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(54) **DEVICE IN A REEL-UP IN A PAPER MACHINE**

VORRICHTUNG IN EINER WICKELEINRICHTUNG IN EINER PAPIERMASCHINE

DISPOSITIF D'UNE ENROULEUSE DE MACHINE A PAPIER

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Description

[0001] The present invention relates to a device for applying an adhesive agent onto a paper web in a reel-up in a paper machine when changing web rolls, in which reel-up the paper web is supported by a surface winding drum or a continuous belt and wound onto replacement web-roll cores or spindles in contact with the surface winding drum or the continuous belt in order to form the web rolls, said device including a supporting frame mounted on the stand of the reel-up, upstream of the surface winding drum or the continuous belt, and extending transversely to the machine direction, and a spray nozzle mounting rack supported by the supporting frame, extending transversely to the web across its entire width and comprising a plurality of nozzles.

[0002] Changing full-width reels in the present context refers to wrapping the entire width of the web around the reeling drum. Also, in the present context, reel is synonymous with web roll, and reeling drum is synonymous with web-roll core or spindle.

[0003] EP-A-0 765 832 discloses a glue-spreading device used when changing reels in a reel-up in a paper machine. When a reel is full a roll is moved to push the full reel into a change position. A new reel spool is lowered into the gap between two rolls by a change device. The web tip is cut by water nozzles and blown onto the new reel spool by blower means. An adhesive is sprayed onto the web tail feeding old reel at the same time as the web is cut off. The adhesive is spread just in front of the cut line and the web tail is glued onto the full reel to fix the tail into place. US-A-5 213 649 describes an apparatus for cross-cutting a web with a laser. The apparatus includes adhesive nozzles which are movable with the laser. The severed web has its trailing edge glued to a web roll being wound while the leading edge of the severed web can be glued to a new core.

[0004] In the last 15 years or so the speed of travel for tissue webs has not increased to any great extend and earlier developments as regards speed have evened out. This is considered to be a result of increasing demands for high-quality tissue and also of difficulties in maintaining the higher production speeds attained in other parts of the paper machine in its dry end also. These difficulties are caused, for instance, by increased vibration in the web at increasing speeds, and problems with web rupture encountered when threading while changing reels since tissue paper has low basis weight and low tensile strength. Threading means that a web end is pulled along through a paper or cardboard machine by a leader consisting of a strip of the web which may initially be e.g. 400-500 mm wide but gradually becomes wider until it extends across the entire width of the web. The leader is cut out in the continuous web, starting either at one edge or somewhere at an optional distance from either edge of the web, whereas its length is determined by the time it takes for the tip to extend across the entire width of the web. Due to the high web speed the leader may be very long, 180-200 m, and this incurs considerable costs for the paper mill since the cut part of the paper web must be discarded for each paper reel. Threading can be performed with cords, compressed air or manually in machines running at low speed.

[0005] Adhesive is often used, mixed with water to ensure that the leader adheres to a new reel core, or to the paper reel already started if a web rupture has occurred during reeling. The adhesive is applied either manually, using a large brush or spray gun, or automatically with the aid of glue nozzles, generally placed at one side of the paper web close to the primary arms. Serious safety aspects naturally arise as regards this manual application. Unsuccessful reel switching and the need to clean up after glue has been spilled during application, have a significant influence on the total capacity of the machine, particularly since the spilled glue forms lumps with the paper dust falling down as a result of machine vibrations and may thus constitute one of the reasons for the web ruptures nowadays occurring several times each shift.

[0006] Currently the safest and most efficient automatic threading means consists of a blower box which, with the aid of compressed air carries the leader to the nip between the new reeling drum and the surface winding drum.

[0007] Sanitary tissue products, usually manufactured of tissue paper, are extremely market-sensitive and the quality of the product is therefore often more important than its quantity. It is thus important that during reeling the paper reel acquires several important properties, i.e. homogeneity and lack of wrinkles, tears or folds. Furthermore, high efficiency in the following conversion machines can only be achieved if the reels of paper from the paper machine have a homogenous high quality.

[0008] Soft paper with low strength must be reeled carefully in order to keep the paper qualities such as density an elasticity as constant as possible throughout the reel. The two main parameters affecting reel density are web tension and radial pressure at the nip. Minimal nip pressure is essential in order to obtain the lowest possible average density.

[0009] The thickness and elasticity decrease from the outside of the reel towards its centre. This is because the compressive stress built up in the paper reel during reeling compresses the inner parts of the reel, thereby causing a loss of thickness in the inner web layers. This effect increases if the reel is stored for too long before being rewound or converted.

[0010] Reeling problems arise when a new reel of paper is commenced with the aid of the leader as mentioned above, since the web turns applied during winding of the innermost layers produce uneven radial growth axially along the reeling drum so that the reel becomes carrot-shaped. This reeling problem is caused partly by superelevation of the web and partly by the car-

rot shape produced resulting in the nip-pressure profile across the web being greatly elevated at the transition point of the web section and along the axial displacement of this section along the roll nip.

[0011] If the cross-sectional profile of the paper web differs as regards thickness, web tension or elasticity, as in the carrot shape described above, pleating, crushing damage, defects in the web and axial forces in the reel will occur at high nip pressure, which forces tend to displace the reeling axially along the reeling drum if the friction between the paper web and the reeling drum or the layers being applied is insufficient. This displacement may even in the worst case result in a web rupture, which is another reason for striving towards the lowest possible nip pressure. However, with low nip pressure slipping may occur in the direction of rotation between the surface winding drum and the reeling drum, as well as between the web layers and contrary aims therefore arise concerning the magnitude of the nip pressure. Slipping in the direction of rotation may also occur at web ruptures since these cause the web to become slack as a result of reduced web tension.

[0012] The now prevalent use of central driving of the reeling drum, however, reduces the risk of rotational slipping since the reel is then not driven only by the frictional force transmitted through a high nip pressure. However, other problems arising out of the carrot shape remain and it would therefore be a considerable step forward if a well-functioning change of full-width reels could be performed instead which does not give rise to said carrot shape.

[0013] When changing reels the web must wrap around the new empty reeling drum, whether reel switching is performed by threading or using full-width transfer. At high web speeds glue is nowadays always applied on the leader, which constitutes the most efficient method hitherto for transferring the continuous web or switching reels. However, at low web speeds full-width wrapping by means of balloon-blowing is a relatively usual method. Briefly, this entails creating a slack across the full width of the web by somewhat retarding the finished reel. With the aid of compressed air, the fold thus formed is then forced into the nip between the new reeling drum and the surface winding drum, after which the web is cut off. In order to increase the reliability of this type of reel switching, glue or tape is also applied, but only on the actual reeling drum before this comes into contact with the paper web. The reason for this is explained below. Regardless of the transfer method used for switching reels, it is extremely important that the glue is still adhesive when contact occurs between paper web and reeling drum. It is thus desirable to use the simultaneous and thus more reliable glue spraying for full-width reel switching as well. However, when applying glue by means of spraying, great care must be taken to avoid the glue being misdirected. In earlier attempts at full-width reel switching considerable problems have been encountered with the use of spray pipes across the machine direction because of the hitherto unavoidable and constant dripping of glue from the glue nozzles down onto the paper web below, causing the web layers to adhere to each other and the web to be torn during rewinding. This has prevented all installation of glue nozzles across the continuous web and a few nozzles as close to the nip as possible have had to be used. To reduce the risk of glue drops, the glue is often still applied entirely manually, using a brush for instance, that the machine operator must carry with him. Thus the main reason that automatic nozzles only function satisfactorily when switching reels with the threading method, but not with full-width reel switching, is that no efficient way has yet been found of spreading the glue to the middle of the web other than by manual application.

[0014] To enable reel switching at the considerably higher speeds now desired, the method usually used with threading must in some way be replaced by full-width reel switching.

[0015] Attempts have been made to apply glue with the aid of travelling devices passed across the continuous web during reel switching but this method does not permit complete full-width reel switching since the high web speed still results in a slanting web end so that the undesirable carrot shape is still obtained.

[0016] A key factor for efficient reel switching is thus the type of reel switching used. However, other important factors are control of the nip pressure and quality of the sleeve applied on the reeling drum. If a substandard sleeve, e.g. one with uneven thickness or strength, is pressed against the surface winding drum, the nip will be incompletely closed, sealing only at the places where the sleeve i thickest. The nip pressure must then be increased in order to completely close the nip, but the variations in compressive stress over the transverse profile still remain because of said differences in thickness in the sleeve. These pressure variations are of course greatly aggravated in the helical reeling resulting from threading.

[0017] The glue should preferably be applied as an aerosol since poorer result is obtained with a liquid jet. The nozzles are nowadays generally arranged on the primary arms, directed in towards the nip, since the.first turns on a new reeling drum generally occur here. A correct nip pressure is most essential during the initial reeling while the reel is still held in the primary arms, since its own weight is then still acting in the direction of the nip. During the secondary reeling, on the other hand, the growing weight of the reel is taken up by the stand rails. Too high a nip pressure will risk crushing the first layers of paper wound on and the nip-pressure control in the primary arms is also extra critical since., because of the leader, the nip width is relatively narrow during the first turns. Glue is sprayed for a brief moment on two occasions, first to facilitate wrapping of the leader around a new empty reeling drum and then, if desired, to attach the end of the web to the finished reel of paper when reel switching has been completed.

[0018] Another problem arising during reel switching when either a leader or a string of glue on only a small part of the paper web is used, is that the wrapping fold formed is too long. This wrapping fold occurs since only a small portion of the web width is glued to the new reeling drum, while the rest, constituting the majority, tends to fly off in the machine direction instead of wrapping around said reeling drum. For this reason balloon-blowing with compressed air is usually used to facilitate wrapping, although this unfavourably increases the number of machine parts in a critical area of the reel-up below the continuous paper web. It. is thus a distinct end in itself to have as little transverse equipment as possible in the area around the roll nip, i.e. to minimize the number of machine parts both because of the complications arising at a web rupture when the paper web falls down onto said parts and because this facilitates service and repairs, for instance.

[0019] A main object of the present invention is to provide an improved glue-spreading device for a reel-up in a paper machine, said glue-spreading device enabling full-width reel switching without risk of glue dripping down onto the paper web.

[0020] Another object of the invention is to provide a glue-spreading device in a reel-up that, despite increasing demands on tissue quality, is able to maintain the higher production speed achieved in other parts of the paper machine, in its dry end as well, by substantially reducing the problems associated with reel switching.

[0021] A third object of the invention is to provide a glue-spreading device which produces a finished paper reel that is homogenous, free from breaks and folds, and has uniform radial growth axially along the entire reeling drum, entailing a uniform cross-sectional profile as regards nip pressure, for instance, thereby enabling high efficiency in the subsequent conversion machines.

[0022] Yet another object of the invention is to provide a glue-spreading device which does not permit the appearance of too long a wrapping fold as a result of only a small portion of the web width being glued to a new reeling drum while most flies away in the machine direction instead of wrapping around said reeling drum.

[0023] An additional object of the invention is to provide a glue-spreading device to replace the currently conventional reel switching by means of threading, with reliable automatic application of glue across the entire width of the web so that a full-width reel switch can be performed at the considerably higher speeds now deemed desirable, while avoiding the serious safety risks that arise with manual application of the glue.

[0024] Finally, it is an object of the invention to provide a glue-spreading device that has automatic nozzles from which the glue can be applied as an aerosol so that it is still adhesive when contact between paper web and reeling drum occurs, and which glue-spreader device can also be arranged transversely to the machine direction without the hitherto inevitable and constant dripping of the glue down onto the paper web below, as well as being able to spread the glue to the middle of the web in an efficient manner even during full-width reel switching.

[0025] The device according to the invention is characterized in that in order to attach a leading end of the paper web to an empty replacement web-roll core or spindle or to a commenced web roll in the event of a web break in the reel-up, and in order to wrap the entire width of the web therearound, respectively, the nozzles are distributed uniformly across the web to spread spray jets of liquid containing said adhesive agent onto the web to form a coherent adhesive area that is perpendicular to the machine direction and covers the whole width of the paper web, whereby, when said adhesive area is brought into contact with said empty replacement web-roll core or spindle or said already commenced web roll, a full-width turn-up will take place.

[0026] Using a glue-spreading device according to the invention avoids the necessity of applying the string of glue manually when performing full-width reel switching and the glue can be applied only where it is supposed to be, i.e. directly on the paper web without glue nozzles having to be arranged at unsuitable points, e.g. on the primary forks or the like. Thanks to this, and the drip-free design of the nozzles which contain a cleaning needle that effectively closes the tip of the nozzle, greatly increased web speed can be maintained. Another advantage of the glue-spreading device is its positive aerodynamic effect on the web passage as regards vibration and "flutter" in the paper web up to the roll nip obtained by the location of the glue-spreading device.

[0027] The invention will be explained in more detail in the following with reference to the drawings.

Figure 1 is a schematic side view of parts of a reel-up according to the invention seen from one long side, the operator side of the reel-up, showing the glue-spreading device with a spray nozzle mounting rack.

Figure 2 shows a view of the glue-spreading device according to Figure 1, seen from the upstream end of the reel-up.

Figure 3 is a view of a part of the spray nozzle mounting rack according to Figure 1, seen from its upstream end.

Figure 4 is an enlarged view of the glue-spreading device according to Figure 1.

Figure 5 is a block diagram of a glue-circulation system for the spray nozzle mounting rack according to Figure 1.

Figure 6 is a sequence diagram showing the spreading process in relation to time in the glue-spreading device according to Figure 1.

Figure 7 is a view of a nozzle for the glue-spreading device according to Figure 1, partially in cross section.

[0028] Figures 1 and 2 show schematically a preferred embodiment of a glue-spreading device 1 according to the invention, arranged upstream of a surface winding drum 2 in a reel-up 3 of a paper machine. When performing full-width reel switching it is possible according to the invention to use some form of adhesive spray liquid, preferably glue, across the continuous paper web so that the whole width of the paper web is covered by jets 4 from nozzles 5 mounted in the glue-spreading device 1, thereby attaching a web end either to a new reeling drum 6 or to a paper reel. The glue-spreading device 1 comprises essentially two parts arranged transversely to the machine direction, namely a box-like shield 7 constituting the supporting frame of the glue-spreading device 1, and a spray nozzle mounting rack 8 which is adjustable in both vertical and horizontal direction to a width and a distance adjusted to the continuous paper web.

[0029] Said box shield 7 is mounted on the stand 9 of the reel-up 3, on which stand the lowering arms 10 including their actuators 11 are also mounted, see Figure 1. As can be seen in Figure 2, the stand 9 comprises two vertical pillars 12, 13, between the upper ends of which a horizontal beam 14 extends across the continuous paper web. Said box shield 7 is preferably rigidly mounted by means of a plurality of attachment devices 15 in the stand 9 of the reel-up 3 in the upper end of the box shield 7 and at each of its vertical short sides. In the embodiment shown, see Figures 1 and 2, said attachment devices 15 consist of an attachment plate 16 welded to the horizontal beam 14 with a support in the form of a bracket 17 protruding from the plate and preferably welded to a reinforcing plate 18 with a specific extension downwards from the upper edge of the box shield 7, and also at least one attachment beam 19 extending preferable horizontally between the pillars 12, 13 and the adjacent vertical short side of said box shield 7 to brace this in lateral direction. In another embodiment, not shown, the box shield may be movably arranged on the reel-up stand by means of some type of actuator able to move or swing the glue-spreading device to any desired position in relation to the surface winding drum 2.

[0030] Depending on the width of the paper web, the box shield 7 comprises at least one, preferably several, thin, identical box sections 20 arranged side by side, see Figure 2. In the embodiment shown each separate box section 20 consists of a rectangular frame 21 constructed of at least two vertical and two horizontal rods 22 of U-section, I-sections or rectangular sections, suitably of steel, welded together at their ends to said frame 21. Diagonal bracing can also be arranged if necessary. The frame 21 has thin covering plates 25 at its upstream and downstream sides 23, 24, said covering places 25 being riveted, welded or secured in some other suitable way to the frame 21. This attachment may be over the whole or part of each side 23, 24 in order to form said thin box section 20. Each box section 20 is connected to the next box section by means of the intermediate, common, vertical joint 26 with the aid of suitable means, e.g. screw joints. Between the two horizontal parts of the frame 21 extend a plurality of vertical bars 27 for adjustment of the spray nozzle mounting rack 8 in vertical direction. This adjustment is suitably achieved by some form of displacement device or attachment device 28, e.g. a screw joint, securing the spray nozzle mounting rack 8 in desired position on the vertical bars 27.

[0031] The spray nozzle mounting rack 8, see Figures 3 and 4 comprises a rail frame 29 mounted with the aid of the attachment devices 28 to said vertical bars 27, and one or more assembly rails 30 arranged to be telescopically movable in the rail frame 29. In the embodiment shown, each assembly rail 30 consists of a U-section, see Figure 4, which can be moved horizontally by means of upper and lower bearing means 31 so that said assembly rails 30 with the nozzles 5 thereon can be first roughly adjusted in relation to the position of the paper web and can also be pulled out completely on both the drive side and the operator side of the reel-up 3 for cleaning and service of the internal parts of the glue-spreading device 1. Besides said rough adjustment a second, finer adjustment of the lateral position of the nozzles 5 is also possible since each nozzle 5 is also displaceable in a fine-adjustment strip 32 arranged below the assembly rail 30. This fine-adjustment strip consists suitably of an aluminium section, for instance, with a horizontal groove in which the mounting device of the nozzle 5 can slide, said mounting device being attached to a block 34 of polytetrafluoroethylene, for instance.

[0032] Said rail frame 29 is made of a number of vertically arranged U-brackets 35 comprising an upper and a lower shank, mounted on the vertical bars arranged at regular intervals along the box shield 7, in the manner described above. A spacer 36 extends inwardly from each shank towards the centre of the U-bracket 35, which is advantageously threaded at both ends for its attachment. Two parallel, horizontal rail fillets are mounted in the free end of these spacers 36 to extend the full length of the box shield 7. Cooperating with the bearing means 31 mentioned above, each rail fillet constitutes a support for the assembly rail 30 horizontally displaceable in the rail frame 29. The bearing means 31 comprise a plurality of travelling devices 38 which are permanently arranged on the upper and lower edges of the assembly rail 30 and run in a groove open to the U-brackets 35 in inside each rail fillet 37, thereby enabling the assembly rail to be displaced telescopically. The travelling devices 38 suitably comprise some form of roller or slide means, e.g. a roller, track wheel or block of polytetrafluoroethylene.

[0033] In the embodiment shown a pipe system is also arranged on the assembly rail 30, said system comprising four separate, parallel pipes. These consist of a pipe

39 for compressed-air control of a cleaning needle 40 arranged in each nozzle 5, as described in more detail below, a compressed-air pipe 41 for atomizing the glue, a glue-inlet pipe 42 and a glue outlet in the form of a return pipe 43 for the required circulation of the glue. Retainers 44 for the pipes 39, 41, 42, 43 are also arranged on the assembly rail 30. In the embodiment shown in Figure 4 these retainers consist of two pipe clamps placed along the assembly rail 30, a suitable distance one above the other, each retaining two pipes 39, 41 and 42, 43, respectively.

[0034] In the embodiment shown in Figure 2 the spray nozzle mounting rack 8 is equipped with six nozzles 5 for spreading glue for full-width wrapping, these nozzles 5 being evenly distributed across the whole width of the paper web. An additional nozzle 45 is also provided, mounted on a blower box 46 fitted on the drive side of the reel-up 3 to spread glue on the leader when a web rupture has occurred and said leader must once more be threaded and guided with the aid of said blower box 46. All the nozzles 5, and also the nozzle 45 in the blower box 46, are adjustable to a desired and optimal position in relation to the surface winding drum 2 and the paper web running over this, by means of the assembly means 33 arranged on the spray nozzle mounting rack 8 and the blower box 46 so that the point of encounter and thus the pattern of contact on the paper web can be varied. The assembly means 33 are therefore both pivotable so that the angle of incidence of the jet of glue towards the centre of the surface winding drum 2 can be finely adjusted, and also vertically adjustable a short distance. The nozzles 5 in the embodiment described consist of automatic, air-operated nozzles 5 which mix air and liquid, preferably in the form of a glue suspension, which is applied on the paper web under high pressure in the form of a finely distributed jet of glue 4.

[0035] Each nozzle 5 is supplied with glue through the glue inlet pipe 42 arranged on the assembly rail 30, with the aid of a compressed-air operated piston pump 50 described below, the nozzles 5 also comprising special supply members, suitably flexible tubes (not shown), for the compressed air needed in a pneumatic cylinder 60 for operation of the main functions of the cleaning needle 40, and also for atomization of the glue suspension.

[0036] A glue circulation system 48 is connected to the glue-spreading device 1 to enable circulation of the glue so that it is prevented from drying, as described with reference to Figure 5. The glue circulation system 48 and a valve cubicle 47 connected thereto, suitably include one or more airpressure regulators 49, pumps 50, glue tanks 51 containing a synthetic polymer glue in water, for instance, safety valves 52, glue-pressure regulators 53, non-return valves 54, pressure accumulators, pressure transducers and finally, the elements on the spray nozzle mounting rack 8 described earlier. In the embodiment described the glue circulation system 48 may be controlled manually and/or automatically from a control panel, not shown, comprising three main functions, namely: application of glue on a leader which, as described above, is only performed in manual mode and when a web rupture has occurred, application of glue manually or automatically across the full width of the web during reel switching and cleaning of respective nozzles 5, this being effected by blowing only compressed air for a moment through respective outlet nozzles 55. The glue is kept constantly circulating in a closed circuit consisting of pipes between the glue-spreading device 1 and the glue tank 51. The spray nozzle mounting rack 8 and the single nozzle 45 for the threading are controlled entirely separately from each other by means of a pneumatic control system. All valves comprising the non-return valves 54 and the separate electromagnetic valves arranged at each nozzle 5 are connected to a control unit together with respective pumps 50 and other parts essential to the glue-spreading device 1.

[0037] Figure 1 also shows a web support 56 extending transversely across the continuous web, said web support 56 comprising at least one actuator 57 for its operation from a first, passive position folded up during the transition when switching reels, to a second, active position, folded down after completion of the reel switch. Said web support 56 serves as an extra protection against dripping glue and also to control the continuous paper web during the air turbulence that always arises close to the nip between the reeling drum 6 and the surface winding drum 2.

[0038] Figure 1 also shows a dust cover 58 arranged on the upstream side 23 of the box shield 7, said cover suitably being rigidly mounted just above the spray nozzle mounting rack 8 at its upper horizontal edge. The dust cover 58 consists, for instance, of a bent plate extending from said side at a specific angle so that the spray nozzle mounting rack 8 is shielded from dust coming from the parts of the reel-up 3 situated upstream. Undesired air currents are thus reduced to a minimum and the effect of dust suction boxes, not shown, situated upstream is improved.

[0039] The spray liquid to the glue-spreading device 1 may consist of a surface-active agent, water or a suspension or dispersion consisting of adhesive agent, a suitable solvent and a carrier, preferably water in order to avoid patches being formed.

[0040] The glue-spreading device 1 may also be equipped with two separate pipe systems for increased reliability, a programmable control unit controlling each nozzle 5 individually, a panel display and equalization container for said glue circulation system 48.

[0041] All the above-mentioned components are mounted in suitable manner which may entail gluing, welding, screwing or riveting, for instance.

[0042] Referring to Figure 7, the nozzles 5 also include the following additional important components: said cleaning needle 40 with associated actuator in the form of a pneumatic cylinder 60 for operation of the cleaning needle, three coupling devices 61, 62, 63 for

the flexible connection hoses described below, the outlet nozzle 55 which in the embodiment shown in fact consist of an outer and an inner nozzle 64, 65 arranged one after the other, the outer nozzle 64 being intended for compressed air and the inner nozzle 65 for the glue dispersion, an outer channel 66 for said glue dispersion, and the assembly means 33 with associated adjustment means as described above. Three flexible connection hoses (not shown) are drawn from the pipes 39, 41, 42 on the assembly rail 30, from the two compressed-air pipes 39, 41 and from the glue inlet pipe 42, each to its own coupling device 61, 62, 63 on respective nozzles 5. Nozzles are preferably used which give a finely distributed flat spray in the shape of a fish tail, i.e. with large width but slight thickness.

[0043] The function of the glue-spreading device 1 is described below with reference to a sequence diagram 59 shown in Figure 6. In auto mode gluing is performed as an automatic full-width reel switch, together with balloon blowing. The sequence 59 commences with the finished paper reel being temporarily retarded so that a slack is created, the slack extending across the full width of the paper web. The web fold thus formed is forced by means of compressed air into the nip between the new empty reeling drum 6 applied by the lowering arms 10 and the surface winding drum 2. Application of the glue can be started 0-10 seconds after commencement of the sequence, whereupon the cleaning needle 40 is moved by its actuator 60 to its rearmost position in the nozzle 5, thereby providing free passage to the nozzle 5 itself, for the glue suspension and the atomizing compressed air, so that they are sprayed out synchronously from the outlet 55 of the nozzle 5. An aerosol mist 4 is thus applied over the whole paper web in a predetermined pattern. The atomization of the liquid 4 is determined by varying the magnitude of the compressed air flow while keeping the liquid flow constant. The glue application sequence 59 is always such that the compressed-air valve to the atomization air is opened first and closed last, preferably about 6 seconds after the glue supply, lasting approximately 0-10 seconds, has been cut off. The nozzles 5 are both operated and cleaned with the aid of compressed air so that they are self-servicing. The cleaning need 40 cleans said outlet channel 66 mechanically so that the glue dispersion can be freely fed out through the outlet nozzle 55 without risk of clogging, as well as closing the outlet channel 66 of the nozzle 5 completely after each gluing procedure. The coupling device 61 for the atomizing compressed air is provided with a separate short connection channel 68 to said outer outlet nozzle 64 to enable the outlet channel 66 to be blown clean in the manner described above. Thanks to this construction the nozzle 5 is completely drip-free.

[0044] The outlet nozzles 55 of the nozzles 5 may be changed depending on the desired pattern of contact and are fitted entirely separately from the pneumatic cylinder 60 and cleaning needle 40, outermost on the nozzle 5 to minimize maintenance. The application process for the glue-spreading device 1 may suitably be synchronized with a slitter, not shown, for cutting the web.

Claims

1. A device for applying an adhesive agent onto a paper web in a reel-up (3) in a paper machine when changing web rolls, in which reel-up (3) the paper web is supported by a surface winding drum (2) or a continuous belt and wound onto replacement web-roll cores or spindles (6) in contact with the surface winding drum (2) or the continuous belt in order to form the web rolls, said device including a supporting frame (7) mounted on the stand (9) of the reel-up (3), upstream of the surface winding drum (2) or the continuous belt, and extending transversely to the machine direction, and a spray nozzle mounting rack (8) supported by the supporting frame (7), extending transversely to the web across its entire width and comprising a plurality of nozzles (5), **characterized in that** in order to attach a leading end of the paper web to an empty replacement web-roll core or spindle (6) or to a commenced web roll in the event of a web break in the reel-up, and in order to wrap the entire width of the web thereabout, respectively, the nozzles (5) are distributed uniformly across the web to spread spray jets of liquid containing said adhesive agent onto the web to form a coherent adhesive area that is perpendicular to the machine direction and covers the whole width of the paper web, whereby, when said adhesive area is brought into contact with said empty replacement web-roll core or spindle (6) or said already commenced web roll, a full-width turn-up will take place.

2. A device as claimed in claim 1, **characterized in that** the supporting frame (7) is rigidly mounted on the stand of the reel-up (3).

3. A device as claimed in either of claims 1 or 2, **characterized in that** the spray nozzle mounting rack (8) comprises a horizontal rail frame (29) and at least one assembly rail (30), which carries said nozzles (5) and is displaceably journalled in the rail frame so as to be adjustable in relation to the web and also to permit extraction of said assembly rail (30) at the drive side and/or tender side of the reel-up (3) for service.

4. A device as claimed in claim 3, **characterized in that** each nozzle (5) is journalled in the assembly rail (30) to be horizontally displaceable for fine adjustment of the position of the nozzle (5) in relation to the other nozzles (5) and the edges of the web.

5. A device as claimed in claim 4, **characterized in that** each nozzle (5) is mounted in the assembly rail (30) to be also pivotable and vertically displaceable for adjustment of the angle or distance of the spray jet in relation to the surface winding drum (2).

6. A device as claimed in any one of claims 3-5, **characterized in that** the nozzles (5) are of air-driven type for mixing air and liquid containing adhesive agent to spray form at feed-out.

7. A device as claimed in claim 6, **characterized in that** the assembly rail (30) supports a pipe system connected to the nozzles (5) and comprising a compressed-air hose (39) to operate a cleaning needle (40) arranged in each nozzle (5), a compressed-air hose (41) for atomization of the adhesive agent, an inlet pipe (42) for the adhesive agent and a return pipe (43) for circulation of the adhesive agent.

8. A device as claimed in claim 7, **characterized in that** it includes a circulation system (48) for the adhesive agent in order to maintain its activity.

9. A device as claimed in any one of claims 1-8, **characterized in that** the supporting frame (7) is box-shaped.

Patentansprüche

1. Vorrichtung zum Auftragen eines Haftmittels auf eine Papierbahn bei einem Aufroller (3) bei einer Papiermaschine beim Wechseln von Bahnrollen, wobei bei dem Aufroller (3) die Papierbahn durch eine Oberflächenwickeltrommel (2) oder einen fortlaufenden Riemen gestützt ist und auf Austauschbahnrollenkerne oder -spindeln (6) in Kontakt mit der Oberflächenwickeltrommel (2) oder dem fortlaufenden Riemen gewickelt wird, um die Bahnrollen auszubilden, wobei die Vorrichtung einen Stützrahmen (7) hat, der an dem Gestell (9) des Aufrollers (3) stromaufwärtig von der Oberflächenwickeltrommel (2) oder dem fortlaufenden Riemen montiert ist und sich quer zu der Maschinenrichtung erstreckt, und einen Sprühdüsenmontagehalter (8) hat, der durch den Stützrahmen (7) gestützt ist und sich quer zu der Bahn über ihre gesamte Breite erstreckt und eine Vielzahl an Düsen (5) aufweist,
dadurch gekennzeichnet, dass
zum Anbringen eines Führungsendes der Papierbahn an einem leeren Austauschbahnrollenkern oder -spindel (6) oder an einer angefangenen Bahnrolle im Falle eines Bahnreißens bei dem Aufroller und zum Wickeln der gesamten Breite der Bahn um diesen herum jeweils die Düsen (5) gleichmäßig über die Bahn verteilt sind, um Sprühstrahlen einer Flüssigkeit, die das Haftmittel enthält, auf die Bahn zu verteilen, um eine koherente Haftmittelfläche auszubilden, die senkrecht zu der Maschinenrichtung ist und die gesamte Breite der Papierbahn abdeckt, wodurch, wenn die Haftmittelfläche in Kontakt mit dem leeren Austauschbahnrollenkern oder -spindel (6) oder der bereits begonnenen Bahnrolle in Kontakt gebracht wird, eine Wicklung in gesamter Breite stattfindet.

2. Vorrichtung gemäß Anspruch 1,
dadurch gekennzeichnet, dass
der Stützrahmen (7) an dem Gestell der Aufwickeleinrichtung (3) steif montiert ist.

3. Vorrichtung gemäß einem der Ansprüche 1 oder 2,
dadurch gekennzeichnet, dass
der Sprühdüsenmontagehalter (8) einen horizontalen Schienenrahmen (29) und zumindest eine Baugruppenschiene (30) aufweist, die die Düsen (5) trägt und in dem Schienenrahmen verschiebbar gelagert ist, um so in Bezug auf die Bahn einstellbar zu sein und außerdem ein Herausziehen der Baugruppenschiene (30) an der Antriebsseite und / oder Bedienerseite des Aufrollers (3) für eine Wartung zu ermöglichen.

4. Vorrichtung gemäß Anspruch 3,
dadurch gekennzeichnet, dass
jede Düse (5) in der Baugruppenschiene (30) gelagert ist, um horizontal für eine Feineinstellung der Position der Düse (5) in Bezug auf die anderen Düsen (5) und die Ränder der Bahn verschiebbar zu sein.

5. Vorrichtung gemäß Anspruch 4,
dadurch gekennzeichnet, dass
jede Düse (5) in der Baugruppenschiene (30) montiert ist, um außerdem drehbar und vertikal verschiebbar für eine Einstellung des Winkels oder des Abstandes des Sprühstrahls in Bezug auf die Oberflächenwickeltrommel (2) zu sein.

6. Vorrichtung gemäß einem der Ansprüche 3 bis 5,
dadurch gekennzeichnet, dass
die Düsen (5) Düsen einer durch Luft angetriebenen Art sind, die Luft und die das Haftmittel enthaltende Flüssigkeit mischen, um beim Herausführen eine Sprühnebelform zu bilden.

7. Vorrichtung gemäß Anspruch 6,
dadurch gekennzeichnet, dass
die Baugruppenschiene (30) ein Leitungssystem stützt, das mit den Düsen (5) verbunden ist und einen Druckluftschlauch (39) zum Betätigen einer in jeder Düse (5) angeordneten Reinigungsnadel (40), einen Druckluftschlauch (41) für ein Zerstäuben des Haftmittels, ein Einlassrohr (42) für das Haftmittel und ein Rücklaufrohr (43) für eine Zirku-

lation des Haftmittels aufweist.

8. Vorrichtung gemäß Anspruch 7, **dadurch gekennzeichnet, dass** sie ein Zirkulationssystem (48) für das Haftmittel aufweist, um seine Wirkfähigkeit aufrecht zu erhalten.

9. Vorrichtung gemäß einem der Ansprüche 1 bis 8, **dadurch gekennzeichnet, dass** der Stützrahmen (7) kastenförmig ist.

Revendications

1. Dispositif pour appliquer un agent adhésif sur une bande de papier dans une bobineuse (3) d'une machine à papier lors du changement des bobines de bande, la bande de papier dans ladite bobineuse étant supportée par un tambour d'enroulement de surface (2) ou une courroie continue et enroulée sur des noyaux ou des pivots (6) de bobines de bande de remplacement en contact avec le tambour d'enroulement de surface (2) ou la courroie continue pour former les bobines de bande, ledit dispositif comportant un bâti de support (7) monté sur un support (9) de la bobineuse (3), en amont du tambour d'enroulement de surface (2) ou de la courroie continue, et s'étendant transversalement à la direction de la machine, et une rampe (8) de montage de buses de pulvérisation supportée par le bâti de support (7), s'étendant transversalement à la bande sur toute sa largeur et comprenant une pluralité de buses (5), **caractérisé en ce que** dans le but d'attacher une extrémité de tête de la bande de papier à un noyau de bobine de bande ou à un pivot (6) de remplacement vide ou à une bobine de bande commencée dans le cas d'une rupture de bande dans la bobineuse, et dans le but d'envelopper l'entière largeur de la bande autour de lui, respectivement, les buses (5) sont distribuées uniformément en travers de la bande pour distribuer des jets de liquide pulvérisé contenant ledit agent adhésif sur la bande pour former une zone adhésive cohérente qui est perpendiculaire à la direction de la machine et couvre l'entière largeur de la bande de papier, et où, lorsque ladite zone adhésive est amenée en contact avec ledit noyau de bobine de bande ou pivot (6) vide de remplacement ou ladite bobine de papier déjà commencée, un soulèvement sur toute la largeur se produit.

2. Dispositif selon la revendication 1, **caractérisé en ce que** le bâti de support (7) est monté rigidement sur le support de la bobineuse (3).

3. Dispositif selon la revendication 1 ou 2, **caractérisé en ce que** la rampe (8) de montage de buses de pulvérisation comprend un cadre formant rail horizontal (29) et au moins un rail d'assemblage (30), qui porte lesdites buses (5) et est reçu de manière déplaçable dans le cadre formant rail de manière à être ajustable par rapport à la bande et aussi à permettre l'extraction dudit rail d'assemblage (30) du côté d'entraînement et/ou du côté conducteur de la bobineuse (3) pour l'entretien.

4. Dispositif selon la revendication 3, **caractérisé en ce que** chaque buse (5) est reçue dans le rail d'assemblage (30) de manière à être déplaçable horizontalement pour un réglage fin de la position de la buse (5) par rapport aux autres buses (5) et aux bords de la bande.

5. Dispositif selon la revendication 4, **caractérisé en ce que** chaque buse (5) est montée dans le rail d'assemblage (30) pour être également pivotable et déplaçable verticalement pour le réglage de l'angle ou de la distance du jet de pulvérisation par rapport au tambour d'enroulement de surface (2).

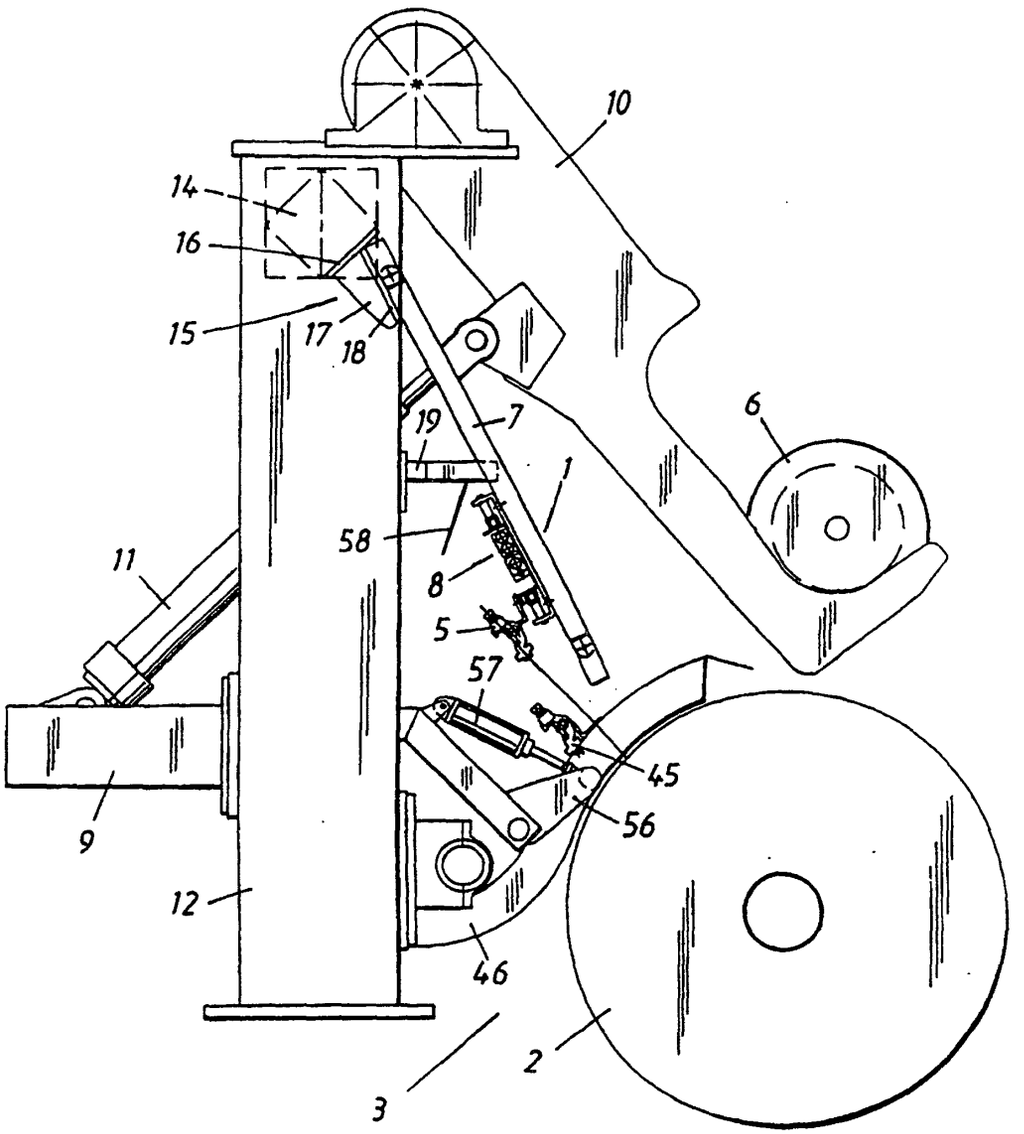
6. Dispositif selon l'une quelconque des revendications 3-5, **caractérisé en ce que** les buses (5) sont du type à entraînement par air pour mélanger de l'air et du liquide contenant un agent adhésif pour former une pulvérisation à la sortie.

7. Dispositif selon la revendication 6, **caractérisé en ce que** le rail d'assemblage (30) supporte un système de tuyaux reliés aux buses (5) et comprenant un tuyau souple d'air comprimé (39) pour faire fonctionner une aiguille de nettoyage (40) agencée dans chaque buse (5), un tuyau souple d'air comprimé (41) pour atomiser l'agent adhésif, un tuyau d'entrée (42) pour l'agent adhésif et un tuyau de retour (43) pour la circulation de l'agent adhésif.

8. Dispositif selon la revendication 7, **caractérisé en ce qu'**il comprend un système de circulation (48) pour l'agent adhésif afin de maintenir son activité.

9. Dispositif selon l'une quelconque des revendications 1-8, **caractérisé en ce que** le bâti de support (7) est en forme de boîte.

Fig.1



Фиг. 2

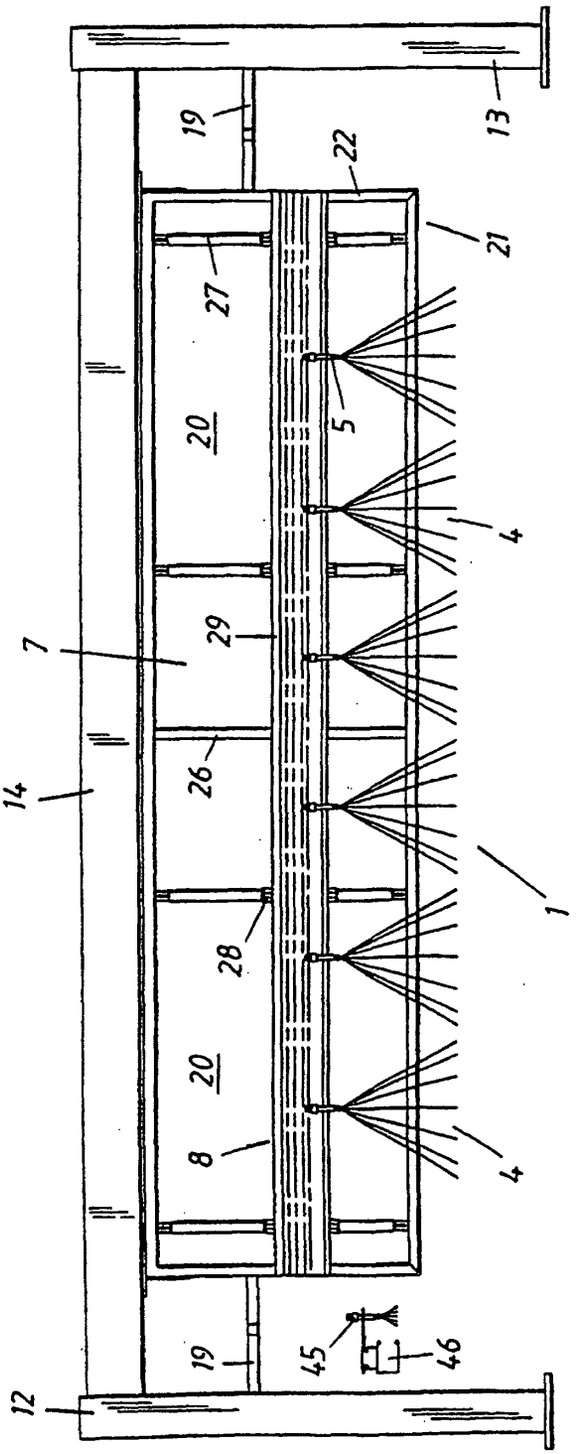


Fig.3

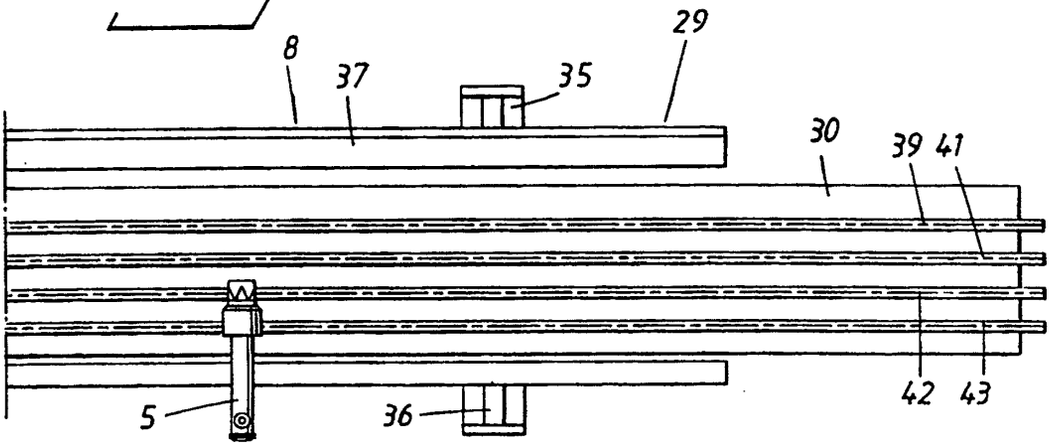
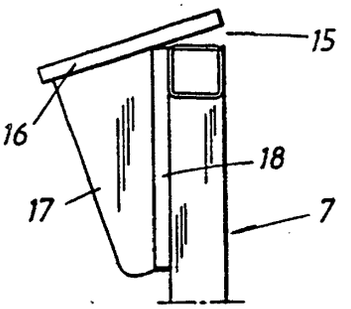
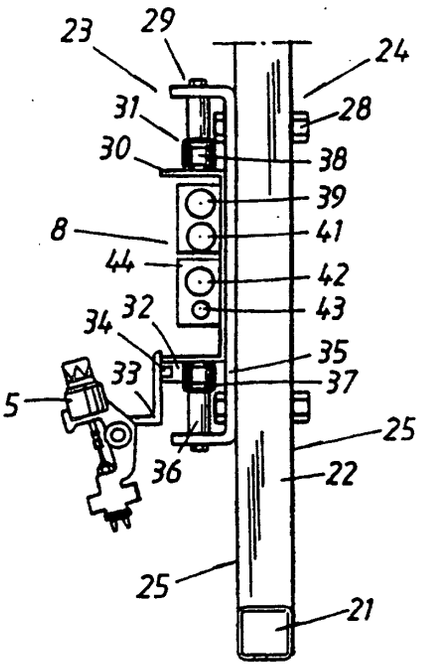

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Fig.4


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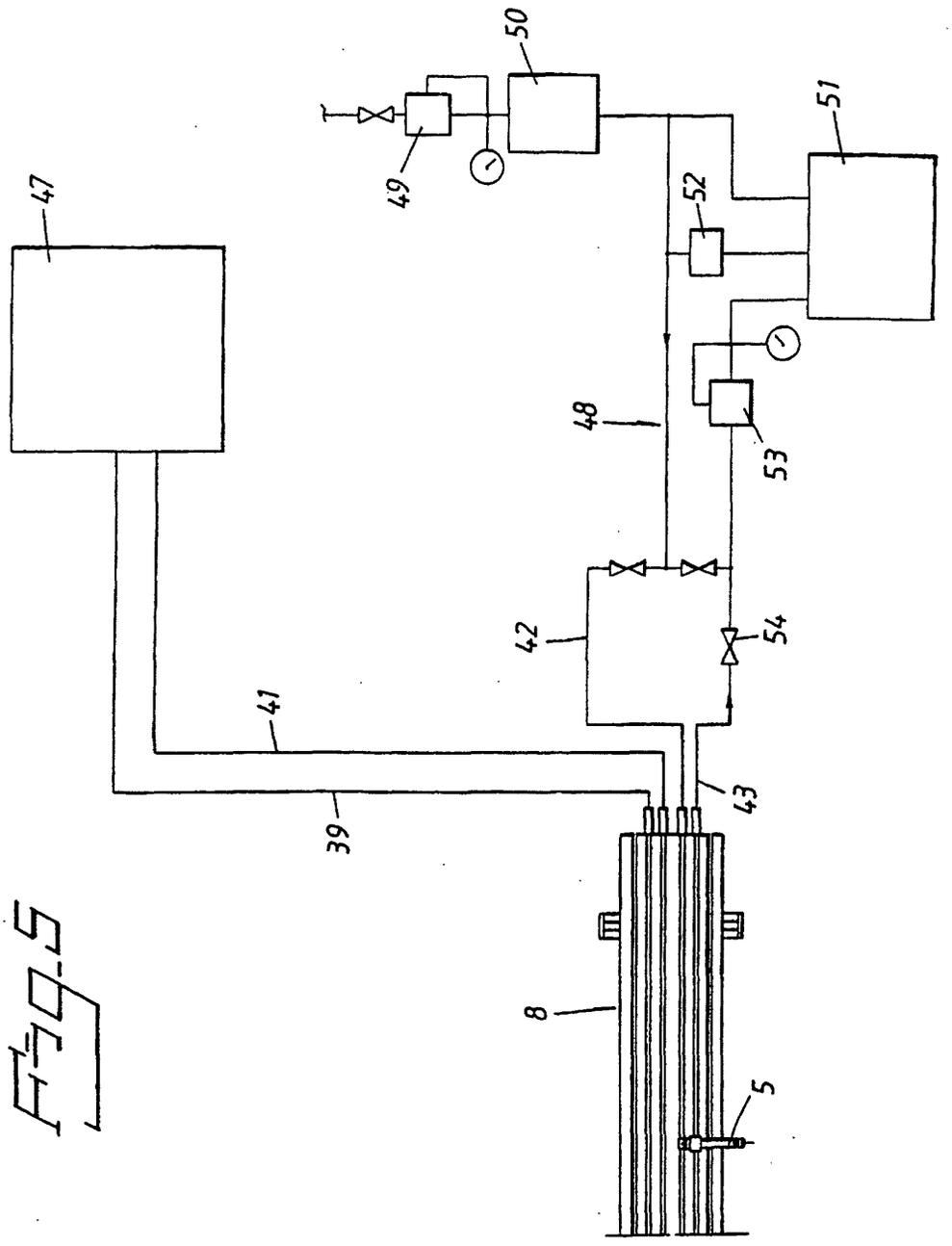


Fig. 5

Fig. 6

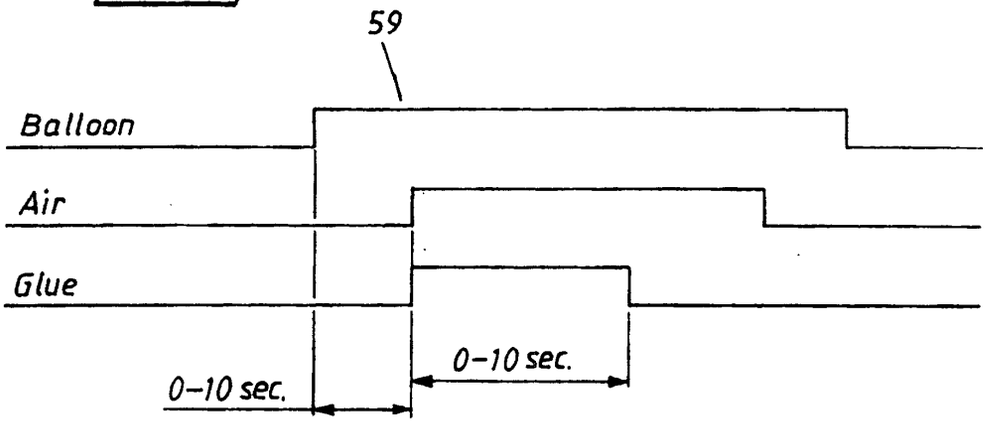
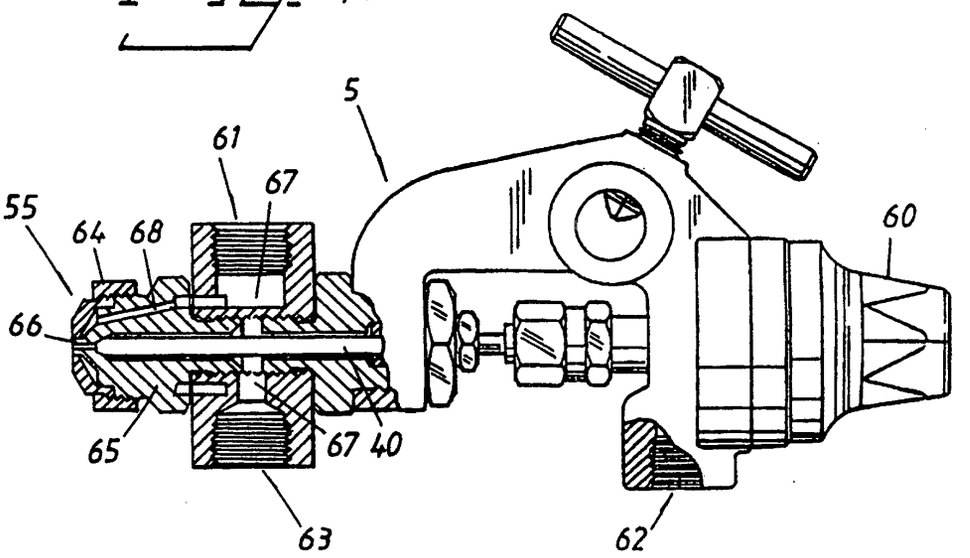

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Balloon
Air
Glue
0–10 sec.
0–10 sec.

Fig. 7


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