

(19)



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(11)

**EP 0 738 657 A2**

(12)

**EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
**23.10.1996 Bulletin 1996/43**

(51) Int Cl.<sup>6</sup>: **B65B 9/15**

(21) Application number: **96500042.5**

(22) Date of filing: **16.04.1996**

(84) Designated Contracting States:  
**AT BE CH DE DK FI FR GB GR IE IT LI NL PT SE**

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(30) Priority: **20.04.1995 ES 9500766**

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

(57) A machine for obtaining bags full of products from batches of tubular net (9), which comprises at least a vertical tube (1), a turning support (2) for said tube and a framework (4) with two arms (10,11) swinging on a

vertical plane, the ends of which arms are fitted with two pairs of conical wheels, turning in opposite directions and applicable against the wall of the tube, with the tubular net in between.

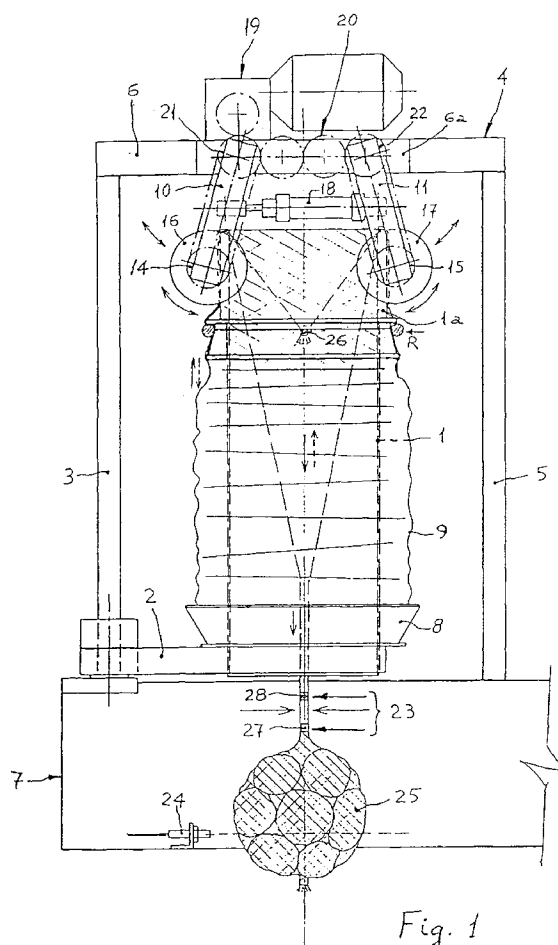


Fig. 1

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## Description

### FIELD OF THE INVENTION

The object of the present Patent is 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 whatsoever that are to be packaged in bags, their total weight or quantity being usually predetermined.

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

### BACKGROUND OF THE INVENTION

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.

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.

Certain means are provided to pinch and gather the net portion supplied, which comprise 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.

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.

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.

A disadvantage of the machine described 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.

### SUMMARY OF THE INVENTION

The machine for obtaining bags full of products from batches of tubular net subject of the present invention is of the kind which comprises an upstanding tube about which a certain quantity or batch of tubular net is arranged, 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. This machine is characterised by comprising at least a vertical tube mounted on a horizontal support that turns about a vertical shaft, wherein bag closure and shearing means are located beneath said support; by having 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; by having the free ends of such arms fitted with two pairs of turning conical wheels having non-slip surfaces that are applied at diametrically opposed positions against the outer lateral upper part of the tube, with the tubular net in between; and by having such conical wheels turn in opposite directions, actuated by turning drive means, and cause the tubular net to be lowered or raised within the tube.

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.

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 prod-

ucts or in practice such products may not be treated using the known process.

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.

### **BRIEF DESCRIPTION OF THE DRAWINGS**

The drawings show a machine for obtaining bags full of products from batches of tubular net which, 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.

### **DESCRIPTION OF AN EMBODIMENT OF THE INVENTION**

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 otherwise howsoever in 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).

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.

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.

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.

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.

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.

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.

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:

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.

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.

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.

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.

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).

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.

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).

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

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 full of products from batches of tubular net, being of the kind which comprises an upstanding tube about which a certain quantity or batch of tubular net is arranged, 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; characterised by comprising at least a vertical tube mounted on a horizontal support that turns about a vertical shaft, wherein bag closure and shearing means are located beneath said support; by having 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; by having the free ends of such arms fitted with two pairs of turning conical wheels having non-slip surfaces that are applied at diametrically opposed positions against the outer lateral upper part of the tube, with the tubular net in between; and by having such conical wheels turn in opposite directions, actuated by turning drive means, and cause the tubular net to be lowered or

raised within the tube.

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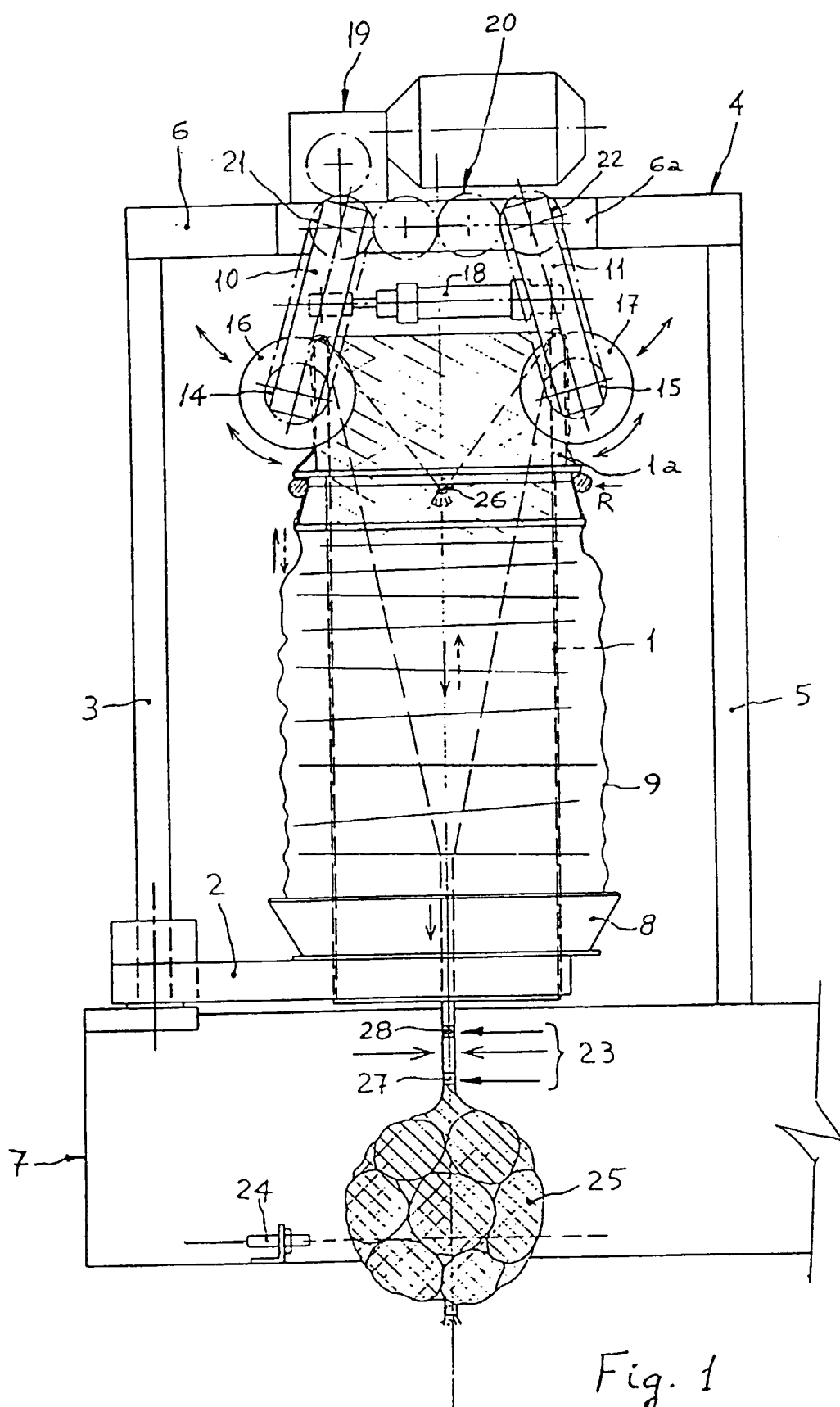


Fig. 1

