (home) position and a sensor for the horizontal position are mounted on the base frame, triggering elements mounted on the table associated to the corners of the load, as operating elements controlling the tilting.

[0024] The disadvantage of the machine is that the stretch tension value can attain only the nearest digital value according to the step values, so it cannot be followed proportionally, consequently the tension of the film cannot be set precisely.

[0025] In the Hungarian utility model description of the registration number 4342 it was set out to develop an apparatus, wherein it is complemented with a tilting film tension setting unit having pre-stretching rollers provided with a pre-stretching motor fastened to the frame of the film holding and pre-stretching unit, a guiding roller containing an arm with a roller, a stretch setting pneumatic cylinder provided with an analogous displacement transducer, which cylinder has magnetic piston, and a frequency changer.

[0026] Using this apparatus, the measurement of

stretching becomes more accurate, the intervention is faster and the hysteresis of stretching reduces.

[0027] The pre-stretching motor reacts faster, more accurately, with smaller redundancy to the increased tension, and the desired tension of the film can be better approached and kept during the whole time of wrapping .

[0028] The disadvantage of the apparatus is that the quantity of the used film cannot be measured while loads of different dimensions and shapes are wrapped, and the necessary film quantity cannot be previously determined by an estimated data.

[0029] It is another disadvantage that there is no possibility to form automatically a more economic pattern relatively to the previously set one, or to form a stronger one with more film requirement if desired, i. e. to the automatic regulation of the used quantity of film.

[0030] The document of US 2010/300049 discloses a method and apparatus for metered pre-stretch film delivery.

[0031] In the method of the document there is no disclosure of measuring the mass of the used film posteriori and setting of a fixed quantity of film to be used in a wrapping operation.

[0032] We aimed to develop a process for measuring quantity of film serving for wrapping loads and if desired for regulating as well the quantity of film, using an equipment as defined in the description, which equipment comprises a controlling computer.

[0033] The process is characterized by that the parameters of width, thickness and density of the film , the length of curved lateral surface perimeter of the pre-stretching roller, the ratio of pre-stretching, the slip coefficient between the film and the pre-stretching roller, the temperature of environment and the program of the foil wrapping pattern are fed into the controlling computer, then a load of arbitrary dimensions and shape is wrapped with film, the used film is removed from the load at the end of wrapping process, its mass is measured, this reference value is fed into the controlling computer, then a film wrapping is performed with a film of the same quantity and with the same pre-stretching ratio and at a nearly the same temperature of environment on a load of different dimensions and/or shape, the actually used quantity is read from the display of the controlling computer, in the cases where it is desirable to reduce or increase the quantity of film for loads of the same dimensions and/or shape, the actually desired quantity of film to be used is fed into the controlling computer and the controlling computer automatically sets the overlap of the film spiral assigned to the desired film quantity economy or to additional film quantity, by means of changing the proportions of rotation speed of the table driving motor and that of the film carriage motor or that of the drive of the film holding and pre-stretching unit and that of the film carriage motor optionally those of the pre-stretching motors respectively.

[0034] A known film-wrapping machine serves for wrapping lateral and upper parts of loading units with

stretchable film. It has a base frame, a table mounted in it and a mast fastened to the base frame, to which a carriage provided with a carriage motor is fastened vertically moving a film reel, a pin is led through it a tilting pneumatic cylinder is connected to the one end and the film reel is connected to the other end of the pin, a home position sensor and a horizontal position sensor are mounted on the base frame, tilting controlling triggers arranged correspondingly to the corners of load and a base position trigger are mounted on the table, and it has a tilting film holding and pre-stretching unit fastened to the other end of the mentioned pin.

[0035] The equipment which is not part of the invention, which can be fitted into a film-wrapping machine and having a tilting film holding and pre-stretching unit, has pre-stretching rollers provided with one or more pre-stretching motors fastened to the frame, a guiding roller containing an arm with a roller, tension setting pneumatic cylinder provided with an analogous displacement transducer and having piston provided with magnet, furthermore a pressure regulator, where the film, wound down from the film reel, is led between pre-stretching rollers, optionally connected with a gear, and one of them or the two extreme ones are driven with a pre-stretching motor or two ones, then the film is led around a guiding roller provided with a swing-arm turning around a center of rotation and having a roller, it is connected with the piston provided with magnet, mounted in the tension setting pneumatic cylinder and the piston provided with magnet is connected to the pressure regulator.

[0036] The exterior rollers from among the pre-stretching rollers optionally complemented with leading rollers, the exterior ones are provided with rotation speed transducers and with rotation speed sensors or they are provided with bearings built together with rotation speed sensors, the former ones are connected by impulse connection to a controlling computer having a display and the latter is optionally connected by impulse connection to the motor turning the table, the one of the film carriage or both to the drive of the film holding and pre-stretching unit and to the film carriage motor.

[0037] The apparatus is applicable for the measurement of film quantity used to wrap loads having different dimensions and shapes, but it can be applied, in addition, for regulation of the film quantity after measurement, to increase or decrease the film quantity.

[0038] The equipment can be built in a known film-wrapping machine, where the table of the film-wrapping machine is driven with a table driving motor in one of its advantageous embodiment, while the film holding and pre-stretching unit of the film wrapping equipment is provided with a drive in another advantageous embodiment.

[0039] In the process of measurement the quantity of used film can be calculated from the product of the perimeter of curved surface of the chosen pre-stretching roller and the number of revolutions performed during the film wrapping process, the slip coefficient between the film and the pre-stretching roller, the current pre-

stretching ratio and the temperature of environment should be taken into account in order to make exact measurement.

[0040] The difference between the rotational speeds of the pre-stretching rolls of greatest and smallest rotational speeds, either measured or previously set on the controlling computer provide data about the pre-stretching ratio.

[0041] It is usually directly proportional to the ratio of sliding in characteristically normal conditions.

[0042] The controlling computer calculates greater film consumption when a greater pre-stretching ratio is chosen or set, because it compensates with a greater sliding coefficient to the greater pre-stretching ratio within the limit of elasticity. The actual elongation of the film will follow less and less the theoretic elongation ratio during increase of pre-stretching ratio. The controlling computer performs a similar compensation under influence of the temperature of environment. The film is stretchable in inverse proportion with the temperature of environment, but in contrary the breaking elongation is directly proportional to the temperature of environment (The film manufacturers determine the temperature limits of applicability of their products).

[0043] The process of regulation can be performed by an apparatus wherein the pre-stretching rollers have only one pre-stretching motor and the other one or more pre-stretching rollers are connected to the motor driven roller through a gear.

[0044] In another embodiment of the regulation process each pre-stretching roller is driven by a motor.

[0045] There are different possibilities of economy in case of pre-stretching apparatuses with one motor drive than in case of embodiments with two motors. In case of embodiments with one motor drive the controlling computer controls the elements of the packing pattern, such as the pitch of screw line of the side wrapping, the numbers of upper lower and middle windings in quarter parts. The controlling computer analyzes the ratio between the existing elements and the desired economy and automatically generates the ratios between the rotational speeds of table and the film holder and pre-stretching unit or that between the film holder and pre-stretching unit and the film carriage motor necessary for the number of windings with increased pitch inversely proportional to the desired economy.

[0046] It is advisable to check the result in every case because the economy exceeding the optimal degree goes to diminish the stability, protection against dust or aesthetical value of the package.

[0047] The ratio between the overlap of winds generated by the pitch of screw-line of the film made in the wrapping cycle as starting base and the desired overlap can also be given as aimed economy, in this case the controlling computer will subtract a quantity corresponding to the ratio of the two overlaps from the quantity of the whole pattern of film-wrapping.

[0048] The process of regulation of film quantity as-

signed to the film pre-stretching unit with two motors has all the advantages of the process as described at the apparatus with one motor with the completion that the apparatuses with two motors are capable to make further savings of film.

[0049] It is reached in such a way that the film of unit length is automatically pre-stretched in arbitrary rate according to the commands of the software running in the controlling computer.

[0050] The equipment which is not part of defined by the invention is shown in the Figures 1 to 10.

[0051] The Figures 1 to 4 and 9 show embodiments of the machine in top-side view wherein the table is motor-driven.

[0052] The Figures 5 to 8 show embodiments of the machine in top side view wherein the table does not turn but the film holding and pre-stretching unit is provided with a drive.

[0053] The Figure 10 shows side view of an embodiment of the equipment.

[0054] The Figure 1 shows an advantageous embodiment of the machine in top view, wherein the table (2) is provided with a table turning motor (21).

[0055] In the Figure the base frame (1), the table (2) mounted in rotatable way in it, and the load (13) placed on the latter are shown.

[0056] A carriage (4) moving vertically the film reel (7) is fastened to the mast (3), which is fastened to the base frame (1) and bushings (5) are formed on the carriage (4).

[0057] A pin (6) is led through the bushings (5) a tilting pneumatic cylinder (8) is connected to its one end and a film holding and pre-stretching unit (22) is connected to its other end.

[0058] A home position sensor (9) and a 10 horizontal position sensor are arranged on the base frame (1).

[0059] Tilting controlling triggers (12A, 12B, 12C and 12D) arranged according to the corners of load (14) and a home position sensor (9) are fitted to the table (2).

[0060] Pre-stretching rollers (7A) provided with a pre-stretching motor (20), a guiding roller (7B) comprising a swing-arm provided with a roller (7C), a tension setting pneumatic cylinder (16) provided with a piston provided with magnet (16A) and an analogous displacement transducer (17) and a pressure regulator (18) are fastened to the frame of the film holding and pre-stretching unit (23) to the tiltable film tension setting unit (22).

[0061] The film wound down from the film reel (7) is led around the pre-stretching rollers (7A) connected together with a gear (19), one of them is driven by the pre-stretching motor (20), then the film is led around a guiding roller (7B) provided with an swing-arm with roller (7C) turning around a center of rotation. The swing-arm with roller (7C) is connected to a piston provided with magnet (16A) and the piston provided with magnet (16A) is in a tension setting pneumatic cylinder (16) provided with an analogous displacement transducer (17).

[0062] The piston provided with magnet (16A) is connected to a pressure regulator (18).

[0063] The table (2) is driven by a table driving motor (21).

[0064] The pre-stretching rollers (7A) of the equipment are provided with rotation speed transducers (24A, B) and rotation speed sensors (25A, B).

[0065] They are connected with impulse connection to a computer (15) connected to a display (15A), which is connected to the table turning motor (21) and to the film carriage motor (30) shown in the Figure 10.

[0066] The rotation speed transducers (24A, B) on the pre-stretching rollers (7A) generate an impulse in each revolution in the rotation speed transducers (24 A,B), when they reach the sensing area of the rotation speed sensors (25 A, B), which impulse is sent to the controlling computer (15). The quantity of film can be read from the display (15A).

[0067] The product SM6 of the firm Bosch-Rexroth or the product named SMAT of the firm Festo are advantageously applied as analogous displacement transducer (17). The gear (19) can be any one of usual type, advantageously one with chain, angle belt, gearwheels, timing belt etc.

[0068] In the case where the next cycles of film-wrapping the reduction or increase of the film quantity is desired, the controlling computer (15) changes the ratio between the speeds of rotation of the table driving motor (21) and the film carriage motor (30) (see in the Figure 10) and the assigned overlap of the film spiral (33).

[0069] The Figure 2 shows another advantageous embodiment of the machine in top-side view, where the table (2) is provided with a table turning motor (21).

[0070] This embodiment differs from the modification shown in the Figure 1 in that the pre-stretching rolls (7A) are provided not with rotation speed transducers (24A, B) and 25A, B) rotation speed sensors but they are provided with bearings built together with rotation speed sensors (26).

[0071] The bearings built together with rotation speed sensor (26) generate several impulses depending on the construction in each revolution of a pre-stretching roller (7A).

[0072] The Figure 3 shows a further advantageous embodiment of the machine in top-side view, wherein the table (2) is provided with a table turning motor (21).

[0073] This embodiment differs from the one shown in the Figure 1 in that it has three pre-stretching rollers (7A) instead of two ones (7A).

[0074] The two exterior pre-stretching rollers (7A) from the three ones are provided with rotation speed transducers (24A, B) and rotation speed sensors (25A, B). The film is guided between the pre-stretching rollers (7A) by leading rollers (7D).

[0075] An advantageous embodiment of the machine is shown in top-side view in the Figure 4, wherein the table (2) is provided with a table turning motor (21).

[0076] This embodiment differs from the one shown in the Figure 3 in that the two exterior pre-stretching rollers (7A) from those ones are equipped with bearing built to-

gether with rotation speed sensors (26) instead of rotation speed transducers (24 A, B) and rotation speed sensors (26A, B).

[0077] A further advantageous embodiment of the machine is shown in top-side view in the Figure 5, wherein the film holding and pre-stretching unit (22) is provided with a drive of the film holding and pre-stretching unit (27).

[0078] This embodiment differs from the solution shown in the Figure 3 that the table (2) has not a drive.

[0079] The drive of the film holding and pre-stretching unit (27) is a film holding driving motor with turning ring (27A).

[0080] An advantageous embodiment of the machine is shown in top-side view the Figure 6, wherein the film holding and pre-stretching unit (22) is provided with a drive of film holding and pre-stretching unit (27).

[0081] This embodiment differs from the one shown in the Figure 4 in that the table (2) has not a drive.

[0082] The drive of the film holding and pre-stretching unit (27) is an arm driving motor (27B) provided with a turning arm (29).

[0083] The turning arm (26) rotates the film.

[0084] An advantageous embodiment of the equipment is shown in top-side view in the Figure 7, wherein the film holding and pre-stretching unit (22) is provided with a drive of the film holding and pre-stretching unit (27).

[0085] This embodiment differs from the solution shown in the Figure 5 in that it is provided with only two pre-stretching rollers (7A) and it has no leading roller (7D).

[0086] An advantageous embodiment of the machine is shown in top-side view in the Figure 8, wherein the film holding and pre-stretching unit (22) is provided with a drive of the film holding and pre-stretching unit (27).

[0087] An advantageous embodiment of the machine is shown in top-side view in the Figure 9, wherein the table (2) is provided with a table turning motor (21).

[0088] This embodiment differs from the solution shown in the Figure 1 in that each pre-stretching roller (7A) is provided with a separate pre-stretching motor (20). So a gear (19) between the two pre-stretching rollers (7A) is not necessary. The difference between the rotation speeds of the two pre-stretching rollers (7A) determines the pre-stretching ratio.

[0089] An advantageous embodiment of the machine is shown in side view in the

[0090] Figure 10 of the equipment 34J, wherein the table (2) is provided with a table turning motor (21).

[0091] In the Figure 10 are shown the base frame (1), the table (2) built in it in rotatable way and the load (13) placed on it.

[0092] A carriage (4) moving vertically the film is fastened to the mast (3) fastened to the base frame (1) and bushings (5) are formed on the carriage (4).

[0093] A pin (6) is lead through the bushings (5) and a tilting pneumatic cylinder (8) is connected to its one end and the film holding and pre-stretching unit (22) is connected to its other end.

[0094] The carriage (4) is provided with a film-carriage motor (30).

[0095] The equipment is provided with a controlling computer (15), which is provided with a display (15A).

5 The controlling computer (15) is connected by impulse connection with the pre-stretching motor (20), the table turning motor (21) and the film-carriage motor (30).

[0096] A spirally wound up film spiral (32) is on the load (13).

10 **[0097]** The invention relates to the process for measuring quantity of film serving for wrapping loads and if desired for regulating as well the quantity of film using the above described equipment 34A-34J.

15 **[0098]** The advantage of the process according to the invention are as follows:

The process is applicable to measure the film quantity used for wrapping loads of different dimensions and shapes, but it is applicable - if desired - at the same time for automatic reduction or increase of the film quantity by means of a computer-aided controlling regulation.

List of notations

[0099]

25	1	base frame
	2	table
	3	mast
	4	carriage
30	5	bushing
	6	pin
	7	film reel
	7A	pre-stretching rollers
	7B	guiding roller
35	7C	swing-arm with roller
	7D	leading roller
	8	tilting pneumatic cylinder
	9	home position sensor
	10	horizontal position sensor
40	11	home position trigger
	12A, B, C D	tilting controlling triggers
	13	load
	14	load corner
	15	controlling computer
45	15A	display
	16	tension setting pneumatic cylinder
	16A	piston provided with magnet
	17	analogous displacement transducer
	18	pressure regulator
50	19	gear
	20	pre-stretching motor
	21	table turning motor
	22	film holding and pre-stretching unit
	23	frame (of the film holding and pre-stretching unit)
55	24A, B	rotation speed transducers
	25A, B	rotation speed sensors
	26	bearing built together with rotation speed

	sensor	
27	drive of the film holding and pre-stretching unit	
27A	film holding driving motor with turning ring	5
27B	arm driving motor	
28	supporting roller	
29	turning arm	
30	film-carriage motor	
32	film spiral	10
33	overlap of the film spiral	

Claims

1. A process for measuring quantity of film serving for wrapping loads and for regulating as well the quantity of film using an equipment comprising a controlling computer (15) **characterized by** that the parameters of width, thickness and density of the film, the length of curved lateral surface perimeter of a pre-stretching roller (7A), the ratio of pre-stretching, the slip coefficient between the film and the pre-stretching roller (7A), the temperature of environment and a program of the foil wrapping pattern are fed into the controlling computer (15), then a load (13) of arbitrary dimensions and shape is wrapped with film, the used film is removed from the load (13) at the end of wrapping process, its mass is measured, this reference value is fed into the controlling computer (15), then a film wrapping is performed with a film of the same quantity and with the same pre-stretching ratio and at a nearly the same temperature of environment on a load (13) of different dimensions and/or shape, the actually used quantity is read from a display (15A) of the controlling computer (15), in the cases where it is desirable to reduce or increase the quantity of film for loads (13) of the same dimensions and/or shape, the actually desired quantity of film to be used is fed into the controlling computer (15) and the controlling computer (15) automatically sets the overlap of a film spiral (33) assigned to the desired film quantity economy or to additional film quantity, by means of changing the proportions of rotation speed of a table driving motor (21) and that of a film carriage motor (30) or that of drive of a film holding and pre-stretching unit (27) and that of the film carriage motor (30) optionally those of pre-stretching motors (20) respectively.

Patentansprüche

1. Ein Verfahren zur Messung der Menge des zum Einpacken eines Gepäcks benutzten Filmes und auch für Regelung der Menge des Filmes, dafür eine einen steuernden Computer (15) enthaltende Apparat benutzt wird **damit gekennzeichnet dass** die Para-

meter des Filmes d. h. die Breite die Dicke und die Dichte, die Länge der gebogenen seitlichen Oberfläche einer vorspannenden Rolle, (7A), das Maß der Vorspannung, der Koeffizient des Ausrutschens zwischen dem Film und der vorspannenden Rolle (7A), die Temperatur der Umwelt und ein Programm des Musters des Einpackens in den Film in den kontrollierenden Computer (15) eingegeben werden, dann ein Gepäck (13) der beliebigen Größe und Form wird in den Film eingepackt, die benutzte Folie wird von dem Gepäck (13) am Ende des Verpackungsverfahrens entfernt und die Menge des Filmes wird gemessen, dieser Referenzwert wird in den kontrollierenden Computer (15) eingegeben, danach eine Verpackung wird mit dem gleichen Film und mit dem gleichen Maß der Vorspannung bei der fast gleichen Temperatur der Umwelt auf einem Gepäck der unterschiedlichen Größe und/oder Form ausgeführt, die faktisch benutzte Menge des Filmes wird von dem Bildschirm (15A) des kontrollierenden Computers (15) gelesen, in den Fällen, wo eine Reduzierung oder Erhöhung der Menge des Filmes für Gepäcks der gleichen Größe und/oder Form gewünscht ist, wird die faktisch zur Benutzung erwünschte Menge des Filmes in den kontrollierenden Computer (15) eingegeben und der kontrollierende Computer (15) automatisch stellt die Überdeckung der zur Ersparnis des Filmes zugeschriebene Spirale (33) des Filmes ein oder er stellt den Apparat zur Benutzung einer zusätzlichen Menge des Filmes ein durch Abänderung die Drehzahl des den Tisch antreibenden Motors (21) und die Drehzahl einer den Film haltenden und vorspannenden Einheit (27), des den Film befördernden Motor (30) und wahlweise auch die des vorspannenden Motors (20).

Revendications

1. Une technique à mesurer la quantité d'un film nécessaire pour couvrir bagages et à la régulation de celle-ci en utilisant un appareil qui contient un ordinateur de contrôle (15) **caractérisé par** que les paramètres du film c'est à dire le largeur, l'épaisseur, la densité, le longueur de la face latérale recourbée d'un rouleau de tension préalable (7A) la proportion de la tension préalable, le coefficient de dérapage entre le film et le rouleau de tension préalable (7A), la température du milieu et un programme de couvrage avec film sont mis en mémoire de l'ordinateur de contrôle (15) ensuite un bagage (13) de forme et dimensions arbitraire est couvert du film, le film utilisé est enlevée du bagage et la masse du film est mesurée au fin du procédé et ce valeur de référence est aussi mis en mémoire de l'ordinateur de contrôle (15), ensuite un bagage (13) de autre forme et/ou des autres dimensions est couvert utilisant la même quantité de film la même proportion de tension préa-

lable et à presque de même température de milieu et la quantité du film utilisé en effect est lue sur le moniteur (15A) de l'ordinateur de contrôle (15), dans les cas où il est désirable à réduire ou augmenter la quantité du film pour les bagages (13) de même forme et/ou dimensions, la quantité du film désirée à être effectivement utilisée est mis dans le mémoire de l'ordinateur de contrôle (15) et l'ordinateur de contrôle (15) initialise automatiquement le chevauchement de la spirale de le film (33) ou la quantité supplémentaire de le film par le changement la proportion de la vitesse de rotation d'un moteur (21) tournant la table et d'un moteur portant le film (30) ou éligiblement par le changement de la proportion des vitesses de rotation les moteurs de tension préalable (20).

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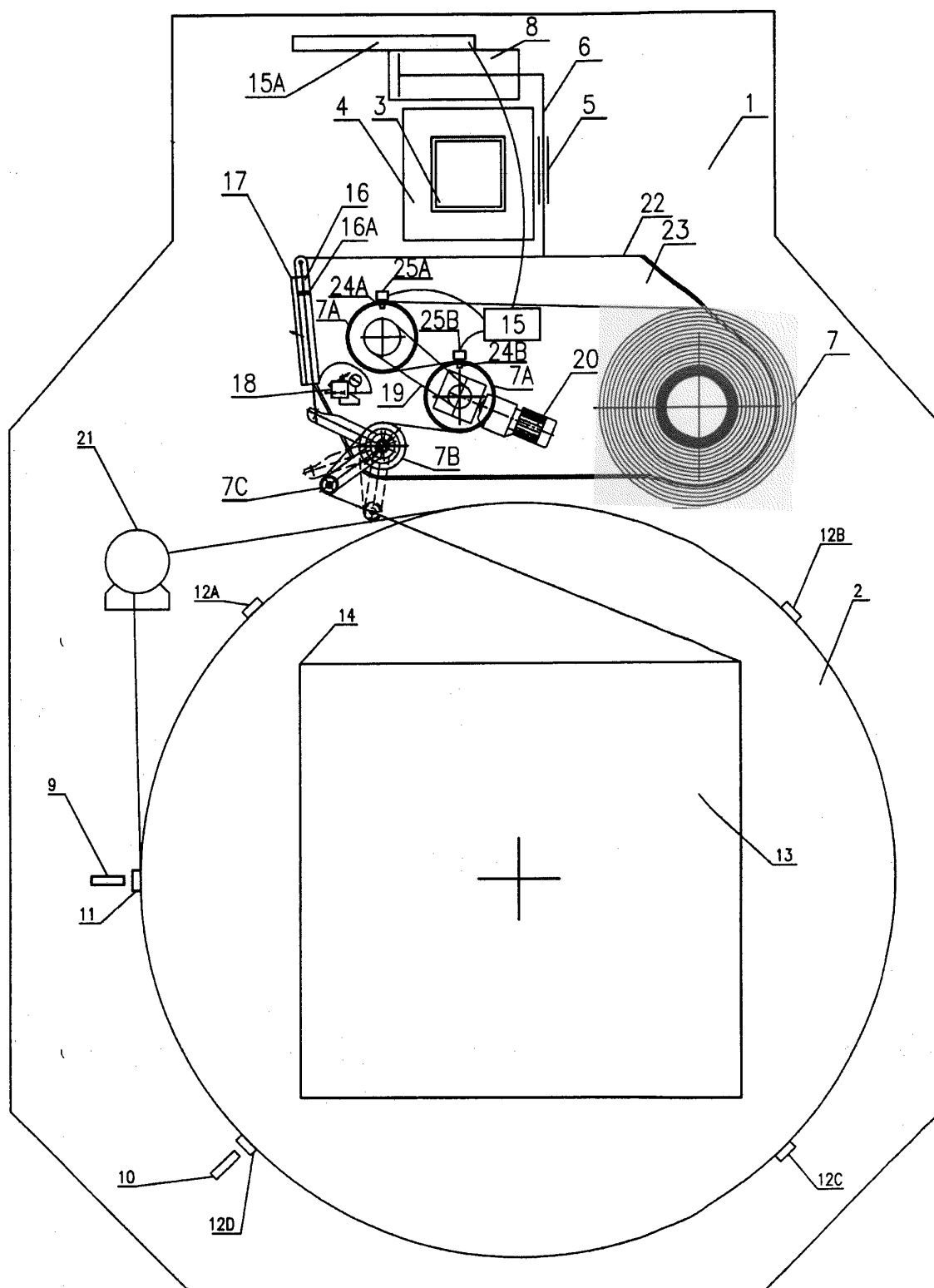


Figure 1

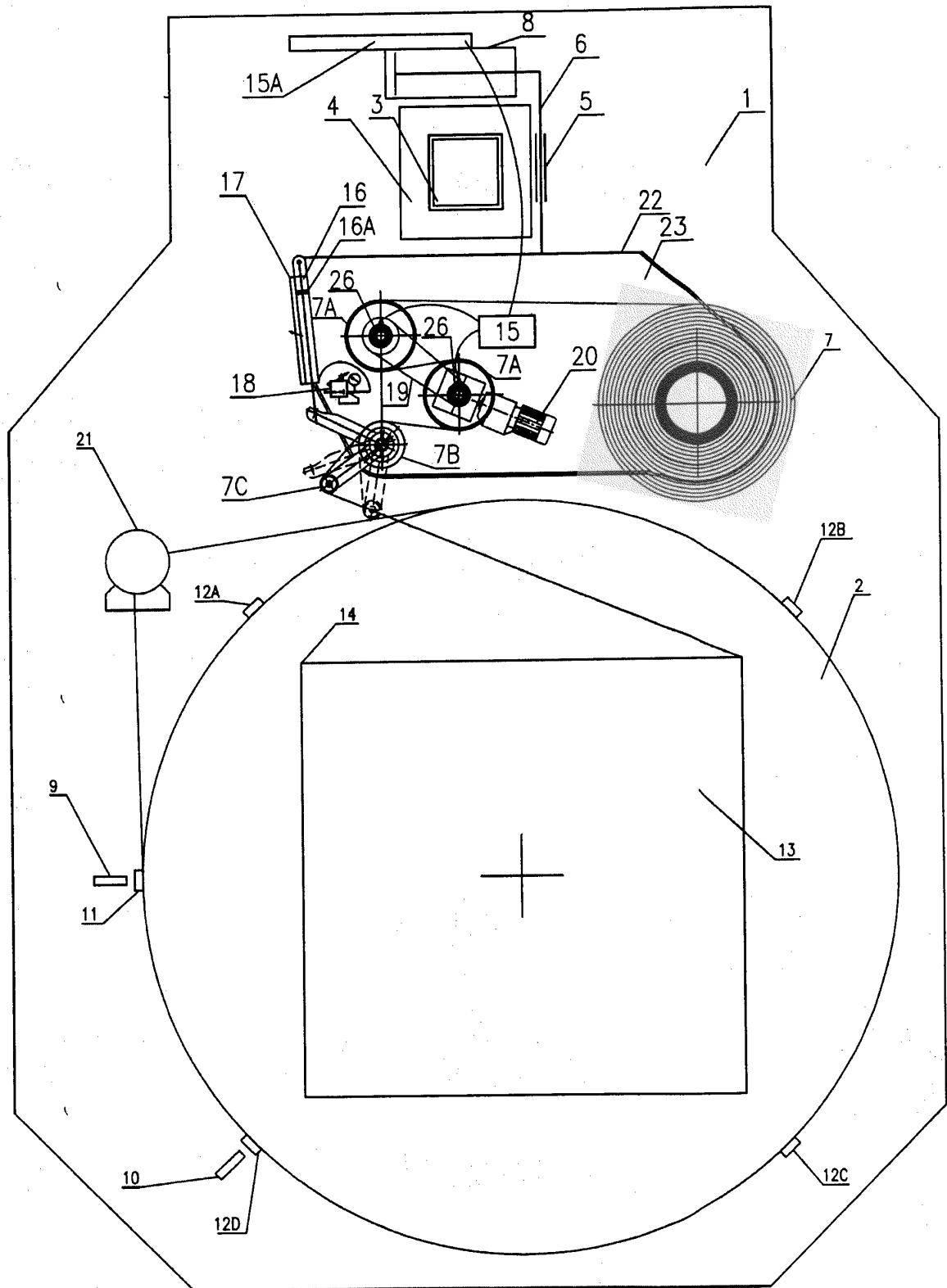


Figure 2

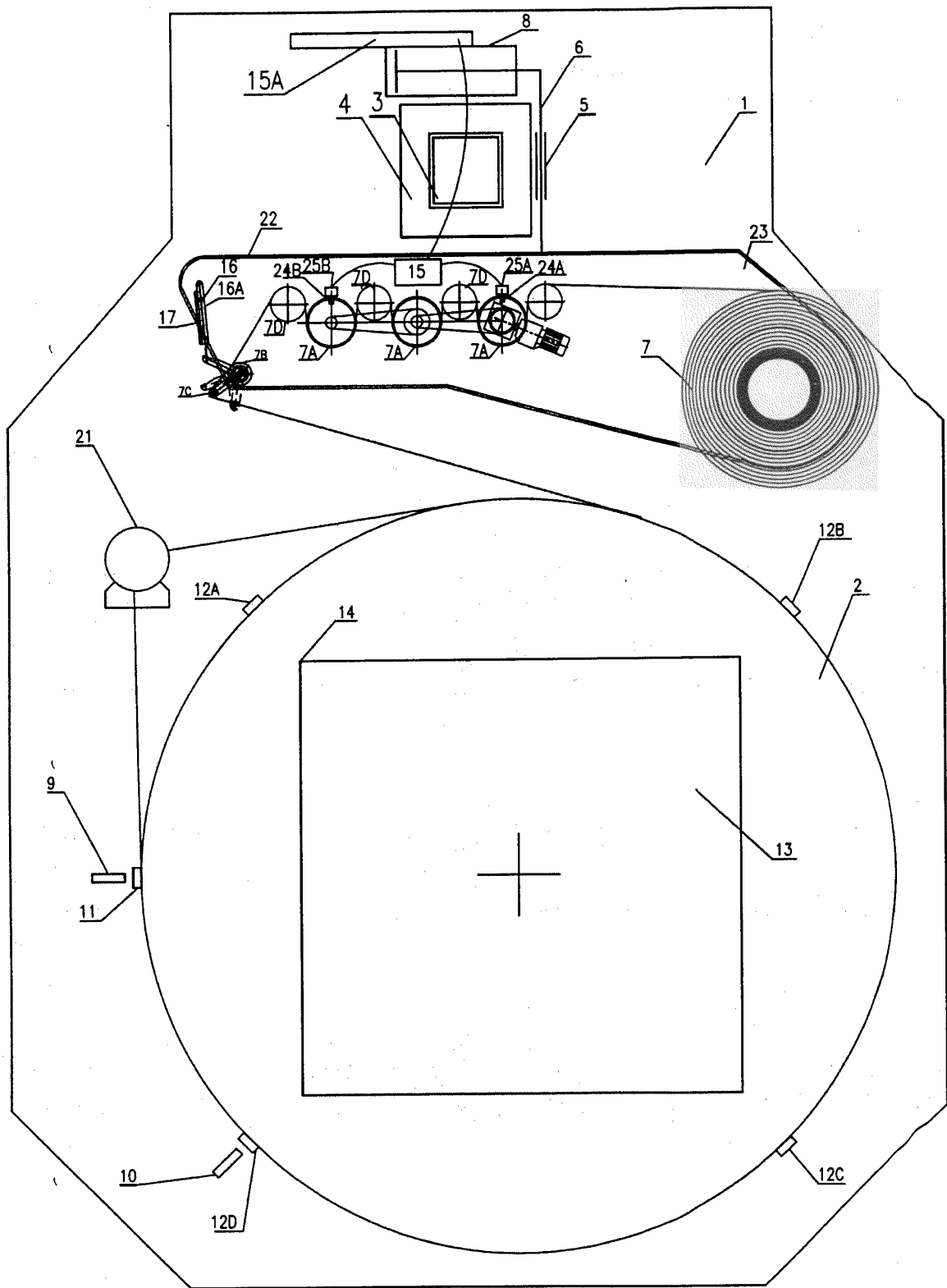


Figure 3

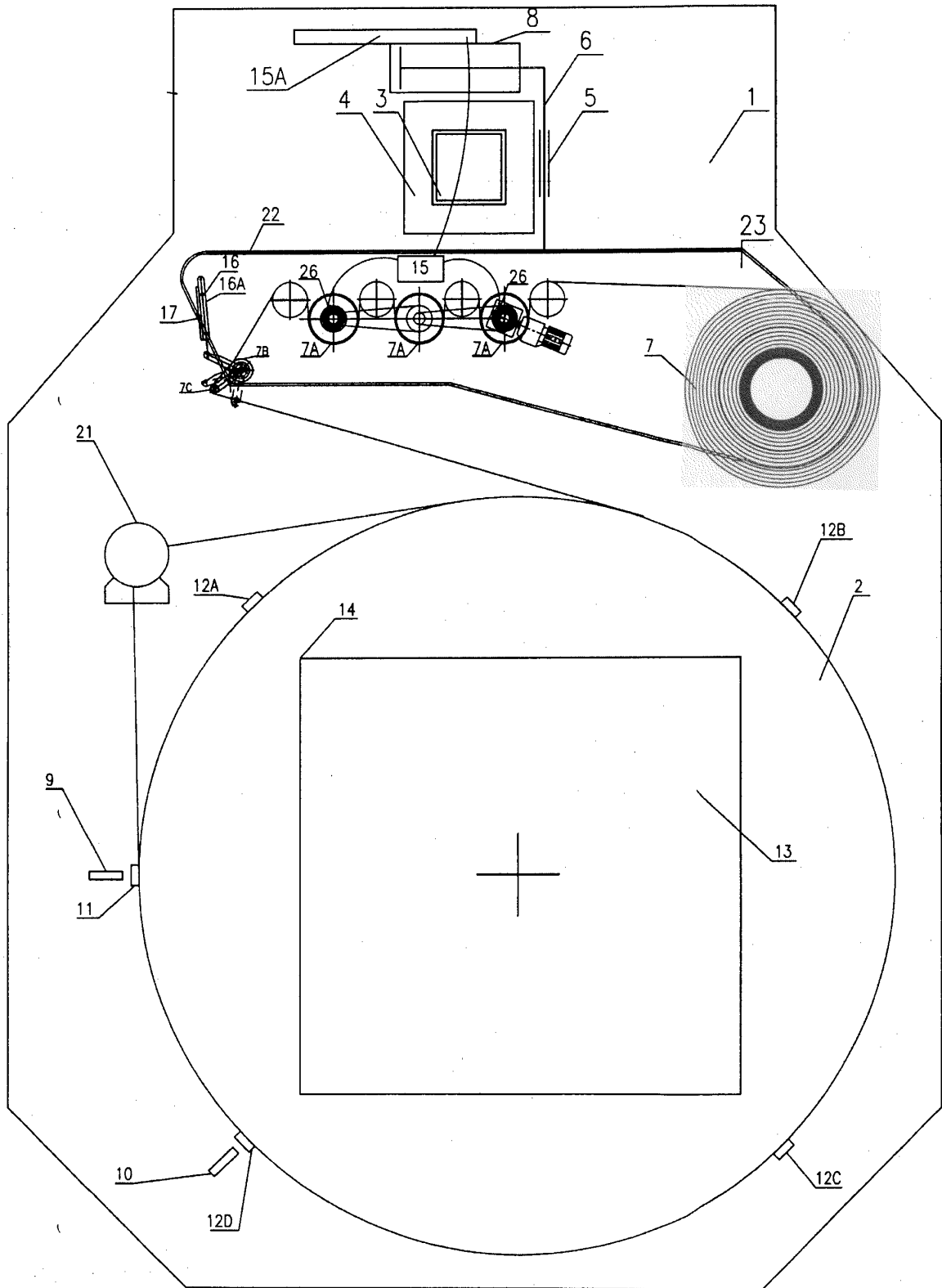


Figure4

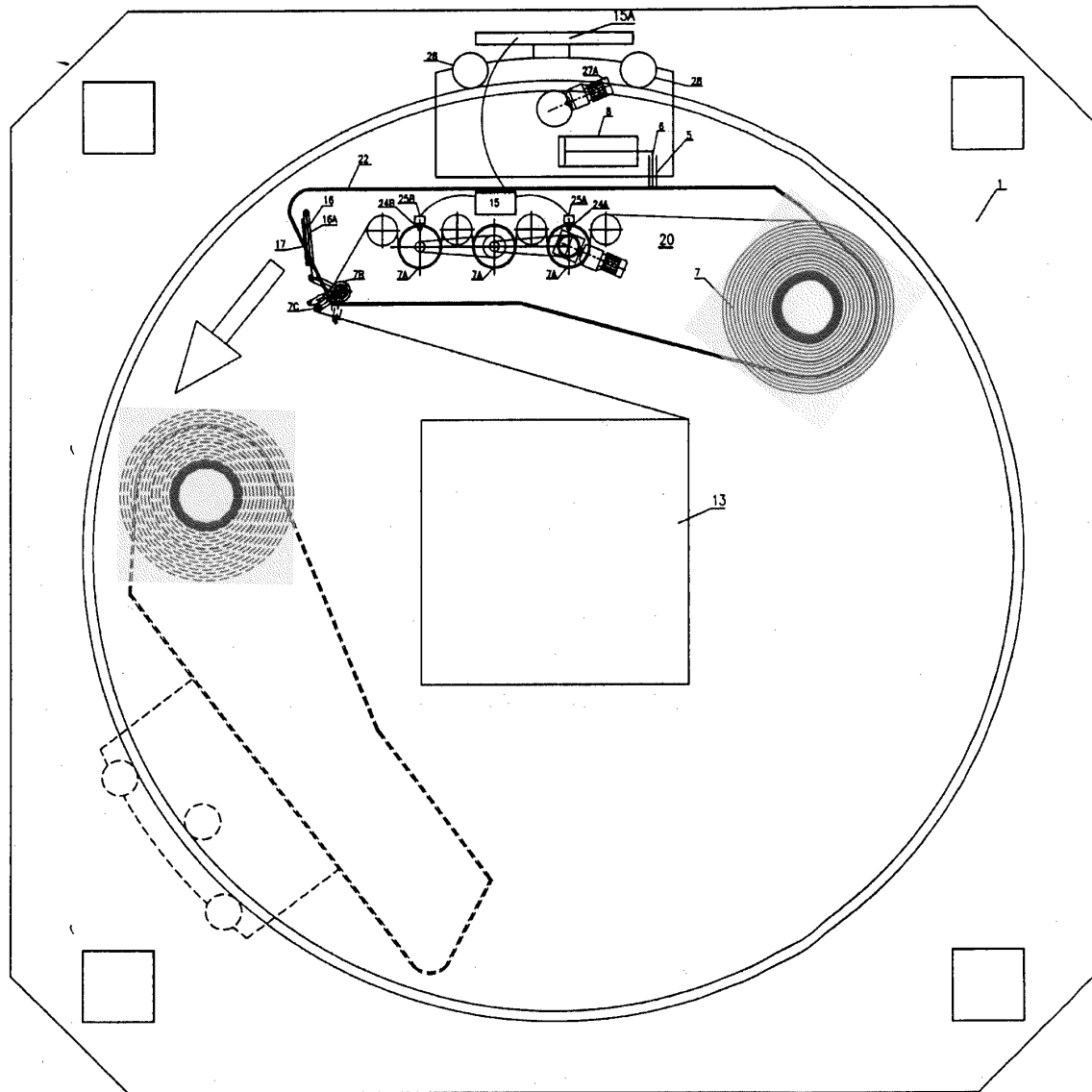


Figure 5

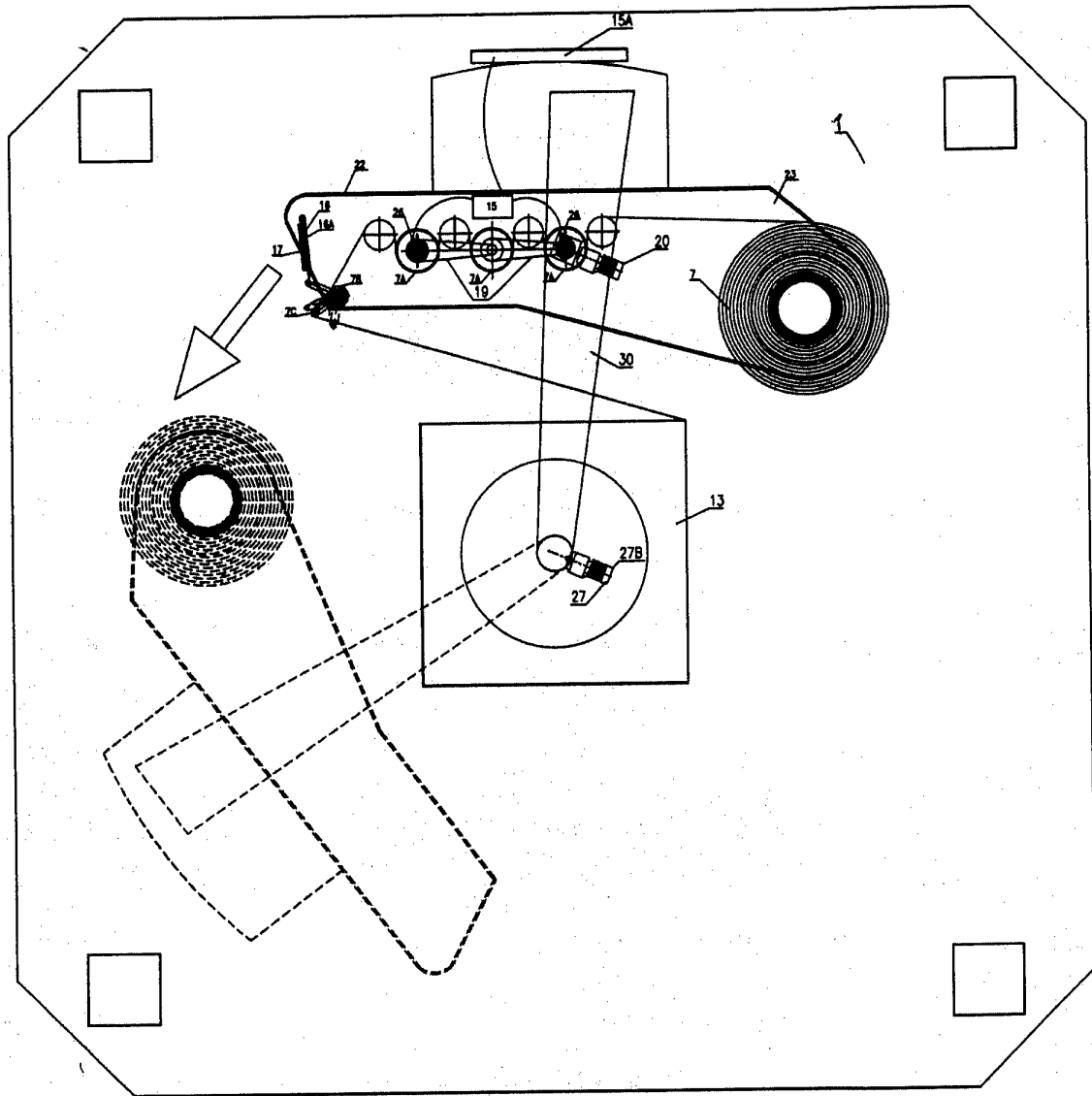


Figure6

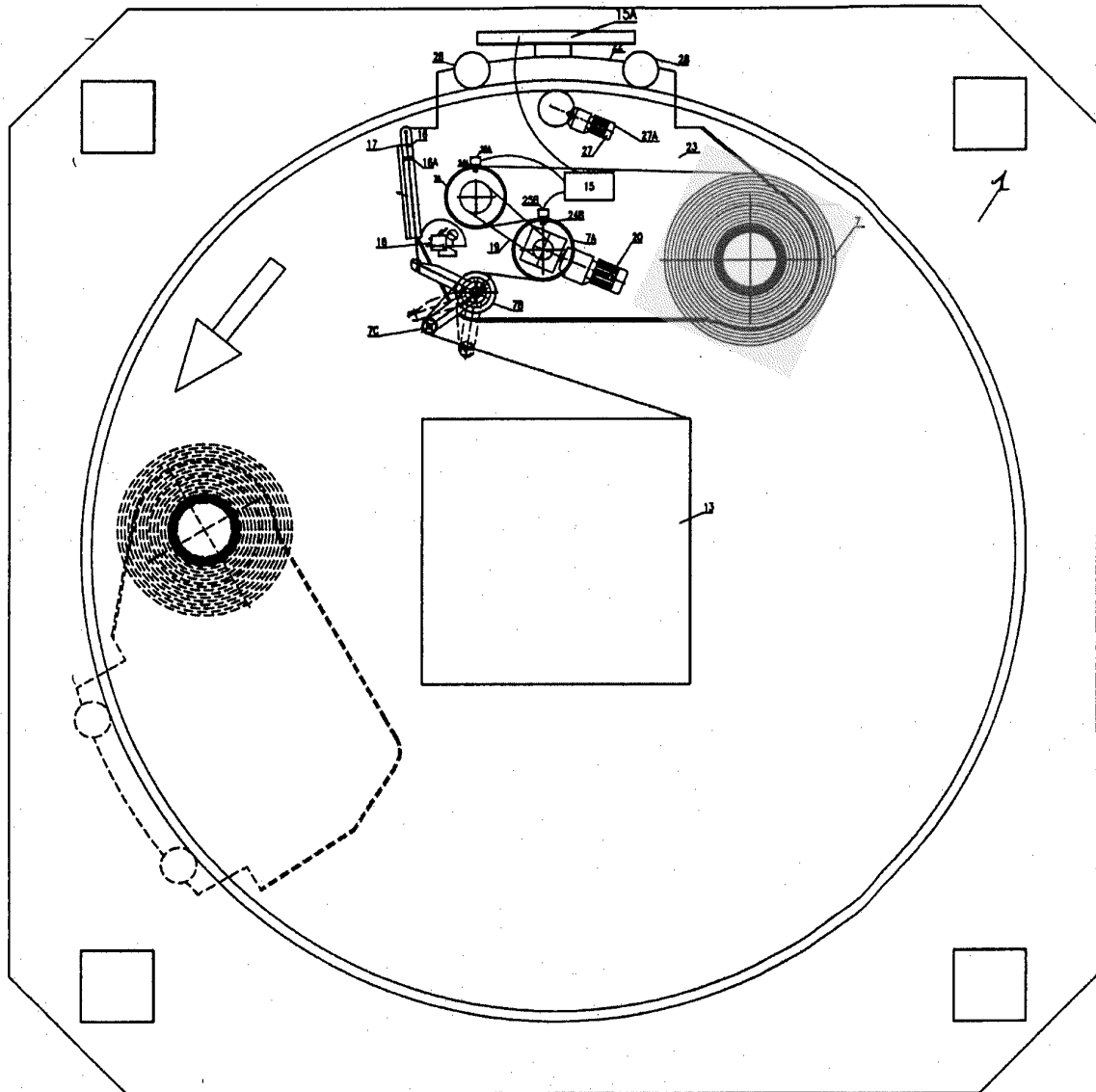


Figure7

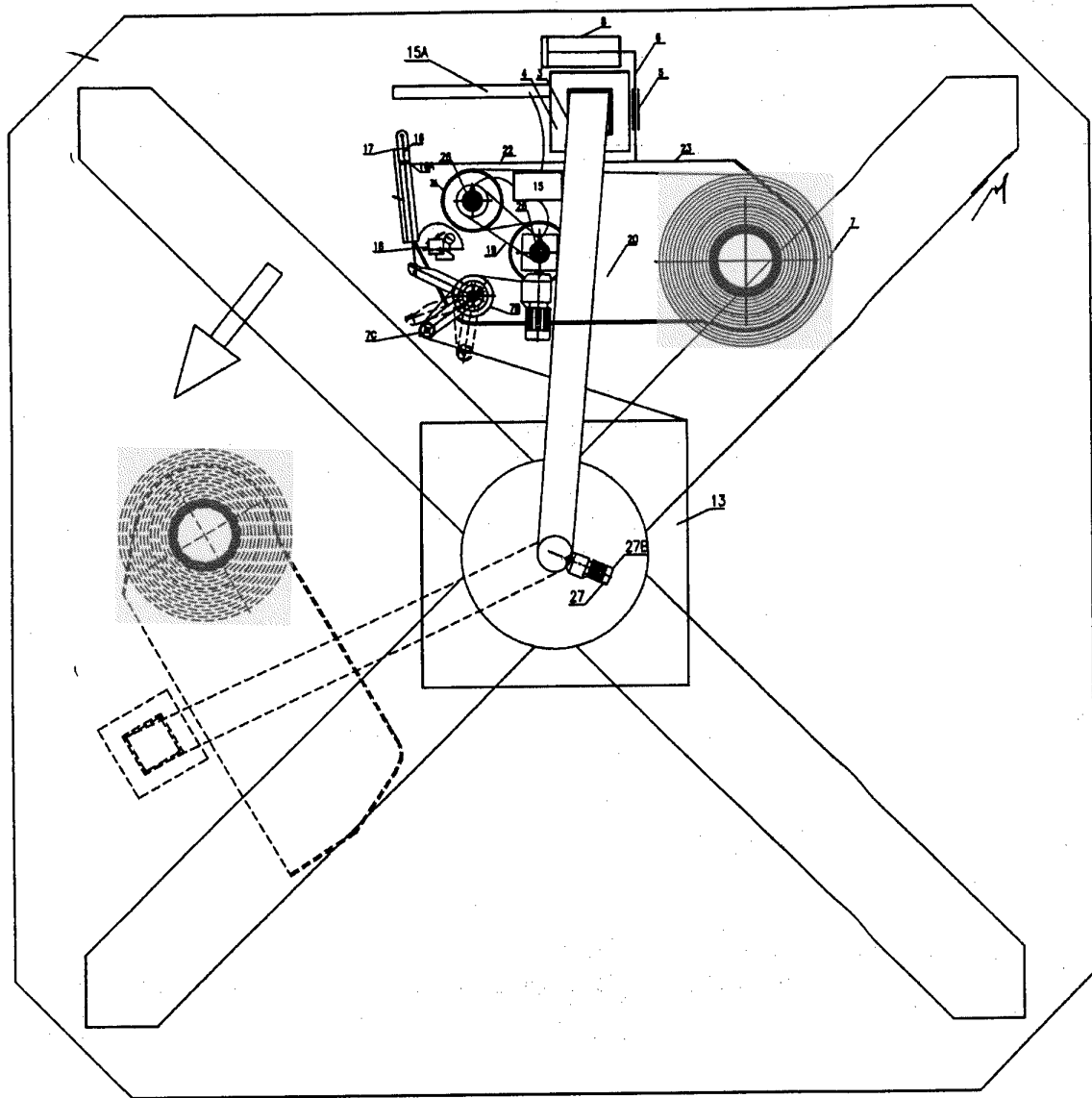


Figure8

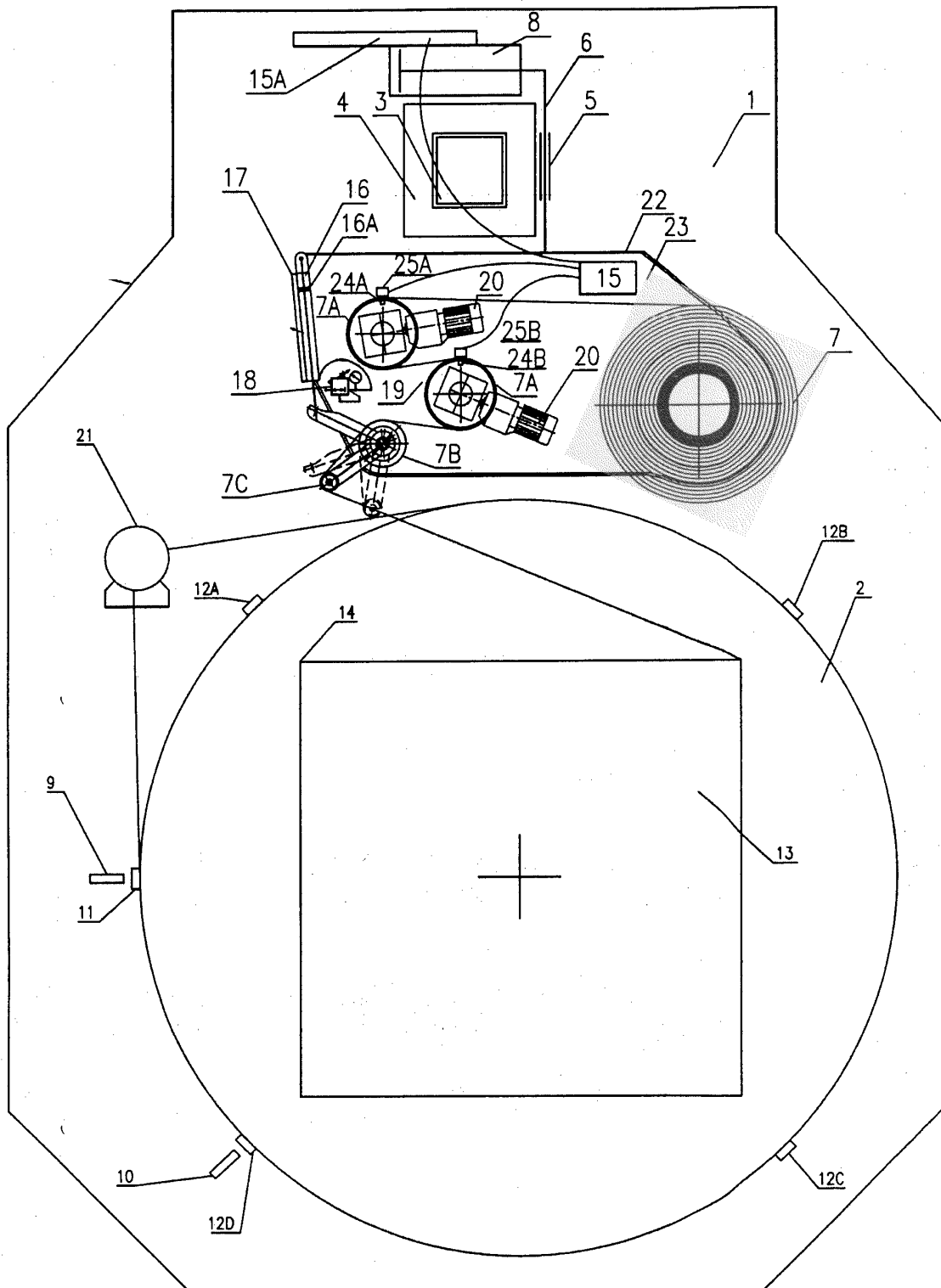


Figure9

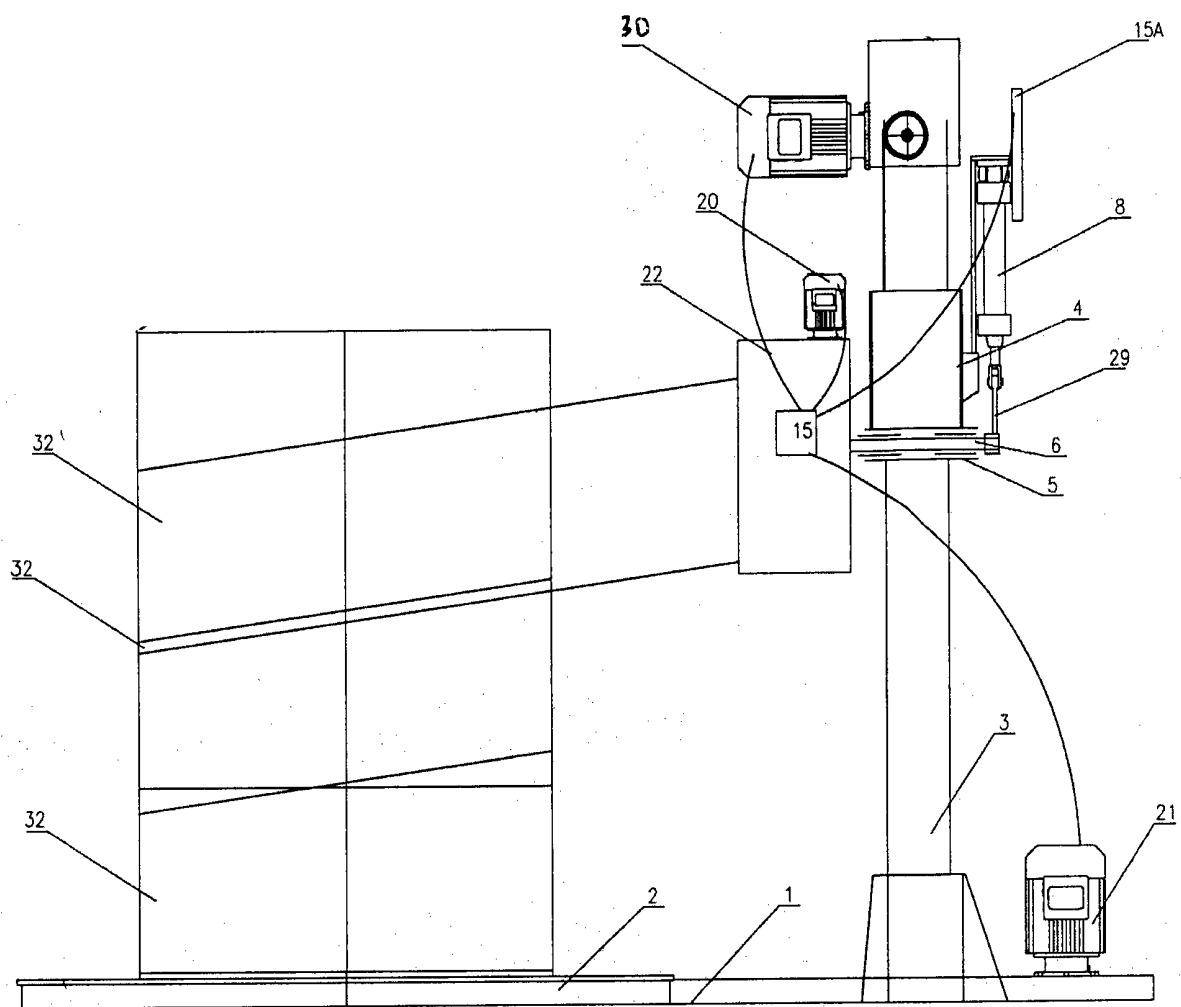


Figure10

REFERENCES CITED IN THE DESCRIPTION

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