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(54) **A machine for obtaining bags full of products from batches of tubular net**

Vorrichtung zum Verpacken von Produkten in Beuteln, ausgehend von einem Vorrat von
schlauchförmigem Netz

Dispositif d'obtention de sacs remplis avec des produits à partir d'une provision de filet tubulaire

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US-A- 3 553 924 **US-A- 3 940 906**

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Description

[0001] The present Patent relates to a machine for obtaining bags full of products from batches of tubular net, the products being in particular fruits, vegetables and the like, as well as foodstuffs of all sorts and kinds and generally any products or items that are to be packaged in bags, their total weight or quantity being usually predetermined.

[0002] The tubular net is generally made of a plastic material, although a vegetable, paper or like material could be used.

[0003] A known automatic machine exists for the continuous formation and closure of net bags obtained from a tubular net which is the object of Spanish Patent number 475,372 granted to Mr Agustin Dauder Guardiola and is essentially characterised by comprising an assembly of two vertically arranged telescopic tubes, namely a fixed inner tube and a sliding outer tube, a third removable tube carrying a certain quantity of the tubular net arranged about the same being disposed over the assembly aforesaid; and the three tubes altogether communicate at the top with a hopper supplying the product to be packaged, which is supplied duly measured, particularly as to its weight.

[0004] The sliding tube is activated axially downwards by a cylinder of adjustable stroke, pulling the required net portion to form a bag of suitable capacity to accommodate the quantity of product supplied, immediately retrieving its initial position.

[0005] Certain means are provided to pinch and gather the net portion supplied, which means comprises two sets of two blades each, acting on either side of the net, travelling along a horizontal plane, across the axis of said net and flush with the lower end of the sliding tube in its initial position.

[0006] Said sets of blades lie overlapping in their active position, the top set making up a support for the bottom of the bag receiving the product discharged by the hopper into the tube; and the blades of the top set are provided with a throat that works with the angular edge of blades of the opposite set to establish the pinching of the net aforesaid, a clamping and shearing head being provided at the back of said throat attached to the top set of blades and lying on the virtual axis of the telescopic assembly. The head closes the mouth of the bag that is to be formed and establishes a closure for the bottom of the next bag, whereupon the blades are moved back to the set limit and a new cycle begins.

[0007] The telescopic tube assembly is mounted on a common turning or swivel support in order to allow the removable tube bearing the net to be removed, which turning support may have another removable tube to be filled with the tubular net and placed in lieu of the tube that has just been emptied, inverting their positions by turning their common support. Each tube is fitted at its lower end with two rings and an annular spring is arranged between them to serve as braking means and

avoid an untimely downward sliding of the net.

[0008] The document US-A 3,553,924 describes a method and an apparatus for bagging products wherein a tubular net is arranged over a vertical tube in the shape of a mandrel. The bag formed is closed at its lower end and open at its upper end and is filled with the products from a product unloading means, closed and sheared. In the apparatus disclosed, there is provided a vertical tube mounted on a horizontal support. Bag closure and shearing means are provided beneath said support. The main framework of the apparatus also comprises two arms which may be moved by corresponding drive means and bear turning wheels at their free ends. The wheels are positioned at diametrically opposed positions against the outer lateral upper part of the tube with the tubular net inbetween and have non-slip surfaces.

[0009] A disadvantage of the machines described in said prior art lies in that the product must drop from a certain height, delimited by the telescopic assembly of three tubes of the machine, down to the bottom of the bag, the lower end of which is closed, and the first items of the product bang against the rigid support at the bottom of the bag receiving the product discharged by the hopper. And such height of the telescopic assembly is quite large in order to be able to store a rather large quantity of tubular net and thereby cut down on the idle time taken to change tubes or fill the same with another batch of tubular net. This is prejudicial for delicate products, namely certain fruits for instance.

[0010] According to the present invention, there is provided a machine for obtaining bags full of products from batches of a tubular net, said net being capable of forming a bag with its lower end closed and its top end open, which is filled with the desired products from product unloading means, closed at the top and sheared, said machine comprising

- at least one vertical tube around which a certain quantity or batch of tubular net is arranged, said tube being mounted on a horizontal support;
- bag closure and shearing means being located beneath said support;
- a framework wherein two arms are fitted to swing in opposite directions on a vertical plane, by action of respective drive means that cause the arms to rise or drop;
- the free ends of such arms being fitted with two pairs of turning rollers having non-slip surfaces that are applied at diametrically opposed positions against the outer lateral upper part of the tube, with the tubular net inbetween; wherein
- the horizontal support is capable to be pivoted around a vertical shaft;
- said turning rollers have a conical shape; and
- such conical rollers are capable to be turned in opposite directions, actuated by turning drive means, and cause the tubular net to be lowered or

raised within the tube.

[0011] The machine for obtaining bags full of products from batches of tubular net subject of the invention overcomes the disadvantage aforesaid of the known machine and contributes the following advantages, among others: a gentler treatment of the products to be contained within the relevant bags; the tube can have any desired length and may therefore initially contain a rather large quantity of tubular net; and a better performance since the idle time required to replace the empty tube with a full tube is reduced in the desired proportion.

[0012] It is noteworthy that the length of the tube holding the tubular net in the known process is limited by the height through which the product must drop, which must be as small as possible, in particular for delicate products or in practice such products may not be treated using the known process.

[0013] The machine subject of the present invention provides the foregoing advantages in addition to others that will follow easily from the embodiment of said machine that is described hereinafter for an easy understanding of the features set out above, contemporaneously giving certain details thereof, a number of drawings being attached to such end which show a practical embodiment of said machine that is meant to illustrate rather than limit its scope.

[0014] The drawings show a machine for obtaining bags full of products from batches of tubular net in accordance with an embodiment thereof. Figure 1 is a front elevation view of the machine and figure 2 is an enlarged plan view of said machine, turned 90°, which shows neither the tubular net nor other means shown in figure 1 in the interests of clarity, and as described hereinafter.

[0015] The subject machine comprises a vertical tube (1) having an outer ring (1a) or collar of a suitable material arranged on its top end to make sliding of the tubular net easier -its edge being therefore rounded- and to hold it back to some extent. The tube, which may be circular, polygonal or of any other desired shape, stands on a support (2) that turns about a vertical column (3) comprising a circular rod forming part of the framework (4) of the machine, which comprises said column, a vertical column (5) -parallel to column (3) and of like construction- and a horizontal crossbar (6) and (6a) fixed to both columns. The framework (4) is upstanding on and fixed to a clamping and shearing device (7) (partially and schematically shown in figure 1).

[0016] The turning support (2) has a short funnel (8) (only shown in figure 1) whose function is to contain the tubular net (9) (figure 1), the creased tubular net being arranged about the tube (1) and is retained by retaining means shown schematically (R) located under the ring (1a) and which press it radially against the tube at various points that are evenly spaced out about the tube or throughout its periphery. The tubular net is arranged,

and before this the support (2a) and the tube (1b) are first placed in the position shown in phantom in figure 2, which position is obtained by turning said support (2) with its empty tube (1) manually or automatically, as the case may be. Having filled the tube (1b) with the appropriate batch or quantity of tubular net about the same, it is returned to the turning support, manually or automatically, reaching the operative position shown in figure 1 with the tubular net already in place.

[0017] When the said batch of tubular net is used up, the support (2) and the empty tube (1) are moved out, as shown in phantom in figure 2, to the positions of the tube (1b) and support (2a). Two variants are possible: one in which the empty tube is replaced with a tube that has already been filled with the respective batch of tubular net upon the support (2a) and another in which a batch of tubular net is arranged about the empty tube. In either case, the support is turned in the opposite direction until it reaches the position shown in figure 1 and in figure 2, although the latter does not show the relevant batch of tubular net. The support may have another diametrically opposed arm, wherein another tube already filled with the batch of tubular net may stand, thereby enhancing the performance of the machine per unit of time, since eliminating the idle times required to place a new tube having the batch of tubular net. The support could evidently carry three or more arms with their respective tubes.

[0018] The machine has two pairs of arms (10) and (11), swinging in opposite directions and on a vertical plane, the top ends of which are articulated to the crossbar (6a) and with two cross shafts (12) and (13) (figure 2) lying within the respective free ends of such arms, supported and guided for rotation between such ends, albeit without axial movement. These shafts are provided on the front of the machine with respective grooved pulleys (14) and (15) (schematically shown only in figure 1), and extend into overhanging projections having affixed respective pairs of frustum-of-the-cone rollers (16) and (17) coated in rubber or another material with adherent features, although they might indeed have a rough surface.

[0019] Both pairs of articulated arms (10) and (11) are interlinked by means of a pneumatic cylinder (18), which could be hydraulic and single or double acting cylinder, whose body is articulated between one of the two pairs of arms, in this example between the pair of arms (11), and whose stem is articulated to the other pair of arms, in this example to the pair of arms (10). When the pneumatic cylinder (18) is retracted, namely as shown in figures 1 and 2, the two pairs of rollers (16) and (17) are applied against the tube (1) ring (1a) with the tubular net (9) in between, and when the pneumatic cylinder (18) is expanded, the stem projects from the body and both pairs of arms (10) and (11) move away from each other and therefore so do the pair of rollers (16) and (17) from the tube ring and the tubular net about the tube. The latter removed position allows an emptied tube, viz.

without a tubular net, to be removed and a tube full of a new batch of tubular net to be arranged in an operative position. Adjustable stops may exist for there to be a maximum and a minimum separation between the two pairs of arms.

[0020] The gearmotor (19) (only shown in figure 1) causes a gearing (20), comprising four intermeshing cogwheels in this example, to turn in one direction or another, the first and the last of such cogwheels being respectively connected to two shafts to which the two pairs of arms (10) and (11) are in turn articulated, respective grooved pulleys (21) and (22) being connected to such shafts which interlink with the grooved pulleys (14) and (15) through respective drive belts. The grooved pulleys (14), (15), (21) and (22) could naturally be replaced with suitable cogwheels and the drive means between the relevant pulleys would then comprise driving chains meshing between such cogwheels.

[0021] Closure and shearing means (23) are provided, shown schematically in figure 1 and forming part of the clamping and shearing device (7), which has a detector (24) for sensing a bag (25) already full of the desired products and closed, which detector governs the gearmotor (19), stopping it when there is no bag (25), which will usually happen when the tubular bag in the tube (1) is depleted or there is a breakdown or malfunction of the pulling means, their driving means and/or the means drawing the pairs of articulated arms to and from each other.

[0022] Operation of the foregoing machine, after placing the tube (1b) in the operative position, i.e. in the tube (1) position of figure 1 with the batch of tubular net already arranged about it, is as follows:

[0023] The top end of the tubular net (9) is lifted and inserted within the tube (1) through its top mouth, running over the edge of the ring (1a) and the tubular net (9) is lowered -inside the tube (1)- until the lower free end projects under the tube (1), whereupon the closure means are applied to such free end, usually in the form of a clamp that is tightly fixed to such free end to close the same.

[0024] When the tubular net is first inserted inside the tube, the pairs of rollers (16) and (17) lie drawn away from the tube in order to allow such operation and when insertion of the top end of the tubular net in the tube has begun, said two pairs of rollers are applied against the tubular net and, upon the gearmotor (19) being activated to turn in the right direction, the two pairs of rollers turn to raise the outer part of the tubular net thereby to supply it into the tube (1) and the free end of the net is lowered within the tube until it projects under the same.

[0025] Closure means, for instance a clamp, are next applied to such free end, and the direction of rotation of the gearmotor is then inverted and the pairs of rollers (16) and (17) thus turn in the opposite direction and thereby cause the outer part of the tubular net to be lowered, the inner part of such net being raised until its lower closed and free end (26) reaches a certain height,

forming a bag that is open at the top and lies next to the top unloading area of the product to be packaged.

[0026] The product is unloaded into said bag above the top edge of the tube (1) and its ring (1a) and the tubular net is next again lowered inside the tube, inverting the rotation of the pairs of rollers (16) and (17), until the full bag projects below the tube (1) still open at the top.

[0027] Closure means, such as a clamp (27), and other means, such as a clamp (28), separate from and slightly above the clamp (27), are applied to the top end of the bag. The pinched net lying midway between both clamps (27) and (28) is sheared by the shearing means of the closure and shearing means (23), and the full bag (25) obtained is thus separated from the rest of the tubular net. A label bearing the desired signs and information can, as appropriate, be affixed to the bag and held by the clamp (27) proper or other means (for instance self-adhesive and sealing means).

[0028] The foregoing operative stages are repeated from the upward travel of the tubular net inside the tube (1), thereby to obtain new bags full of products, until the batch of tubular net (9) stocked in the tube (1) is depleted.

[0029] It should be recalled that in order to arrange a tube filled with the relevant batch of tubular net in the operative position or to remove an empty tube, the two pairs of arms (10) and (11) -and therefore the two pairs of rollers (16) and (17)- must be drawn away from each other activating the pneumatic cylinder (18) to such end and, having arranged the tube already full of the batch of tubular net in the operative position (figure 1), the pneumatic cylinder (18) is deactivated or activated in the opposite direction, drawing said two pairs of arms toward one another and applying the two pairs of rollers (16) and (17) to the net, tightening it against the ring (1a).

[0030] The full and closed bags that are obtained may be carried or slid to the temporary storage location by conventional means.

[0031] The various operative stages described above can be controlled and regulated by means of a program processing unit, thereby automating the whole process carried out by the machine, which is consequently convenient as to its operation and performance per unit of time.

Claims

1. A machine for obtaining bags (25) full of products from batches of a tubular net (9), said net being capable of forming a bag (25) with its lower end closed and its top end open, which is filled with the desired products from product unloading means, closed at the top and sheared, said machine comprising

- at least one vertical tube (1) around which a

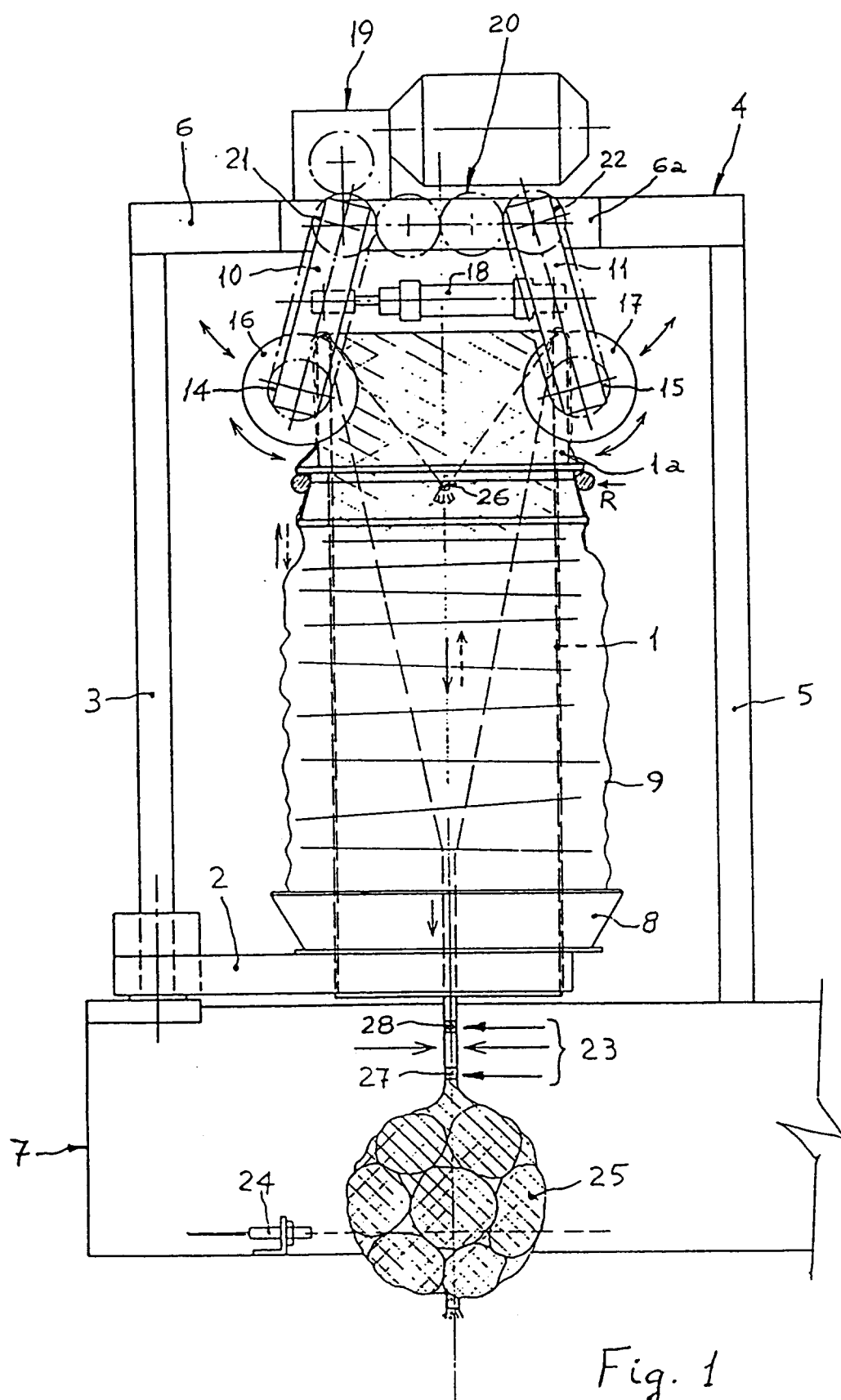
- certain quantity or batch of tubular net (9) is arranged, said tube (1) being mounted on a horizontal support (2);
- bag closure and shearing means being located beneath said support (2); 5
 - a framework (4) wherein two arms (10, 11) are fined to swing in opposite directions on a vertical plane, by action of respective drive means (18) that cause the arms to rise or drop; 10
 - the free ends of such arms (10, 11) being fitted with two pairs of turning rollers (16, 17) having non-slip surfaces that are applied at diametrically opposed positions against the outer lateral upper part of the tube (1), with the tubular net (9) inbetween; characterised in that 15
 - the horizontal support (2) is capable to be pivoted around a vertical shaft (3);
 - said turning rollers (16, 17) have a conical shape; and
 - such conical rollers (16, 17) are capable to be turned in opposite directions, actuated by turning drive means (19, 20, 21, 22), and cause the tubular net (9) to be lowered or raised within the tube (1). 20
- 25
2. The machine according to claim 1, wherein more than one tube (1) is mounted on said support (2).
 3. The machine according to claim 1 or claim 2, wherein said conical rollers (16, 17) are coated with a rubber or another material having adherent properties. 30
 4. The machine according to claim 1 or claim 2, wherein said conical rollers (16, 17) have a rough surface. 35
 5. The machine according to any of claims 1 to 4, wherein said arms (10, 11) are two pairs of arms (10, 11). 40
 6. The machine according to any of the claims 1 to 5, wherein said arms or pairs of arms (10, 11) are interlinked by means of a pneumatic cylinder (18) so as to to be capable to be moved away from each other or towards each other. 45
- Patentansprüche**
1. Vorrichtung zum Erhalten von mit Produkten gefüllten Beuteln (25) aus Vorratsmengen eines schlauchförmigen Netzes (9), wobei das Netz einen Beutel (25) mit einem unteren geschlossenen Ende und einem oberen offenen Ende bilden kann, der mit den gewünschten Produkten von einer Produkt-Entlade-Einrichtung gefüllt, am oberen Ende geschlossen und abgeschnitten wird, wobei die Vorrichtung umfaßt: 50
 - wenigstens ein vertikales Rohr (1), um das eine bestimmte Menge oder Vorratsmenge eines schlauchförmigen Netzes (9) angeordnet ist, wobei das Rohr (1) auf einem horizontal angeordneten Träger (2) montiert ist;
 - eine Beutel-Schließ- und -Abschneide-Einrichtung, die unterhalb des Trägers (2) angeordnet ist;
 - einen Rahmen (4), an dem zwei Arme (10, 11) so angebracht sind, daß sie unter Einwirkung jeweiliger Antriebs-Einrichtungen (18), die veranlassen, daß sich die Arme aufwärts- und abwärtsbewegen, in gegenläufige Richtungen auf einer vertikalen Ebene schwenken;
 - wobei an die freien Enden der Arme (10, 11) zwei Drehrollen-Paare (16, 17) mit rutschfesten Oberflächen angebracht sind, die an diametral einander gegenüberliegenden Stellen an den äußeren seitlichen oberen Teil des Rohrs (1) angelegt sind, wobei das schlauchförmige Netz dazwischen angeordnet ist; dadurch gekennzeichnet, daß
 - der horizontale Träger (2) um eine vertikale Welle (3) geschwenkt werden kann;
 - die Drehrollen (16, 17) konische Form haben; und
 - die konischen Rollen (16, 17) in gegenläufige Richtungen gedreht werden können, durch Drehantriebs-Einrichtungen (19, 20, 21, 22) betätigt werden können und dafür sorgen können, daß das schlauchförmige Netz (9) innerhalb des Rohrs (1) herabgelassen oder hochgezogen wird.
 2. Vorrichtung nach Anspruch 1, worin mehr als ein Rohr (1) auf dem Träger (2) montiert ist.
 3. Vorrichtung nach Anspruch 1 oder Anspruch 2, worin die konischen Rollen (16, 17) mit einem Kautschuk oder einem anderen Material mit Hafteigenschaften überzogen sind.
 4. Vorrichtung nach Anspruch 1 oder Anspruch 2, worin die konischen Rollen (16, 17) eine raue Oberfläche haben.
 5. Vorrichtung nach einem der Ansprüche 1 bis 4, worin die Arme (10, 11) zwei Arm-Paare (10, 11) sind.
 6. Vorrichtung nach einem der Ansprüche 1 bis 5, worin die Arme oder Arm-Paare (10, 11) mittels eines pneumatischen Zylinders (18) verbunden sind und damit voneinander weg oder aufeinander zu bewegt werden können. 55

Revendications

1. Machine pour obtenir des sachets (25) remplis de produits à partir de portions d'un filet tubulaire (9), ledit filet pouvant former un sachet (25) à l'extrémité inférieure fermée et à l'extrémité supérieure ouverte, qui est rempli avec les produits souhaités à partir de moyens de décharge de produit, est fermé à son sommet et cisailé, ladite machine comprenant :
 - au moins un tube vertical (1) autour duquel est agencé une certaine quantité ou portion de filet tubulaire (9), ledit tube (1) étant monté sur un support horizontal (2) ;
 - des moyens de fermeture et de cisaillement de sachet situés sous ledit support (2) ;
 - un châssis (4) dans lequel deux bras (10, 11) sont montés de manière à osciller dans des sens opposés sur un plan vertical, sous l'effet de moyens d'entraînement (18) respectifs qui lèvent ou abaissent les bras ;
 - les extrémités libres desdits bras (10, 11) étant munies de deux paires de rouleaux rotatifs (16, 17) ayant des surfaces antiglissantes qui sont appliquées à des positions diamétralement opposées contre la partie supérieure latérale extérieure du tube (1), avec le filet tubulaire (9) entre lesdites surfaces ; caractérisée en ce que
 - le support horizontal (2) peut pivoter autour d'un axe vertical (3) ;
 - lesdits rouleaux rotatifs (16, 17) ont une forme conique ; et
 - lesdits rouleaux coniques (16, 17) peuvent tourner dans des sens opposés, sous l'action de moyens d'entraînement en rotation (19, 20, 21, 22) et entraîner l'abaissement ou l'élévation du filet tubulaire (9) à l'intérieur du tube (1).
2. Machine selon la revendication 1, dans laquelle plusieurs tubes (1) sont montés sur ledit support (2).
3. Machine selon la revendication 1 ou 2, dans laquelle lesdits rouleaux coniques (16, 17) sont revêtus d'un caoutchouc ou d'une autre matière présentant des propriétés d'adhérence.
4. Machine selon la revendication 1 ou 2, dans laquelle lesdits rouleaux coniques (16, 17) ont une surface rugueuse.
5. Machine selon l'une quelconque des revendica-

tions 1 à 4, dans laquelle lesdits bras (10, 11) sont deux paires de bras (10, 11).

6. Machine selon l'une des revendications 1 à 5, dans laquelle lesdits bras ou paires de bras (10, 11) sont reliés au moyen d'un vérin pneumatique (18) de manière à pouvoir s'éloigner l'un de l'autre ou se rapprocher l'un de l'autre.



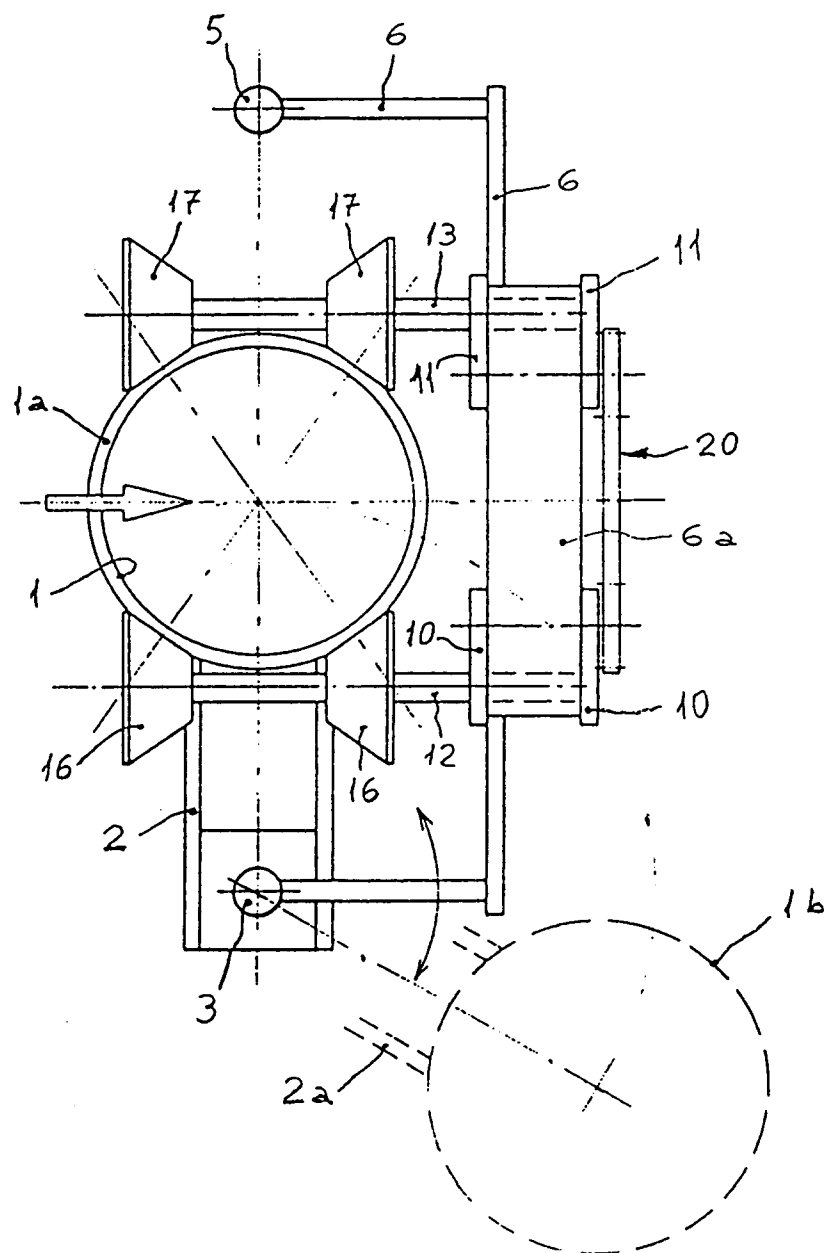


Fig. 2