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(54) **Method for holding a label or a protector to a side surface of a piece to be wrapped**

(57) Method for holding in its place a label or protector (3) placed against a side surface of a piece to be wrapped (1), wherein an air jet is directed to the label or protector (3) and under this influence the label or protector (3) is pressed against the end. Means (4a to 4c) for producing the air jets are placed for example in a stationary position or the piece to be wrapped (1) is conveyed by a transfer carriage to which the means for pro-

ducing the air jets are placed and arranged to hold at least one label or protector (3) in its place. Alternatively, the piece to be wrapped (1) is transferred by means of a conveyor or a transfer carriage and the means for producing the air jets are placed along this route in a stationary position and are arranged to hold in its place at least one label or protector (3) that moves along with the piece to be wrapped (1).

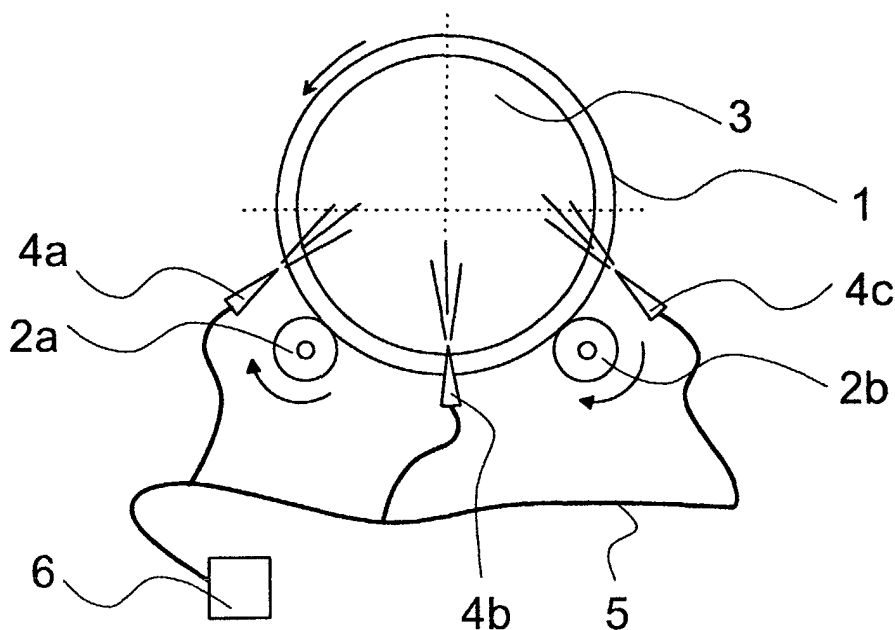


Fig. 1

Description

[0001] The present invention relates to a method according to the preamble of claim 1 for holding in its place a separate piece placed against the side surface of a basic piece.

[0002] According to prior art for example substantially cylindrical pieces, especially rolls in which different paper grades have been wound as a continuous web, are wrapped into a transparent stretch film. The purpose of the wrapping is to protect the piece from external mechanical effects, from the dirt in the environment as well as from other impurities and moisture. The material wound on the roll is for example printing paper, copying paper or soft tissue.

[0003] The stretch film is typically an elastic, transparent film made of plastic material that is wrapped around the outer shell of a piece and typically around the end surfaces of the same as well. For the purpose of wrapping the shell, there are radial wrapping apparatuses in use, in which a horizontal piece is rotated around a longitudinal axis, for example by means of rotating rolls or a cradle formed on a belt. The film roll is typically transferred in parallel to the longitudinal axis of the piece, so that the entire shell surface would be covered. The tight film also stretches on top of the end, which is thus at least partly protected. There are known axial wrapping apparatuses or circumferential wrapping apparatuses for wrapping of shell and end surfaces, in which apparatuses the film roll orbits the piece typically at the same height with the horizontal longitudinal axis of the piece, and at the same time the piece is rotated around the longitudinal axis. The piece may contain both axial and radial layers, between which protective layers made for example of bubble wrap, have possibly been placed.

[0004] The piece is conveyed or transferred to the wrapping apparatuses by means of different kinds of conveyors or automatic transfer carriages. The conveyors include for example different belt, roll or slat conveyors, on top of which the roll rests and is supported thereto from one or more points. The roll can be conveyed both in the longitudinal direction and transversely. A section of the conveyor can also be placed in a transfer carriage that conveys the roll. The transfer carriage can also contain a lifting table, on the support of which the piece rests, and thus especially a roll can be easily lowered on the support of said rotating rolls, or lifted up from the same after the wrapping is finished.

[0005] Especially rolls containing different kinds of paper grades, even sensitive paper grades, are equipped with different kinds of end protectors and labels, the purpose of which is to protect the roll even more for example from different kinds of mechanical effects that also occur during the wrapping and by the influence of the wrapping film. Protection from light is also possible by means of a transparent protector. Typically the protector has a round shape, and its diameter is equal or smaller in size than the reel. The protectors are for example made of

more rigid and stronger paper grades, such as cardboard or paperboard. The protectors often also contain variable information relating to the product that can be read from underneath the transparent film layer.

[0006] The attachment of the protectors is, however, problematic, because the adhesion of the same must be secured by means of adhesives or different kinds of adhesive tapes. Especially adhesives dirty the end of the roll, and at the same time the edge of the material can become dirty throughout the entire length of the web. Mechanical attachment, on the other hand, breaks and tears the material in the roll.

[0007] The protector can also be attached on top of one or more wrapping film layers, whereafter it is possible to continue the wrapping process. In this case the disadvantage that occurs is that the wrapping process is interrupted, which decelerates and disturbs especially continuous automatic production. In addition, it is necessary to install robots or devices that take care of the automatic placement and attachment of the protectors.

[0008] The protector can, of course, be attached to the piece only after the wrapping, but in such a situation it will not protect the piece from the mechanical effects caused by the wrapping film and the wrapping process. The protector attached on the film layers is more easily detached during transport and handling, wherein it must be attached in a more durable and reliable manner. Thus the amount of work is increased, larger amounts of adhesives must be used, or the adhesives must be more effective. Large amounts of adhesives are also a problem in view of work safety. If the protector is detached, the information contained therein is also lost.

[0009] It is a purpose of the present invention to eliminate the aforementioned problems and to introduce a new method for holding the protectors in their place so that the protectors could be attached to the piece as early as possible and in such a manner that the piece is not damaged. Thus, it is possible to protect for example the ends of a roll also during transport and transfers, which enables the use of the protectors also as temporary protectors, because as a result of the invention both manual and mechanical placement and detachment can be conducted quite easily and rapidly, without interfering with the rest of the process. The components necessary in the invention are known and easily available.

[0010] The method according to the invention is presented in claim 1.

[0011] A central principle of the invention is the use of air jets for holding end labels, protectors or the like in their place against the ends of rolls or other pieces to be wrapped. Air jets are used both during the transfers of the piece as well as during wrapping.

[0012] The apparatus according to the invention can be easily and rapidly constructed to handle varying situations, because in a factory environment pressurized air is readily available. The act of installing and directing the nozzles used for the production of air jets is a simple and rapid process that can be easily tested by means

of practical experiments.

[0013] By means of a special embodiment of the invention it is possible to hold the end labels of moving rolls even though the air nozzles are installed in a stationary position.

[0014] By means of the invention it is possible to avoid the use of different attachment and gluing methods, and especially the use of adhesives. It is not necessary to interrupt the wrapping process, and the end label also protects the roll when the wrapping is started and before the wrapping process. By applying different kinds methods for installing the water jets, it is possible to hold the protector when the roll is placed on a conveyor or a transfer carriage, when the roll is transferred to a wrapping apparatus, when it moves from conveyors to a wrapping apparatus and when the rotation of the same begins to start the wrapping process.

[0015] In the following description the invention will be described in more detail, using as an example a roll that constitutes the basic piece and the unit load, and a protector mounted thereon. At the same time reference is made to the following drawings, in which:

Fig. 1 shows in a reduced end-view the act of applying the apparatus according to the invention in connection with rotating a roll,

Fig. 2 shows in a reduced top-view the act of applying the apparatus according to the invention in connection with a transfer carriage that conveys the roll,

Fig. 3 shows in a reduced side-view the act of applying the apparatus according to the invention in connection with a conveyor that transfers the roll, and

Fig. 4 shows the apparatus according to Fig. 3 in a top-view.

[0016] Fig. 1 shows a reduced principle view of the invention, in which only the essential aspects of the different structures have been shown. The technique used for the transfer and rotation of the roll is known as such, and thus the operation of the same will not be discussed in more detail in this context. A paper roll 1 is used as an example. The roll 1 is rotated around its longitudinal axis by means of two rotating rollers 2a, 2b. The rollers 2a, 2b are rotated by motor means around axes of rotation that are parallel to the longitudinal axis of the roll 1. The rotating apparatus is known as such and comprises for example the necessary frame structure. A continuous belt can also be passed via the rollers 2a, 2b that are typically longer than the roll 1, wherein the roll 1 rests on the support of the belt, and smaller surface pressures are attained.

[0017] Against the end of the roll 1 an end protector 3 has been placed for example manually or automati-

cally by means of an apparatus, said end protector covering the end of the roll 1 either entirely or partly. The diameter of the end protector 3 is preferably equal or smaller in size than the diameter of the roll 1, wherein opposite air jets do not hit the protector 3 that extends over the edge of the roll 1.

[0018] The protector 3 is held against the roll 1 by means of the force effect exerted by the pressure of the air jets on the protector 3. The air jets are produced by means of air nozzles 4a to 4c, known as such, that are attached to a pneumatic hose or pipe 5 for example by means of the frame part. Fig. 3 shows air jets 12a, 12b by way of example. The number of nozzles can vary in different embodiments, so that a sufficient force effect is attained, preferably throughout the protector 3. Preferably, the air jets of the nozzles 4a to 4c are directed perpendicularly or obliquely towards the protector 3. By means of the oblique orientation it is possible to control it better in which direction the air jet exits along the protector 3. The friction between the roll 1 and the protector 3 for its part helps to keep the protector 3 in its place, even if the jet would be obliquely orientated. The aim is to direct each air jet in such a manner that it does not interfere with another air jet or reverse its force effect. The pressurized air supplied to the pipework 5 is controlled with pneumatic means 6 that typically comprise a pressure source, a valve system and control electronics, if necessary. By means of the valve system it is possible to control the air supply of the nozzle group 4a to 4c. The frame part can also be a valve that is controlled electrically or mechanically to an opened and closed position, wherein it is possible to control the air supply of an individual nozzle 4a, 4b or 4c. If the consumption of pressurized air is to be reduced, the roll 1 can during its movement switch on one or several nozzles, wherein different kinds of switches and responses are used that are placed to a suitable location. The control system of the conveying or wrapping apparatus can control and time the function of the nozzles. The necessary configuration varies, but on the basis of this description the selection of components, as well as the assembly and installation of the system is obvious for anyone skilled in the art.

[0019] The apparatus 1 used in Fig. 1 can be applied in connection with radial wrapping, axial wrapping and circumferential wrapping, as long as the nozzles 4a to 4c are located outside the travel path of the devices included in the wrapping apparatus. In Fig. 1 the nozzles 4a to 4c are fixed to a stationary position, for example to the frame of the rotating apparatus or wrapping apparatus. By adding extra air nozzles it is also possible to hold the protectors 3 when the roll 1 is transferred from the conveyor on top of the rolls 2a, 2b. If necessary, there are additional mechanical springs or supports that make sure that the protector remains in its place.

[0020] In Fig. 2 the air nozzles 4d to 4g are attached to an automatic transfer carriage 7 that has a power source of its own for the movement. The roll 1 is con-

veyed in the carriage 7 in a horizontal position, and the end protector 3 placed against each end is held in its place by means of air jets. The necessary pipeworks 5 and pneumatic means 6 can be placed in the transfer carriage 7. The nozzles 4d to 4g are located inside the structures of the carriage 7, on top of the carriage 7 on the level of the reel 1, or in both of these, depending on the directions in which the roll is removed from the carriage. The carriage 7 contains for example a lifting table by means of which the roll 1 is lowered on the rollers 2a, 2b of Fig. 1, when the carriage 7 is located therebetween. The roll 1 can also be rolled sideways away from the carriage 7. It is, of course, possible to consider that the nozzles 4d to 4g are attached to another moving carriage or for example to a conveyor above the same that follows the carriage 7. Said embodiment is only suitable for special cases, because the installation of an extra conveyor will cause costs. Similarly, it is possible to monitor the roll 1 moving on different conveyors. The roll 1 can thus be moved both in the longitudinal direction and sideways.

[0021] In Fig. 3 a series of air nozzles 4h to 4o are attached to a fixed stationary position, wherein it is possible to hold the roll 1 transferred on a conveyor 8 or in a transfer carriage according to Fig. 2. The attachment is made to the roof structures, stands or other available support and frame structures. Preferably, the transfer takes place in the longitudinal direction and the nozzles 4h to 4k are directed towards the direction of motion, if the protecting label 3a positioned in the front end is being held. Furthermore, the nozzles 4l to 4o are directed towards the direction of motion, if the protector label 3b placed at the rear end is being held. Fig. 3 shows only four air nozzles, but their distance from each other can vary, and they have been placed along the entire transfer path. The principle is that all the time a sufficient number of air jets hit the protector label 3, even if the roll 1 would cover some of the jets. The roll covers the oppositely directed jets, which thus do not interfere with the function of the other jets. The optimal placement is discovered for example by means of experiments, and there may be several nozzles at the same point. The nozzle that blows to the opposite direction, for example air nozzle 4i does not detach the end label 3b, because the roll 1 protects the label 3b and directs the air current away, and because the edge of the label 3b does not extend over the edge of the roll 1. The air nozzles are connected to each other by means of a pipework 5 and pneumatic means 6, and there may be several of them. It is also possible to embed air nozzles in the conveyor 8 or below the floor level in accordance with the nozzles 9a, 9b shown in the drawing (with broken lines), which provides an alternative way of placing the nozzles 4h to 4o or the additional nozzles.

[0022] Fig. 4 shows in more detail the placement of the air nozzles 4h to 4k and 4l to 4o in the embodiment according to Fig. 3, and seen from above. In order that the jets to different directions would interfere with each

other as little as possible, they are placed in different lines 10a and 10b that are directed in parallel to the travel direction of the roll 1. The air nozzles are directed substantially in parallel with the lines. It is possible to interlock several lines in a manner similar to the additional lines 11a, 11b (shown with a broken line), wherein it is possible to increase the force effect or an air jet can be directed throughout a wide protector 3 as well. The air nozzles or additional nozzles can be placed in accordance with the nozzles 9a, 9b of Fig. 3.

[0023] The invention can also be applied in connection with other pieces on the basis of the examples above. Said basic pieces can be unit loads, for example cubical pallet loads that are transported and wrapped, if necessary, wherein they are possibly rotated around a vertical axis of rotation. Generally, a continuous surface or a surface of with another kind of shape is required, against which the protector is held in its place. The protector can be supported from its lower part against a carriage or a conveyor, but preferably it is supported entirely on the support of air jets, wherein the lower part does not stick anywhere.

[0024] The surface is not necessarily the end of the piece, but for example a vertical or curved side surface, from which the label or protector easily falls off under the effect of gravity. The straight end surface or curved shell of the roll both constitute said side surfaces. The purpose of the protector is merely to transmit information, wherein by means of the air jet according to the invention it is also possible to hold such labels in their place that are especially left underneath wrapping films at different stages of the handling and packing of the piece. Generally, the method is suitable for holding different kinds of separate pieces in their place against a basic piece, wherein the separate piece is especially a coated piece or label made of different paper grades, paperboard, cardboard or plastic.

[0025] The invention is not restricted solely to the above-presented preferred embodiments, but it can be modified within the scope of the appended claims.

Claims

1. A method for holding in its place a separate piece (3) placed against a side surface of a basic piece (1), wherein an air jet (12a, 12b) is directed to the separate piece (3) and under this influence the separate piece (3) is pressed against the side surface of the basic piece, and remains in its place, **characterized in that** said basic piece (1) is at the same time conveyed by an automatic transfer carriage (7) to which the means (4d to 4g) for producing the air jets are placed.
2. The method according to claim 1, wherein said separate piece (3) is also held by means of said same means (4d to 4g) during stretch film wrapping of the

basic piece (1), where it is transported by means of said carriage (7), and said basic piece (1) is at the same time rotated around its horizontal longitudinal axis (X).

3. The method according to claim 1 or 2, wherein said basic piece (1) is a paper roll and said separate piece (3) is an end protector of the paper roll or a label to be attached to the paper roll.
4. A method for holding in its place a separate piece (3) placed against a side surface of a basic piece (1), wherein an air jet (12a, 12b) is directed to the separate piece (3) and under this influence the separate piece (3) is pressed against the side surface of the basic piece, and remains in its place, **characterized in that** said basic piece (1) is at the same time transferred by means of a conveyor (8) or an automatic transfer carriage (7) that is followed by another conveyor or automatic transfer carriage, in which the means (4h to 4o) for producing air jets are placed.
5. The method according to claim 4, wherein said separate piece (3) is held by means of said means (4d to 4g) also during stretch film wrapping of the basic piece (1), where it is transported by means of said conveyor (8) or said carriage (7), and said basic piece (1) is at the same time rotated around its horizontal longitudinal axis (X).
6. The method according to claim 4, wherein said basic piece (1) is conveyed in a direction parallel to its longitudinal direction (X) or in a direction transverse to its longitudinal direction (X).
7. A method for holding in its place a separate piece (3) placed against a side surface of a basic piece (1), wherein an air jet (12a, 12b) is directed to the separate piece (3) and under this influence the separate piece (3) is pressed against the side surface of the basic piece and remains in its place, **characterized in that** said basic piece (1) is at the same time conveyed by means of a conveyor (8) or transfer carriage (7) along whose path the means (4d to 4g) for producing the air jets are placed in a stationary position and arranged to hold said separate piece (3) in its place, said separate piece moving along with the basic piece (1).
8. The method according to claim 7, wherein several air jets (12a, 12b) are placed along said route within a distance from each other, wherein they are directed to opposite directions in relation to each other in such a manner that one said separate piece (3) can be held against one side surface of the basic piece (1) or two said separate pieces (3) can be held against the opposite side surfaces of the basic

piece (1).

9. The method according to claim 7, wherein the first air jets (12a) directed to the same direction are all placed on substantially the same first line (10a) that is substantially parallel to the longitudinal direction (X) as well as the travel direction of said basic piece (1) in such a manner that said side surface is located transversely in relation to said longitudinal direction (X) and travels either in front of said basic piece (1) or after the same, and wherein the second air jets (12b) directed to the opposite direction are all placed on the same second line (10b) that is located within a distance from the first line (10a), wherein said air jets (12a, 12b) hold one separate piece (3) in its place, irrespective of the fact whether said separate piece is located in the front of or behind said basic piece (1).
10. The method according to any of the claims 7 to 9, wherein said separate piece (3) is placed manually or automatically to a side surface of the basic piece (1), said separate piece being equal or smaller in size than said side surface.
11. The method according to claim 9, wherein said air jets (12a, 12b) are directed in such a manner that said basic piece (1) during its movement at the same time covers the first air jet (12a), thus preventing the access of the same to said side surface that moves towards the second air jet (12b), thereby allowing a less obstructed access of the second air jet (12b) to said side surface.
12. The method according to claim 9, wherein said air jets (12a, 12b) are directed in such a manner that said basic piece (1) during its movement at the same time covers the second air jet (12b), thus preventing the access of the same to said side surface that moves away from the first air jet (12a), thereby allowing a less obstructed access of the second air jet (12a) to said side surface.
13. The method according to claim 7 to 12, wherein said air jets (12a, 12b) are used that are directed obliquely towards said side surface.
14. The method according to any of the claims 7 to 12, wherein the basic piece (1) is a unit load composed especially of a cylindrical roll made of a continuous web, that is suitably made of paper material.

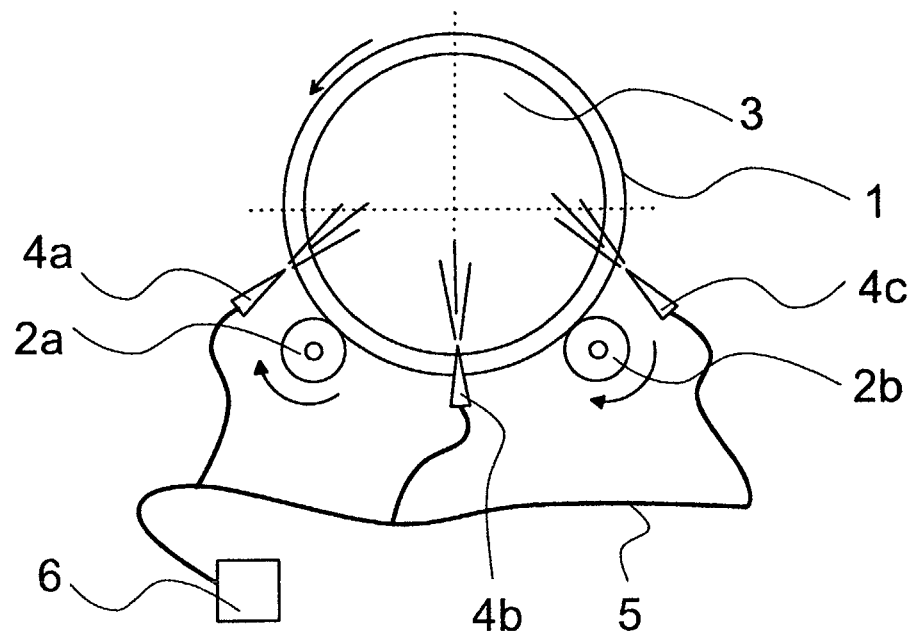


Fig. 1

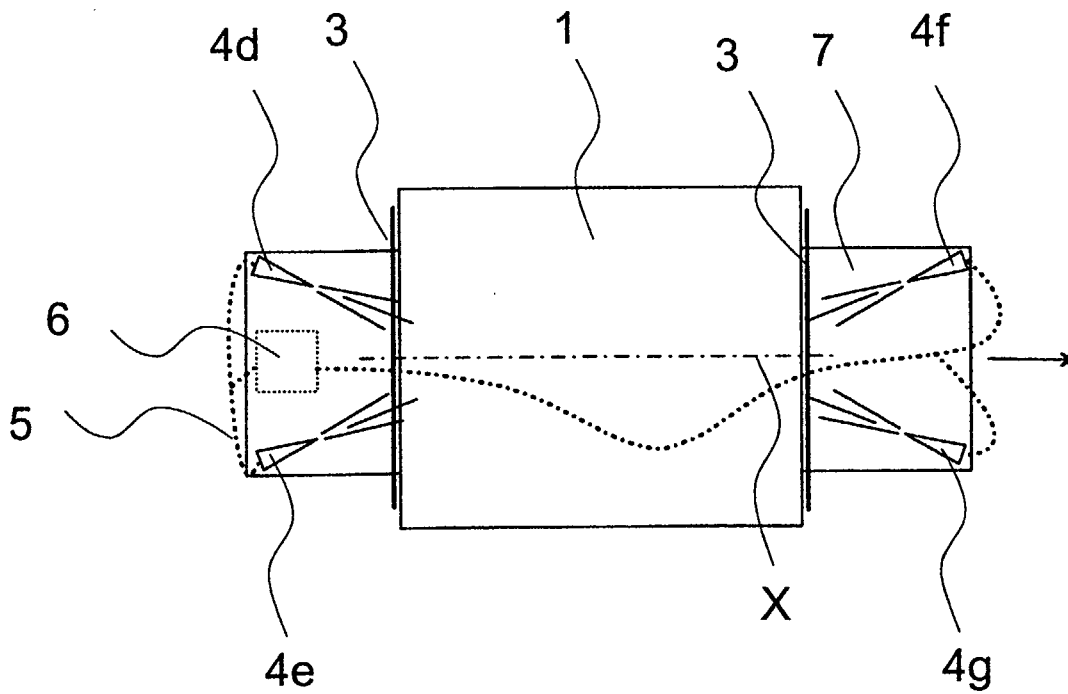


Fig. 2

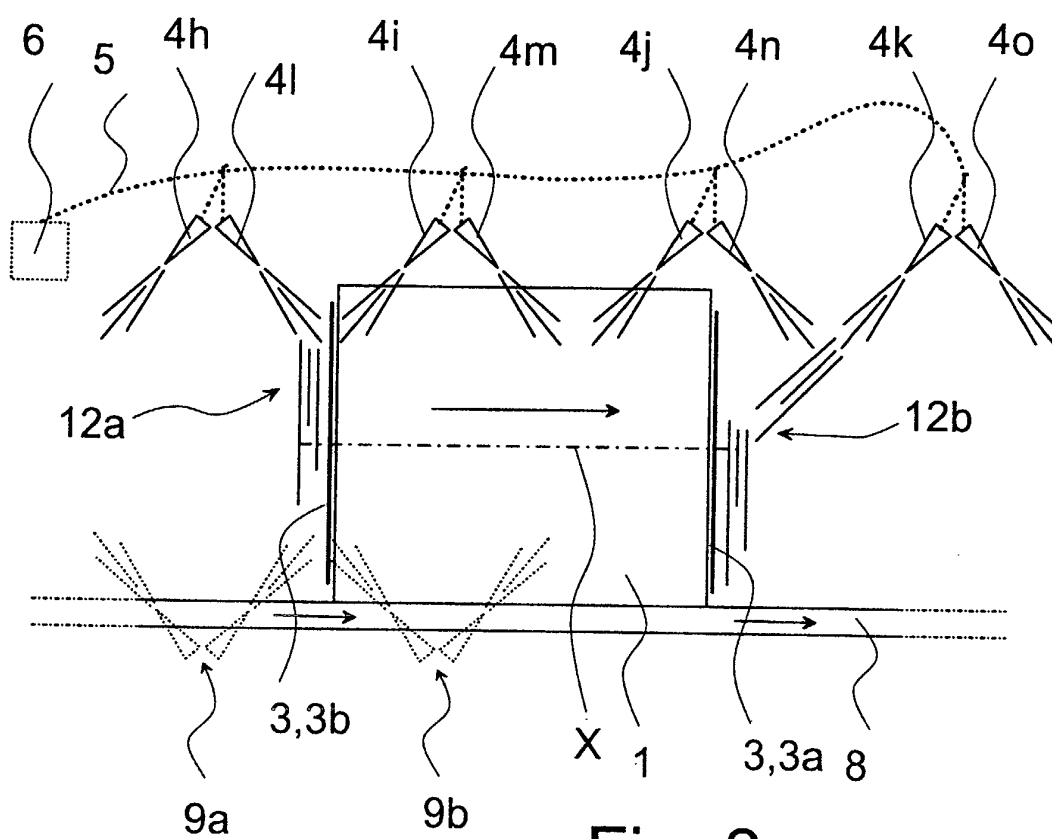


Fig. 3

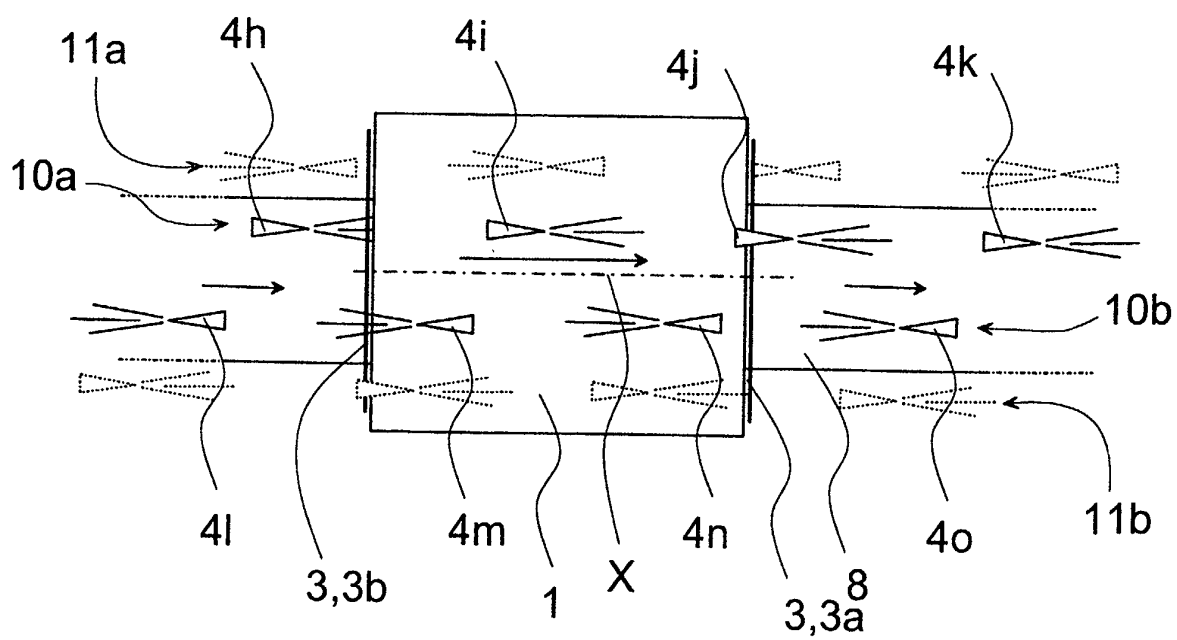


Fig. 4



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Place of search		Date of completion of the search	Examiner
MUNICH		3 December 2002	Johne, O
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