



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
**30.06.2010 Bulletin 2010/26**

(51) Int Cl.:  
**B65H 19/26 (2006.01)**

(21) Application number: **09180392.4**

(22) Date of filing: **22.12.2009**

(84) Designated Contracting States:  
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO SE SI SK SM TR**  
 Designated Extension States:  
**AL BA RS**

(71) Applicant: **Gambini International S.A.**  
**2449 Luxembourg (LU)**

(72) Inventor: **Gambini, Giovanni**  
**56100, PISA (IT)**

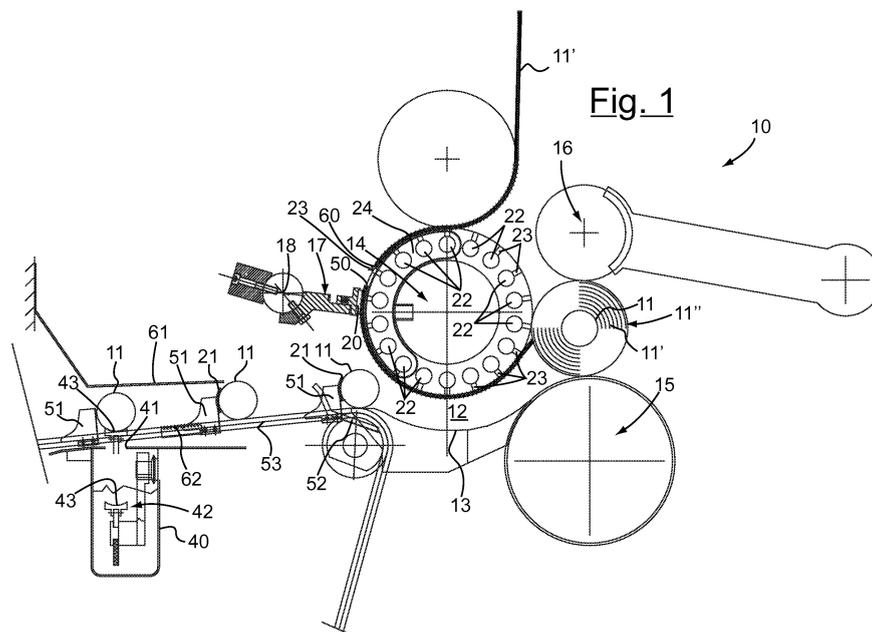
(74) Representative: **Branca, Emanuela et al**  
**Barzanò & Zanardo Milano S.p.A.**  
**Via Borgonuovo, 10**  
**20121 Milano (IT)**

(30) Priority: **23.12.2008 IT MI20082313**

(54) **Winding group and method for winding paper around a core to make a log**

(57) A winding group (10) for winding paper (11') around a core (11) to make a log (11'') comprising in an upstream position, means for transporting and introducing the core (11) into a channel (12) defined at the top by an upper winding roller (14), supplied from above with the paper (11') directed towards the channel (12), and at the bottom by a cradle member (13) associated downstream with a lower winding roller (15), the winding group (10) comprising a third oscillating roller (16) arranged above the lower winding roller (15), the three rollers (14, 15, 16) cooperating downstream of the channel (12) to wind the paper (11') around the core (11) to make the

log (11''), further being provided cyclic means for tearing the paper (11') moving forward on the upper winding roller (14) to identify a final edge (50) and an initial edge (60) as well as means to cause the initial edge (60) to wind on the core (11) introduced into the channel (12), the cyclic means for tearing the paper (11') comprising a rod member (17) rotating around a pin (18) and provided with a head (20) for cyclic cooperation with the upper winding roller (14) for tearing the paper (11'), wherein the head (20) at least in proximity to the upper winding roller (14) has a greater peripheral speed with respect to that of the upper winding roller (14) to tear the paper (11') upstream of the head (20).



## Description

**[0001]** The present invention refers to an improved winding group and method for winding paper around a core to make a log.

**[0002]** In common machines for winding paper around a core to make a log, for example for domestic use as toilet paper, paper towel and/or similar, it is currently known to use elements that guide the arriving paper and control its first contact and its winding onto a core in order to make a finished log.

**[0003]** In these machines, usually called rewinders, there are rollers that cooperate to wind the log.

**[0004]** In general, in such known machines there are two fixed rollers that determine the winding of the paper in a log of gradually increasing diameter, whereas a third oscillating roller maintains a certain pressure on the log being formed making sure that it is correctly wound in a well-compacted manner.

**[0005]** In order to optimise the production of the aforementioned logs, various devices have been progressively developed that simultaneously, and in synchrony, supply a new core in the rewinding machine and expel the finished log from it.

**[0006]** In such synchronised steps the paper moving forward on a roller is torn by suitable devices so as to define two edges of which the one downstream is called "final edge" and is wound on the finished log, whereas the one upstream is called "initial edge" and is associated with the new core being inserted into the machine.

**[0007]** An example of these known machines is described in patent WO94/21545A1 where a device for tearing the paper is shown that takes care of tearing the paper moving forward inside the machine, i.e. in a point comprised between that in which the core is introduced and that in which the log is expelled.

**[0008]** Alternatively, there are currently other machines on the market in which the devices for tearing the paper take care of tearing the paper moving forward outside of the machine, i.e. in a point upstream of that in which the core is introduced.

**[0009]** Such a machine is described in patent EP1262434A1.

**[0010]** In both of the aforementioned types of rewinding machines as the device for tearing the paper it is foreseen for there to be a rod member rotating or oscillating around a pin and provided with a head for cyclic cooperation with a roller to tear the paper that moves forward on it.

**[0011]** In such machines, at a certain moment, i.e. when a new core is introduced and a finished log is expelled, the head of the rod comes into contact with the roller on which the paper moves forward, stopping it or slowing it down so as to pull the paper tight downstream of the head that tears the paper itself.

**[0012]** From the above it is clear that in such machines, where the rod rotates at a lower speed than the roller on which the paper moves forward, the tearing of the paper

takes place downstream of the tearing head.

**[0013]** This means that it is the "final edge" that is pulled tight, whereas the "initial edge" is held and slowed down by the tearing head on the relative roller.

5 **[0014]** What has just been described, and common to the two types of machines given, involves some drawbacks.

**[0015]** One of these in particular concerns the quality of the "initial edge" that first comes into contact with the new core introduced into the machine.

10 **[0016]** Indeed, as described earlier, the "initial edge" is held on the roller and slowed down by the tearing head necessarily creating a paper accumulation zone upstream of the head itself.

15 **[0017]** Such accumulation, as well as making unwanted folds in the paper, damages the coupling of the core with the "initial edge", the latter coming into contact not always laid out in the ideal way on the roller and/or overlapping other portions of paper.

20 **[0018]** Such an aspect, disadvantageously, greatly limits the "hold" of the "initial edge" on the core and also creates waste.

**[0019]** The purpose of the present invention is to make a winding method and group for winding paper around a core to make a log capable of solving the aforementioned drawbacks of the prior art in an extremely simple, cost-effective and particularly functional manner.

25 **[0020]** Another purpose is to make a winding method and group for winding paper around a core to make a log in which the "initial edge" of paper comes into contact with a new core tightened in an ideal manner.

30 **[0021]** Yet another purpose is to be able to have a winding method and group for winding paper around a core to make a log in which during the tearing of the paper there is no accumulation of paper at the "initial edge".

35 **[0022]** Yet another purpose is to be able to have a winding method and group for winding paper around a core to make a log in which the tearing of the paper occurs upstream of the relative devices for tearing the paper itself.

40 **[0023]** These purposes according to the present invention are accomplished by making a winding method and group for winding paper around a core to make a log as outlined, respectively, in claims 1 and 11.

45 **[0024]** Further characteristics of the invention are highlighted by the dependent claims.

**[0025]** The characteristics and advantages of a winding method and group for winding paper around a core to make a log according to the present invention shall become clearer from the following description, given as a non-limiting example, referring to the attached schematic drawings, in which:

- figure 1 shows a schematic side elevation view partially in section of a winding group for winding paper around a core to make a log according to the present invention in a first step of use at the tearing of the paper and the introduction of a new core into the

- machine;
- figure 2 shows a schematic side elevation view partially in section of the winding group of figure 1 in a subsequent step of use at the coupling of the initial edge with the new core introduced into the machine;
  - figure 3 shows a schematic side elevation view partially in section of the winding group of figure 1 in a subsequent step of use at the winding of the paper on the new core introduced into the machine that has received the initial edge; and
  - figure 4 is a schematic side elevation view partially in section of another winding group for winding paper around a core to make a log according to the present invention; and
  - figures 5-8 are schematic side elevation views partially in section of another winding group for winding paper around a core to make a log according to the present invention in different operating steps.

**[0026]** With reference to the figures, a winding group for winding paper 11' around a core 11 to make a log 11" is shown with 10.

**[0027]** Such a winding group 10 comprises, in an upstream position, means for transporting and introducing a succession of cores 11 one after the other in a channel 12 that, as can be seen in the figures, is defined at the top by an upper winding roller 14, supplied from above with the paper 11' directed towards the channel 12 itself, and at the bottom by a cradle member 13.

**[0028]** A lower winding roller 15, associated downstream of the cradle member 13, and a third oscillating roller 16 arranged above the lower winding roller 15 are also foreseen.

**[0029]** These aforementioned three rollers 14, 15, 16, having axes parallel to one another and perpendicular to the forward movement of the paper 11', cooperate with one another downstream of the channel 12 to wind the paper 11' around the core 11 to make the finished log 11".

**[0030]** In order to tear the paper 11' to identify a final edge 50, which must be wound on the finished log 11", and an initial edge 60, which must be coupled with a new core introduced into the channel 12, there are cyclic means for tearing the paper 11' moving forward on the upper winding roller 14.

**[0031]** In order to ensure the coupling of the initial edge 60 on the new core 11 introduced into the channel there are also means to cause such an initial edge 60 to wind on the core 11.

**[0032]** As cyclic means for tearing the paper 11', synchronised with the supply of a new core and the expulsion of a finished log 11", a rod member 17 is foreseen rotating or oscillating around a pin 18 and provided with a head 20 for cyclic cooperation with the upper winding roller 14 for tearing the paper 11' making direct contact with the latter against the upper winding roller 14.

**[0033]** In particular, according to the present invention such a head 20 of the rod member 17, at least near to the upper winding roller 16 and thus during the tearing

of the paper 11', has a greater peripheral speed with respect to that of the upper winding roller 14.

**[0034]** Generally, the head 20 will have a speed that is greater by about 20% with respect to the upper winding roller 14. As can be seen in figure 1 such a speed ratio means that the section of paper 11' to undergo a tightening is exclusively that upstream of the head 20, unlike all rewinders currently known, thus tearing the paper 11' upstream of the head 20.

**[0035]** In figure 1 it is indeed possible to see both the final edge 50, which must be wound on the log 11", and the initial edge 60 that stays laid out without creases on the upper winding roller 14 upstream of the head 20 since it is not slowed down in any way by the faster head 20.

**[0036]** Advantageously, in this way, since the initial edge 60 is laid out on the upper winding roller 14 without creases, a correct coupling of the initial edge 60 itself with the new core 11 supplied into the channel 12 is ensured.

**[0037]** The way in which such a coupling occurs without the generation of any creases is shown in figure 2.

**[0038]** According to a first preferred embodiment, visible in figures 1-4, the rod member 17 cyclically rotates or oscillates around the pin 18 selectively firstly accelerating as it approaches the upper winding roller 14 upon contact with the paper 11' in order to definitely have a greater speed with respect to that of the upper winding roller 14.

**[0039]** After the paper 11' is torn, i.e. as it goes away from the upper winding roller 14, it is foreseen for the rod member 17 to decelerate until it stops.

**[0040]** Finally, in order to provide the greatest possible acceleration path of the rod member 17 for a new tearing of the paper 11', the rod member 17 after the aforementioned stopping can carry out a rotation in the opposite direction, in other words going towards the upper winding roller 14.

**[0041]** According to another embodiment, shown in figures 5-8, the rod member 17 is rototranslating.

**[0042]** Such rototranslating movement is the component of the continuous rotation of the rod 17 around the pin 18 with a cyclic translation of the pin 18 itself away from and towards the roller 14.

**[0043]** In particular, in the withdrawn position of the pin 18, visible in figures 5 and 7-8, the rod member 17 can rotate freely around the pin 18 without interfering in any way and coming into contact with the paper 11' moving forward on the roller 14.

**[0044]** Advantageously, therefore, the rod member 17 can continuously rotate without ever stopping keeping the relative rotation speed high, in particular higher than that of the roller 14 on which the paper 11' moves forward, without imposing high accelerations on the rod when approaching the roller 14.

**[0045]** As can be seen in figures 5-8, the cyclic movement of the pin 18 towards and away from the roller 14 is controlled by a rod 71 constrained at the front to a guiding support 70, on which the pin 18 is associated,

and that is eccentrically hinged at the rear to a rotary actuator.

**[0046]** Thus in such a second embodiment of figures 5-8 the machine 10 comprises a connecting rod 71 - crank 72 assembly in which the head of the connecting rod is defined by the guiding support 70 able to slide away from and towards the roller 14, through the effect of the crank 72, on suitable pins 73 or idle rollers.

**[0047]** Of course, the movement of such a connecting rod 71 - crank 72 assembly is synchronised with the production of the finished logs 11" in such a way as to take the head 20 of the rod 17, always kept in rotation with respect to the pin 18, in contact with the paper 11' moving forward on the roller 14 only upon the introduction of a new core 11 into the channel 12.

**[0048]** According to a preferred embodiment, shown in figures, the cyclic means for tearing the paper 11' are arranged upstream of the channel 12 and cooperate with means for keeping the paper 11' adhering around the upper winding roller 14 acting at least upstream of the channel 12.

**[0049]** Preferably, such means for keeping the paper 11' act both along a section upstream and a section downstream of the cyclic tearing means to keep both the initial edge 60, upstream of the head 20, and the final edge 50 adhering around the upper winding roller 14.

**[0050]** In order to provide for keeping the edges 50 and 60 on the upper winding roller 14, the latter comprises a plurality of longitudinal channels 22 arranged according to a circular ring in proximity to its cylindrical outer side surface.

**[0051]** Such longitudinal channels 22 pass through from one head to the other head of the upper winding roller 14 and each of them 22 is placed in communication with the outside on the cylindrical outer side surface of the upper winding roller 14 through a plurality of holes 23.

**[0052]** Cooperating with such longitudinal channels 22 there is a pair of suctioning shoes 24, for example in the shape of a circular sector, arranged in axis with the roller 14 and fixed facing the opposite heads in which these suctioning shoes 24 are suitable for causing air to be sucked in through the channels 22 comprised between them from the outside towards the inside of the upper winding roller 14.

**[0053]** Thus, in order to ensure that both the initial edge 60, upstream of the head 20, and the final edge 50 adhere around the upper winding roller 14 during their forward movement, the aforementioned suctioning shoes 24 extend on the heads of the upper winding roller 14 both above and below the point of cyclic contact of the head 20 with the external cylindrical surface of the roller 14 itself. In the depicted example the shoes 24 extend for a sector of about 180°.

**[0054]** The suction through the shoes 24 can be continuous or suitably synchronised with the operation of the group 10 and ensures the transportation of the initial edge 60 adhering to the shell of the roller in the fraction that runs between the tearing of the paper and the insertion

of the new core in the channel 12.

**[0055]** The core 11, inserted in the channel 12 in which it is supported by the cradle member 13, receives the initial edge 60 of the paper 11', which, staying adhering without creases to the surface of the suction roller 14 during the rotation thereof, makes such a coupling optimised.

**[0056]** Indeed, the sucking surface of the upper roller 14 avoids the initial edge 60 of the paper 11' returning back and the greater speed of the head 20 avoids any accumulation of paper upstream of the head 20 itself.

**[0057]** At the inlet of the channel 12 a thruster 52 can be foreseen rotating around a pin to insert the cores 11 into the channel 12 at the unloading of the finished log 11" and at the start of a new log to be formed.

**[0058]** Of course, other types of oscillating or rotating thrusters, different to what has been shown as a non-limiting example, could be arranged at the inlet of the channel 12.

**[0059]** In such a group 10, as stated earlier, in order to ensure the correct coupling in the channel 12 of the initial edge 60 of the paper 11' with the new core 11, it is possible to foresee means to cause the aforementioned initial edge 60 to wind on the core 11 introduced into the channel 12.

**[0060]** In a first embodiment shown in figures 1-3 the aforementioned means to cause the winding comprise means for supplying glue 21 to the core 11 arranged upstream of the channel.

**[0061]** As can be imagined, such glue 21 during the journey of the core 11 in the channel 12 holds the initial edge 60, which proceeds on the roller 14 thanks to the suction means, ensuring safe winding of the paper 11'.

**[0062]** Alternatively, the means to cause the initial edge 60 to wind on the core 11 introduced into the channel 12 can comprise means for taking the initial edge 60 away from the upper winding roller 14 arranged at the channel 12 substantially downstream of the cyclic means for tearing said paper 11' and of the suction shoes 24. In particular, such means for taking away the initial edge 60 have the purpose of thrusting the initial edge 60 of the paper 11' towards the lower portion of the channel 12 promoting its firm engagement on the new core 11 that is moving forward in the channel 12 trapping the paper 11' between the core 11 moving forward and the cradle 13.

**[0063]** The core 11, inserted into the channel 12 in which it is supported by the cradle 13, receives and thus, as can be seen in figure 4, keeps the initial edge 60 of the paper 11' that, being located between the surface of the core 11 during the rotation thereof and of the cradle 13, naturally winds onto the core 11.

**[0064]** The means for taking the initial edge 60 away from the upper winding roller 14 can be of any type, for example of the mechanical type such as cams, but according to a preferred embodiment they comprise a pair of shoes 25 shaped like a circular sector arranged in axis with the roller 14 facing opposite heads at the channel

12 substantially downstream of the cyclic means for tearing the paper 11'.

**[0065]** Such shoes 25 are suitable for causing air to come out through the channels 22 comprised between them and thrusting the initial edge 60 of the paper 11' downwards into a position comprised between the core 11 moving forward and the cradle 13.

**[0066]** As described in such a last embodiment with the blowing shoes 25 downstream of the suction ones 24, it is not necessary to foresee the presence of glue 21 on the core 11 moving forward in the channel 12, but nevertheless the presence of glue 21 even in this embodiment does not jeopardise the correct operation of the group 10.

**[0067]** With regard to the dispenser of glue 21 on the core upstream of the channel 12, it can preferably comprise means for depositing a plurality of arcs of circle 21 of glue on at least an outer portion of the core 11 so as not to require a particularly precise timing of the core itself 11 at the introduction into the channel 12. Indeed, since the glue 21 is distributed along an arc of circle, almost independently from its position on the core 11 at the introduction of the channel 12, it will take care of meeting and securely holding the initial edge 60 of the paper 11'.

**[0068]** In the case in which it is still wished to "time" the core 11 provided with glue 21, the group 10 can comprise an upper abutment plane 61 that at least partially extends from the means for supplying glue towards the channel 12 above the means for transporting and introducing the core 11 and knurled timing elements 62.

**[0069]** Such an upper abutment plane 61 and such knurled elements 62 impose a controlled rotation upon the core 11 after the supply of glue 21 to arrange it in an optimal position for immediately receiving the initial edge 60 as soon as the core 11 is inserted into the channel 12.

**[0070]** In particular, the means for supplying glue on the core 11 comprise a container 40 for the glue equipped with an opening 41 oriented upwards and associated with the means for transporting and introducing the core 11 into the channel 12.

**[0071]** In such a container 40 a member 42 is housed that is mobile between a first position for receiving the glue by immersion and a second position for supplying the glue received onto the core 11 moving forward on the transporting and introducing means.

**[0072]** Such a mobile member comprises a plurality of free heads 43 shaped like a convex arc of circle, in which every free head 43 in the first receiving position is immersed in the glue and in the second supplying position it projects from the opening 41 towards the core 11 as schematised in figure 1.

**[0073]** The transportation means can, for example, comprise a plurality of chains 53 each equipped with thrusters 51. It is very easy to understand how the group 10 object of the invention operates.

**[0074]** Indeed, the winding group 10 for winding paper 11' around a core 11 to make a log 11" cyclically carries

out the steps of:

a) transporting and introducing the core 11 into a channel 12 defined at the top by an upper winding roller 14 and at the bottom by a cradle member 13 associated, downstream, with a lower winding roller 15;

b) supplying the paper 11' from above onto the upper winding roller 14 towards the channel 12;

c) tearing the paper 11' moving forward on the upper winding roller 14 to define an initial edge 60 to be coupled with the new core 11 introduced into the channel 12;

d) winding the initial edge 60 of the paper 11' around the core 11 to make a log 11' downstream of the channel 12 through cooperation of the upper and lower winding rollers 14, 15 with a third oscillating roller 16 arranged above the lower winding roller 15, in which the step of tearing the paper 11' moving forward on the upper winding roller 14 to define an initial edge 60 to be coupled with the new core 11 introduced into the channel 12 comprises the steps of:

e) bringing a head 20 of a rotating rod member 17 into contact with the upper winding roller 14 with a greater peripheral speed with respect to that of the upper winding roller 14 for tearing the paper 11' upstream of the head 20.

**[0075]** In particular, the rotating rod member 17 for tearing the paper 11' upstream of the head 20 carries out the cyclic steps of:

a) accelerating the rotating rod member 17 approaching the upper winding roller 14;

b) slowing down the rotating rod member 17 moving away from the upper winding roller 14 after the paper 11' has been torn;

c) stopping the rotating rod member 17; and

d) rotating the rotating rod member 17 in the opposite direction to provide the rod itself with a greater acceleration path.

**[0076]** In the case in which it is foreseen to deposit glue 21 on the core 11 it is of course also foreseen for there to be the steps of depositing glue 21, preferably in the shape of an arc of circle, on an outer portion of the core 11 and, optionally, transporting such a core 11 provided with glue 21 in a controlled manner up to the channel 12.

**[0077]** It has thus been seen that a winding method and group for winding paper around a core to make a log according to the present invention achieves the purposes outlined earlier.

**[0078]** Indeed, the winding method and group for winding paper around a core to make a log of the present invention allows the "initial edge" of paper to make contact with a new core in the ideal manner without any ac-

cumulation of paper or undesired creases causing the paper from tearing upstream of the relative devices for tearing the paper itself.

**[0079]** The winding method and group for winding paper around a core to make a log of the present invention thus conceived can undergo numerous modifications and variants, all of which are covered by the same inventive concept; moreover, all of the details can be replaced by technically equivalent elements. In practice, the materials used, as well as their sizes, can be whatever according to the technical requirements.

### Claims

1. Winding group (10) for winding paper (11') around a core (11) for making a log (11") comprising in an upstream position, means for transporting and introducing said core (11) into a channel (12) defined at the top by an upper winding roller (14), supplied from above with said paper (11') directed towards said channel (12), and at the bottom by a cradle member (13) associated downstream with a lower winding roller (15), said winding group (10) comprising a third oscillating roller (16) arranged above said lower winding roller (15), said three rollers (14, 15, 16) having respective axes parallel to each other and perpendicular to the forward movement of said paper (11') and cooperating downstream of said channel (12) to wind said paper (11') around said core (11) to make said log (11"), further being provided cyclic means for tearing said paper (11') moving forward on said upper winding roller (14) to identify a final edge (50) and an initial edge (60), as well as means to cause said initial edge (60) to wind on said core (11) introduced into said channel (12), said cyclic means for tearing said paper (11') comprising a rod member (17) rotating around a pin (18) and provided with a head (20) for cyclic cooperation with said upper winding roller (14) for tearing said paper (11'), **characterised in that** said head (20) at least in proximity to said upper winding roller (14) has a greater peripheral speed with respect to that of said upper winding roller (14) to tear said paper (11') upstream of said head (20).
2. Winding group (10) according to claim 1 **characterised in that** said rod member (17) cyclically rotates around a pin (18) and selectively accelerates when approaching said upper winding roller (14) and decelerates when moving away from said upper winding roller up to stopping.
3. Winding group (10) according to claim 2 **characterised in that** said rod member (17) performs a rotation in the opposite direction subsequently to said stopping and before said acceleration.
4. Winding group (10) according to claim 1 **characterised in that** said rod member (17) is rototranslating, said rod member (17) rotating around a pin (18) associated to a support (70) cyclically rotating when approaching and moving away from said roller (14).
5. Winding group (10) according to claim 4 **characterised in that** said cyclically translating support (70) is connected to an end of a connecting rod (71) motorised crank (72) assembly.
6. Winding group (10) according to claim 1 **characterised in that** it comprises means for keeping said paper (11') adhering to said upper winding roller (14) at least upstream of said channel (12), said cyclic means for tearing said paper (11') being arranged upstream of said channel (12).
7. Winding group (10) according to claim 6 **characterised in that** said upper winding roller (14) comprises a plurality of longitudinal channels (22) arranged according to a circular ring in proximity to the external cylindrical surface of said roller (14), each of said longitudinal channels (22) being in communication with the outside through a plurality of holes (23) made on the external cylindrical surface of said roller (14), a pair of suctioning shoes (24) being provided arranged in axis with said roller (14) fixed and facing opposite heads, said suctioning shoes (24) being adapted to cause suctioning of air through the channels (22) comprised between them and extended on said heads of said upper winding roller (14) both above and beneath the point of cyclic contact of said head (20) with the external cylindrical surface of said roller (14).
8. Winding group (10) according to claim 6 **characterised in that** said means to cause said initial edge (60) to wind on said core (11) introduced into said channel (12) comprises means for supplying glue (21) to said core (11) such means being arranged upstream of said channel.
9. Winding group (10) according to claim 6 **characterised in that** said means to cause said initial edge (60) to wind on said core (11) introduced into said channel (12) comprise means for moving said initial edge (60) away from said upper winding roller (14) arranged at said channel (12) substantially downstream of said cyclic means for tearing said paper (11').
10. Winding group (10) according to claim 9 **characterised in that** said means for moving the initial edge (60) away from said upper winding roller (14) comprise a pair of shoes (25) arranged in axis with said roller (14) fixed, facing opposite heads at said channel (12) substantially downstream of said cyclic

means for tearing said paper (11'), said shoes (25) being adapted to cause exit of air through the channels (22) comprised between them.

11. Winding method for winding paper (11') around a core (11) to make a log (11") cyclically comprising the steps of:

a) supplying glue on said core (11);  
 b) transporting and introducing said core (11) into a channel (12) defined at the upper part by an upper winding roller (14) and at the lower part by a cradle member (13) associated downstream with a lower winding roller (15);  
 c) supplying said paper (11') from above on said upper winding roller (14) towards said channel (12);  
 d) tearing said paper moving forward on said upper winding roller (14) upon introduction of said core (11) into said channel (12);  
 e) coupling and winding said paper (11') around said core (11) to make said log (11") downstream of said channel (12) through cooperation of said upper and lower winding rollers (14, 15) with a third oscillating roller (16) arranged above said lower winding roller (15), **characterised in that** said step of tearing said paper moving forward on said upper winding roller (14) upon introduction of said core (11) into said channel (12) comprises the steps of:  
 f) bringing a head (20) of a rod member (17) rotating around a pin (18) into contact with said upper winding roller (14) with a greater peripheral speed with respect to that of said upper winding roller (14) to tear the paper (11') upstream of said head (20).

12. Winding method according to claim 11 **characterised in that** said step of bringing a head (20) of a rotating rod member (17) into contact with said upper winding roller (14) with a greater peripheral speed with respect to that of said upper winding roller (14) to tear said paper (11') upstream of said head (20) comprises the cyclic steps of:

a) accelerating said rotating rod member (17) approaching said upper winding roller (14); and  
 b) slowing said rotating rod member (17) moving away from said upper winding roller;  
 c) stopping said rotating rod member (17).

13. Winding method according to claim 12 **characterised in that** subsequent to said stopping of said rotating rod member (17), it also comprises the steps of:

- rotating said rotating rod member (17) in the opposite direction.

14. Winding method according to claim 11 **characterised in that** said step of bringing a head (20) of a rod member (17) into contact with said upper winding roller (14) with a greater peripheral speed with respect to that of said upper winding roller (14) to tear said paper (11') upstream of said head (20) comprises the steps of:

a) rotating said rod member (17) around a pin (18) with greater constant speed with respect to that of said upper winding roller (14)  
 b) cyclically translating said pin (18) approaching and moving away from said upper winding roller (14).

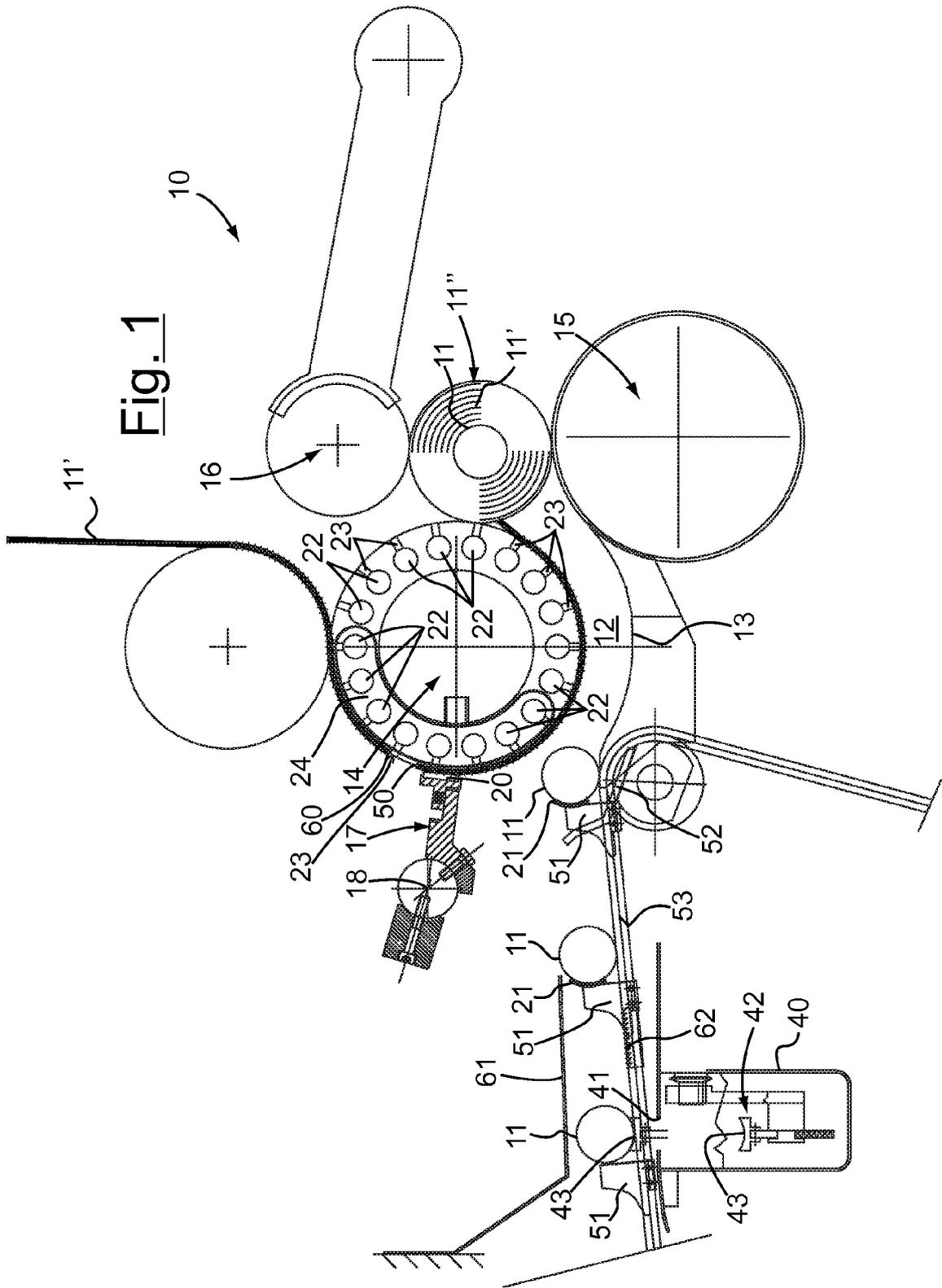
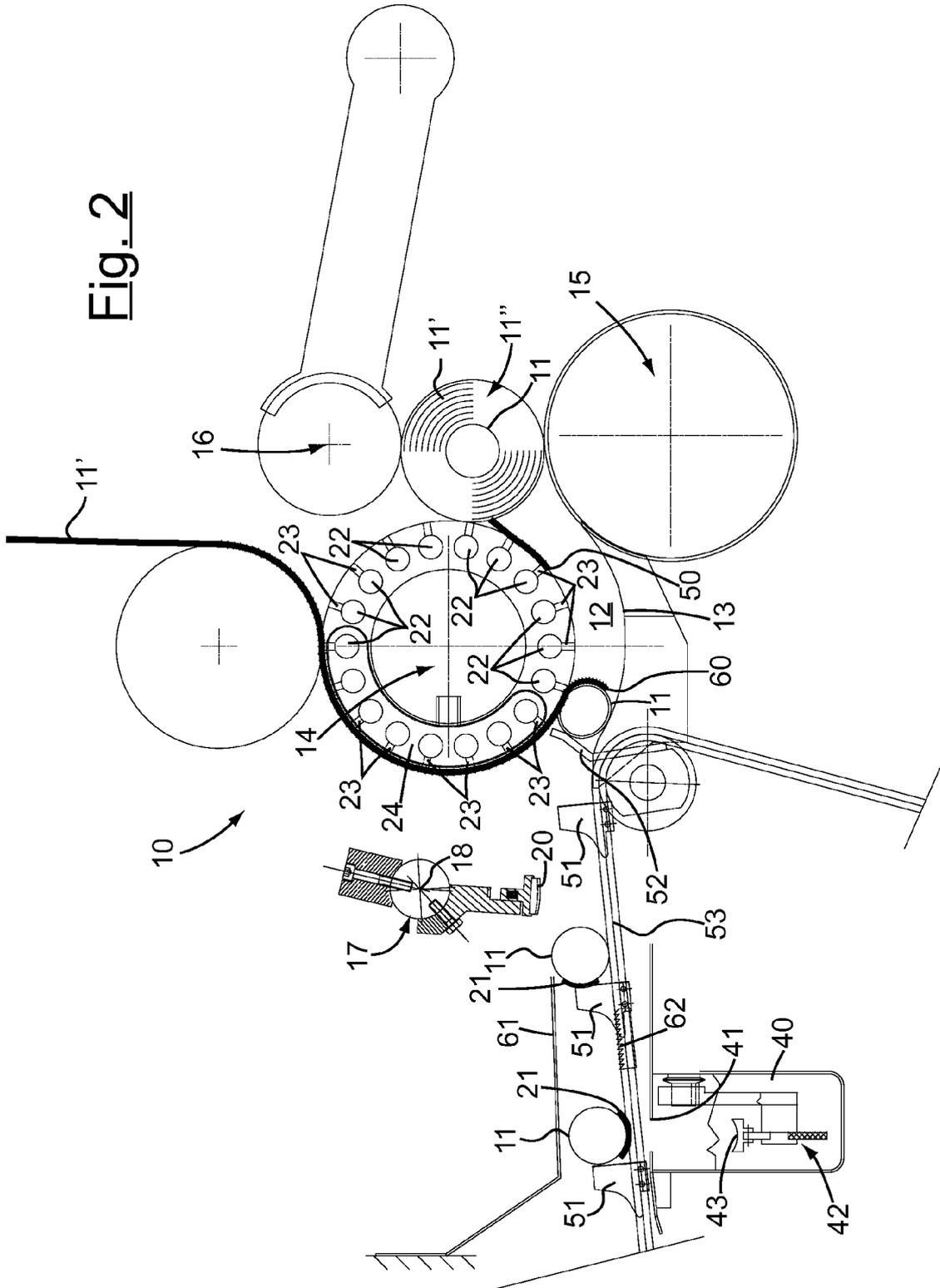
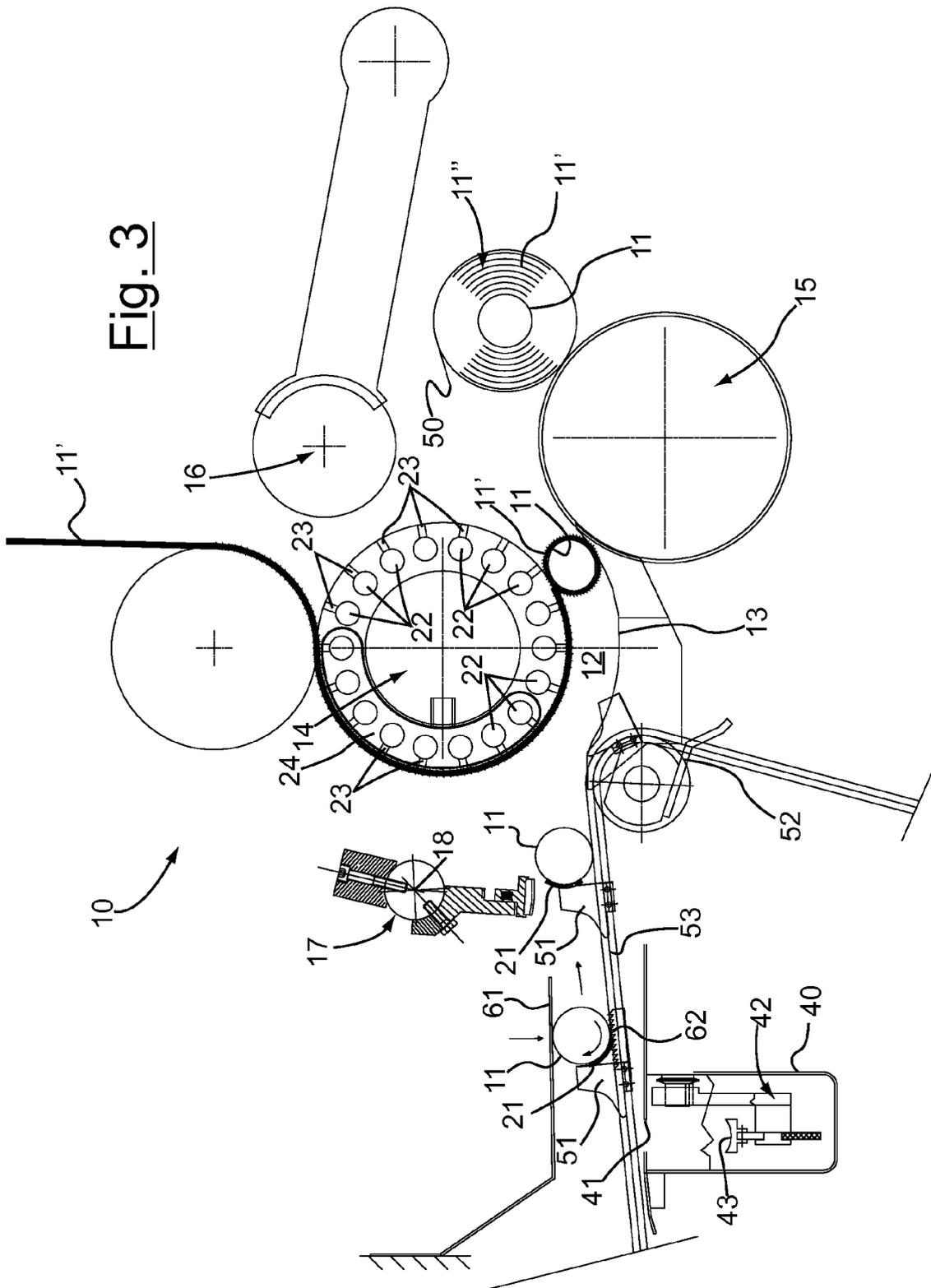
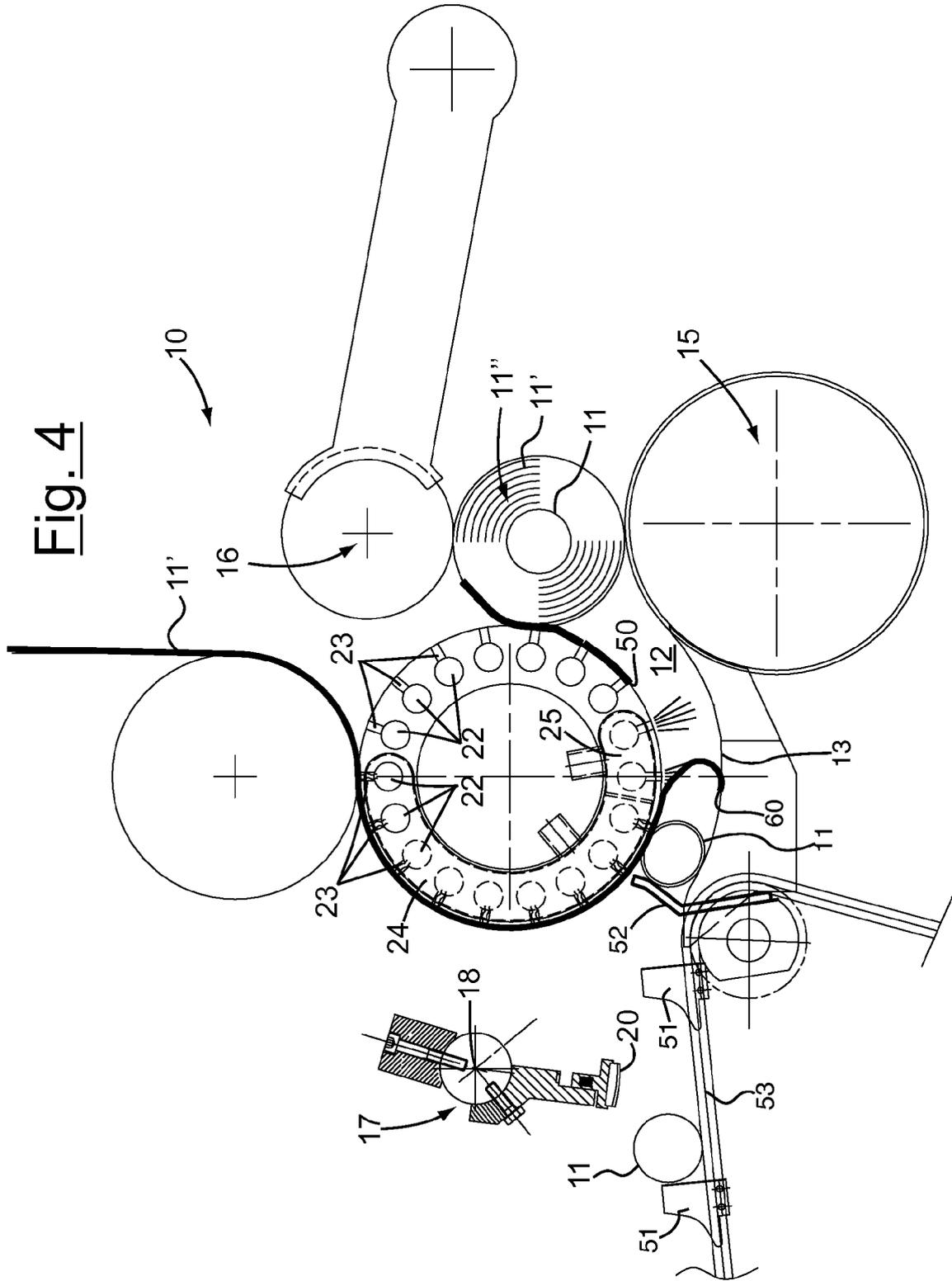
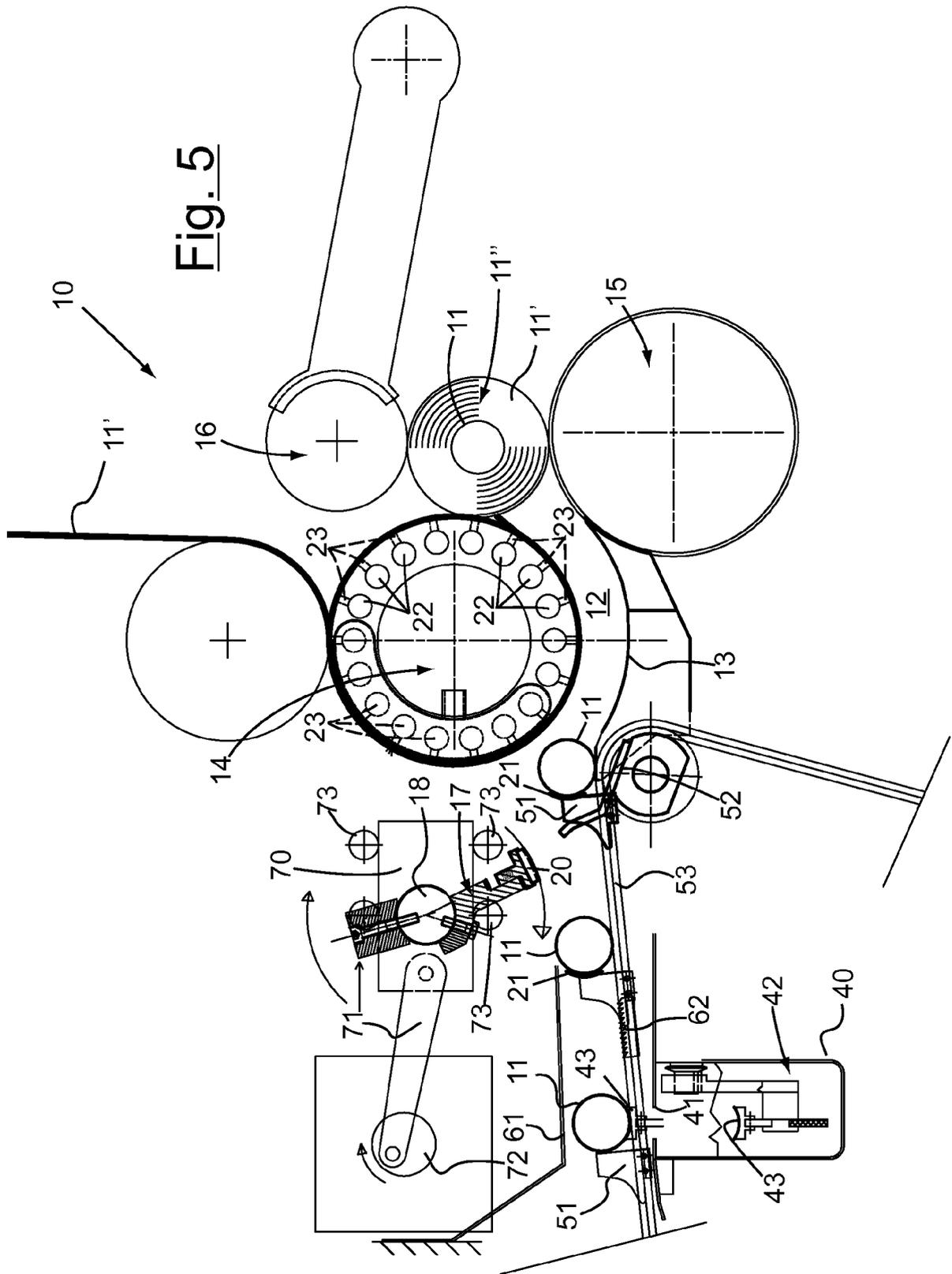


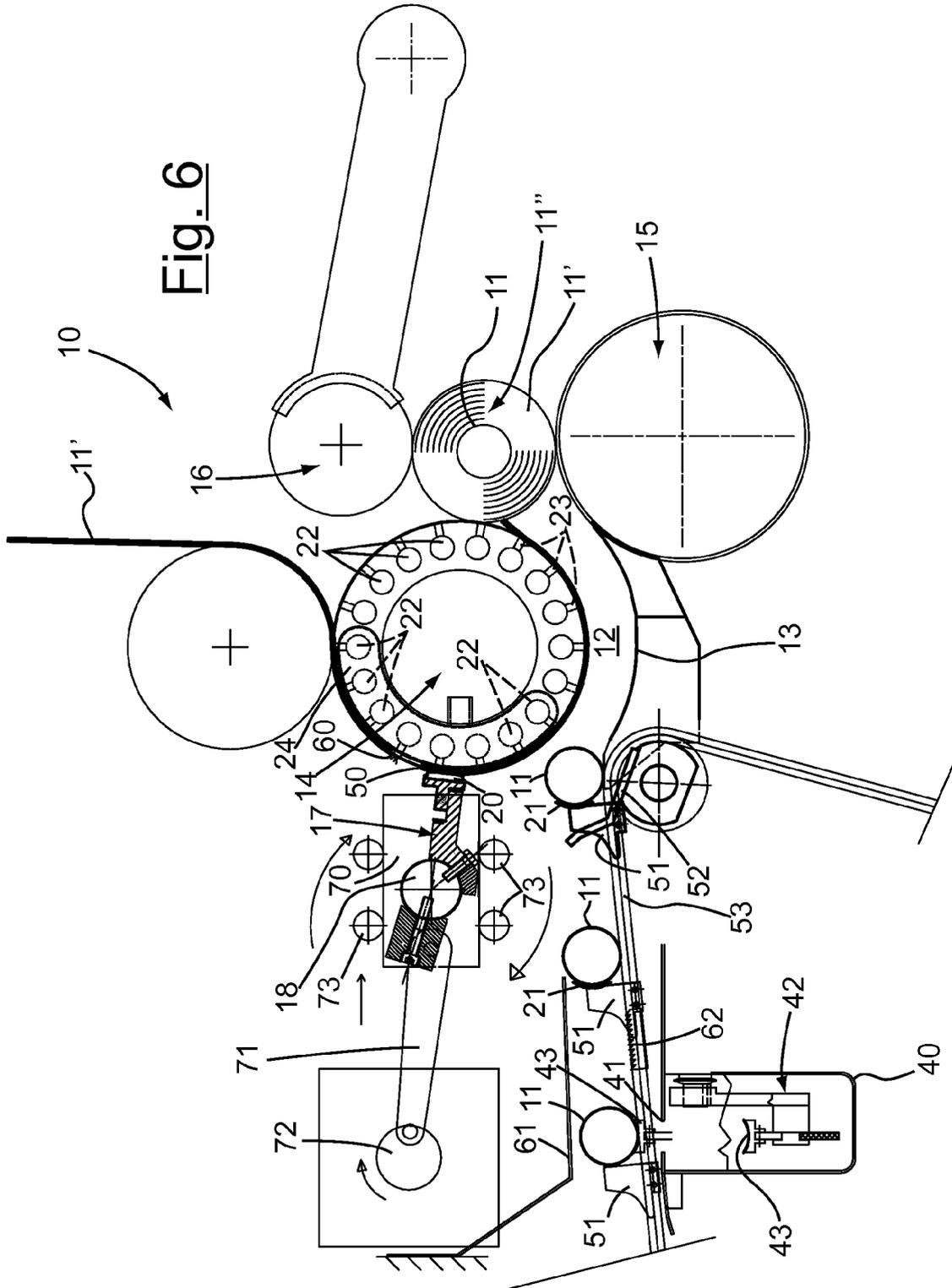
Fig. 2

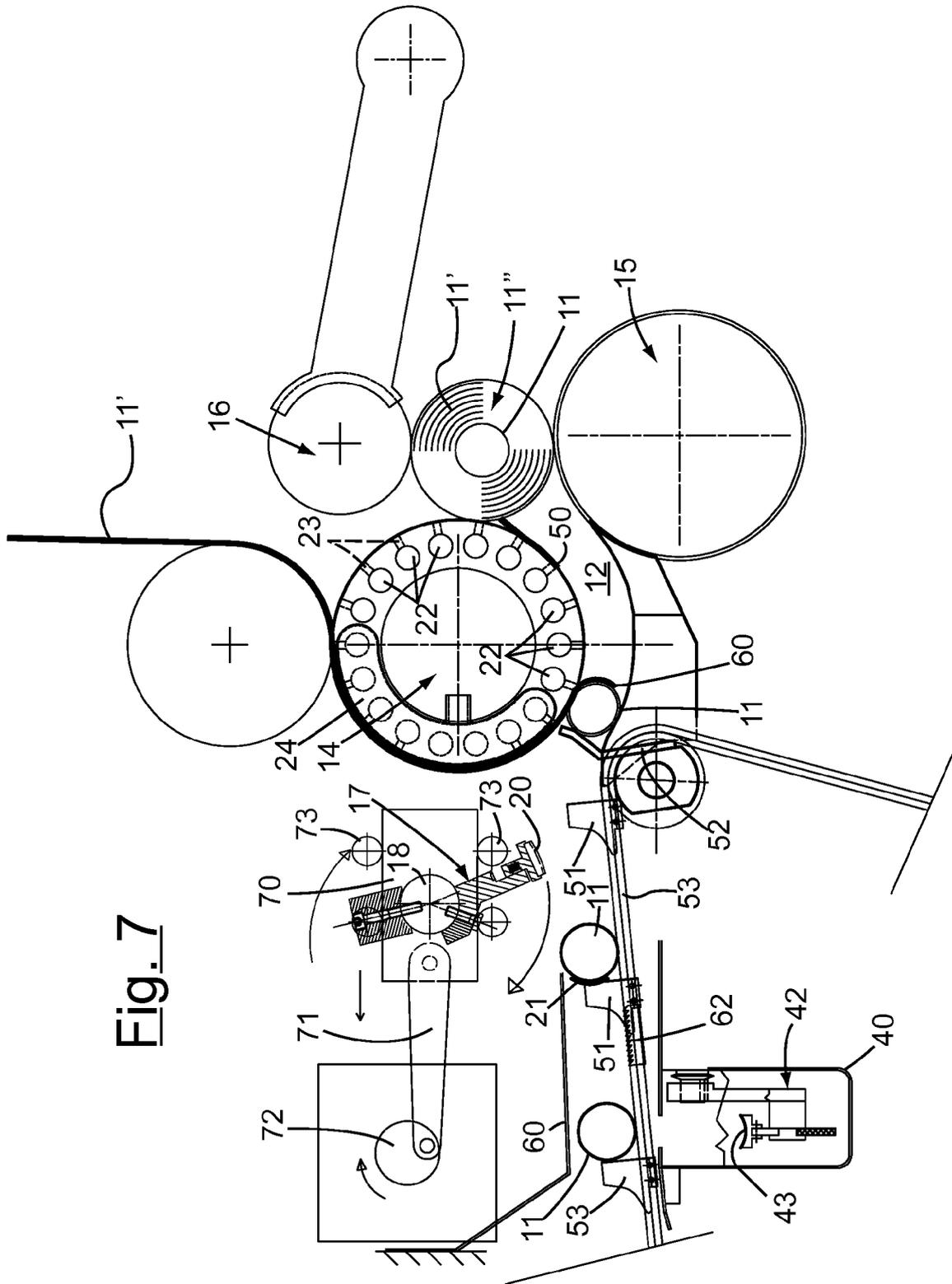


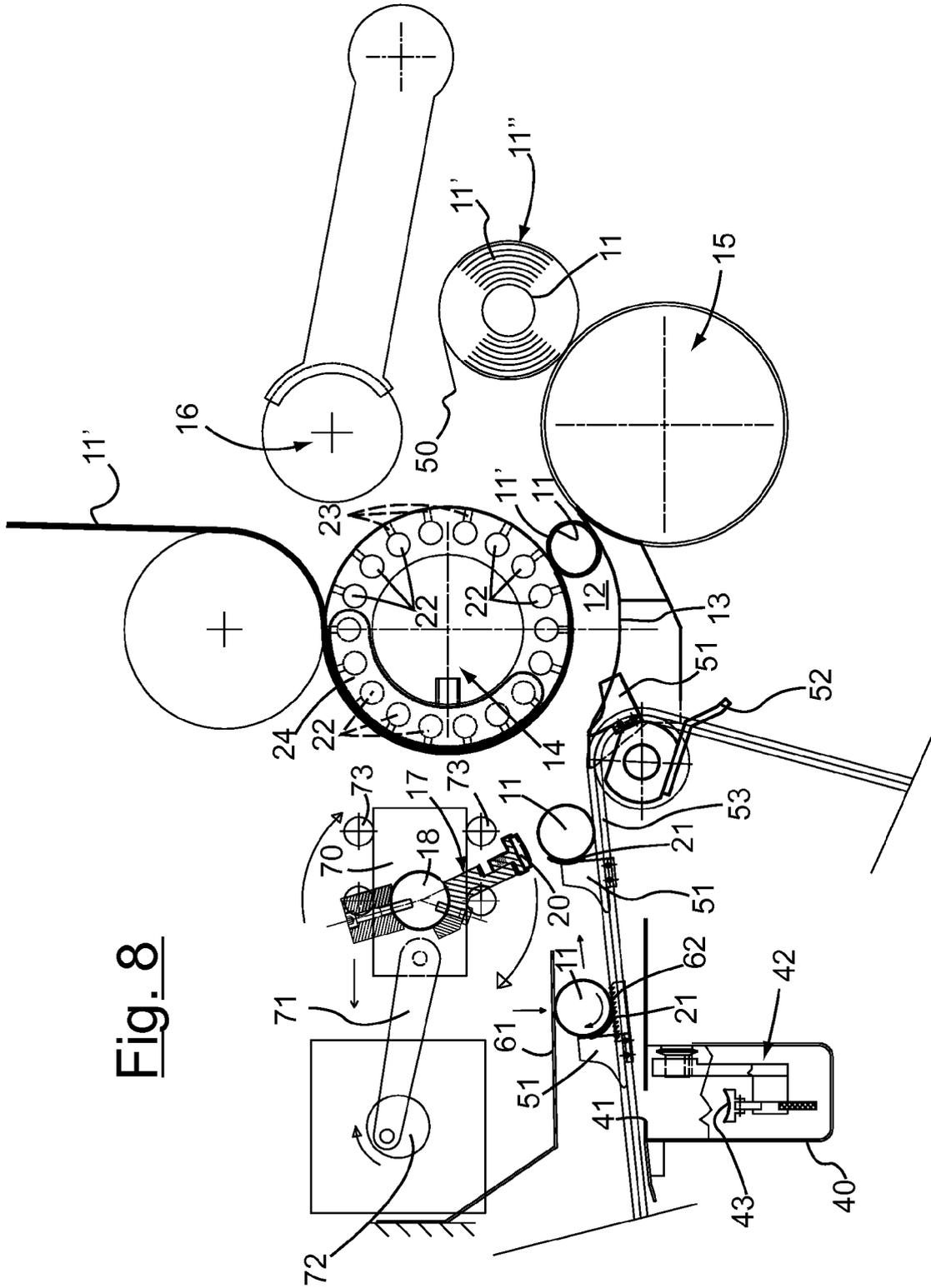












**Fig. 8**



EUROPEAN SEARCH REPORT

Application Number  
EP 09 18 0392

DOCUMENTS CONSIDERED TO BE RELEVANT				
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)	
A	EP 1 988 041 A (GAMBINI GIOVANNI [IT]) 5 November 2008 (2008-11-05) * the whole document *	1,11	INV. B65H19/26	
A	WO 94/29205 A (PERINI FABIO SPA [IT]; PERINI EVA [IT]) 22 December 1994 (1994-12-22) * page 8, line 7 - line 32; figures *	1,11		
A	US 2004/061021 A1 (BUTTERWORTH TAD T [US]) 1 April 2004 (2004-04-01) * paragraphs [0033], [0037], [0038]; figure 2 *	1,11		
A	US 5 769 352 A (BIAGIOTTI GUGLIELMO [IT]) 23 June 1998 (1998-06-23) * column 4, line 49 - column 5, line 22; figures *	1,11		
A	US 2003/037725 A1 (DAUL THOMAS J [US] ET AL DAUL THOMAS J [US] ET AL) 27 February 2003 (2003-02-27) * paragraph [0072] * * paragraph [0093] - paragraph [0098]; figures 1-10 *	1,11		TECHNICAL FIELDS SEARCHED (IPC)
A	US 4 723 724 A (BRADLEY JOHN J [US]) 9 February 1988 (1988-02-09) * column 11, line 46 - column 12, line 14; figures 12-15 *	1,11		B65H
A	WO 2007/141819 A (PERINI FABIO SPA [IT]; MADDALENI ROMANO [IT]; BENVENUTI ANGELO [IT]; M) 13 December 2007 (2007-12-13) * page 14, line 15 - page 15, line 27; figures 2A-F *	1,11		
The present search report has been drawn up for all claims				
Place of search		Date of completion of the search	Examiner	
The Hague		9 April 2010	Haaken, Willy	
CATEGORY OF CITED DOCUMENTS				
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2  
EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.

EP 09 18 0392

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

09-04-2010

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 1988041	A	05-11-2008	US 2008272223 A1	06-11-2008
-----				
WO 9429205	A	22-12-1994	AT 161796 T	15-01-1998
			AU 6981194 A	03-01-1995
			BR 9406768 A	21-02-1996
			CA 2164870 A1	22-12-1994
			CN 1124947 A	19-06-1996
			DE 69407820 D1	12-02-1998
			DE 69407820 T2	03-09-1998
			EP 0738231 A1	23-10-1996
			ES 2111308 T3	01-03-1998
			FI 955835 A	29-01-1996
			GR 3026093 T3	29-05-1998
			IL 109718 A	10-06-1997
			IT 1265867 B1	12-12-1996
			JP 3428019 B2	22-07-2003
			JP 9501385 T	10-02-1997
			PL 311960 A1	18-03-1996
			RU 2120399 C1	20-10-1998
-----				
US 2004061021	A1	01-04-2004	AU 2003276965 A1	19-04-2004
			BR 0314791 A	26-07-2005
			CA 2500110 A1	08-04-2004
			EP 1554202 A2	20-07-2005
			MX PA05003467 A	03-06-2005
			WO 2004028938 A2	08-04-2004
			US 2005087647 A1	28-04-2005
-----				
US 5769352	A	23-06-1998	AT 184256 T	15-09-1999
			AU 2751695 A	05-01-1996
			BR 9508005 A	18-11-1997
			CA 2192992 A1	21-12-1995
			CN 1150786 A	28-05-1997
			DE 69512072 D1	14-10-1999
			DE 69512072 T2	25-05-2000
			EP 0770028 A1	02-05-1997
			ES 2136296 T3	16-11-1999
			FI 964955 A	11-12-1996
			GR 3031635 T3	29-02-2000
			IL 114069 A	17-02-2000
			WO 9534498 A1	21-12-1995
			IT FI940124 A1	18-12-1995
			JP 3587527 B2	10-11-2004
			JP 10501786 T	17-02-1998
			KR 100202229 B1	15-06-1999
			PL 317756 A1	28-04-1997

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 09 18 0392

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The members are as contained in the European Patent Office EDP file on  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

09-04-2010

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 5769352	A		RU 2128617 C1	10-04-1999
US 2003037725	A1	27-02-2003	NONE	
US 4723724	A	09-02-1988	AU 582640 B2	06-04-1989
			AU 5608486 A	23-10-1986
			BR 8601740 A	23-12-1986
			BR 8601741 A	23-12-1986
			BR 8601742 A	23-12-1986
			CA 1307512 C	15-09-1992
			DE 3666575 D1	30-11-1989
			DE 3666576 D1	30-11-1989
			DE 198495 T1	05-02-1987
			DE 199285 T1	05-02-1987
			DE 199286 T1	05-02-1987
			EP 0198495 A2	22-10-1986
			EP 0199285 A2	29-10-1986
			EP 0199286 A2	29-10-1986
			MX 167735 B	12-04-1993
WO 2007141819	A	13-12-2007	CA 2654353 A1	13-12-2007
			CN 101466626 A	24-06-2009
			EP 2027050 A1	25-02-2009
			JP 2009539724 T	19-11-2009
			KR 20090016766 A	17-02-2009
			US 2009173819 A1	09-07-2009

**REFERENCES CITED IN THE DESCRIPTION**

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**Patent documents cited in the description**

- WO 9421545 A1 [0007]
- EP 1262434 A1 [0009]