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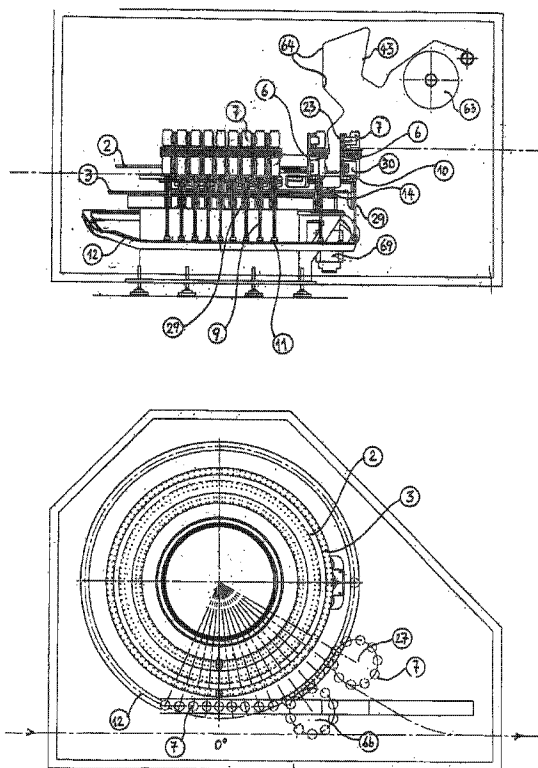
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(54) Titre : INSTALLATION POUR APPLIQUER DES MEMBRANES DE PROTECTION SUR DES CANETTES

(54) Title: PLANT FOR APPLYING PROTECTIVE MEMBRANES ON BEVERAGE CANS



(57) **Abrégé/Abstract:**

Rotating plant for the application of protective membranes of stretchable plastic polymer on the upper rim of beverage cans (7) performed by a series of equal operating devices (6) movable along radial trajectories of a turntable (1) that guarantee the circular movement, the radial movement and the vertical movement necessary and sufficient for applying said membranes.

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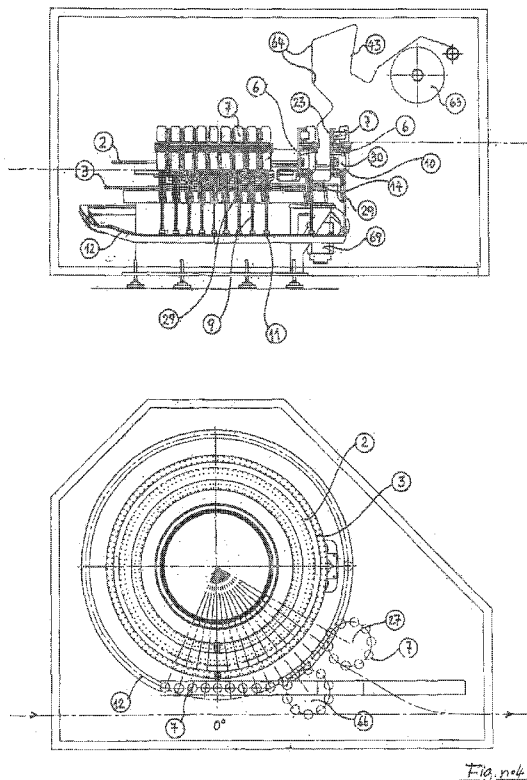
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(54) Title: PLANT FOR APPLYING PROTECTIVE MEMBRANES ON BEVERAGE CANS



(57) Abstract: Rotating plant for the application of protective membranes of stretchable plastic polymer on the upper rim of beverage cans (7) performed by a series of equal operating devices (6) movable along radial trajectories of a turntable (1) that guarantee the circular movement, the radial movement and the vertical movement necessary and sufficient for applying said membranes.

PLANT FOR APPLYING PROTECTIVE MEMBRANES ON BEVERAGE
CANS

5

The use of cans such as pull-tab quick opening metal sealed containers has been fast growing for some decades because of their efficacy.

Moreover the manufacture of said cans is
10 implemented by now and it follows general processes that have found both the acceptance by the customers and acceptable packaging costs.

The use of metal instead of plastic polymers for making said containers, among other things, allows a
15 particularly environmental-friendly recycling of the base material unlike the containers made of plastic materials.

In time, however, sanitary problems have arisen that currently are still unsolved, particularly those
20 related to the opening of the cans. The simple fact of pouring the beverage in a glass from a torn opening whose outer surface may have been contaminated formerly, or even worse the fact of drinking directly from the torn opening can result in severe oral or
25 gastrointestinal infections.

In the last years, contaminations of the external surfaces of the cans have took place due to various microbial strains and particularly contaminations by microbial strains of leptospirosis probably occurred
30 during the storage of the cans in unhygienic rooms

especially under hot climates and with a possible presence of rats.

The invention, object of the present patent filing, is precisely a plant intended to apply without
5 using adhesives a waterproof membrane of a suitable plastic polymer, or seal, which covers and strongly adheres to the upper circular rim of the can and so it is intended to protect also the pull-tab opening of the can. Previous attempts have been made with plastic
10 covers (caps) forced on the upper rim of the cans or with aluminium metal covers even glued ones which however besides being more expensive they have also a poor sealing effect and therefore they are not so much effective in preventing contaminated liquids or
15 condensations from infiltrating.

DESCRIPTION

The plant of the present invention is essentially composed of a turntable 1 rotating around an axis which is made of two flat rigid rings 2,3, integral with each
20 other, connected to said axis which is driven by an electric motor, also by a transmission toothed belt 4, equipped with the relevant running, stopping and controlled speed controls.

Each of the two rings 2, 3 bears an equal number
25 of radial rails or guides 5 in a variable number, depending on the size of the plant, integral with said two rings 2,3 and whose angular distances therebetween are all equal and constant in both the rings 2,3, while each guide 5 of the upper ring 2 is located on the same
30 vertical radial plane of a guide 5 of the lower ring 3.

An operating device 6 corresponds to each pair of guides 5 or rails lying on the same vertical plane, it is radially movable along said two guides 5, and it is intended to grasp, retain, seal and subsequently
5 release the cans 7 on whose top the protective membrane 8 has been applied.

This operating device 6 is intended to translate the cans 7, pushing them vertically, by means of a vertical rod 9 equipped with a suitable plate 10
10 arranged on the upper end and with a caged lubricated rotating ball 11 at the lower end.

The vertical motion takes place by means of a track 12 rigid and integral with the base frame, about twenty millimeters wide, whose central axis lies on the
15 surface of a cylinder with a diameter anyway greater than those of the two rings 2,3 and upon which a lubricated ball 11 caged on the vertical rod 9 of the operating device 6 slides. Said closed annular track 12, without interruptions, obviously develops along a
20 continuous plane that changes in level with several slopes between a horizontal higher level L1 and a lower one L2, and thus it behaves like a cam that causes said vertical motion of the rods 9 by means of the rotation of the two rings 2, 3 that drive all the operating
25 devices 6.

Moreover said operating devices 6 are radially movable along said guides 5 by means of the action of horizontal rolling bearings 13 mounted at the end of arms 14 integral with the operating devices 6
30 themselves which slide inside an annular groove 15,

formed in a flat ring 16, with a variable diameter and a constant width only higher than the diameter of said bearings 13, which ring 16 with the relevant groove 15 is also integral with the base frame. Said groove 15
5 behaves like a horizontal cam for changing the radial widths of the operating devices 6.

The turntable

The turntable 1 is composed of two rigid horizontal rings 2, 3 held together by webs 17 such to
10 form a rigid rotating structure. Said rotating structure is supported by other three rings 18, 19, 20, integral one with the other of which the two lower ones 18, 20 bear a circular groove 21 that slides on balls that in turn slide in a groove 22 obtained on the outer
15 surface of a base ring or disc. The drive, by means of a toothed belt 4, is applied on the outer surface of the intermediate ring 19. On the two rigid rings 2,3 there are radial guides 5 translating the operating devices 6. Said guides 5 are angularly equally spaced
20 from each other and all the guides 5 of the upper ring 2 are at the precise vertical of the same number of corresponding guides 5 attached to the lower ring 3.

The rotation of the turntable 1 is preferably guaranteed by a powered electric motor that transmits
25 the rotation to the turntable 1 through said toothed belt 4.

Moreover, fastened to or attached to the base structure of the plant supporting the turntable 1, there are provided:

30 1) A series of operating devices 6

2) A variable level track 12, acting as a vertical cam with a diameter greater than that of the two rings 2 and 3 that allows the rods 9 of the operating devices 6 to vertically move

5 3) A programmed profile horizontal cam 35 which controls the opening and closing of the upper clamp 23

4) A horizontal cam in the form of a groove 15 and with a preferably rectangular section formed in a rigid ring 16 for radially moving the operating devices 6

10 5) A circular horizontal cam 54 with a variable radius profile for controlling the linkage 50

6) A plate 26 with a lead-in for receiving the output sealed cans 7 and for directing them to the output rotating star 27

15 7) A horizontal circular duct 24 equipped with a longitudinal slit 25 for feeding hot air or a similar device.

The operating device

The operating devices 6 are the movable members
20 that circularly, radially and vertically move the cans 7 during the sealing operation.

Said operating devices 6 rotate driven by what we have called a "turntable" 1, which, as we have just seen, is composed of two rings 2, 3 connected one to
25 the other by spacing webs 17, which are equipped with two radial superimposed guides 5 for each operating device 6, while said turntable 1 is driven by an electric motor 69 powered by a toothed belt 4.

The cans 7, therefore, transported by said
30 operating devices 6 can contemporaneously move

circularly, radially and vertically.

Each operating device 6 is essentially composed of a rigid structure bearing two horizontal superimposed and parallel saddles 28, able to move along two of the
5 superimposed guides 5 of the turntable 1. Said saddles 28 have a dovetail male portion which will slide in the dovetail female portion of the guides 5.

The lower portion of each of the rigid structures bears an arm 14, near to the distal part of the lower
10 guide 5, equipped with a horizontal rolling bearing 13 intended to be housed in the groove 15 of the horizontal static cam which, by the rotating motion of the turntable 1, provides the radial translation motion of the operating device 6.

15 At the opposite side of the position of the horizontal bearing 13 of each operating device 6 the rigid structure bears a vertical guide 29 along which a rod 9 slides at which upper end a plate 10 is located intended to push the bottom of the cans 7 while at the
20 lower end there is a lubricated cage containing, in a tight manner, a ball 11 able to freely rotate in the cage.

Said ball 11 is intended to roll on a variable level closed track 12 along a trajectory, whose
25 vertical projection is on a circle except for a lower horizontal straight portion corresponding to a chord of said circle. The chord concerned encompasses an arc of a circle variable about 60°.

At a level between the lower saddle 28 and the
30 upper one 28 the rigid structure bears a sort of

horizontally opening elastic clamp 30 having two self-lubricating plastic polymer jaws whose inner shapes are fittable to the cylindrical area of the cans 7 along a development arc, opposite to its opening, only higher
5 than 180°.

Thus said clamp 30 allows the can 7 to be laterally inserted by a simple lateral pressure, made by a star-like rotor 66, while the holding is guaranteed by an adjustable spring 31 located at the
10 part opposite to its opening with respect to its fulcrum 32.

The pressure of the clamp 30 on the cylindrical wall of the can 7 is such to allow it to vertically upwardly slide due to the vertical rod 9 pushing it
15 when said rod 9 is forced to lift due to the ball 11 rolling along the cam track 12.

The rigid structure at its upper part bears another sort of clamp 23 equipped with two jaws whose inner shape is similar to that of the lower clamp 30.

20 The opening and closing of its jaws, unlike the lower clamp 30, is driven by a rod 33 which bears at its end a horizontal bearing 34 sliding along a circular profile 35 or stationary cam, integral with the base frame. Said rod 33 is pushed during the
25 rotation of the turntable 1 towards the outside by the stationary cam 35 and towards the inside by a compression coil spring 36 surrounding the rod 33 itself, compressed between the fork 37 supporting the horizontal bearing 34 and the rigid structure of the
30 operating device 6.

The rod 33 concerned is integral with a wedge 38 coaxial thereto whose two sloped planes are vertical and symmetric with respect to the axis of the rod 33.

The two driving arms 39 of the clamp 23 are articulated on a fulcrum integral with the structure of the operating device 6.

At the end of the two arms 39 of the clamp 23 there are two vertical cylindrical pawls 41 mounted on two pins. Said pins arranged on the end of the arms 39 of the clamp are connected to each other by one or two tension coil springs 40. Said pawls 41 are always in contact with the rod 33 whose section is locally quadrangular or with the sloped sides of the wedge 38. When the rod 33 is pushed by the stationary cam 35 by the horizontal bearing 34 the two pawls are moved away from each other by the inclined surfaces of the wedge 38 thus allowing the clamp 23 to close while when the rod 33 is pushed in an opposite direction by the compression coil spring 36, the two pawls 41 move down along the sloped walls of the wedge 38 thus allowing the clamp 23 to elastically open by means of the return springs 40.

In the gap between the two clamps 23 and 30 there is the gripper 42 for gripping the plastic polymer tape 43 to be applied as a seal on the upper rim of the cans 7.

The gripper 42 is composed of a fixed part integral with the rigid structure of the operating device 6 at the top it is composed of a first rigid ring 42s, with an inner diameter higher than that of

the can 7 which is connected, by four columns 45 or vertical spacers, to a second horizontal ring 42i, parallel to the first one, which in the lower part is equipped with a circular groove 46 housing an annular seal. Underneath and adherent to the upper fixed part of the gripper 42, namely under the ring 42s, there is the hot air diffuser 44 that serves for circularly cutting the scrap of the plastic polymer membrane. A lip seal 47 made of heat resistant plastic material is engaged to the first upper ring 42s whose inner diameter faces the upper aperture of the diffuser 44 such to leave the cans 7 to pass in contact.

The gripper 42 further comprises a rigid member 48, vertically movable, that can slide along a vertical guide fastened to the rigid structure of the operating device 6. This movable rigid member 48 is integral, at its upper end, with another rigid horizontal ring 49, integral thereto, which bears at its upper surface a concentric ring 70 having a diameter equal to that of the ring 42i, which is also equipped with a circular groove 46 equal to that of the ring 42 which houses another annular seal. The rim of the holes of the rigid ring 42i and of the ring 70 fastened on the top of the ring 49 are suitably rounded such to better stretch the membrane 8 to be applied to the cans 7.

In order to close the jaws of the gripper 42 the rigid vertical member 48 bearing the lower horizontal rigid ring 49, that is the lower jaw, has to be lifted. The upward movement, as downward movement, is caused by a "L" shaped linkage 50 having its fulcrum at its

angle. The vertical arm 51 can be pushed, causing the gripper 42 to open, by the rod 52 equipped with the bearing 53 which is pushed by the circular stationary cam 54, or it can be pulled, causing the gripper 42 to close, by return coil springs 55, anchored to the rigid structure of the operating device 6. The end of the horizontal arm 56, on the contrary, is engaged between an adjustable strut 57 fitted in the movable vertical sliding member 48 and a striding element 58 it being also attached to said vertical member 48.

Underneath the first rigid perforated ring 42s of the fixed part of the gripper 42 there is provided a hot air diffuser 44 composed of a toroidal box, kept and placed concentric to the holes of the rings 42s and 42i by means of the four vertical columns, which is made with an externally closed torus shape made of sheet which takes, on the outside, the shape of a mouth 59 whose horizontal opening, for simplicity reasons, is quadrangular and it opens downwardly while the diameter of the circular opening of the torus is slightly higher than that of the cans 7 that have to pass through it.

The lower mouths 59 of the diffusers slide on a circular duct 24 concentric with the turntable 1 bearing a continuous longitudinal slit 25 that feeds hot air while the contiguous side edges of each rectangular mouth bear two thin horizontal elastic blades 60 that superimpose, by imbricating each other, the ones of the contiguous mouths 59 which serve for reducing hot air leaks. Another way to feed the diffusers, in this case composed of tori made of box-

like sheet closed on the outside and opened on the inside, is to apply to them flexible hoses 61 connected to a central dispenser 62 located at the axis of rotation of the turntable 1 which dispenser 62 allows
5 hot air to pass with ports obstructable only when the diffusers 44 pass in the circular sector of the turntable 1 corresponding to the step cutting the membrane 8.

Plant for feeding the stretchable plastic polymer tape

10 The plant concerned is essentially composed of a reel 63 containing a tape 43 of stretchable plastic polymer and of a series of tension means 64 and tension adjusters which allow the tape 43 to be laterally introduced between the jaws 42i and 70 of the gripper
15 42 that serves for applying the seals. Therefore the tape 43 arrives as tangent to the straight geometric chord where the cans 7 are aligned and here it is pinched by the jaws 42i and 70 of the gripper 42 and it is applied by stretching it on the top of the cans 7,
20 that is on their opening, due to the lifting of the cans 7 produced by the rod 9 of the operating device.

Firstly the cans 7 are fed linearly by an auger 65 then a star-like rotor 66 intercepts them and take the cans 7 from the auger 65 and finally it pushes them
25 between the jaws of the elastic clamp 30 of the operating devices 6.

Plant operation

The cans 7 are directed towards an auger 65 which provides to move them at the operating speed of the
30 plant. The star-like rotor 66 synchronized with the

auger 65 provides to collect the cans 7 one by one and, rotating them of about 200° , it fits them between the elastic jaws of the lower clamp 30 of the operating device 6. After a rotation of about 15° of the
5 turntable 1 the groove-like stationary cam 15, by the bearing 13 of the arm 14, progressively slide along the radial guides 5 of the two rings 2, 3 of the turntable 1 the operating devices 6 which are forced to travel the cans 7 along a straight trajectory along a chord of
10 the constant radius rotation circle of the trajectory of the cans 7.

Upon the entrance of the operating devices 6 in said straight trajectory the jaws of the grippers 42 open. Advancing along the trajectory of said chord the
15 jaws of the grippers 42 progressively close thus pinching the tape 43 of stretchable plastic polymer that meanwhile is introduced between the open jaws during the last curvature portion preceding the straight chord of the rotation circle of the cans 7.

20 Now, the vertical lifting rods 9, moved by the stationary cam 12 that increases its level by increasing its slope, push the cans 7 corresponding thereto upwardly making them to slip between the jaws of their lower elastic clamps 30. With such vertical
25 motion of the cans 7, the membrane 8 of the tape 43 of plastic polymer pinched between the jaws 42i and 70 of the closed gripper 42 is stretched on the upper rim of the cans 7 and here it adheres by an annular area reduction caused by the forced radial orientation of
30 the molecules of the stretchable polymer.

Upon the arrival at a certain vertical programmed level the cans 7 are surrounded by the tori of the hot air diffusers 44 bordered at the top by the lip seal 47. Now the track 12 of the static cam acting on the
5 rod 9 travels for an arc of a circle at a constant level and the cans 7 rotate with the turntable 1 on a horizontal plane.

During this arc of rotation on this horizontal plane the hot air flows into the diffusers 44, clear-
10 cutting the membranes 8 applied exactly at the level of said lip seal 47.

Then the track of the static cam 12 raises again and the vertical rods 9 of the operating devices 6 push further upwardly the cans 7 now sealed between the open
15 jaws at the proper location of the upper clamps 23 driven by the stationary cam 35 and by the coil return spring 36. Once the cans arrive at the highest programmed level the jaws of the clamps 23 close while the track of the stationary cam 12 that drives the
20 vertical rods 9 of the operating devices 6 stabilizes on said horizontal plane forcing the cans 7 to rotate with a constant radius going towards the exit of the turntable 1.

When the cans arrive at about 280° of rotation of
25 the turntable 1, starting from the centre (0°) of the geometric chord, they fall on a plane namely a metal plate 26 which has a level lead-in which plane is flanked with a curved vertical wall 67. The cans 7 then are deviated from the trajectory of their rotation with
30 constant radius of the turntable 1 and the jaws of the

upper clamps 23 open by releasing them. Once released, a star-like rotor 27 collects them one by one and it sends them, aligned against a circular wall, to the exit where they can be removed by a conveyor belt. Once the cans 7 are on said metal plate 26 the track 12 of the cam setting the operating levels abruptly moves down with a sudden negative progressive slope to finally reach the lower base level by progressively reducing the negative slope.

10 KEY

Fig.1 is a plan view of the plant showing the feeding and discharging of cans

Fig.2 is the plan, different sections and an axonometric projection of the turntable

15 Fig.3 is a plan, different sections, details and an axonometric projection related to the rotating means of the turntable

Fig. 4 is a side view of the movement of the cans and a clear plan section of the plant

20 Fig. 5 is various sections and plans of an operating device

Key elements

- 1) Turntable
- 2) Rigid upper ring of the turntable 1
- 25 3) Rigid lower ring of the turntable 1
- 4) Transmission toothed belt
- 5) Radial guides
- 6) Operating device
- 7) Cans
- 30 8) Protective membrane made of stretchable plastic

polymer

- 9) Vertical rod lifting the cans 7
- 10) Plate of the rod 9
- 11) Caged rotating ball
- 5 12) Track with variable level and slopes acting as a vertical cam
- 13) Horizontal ball bearings of the arms 14
- 14) Radial moving arms
- 15) Annular groove of the ring 16 ***
- 10 16) Ring equipped with the groove 15 acting as a horizontal cam ***
- 17) Webs between the rings 2 and 3
- 18) Upper ring supporting the turntable 1
- 19) Intermediate ring supporting the turntable 1
- 15 20) Lower ring supporting the turntable 1
- 21) Circular external groove for sliding the balls
- 22) Circular internal groove for sliding the balls
- 23) Controlled upper clamp
- 24) Circular duct for hot air ***
- 20 25) Longitudinal slit of the circular duct 24 ***
- 26) Plate with inclined lead-in ***
- 27) Output star-like rotor
- 28) Horizontal saddles of the operating device 6
- 29) Vertical guide of the rod 9
- 25 30) Lower automatic elastic clamp
- 31) Adjustable spring for the lower automatic elastic clamp 30
- 32) Fulcrum of the clamp 30
- 33) Horizontal rod moving the upper clamp 23
- 30 34) Horizontal bearing of the rod 33

- 35) Horizontal stationary cam with circular profile and variable radius ***
- 36) Compression coil spring of the rod 33
- 37) Fork of the bearing 34
- 5 38) Perforated prism for widening the clamp 23
- 39) Control arms of the clamp 23
- 40) Coil spring between the pins of the pawls 41
- 41) Pins of the arms 39 of the clamp 23
- 42) Gripper
- 10 42s) Upper rigid ring with fitting for the seal 47
- 42i) Upper rigid ring of the gripper 1 with groove 46 (upper jaw)
- 43) Tape of stretchable plastic polymer
- 44) Toroidal diffuser for hot air ***
- 15 45) Columns supporting the toroidal diffuser 44
- 46) Grooves housing the seals of the rings 42i and 70
- 47) Heat resistant lip seal for cutting the membrane 8
- 20 48) Rigid vertically movable member of the gripper 1
- 49) Horizontal ring with groove 46 integral with the rigid member 48 (lower movable jaw)
- 50) Linkage lifting the rigid movable member 48
- 25 51) Vertical arm of the linkage 50
- 52) Rod equipped with top bearing 53 for operating the linkage 50
- 53) Horizontal ball bearing of the rod 52
- 54) Circular cam with variable radius profile for operating the linkage 50 ***
- 30

- 55) Return spring of the linkage 50
- 56) Horizontal arm of the linkage 50
- 57) Strut adjusting the movable rigid member 48
- 58) Striding element retaining the horizontal arm
- 5 56
- 59) Quadrangular mouth of the diffuser 44
- 60) Imbricated elastic blades of the quadrangular mouth 59
- 61) Flexible hoses for hot air (not shown in the
- 10 drawings) ***
- 62) Central dispenser of hot air ***
- 63) Reel of the stretchable plastic polymer tape
- 43
- 64) Tension means and adjusters of the stretchable
- 15 plastic polymer tape 43
- 65) Auger
- 66) Feeding star-like rotor
- 67) Vertical wall deviating the cans 7 ***
- 68) Base ring with groove 22 mounted on the
- 20 stationary base structure of the plant
- 69) Motor
- 70) Ring with groove 46 of the lower jaw of the gripper 42

25 N.B., The elements of the legend marked by a triple asterisk are not shown in the figures such to facilitate its interpretation. However they are as identity references for facilitating the reading of the text.

CLAIMS

1. Plant for applying protective membranes on beverage cans (7) characterized in that it is essentially composed of a turntable 1 rotating about a virtual and vertical axis driven by an electric motor through a toothed belt (4) made of two rings (2 and 3) integral with each other whose surfaces, the lower one of the ring (2) and the upper one of the ring (3) each bears a series of an equal number of guides (5) horizontal and radial and angularly equally spaced, where each guide (5) of the upper ring (2) vertically corresponds to a guide (5) of the lower ring (3) , while to each vertical pair of two superimposed guides (5) there is engaged an operating device (6) so as to radially move it is equipped with a pair of horizontal and radial saddles (28) which operating device (6) is able to circularly, radially and vertically move the cans (7) to which a protective membrane (8) made of stretchable plastic polymer has to be applied.
2. Plant according to claim 1, characterized in that all the operating devices (6) are equipped with a vertical rod (9) complete with an upper plate (10) intended to vertically push the cans (7) and with a lower caged rotating ball (11) intended to slide along a track (12) which track (12) , with variable level and slopes, acting as a stationary cam integral with the plant base, guarantees the vertical movement of the cans (7) generated by the rotation of the turntable 1.
3. Plant according to claim 1 or 2, characterized in that all the operating devices (6) each has a horizontal arm (14) equipped with a horizontal top bearing (13) with a vertical axis intended to slide in a quadrangular section groove (15) acting as a horizontal static cam which groove (15) is obtained on the upper surface of a rigid ring (16) integral with the base structure of the plant while the arms (14) with the relevant bearings (13) guided by the groove (15) guarantee the radial movement of the operating devices (6) that move the cans (7) .
4. Plant according to claim 1, characterized in that its turntable (1) , namely its rotating part composed of a rigid upper horizontal ring (2) , with a constant radius, and of a rigid lower horizontal ring (3), with a constant radius, concentric and integral with the upper one by means

of radial and vertical webs (17) , where on each of the mentioned surfaces of the two rings (2, 3) radial angularly equally spaced guides (5) with a dovetail section or similar section are secured, rotates engaged to a concentric assembly of three rings (18, 19 and 20) the two lower ones of which (19 and 20) bear at the contact of their inner diameters a groove (21) opposite to an equal groove (22) obtained in the outer face of a fourth ring (68) integral with the stationary structure of the plant and in such opposite grooves (21 and 22) there are provided rolling balls while a toothed belt (4) driven by a powered electric motor (69) and acting on the outer surface of the intermediate toothed ring (19) , guarantees it to rotate synchronously with the feeding of the cans (7) to be sealed and with their discharge.

5. Plant according to any one of claims 1 to 4, characterized in that all the operating devices (6) are equipped with two horizontal, parallel and superimposed saddles (28) intended to slide, vertically engaged, along the guides (5) of the two rings (2 and 3) .

6. Plant according to any one of claims 1 to 5, characterized in that all the operating devices (6) bear a lower elastically opening clamp (30) equipped with a fulcrum (32) and an adjustable spring (31) in whose jaws the cans (7) are fitted by a synchronized feeding star-like rotor (66) and wherein, moreover, said cans (7) can slide when they are pushed, forced, by the rod (9) with the plate (10) .

7. Plant according to any one of claims 1 to 6, characterized in that all the operating devices (6) bear an upper clamp (23) to grasp and release the cans (7) that can be opened or closed by the horizontal movement of a rod (33) equipped with a horizontal top bearing (34) mounted on a fork (37) and with a coaxial coil return spring (36) which quadrangular section rod (33) is equipped with an wedge (38) integral therewith and coaxial to vertical walls on the surfaces of which two pawls (41) mounted on vertical pins fastened at the ends of the arms (39) of the clamp (23) can roll such to move away from each other, and so to close the clamp, when the horizontal cam 35 with a variable radius pushes the rod (33) by the bearing (34) or such to move one near the other when the coaxial spring (36) by pushing back the rod (33) allows the

tension coil springs (40) to open the clamp (23) .

8. Plant according to any one of claims 1 to 7, characterized in that all the operating devices (6) are equipped with two rigid rings (42i and 70) both equipped with grooves (46) faced to each other intended to house elastic seals and whose edges of their inner diameters are rounded, which rings (42i and 70) are the two jaws of a gripper (42) intended to pinch the stretchable plastic polymer tape (43) .

9. Plant according to any one of claims 1 to 8, characterized in that the rigid ring (49) , namely the lower jaw of the gripper (42) is integral with a rigid member (48) vertically movable and sliding along a guide which, pushed by the horizontal arm (56) of the linkage (50) , presses said rigid ring (49) , integral with the lower jaw (70) of the gripper (42) , against the rigid ring (42i) , namely the upper jaw of the gripper (42) .

10. Plant according to claim 9, characterized in that the linkage (50) operating the vertical coming and going movement of the rigid member (48) is composed of a vertical arm (51) and a horizontal arm (56) engaged and orthogonal to each other articulated about a fulcrum near the intersection of said two arms (51 and 56) where the vertical arm is operated by a horizontal rod (52) equipped with a horizontal bearing (53) which rolls against a horizontal, circular, stationary cam (54) integral with the base of the plant having a variable radius profile and by a pair of return springs (55) while the horizontal arm has its end comprised in close contact between an adjustable strut (57) housed in the movable rigid member (48) and a striding element (58) inserted also in the same movable rigid member (48) .

11. Plant according to any one of claims 1 to 10, characterized in that all the operating devices (6) of the turntable 1 have a diffuser (44) composed of a toroidal box equipped with a side opened mouth (59) to the outside with a quadrangular mouth (59) faced downwardly through which hot air flows intended to cut the membrane (8) applied on the upper rim of the cans (7) wherein the hot air comes from a circular duct (24) equipped with a longitudinal slit (25) along

which the quadrangular mouths (5) slide while between said side mouths (59) there are provided flat elastic blades (60) imbricated each other intended to reduce the interstitial leaks of the hot air.

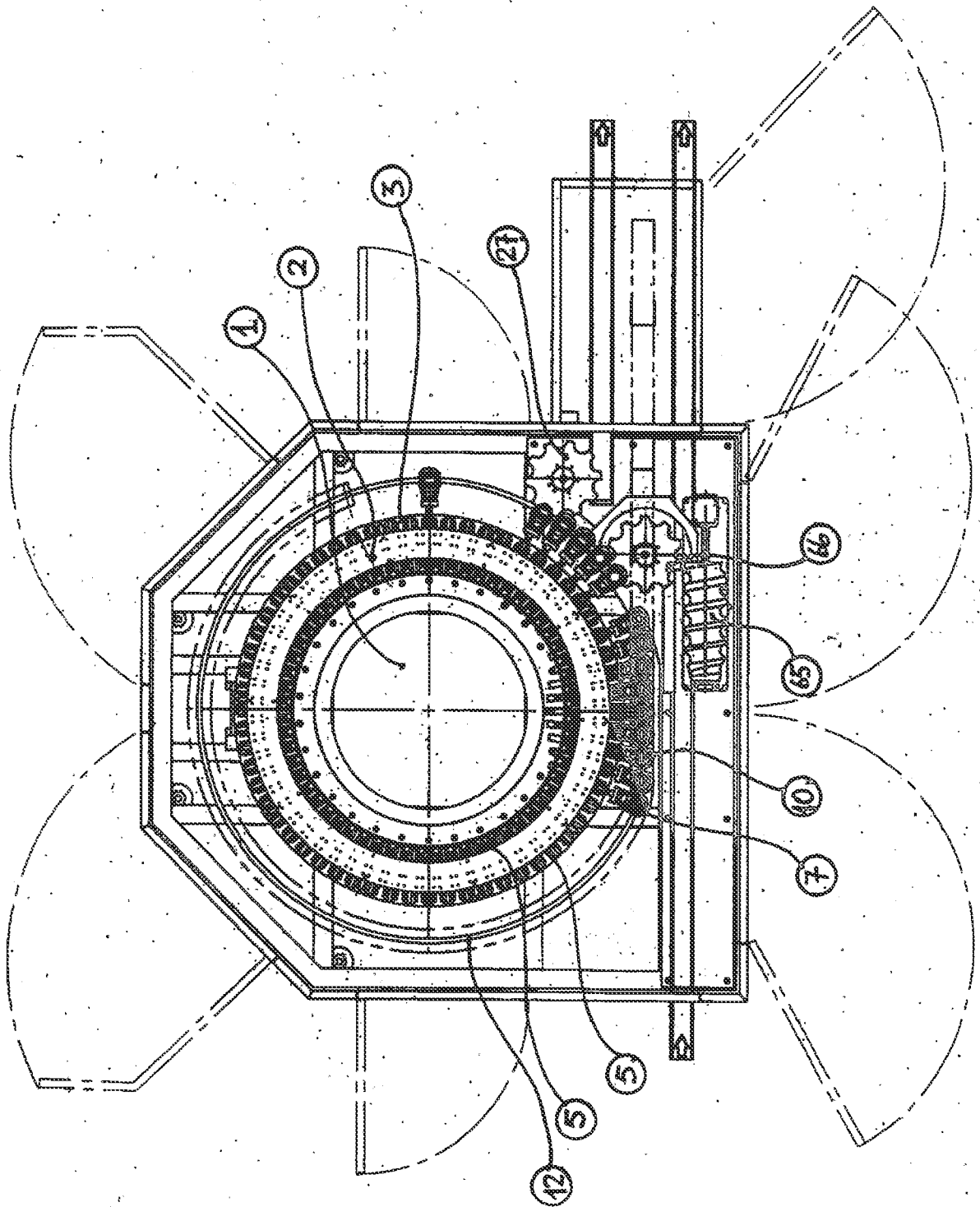
12. Plant according to claim 11, characterized in that the diffuser (44) is kept in its position by four spacing columns (45) , equally spaced from each other, which are arranged on a circle whose diameter, subtracting twice the radius of the columns (45) , is higher than the diameter of the cans (7) , which columns (45) at the top are integral with the fixed ring (42s) on the inner diameter of which the seal (47) is retained exactly delimiting the cut of the membrane (8) and at the bottom with the ring (42i) namely with the upper fixed jaw of the gripper (42) .

13. Plant according to any one of claims 1 to 12, characterized in that the toroidal diffusers (44) have no side mouths (59) but they are directly fed by hoses (61) coming from a fixed central cylindrical hot air dispenser (62) provided with a port in the form of a horizontal aperture travelling along an arc of the cylindrical surface corresponding to the arc during which the membranes (8) are cut which is able to feed hot air when the ends of the hoses (61) feeding each operating device (6) tightly pass in front of said aperture .

14. Plant according to any one of claims 1 to 13, characterized in that at the higher rotation level of the cans (7) , that is on the plane corresponding to the bottoms of the cans (7) and at the angle of their programmed exit there is arranged a horizontal plate (26) equipped with an inclined lead-in and a vertical curved deviating wall (67) providing to collect the cans (7) released by the clamps (23) which are taken again by an output star-like rotor (27) that directs them aligned towards a conveyor belt.

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Fig. n°1



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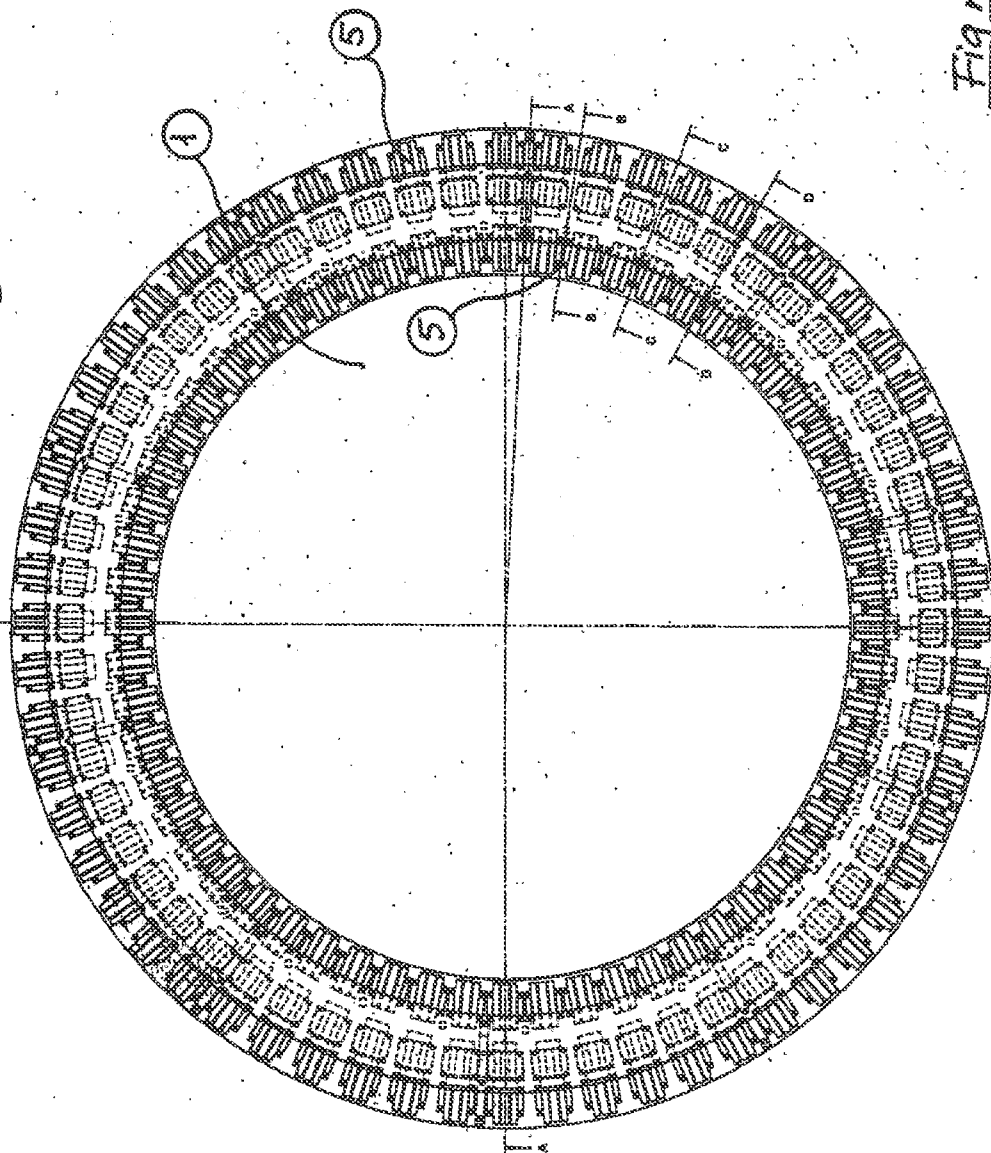
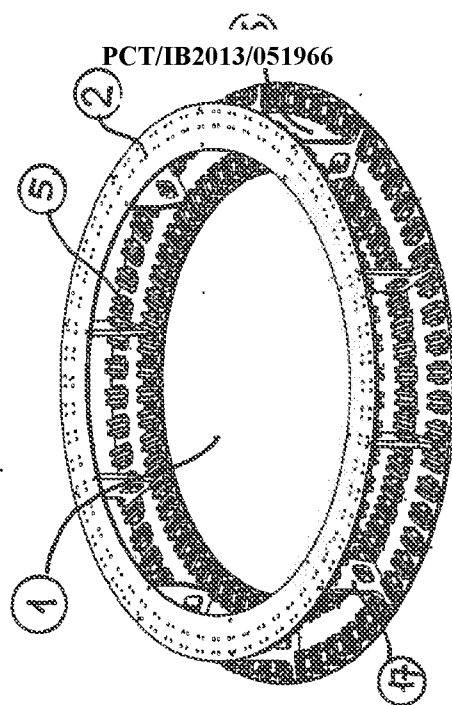
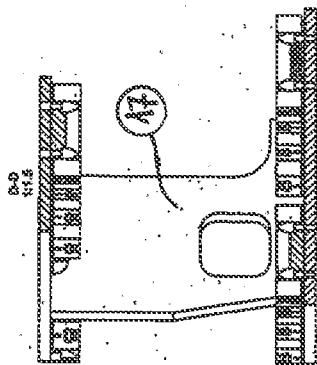
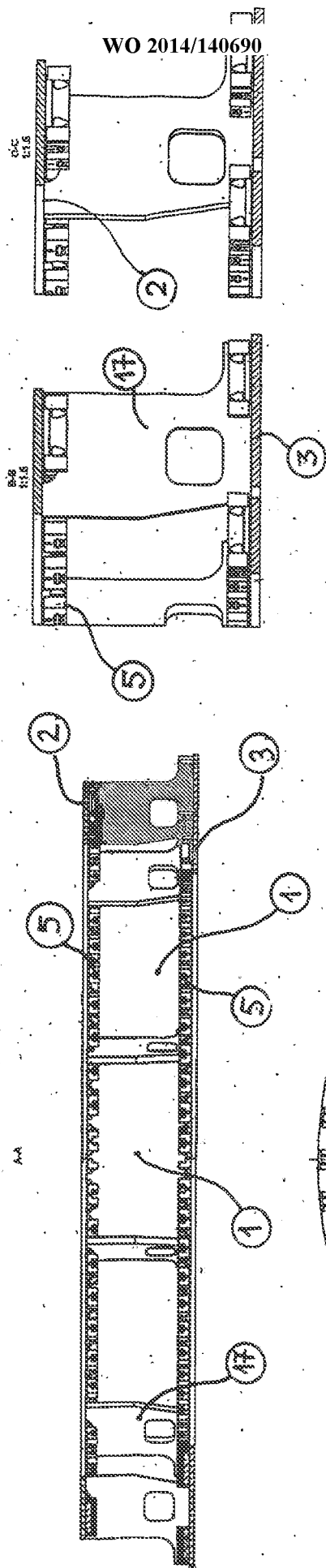
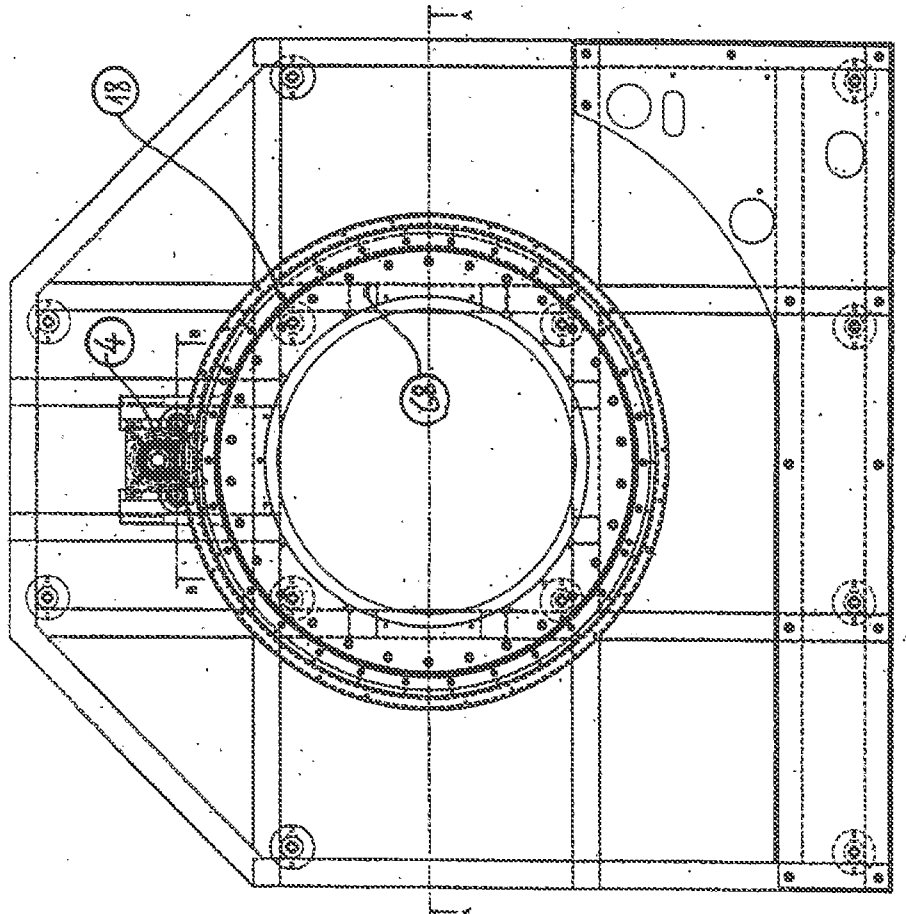
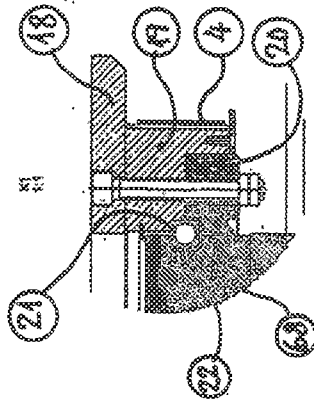
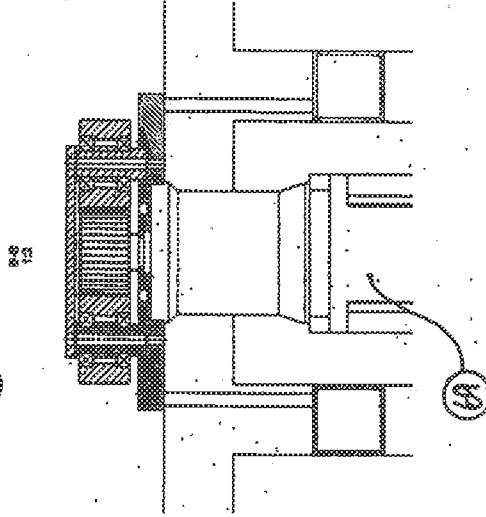
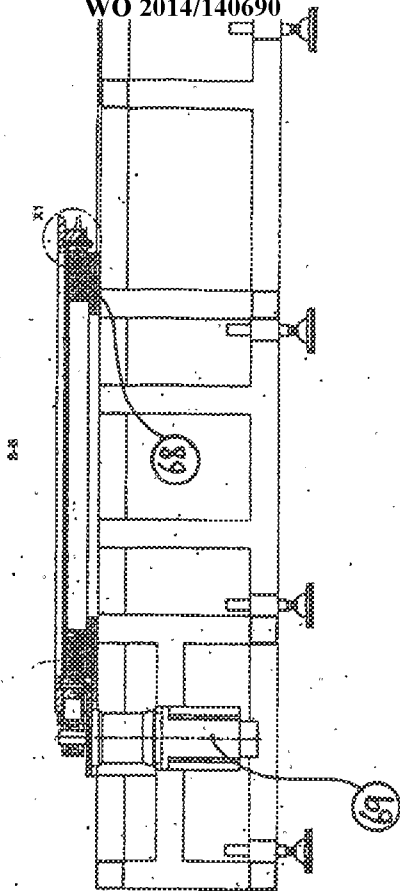
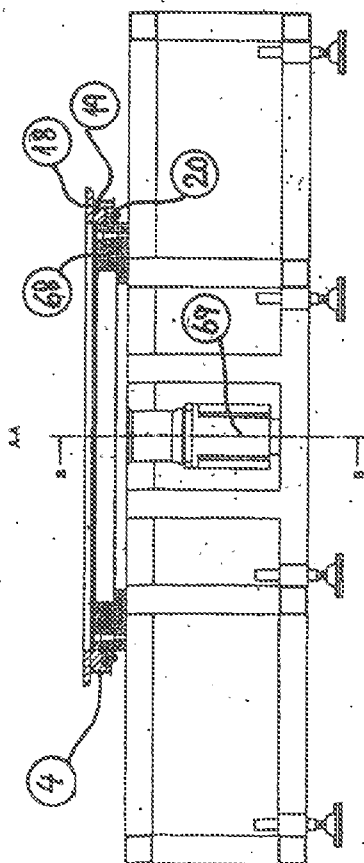


Fig n°2



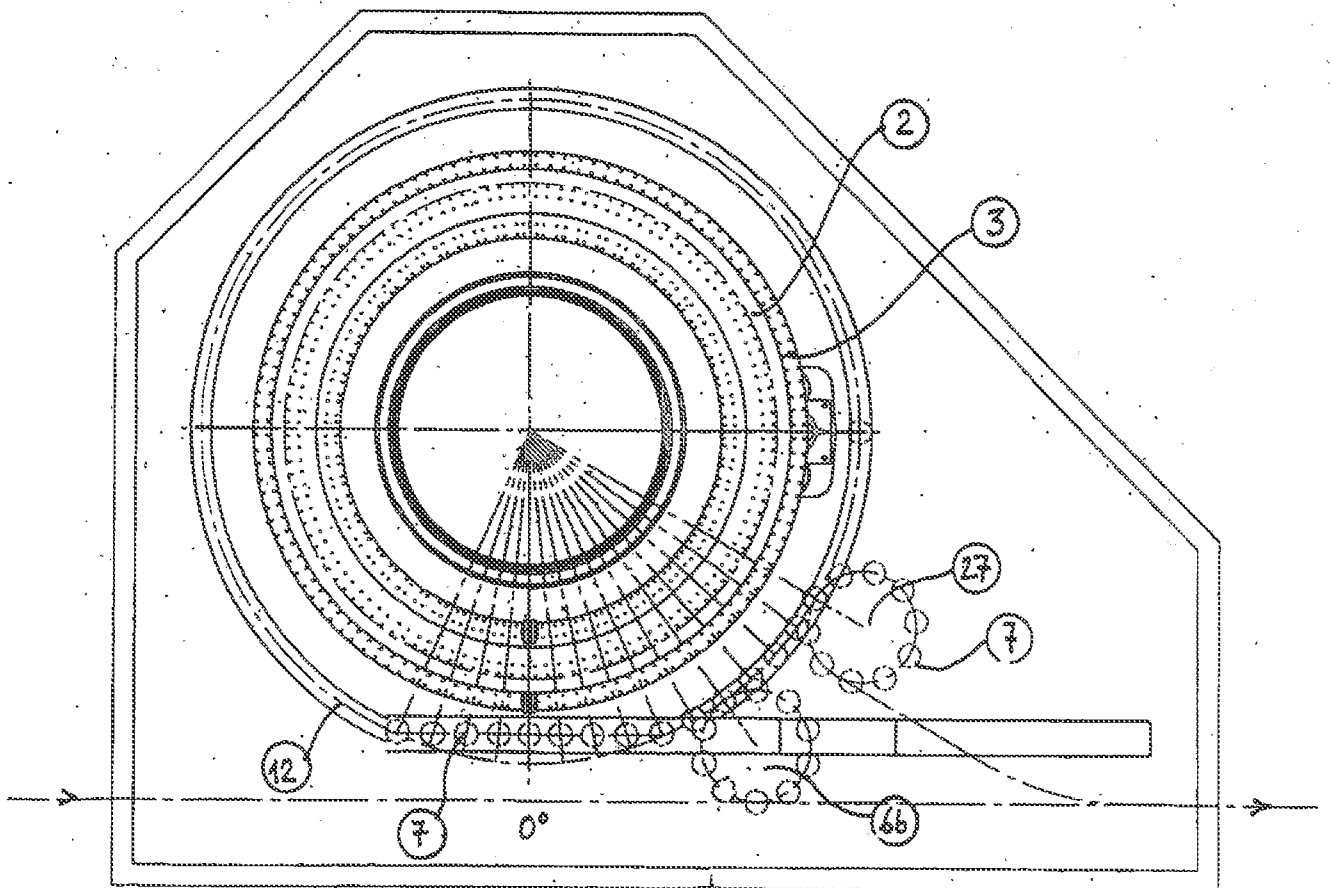
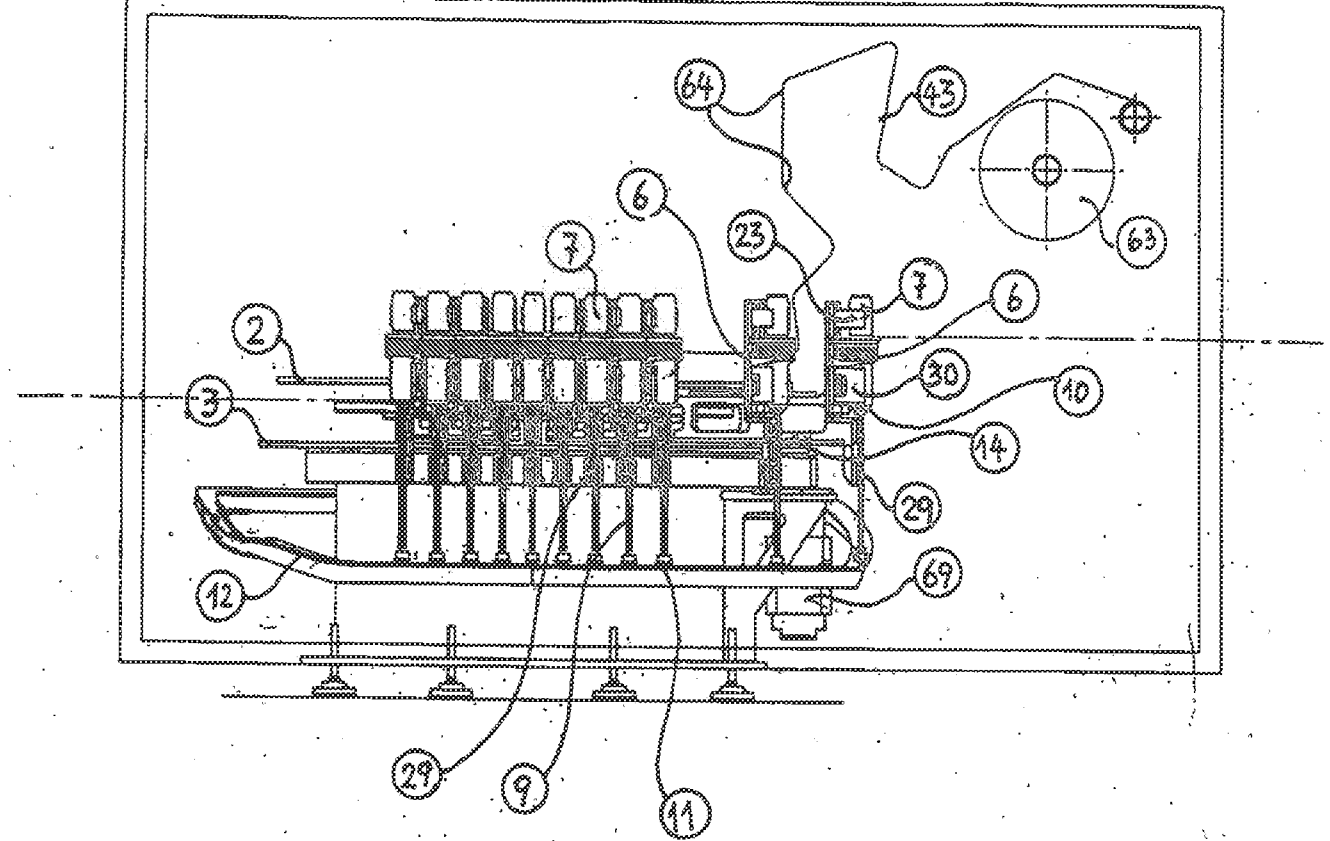


Fig. n°4

