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(54) **APPARATUS FOR USE IN AND A METHOD OF APPLYING GLUE**

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FR-A- 1 455 170 **GB-A- 925 036**
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Description

[0001] The present invention relates to apparatus for use with a rotating glue roll for applying glue to a sheet of material, and to a method of applying glue. The invention relates in particular, but not exclusively, to apparatus for applying glue to the flute tips of a single-faced sheet of corrugated paper board prior to the single-faced sheet being combined with a continuous second cover sheet for facing the other side of the fluted sheet, and to a method of such manufacture.

[0002] Corrugated paper board conventionally consists of two opposing cover sheets or liners and an intermediate sheet which is fluted or corrugated, the three layers being secured together by adhesive. The manufacturing process includes corrugating a fluting sheet; gluing this to a first cover sheet; and then gluing a second cover sheet to the single-faced board already produced. Sometimes two or more fluted layers are included, interspersed with cover sheets.

[0003] In the step of gluing the second cover sheet or liner to the single-faced sheet a gluing machine applies adhesive to the flute tips by a rotating glue applicator roll. The glue applicator roll turns at about the speed of the single-faced sheet, while the lower portion of the rotating roll picks up glue from a suitable reservoir. Glue is thus transferred from the rotating glue roll to the flute tips of the single-faced sheet. To ensure that the flute tips adequately contact the glue roll so that glue is applied to all of the flute tips of the single-faced sheet, pressure must be applied to the back, or faced side, of the single-faced sheet. It is known in the art to use a rotating pressure roll positioned opposite the glue roll to ensure contact between the flute tips of the single-faced sheet and the glue roll. Unfortunately the opposing pressure roll of the prior art may frequently cause crushing of the flute tips as the single-faced sheet is pinched at the tangent point between the pressure roll and the glue roll. It is also known in the art to provide an air bearing in place of the pressure roll to attempt to overcome crushing of the flute tips and other limitations associated with the rotating pressure roll.

[0004] In US-A-5,129,980 (Sissons) and US-A-5,248,362 (Sissons) there is disclosed a contact bar for slidably contacting the liner of a single-faced corrugated paper board sheet to press the flute tips of the sheet against a rotating glue roll without crushing the flute tips. The contact bar includes an elongate frame mounted opposite to and in spaced apart relation from the rotating glue roll. A series of shoes are pivotally connected to the frame and depend therefrom defining a predetermined clearance from the outer surface of the rotating glue roll.

[0005] Although this arrangement has produced considerable improvement over the previous form of contact means which was provided by the opposing pressure roll of the previous prior art, there remains a need for improvement in the arrangement, to ensure tension-

ing of the sheet before contact with the glue roll, and to allow adjustment of the area of the sheet which contacts the glue roll whilst passing over the glue roll.

[0006] FR-A-1455170 (Martin) discloses apparatus for applying adhesive to corrugated card by an applicator cylinder rotating in a reservoir, with a pressure cylinder urging the corrugated card against the application cylinder. A separate controllable cylinder spaced upstream of the pressure cylinder and applicator cylinder bears against the card on the same side as the pressure cylinder. The controllable cylinder is movable during operation of the apparatus to vary the arc of contact of the card with the applicator cylinder while the glue is being applied.

[0007] GB-A-925036 discloses apparatus for applying adhesive to component parts of corrugated board, and more particularly to apparatus for applying adhesive to the tips of the flutes of a single faced corrugated board prior to the application of a second face in the production of a double faced corrugated board. There is disclosed apparatus for applying glue to a sheet of material comprising a glue roll for applying glue to a sheet of material passing over the glue roll; an elongate frame positioned across the direction of movement of the sheet over the glue roll; contact means mounted on the frame for urging the sheet into contact with the glue roll; and an elongate rotary device mounted on the frame substantially parallel to the elongate frame and spaced therefrom upstream relative to the direction of movement of the sheet, the elongate rotary assembly being positioned so as to bear against the sheet for tensioning the sheet before it passes to the glue roll. In the embodiment illustrated, the contact means for urging the sheet into contact with the glue roll consists of a riding roll above the glue roll. The purpose of the disclosure is said to be to enable the nip pressure exerted by the riding roll to remain unaffected by variations in the thickness of the board.

[0008] It is an object of the present invention, at least in preferred embodiments thereof, to provide an improved apparatus and method which provides improved performance in the applying of glue to a sheet of material.

[0009] According to the present invention there is provided apparatus for applying glue to a sheet of material comprising a glue roll for applying glue to a sheet of material passing over the glue roll; an elongate frame positioned across the direction of movement of the sheet over the glue roll; contact means mounted on the frame for urging the sheet into contact with the glue roll; and an elongate rotary device mounted on the frame substantially parallel to the elongate frame and spaced therefrom upstream relative to the direction of movement of the sheet, the elongate rotary device being positioned so as to bear against the sheet for tensioning the sheet before it passes to the glue roll; characterised in that the elongate rotary device is positioned so as to bear against the sheet on the same side as the contact

means.

[0010] The invention has particular application where the apparatus is adapted for the manufacture of corrugated paper board, the apparatus comprising a single-faced assembly for supplying a continuous single-faced corrugated paper sheet comprising a fluted sheet and a first cover sheet on one side of the fluted sheet, and a gluing machine including said glue roll arranged to apply glue to the flute tips of the single-faced sheet for subsequent combination with a continuous second cover sheet for facing the other side of the fluted sheet.

[0011] In a particularly preferred form, the apparatus may include a positioning device mounted on the frame for adjusting the position of the rotary device relative to the elongate frame so as to predetermine the amount of the sheet in contact with the glue roll when passing over the glue roll. In one preferred form the positioning device comprises means for moving the axis of the rotary device relative to the frame in a direction transverse to the direction in which the rotary device is spaced from the elongate frame.

[0012] The use of a positioning device embodying the invention allows variation in the length of the arc of the sheet which is in contact with the glue roll as the sheet passes around the glue roll.

[0013] Conveniently the positioning device may comprise at each end of the rotary device a support for the rotary device which is movably mounted on the frame and drive means coupled between the frame and the support for moving the support relative to the frame. The drive means may comprise a pneumatic piston and cylinder arrangement.

[0014] In a preferred form, the positioning device includes at each end of the rotary device an adjustable stop mounted on the the frame to determine the operating position of the support.

[0015] In a particularly preferred form, the rotary device may comprise a series of rollers spaced apart across the elongate rotary device. The term roller includes an elongate roller having a width greater than its radius, and also includes a relatively narrow roller forming a wheel having a width less than its radius. Preferably the rollers are independently rotatably mounted on a shaft extending across the elongate rotary device, and conveniently there may be provided means for varying the spacing of the rollers across the elongate rotary assembly.

[0016] In accordance with another particularly preferred feature of the invention, the contact means may comprise a series of shoes arranged in side-by-side relationship across the elongate contact means, for example generally as disclosed in the aforesaid patent US-A-5,248,362. In such an arrangement each shoe may have a contact portion for contacting the sheet and a pivot portion pivotally connected to the frame, the contact portion being spaced from the pivot portion in a first direction and the rotary device being spaced from the contact means in a second direction generally opposite

to the first direction.

[0017] It is to be appreciated that where features of the invention are set out herein with regard to apparatus according to the invention, such features may also be provided with regard to a method according to the invention, and visa versa.

[0018] In GB-A-925036 there is disclosed a method of applying glue to a sheet of material comprising passing a sheet of material over a rotating glue roll; urging the sheet into contact with the glue roll as it passes over the glue roll by contact means mounted on an elongate frame positioned across the direction of movement of the sheet over the glue roll; and tensioning the sheet by an elongate rotary device mounted on said elongate frame substantially parallel to the elongate frame and spaced therefrom upstream relative to the direction of movement of the sheet, the elongate rotary device being positioned so as to bear against the sheet before it passes to the glue roll.

[0019] In accordance with the invention such a method is characterised in that the elongate rotary device bears against the sheet on the same side as the contact means.

[0020] An embodiment of the invention will now be described by way of example with reference to the accompanying drawing in which:-

Figure 1 is a diagrammatic side view of a first section of a known manufacturing apparatus for manufacture of corrugated paper board, showing two single-facer assemblies;

Figure 2 is a diagrammatic side view of a second section of the known manufacturing apparatus, showing a pre-heater and a glue machine;

Figure 3 is a diagrammatic side view of a third section of the known manufacturing apparatus, showing a heating section;

Figure 4 is a side section showing in more detail a known contact bar which is shown diagrammatically in Figure 2;

Figure 5 is a diagrammatic perspective view from above of apparatus embodying the invention for use with the rotating glue roll of the known machine illustrated in Figures 2 and 4, comprising an elongate rotary device for tensioning a sheet passing over the glue roll;

Figure 5a is a diagrammatic plan view of a wear shim for use in the apparatus shown in Figure 5;

Figure 6 is a diagrammatic side view of the tensioning apparatus of Figure 5, illustrating its relationship with other components of the manufacturing apparatus;

Figure 7 is a diagrammatic end view, partly in section, taken along the direction of movement of the sheet, of the tensioning apparatus of Figures 5 and 6; and

Figures 8a, 8b and 8c show the tensioning apparatus of Figure 6, with the position of the tensioning apparatus varied to vary the amount of sheet in contact with the glue roll.

[0021] There will firstly be described briefly the overall process of manufacturing corrugated paper board in known manner, with reference to Figures 1 to 3. A fuller description of the process is given in our co-pending patent application GB-A-2,321,652. The process typically starts with a single sheet of paper referred to as a cover sheet or liner. To this cover sheet is added a fluted sheet of paper, by the use of adhesive, thereby forming a single-faced sheet of corrugated paper board. A second opposing cover sheet is then applied to the flute tips of the single-faced corrugated sheet to form the double-faced corrugated paper board.

[0022] In Figure 1, a source 12 of a first cover sheet or liner 13, and a source 9 of a fluting sheet 10, feed the liner 13 and fluting sheet 10 to be combined in a machine 14 which effects the steps of corrugating the fluting sheet 10, to form a corrugated sheet 15 and gluing to it the liner 13. The machine 14 is called a single-facer and produces at its output a single-faced sheet of corrugated paper board 16 which is fed onto a conveyor belt 17. These components are usually known as the "B" assembly. Figure 1 also shows a second single-facer 14', usually known as the "C" assembly, for producing a similar single-faced sheet of corrugated paper board 16' supplied to a second conveyor 17'. Throughout the following description, only the first, "B" assembly and the product thereof will be described in detail in the subsequent manufacturing steps. The second, "C", single-facer assembly operates in a similar manner, and like components are indicated by like reference numerals. In some arrangements the single-faced webs from the first and second single-facer assemblies may be combined, but for simplicity this will not be described in the present embodiment, since such duplication is not necessary for an understanding of the present invention. The combination of the "B" and "C" webs is optional in normal manufacturing. For a lighter board, the "C" assembly is not operated. The purpose of having the "B" assembly and the "C" assembly is to provide different strengths of final corrugated board.

[0023] In the case illustrated in Figure 1, the single-faced sheet 16 is produced from one liner or cover sheet and one fluting sheet. In Figure 1 the source 12 is shown as having two supply rolls, and the same is shown for source 9. One roll is used at a time in each source. When one roll expires the second roll is spliced in to provide a continuous sheet. In the single-facer 14, the fluting sheet 10 is fed into the nip of heated corrugating rolls

(not shown). A corn based starch reservoir applies glue to the tip of the flutes of the newly formed fluted paper which is combined with the liner sheets 13 and the various sheets are stuck together by the adhesive. The newly formed single-faced web 16 is then transferred to the overhead conveyor 17 from whence it is passed to a preheating and gluing section shown in Figure 2.

[0024] In Figure 2 the single faced web 16 is passed to a triplex pre-heater 18, thence to a duplex glue machine 19, and thence to a heating section shown in Figure 3. The triplex pre-heater 18 has three drums 20 and 20', and 21. The single-faced web 16 is passed around the underside of the drum 20 and pre-heated prior to passing to the glue machine 19. Similarly, a second cover sheet or liner 22 from a source (not shown) of continuous liner sheet, passes into the pre-heater 18 and around the underside of the drum 21, and thence to the glue machine 19. (If required, the second single-faced web 16' passes in similar manner around the drum 20'.)

In the glue machine 19 a reservoir of glue 23 is applied by a glue roll 24 to the single-faced web 16. The second liner or cover sheet 22 merely passes through the bottom of the glue machine 19 without being glued, and is then joined to the single-faced web 16 in the heating section of the double-facer to be described with reference to Figure 3. In the glue machine 19, the sheet 16 is urged against the glue roll 24 by a contact means 31, which may be any of the known prior art contact means, but preferably is a sliding contact device as set out in the said patent US-A-5,248,362.

[0025] In Figure 3 is shown the first part of an assembly 25 known as a double-facer, which part is the heating section 30 thereof having a main frame 32. (The second, traction, section of the double-facer is not shown but is disclosed fully in our co-pending patent application GB-A-2,321,652.) In the double-facer 25, a roll 26, opposed by a pressure platen (not shown) receives between the two the single-faced corrugated paper board sheet 16 and the second cover sheet 22. The sheets 16 and 22 are compressed together and glued by the adhesive which has been applied to the tips of the flutes of the sheet 16 by the glue roll 24. The sheets 16 and 22 are combined together to form a double-faced corrugated paper board sheet 27 which is then passed through the heating section 30 of the double-facer 25, consisting in this example of eighteen thermo bars 28 mounted on a supporting frame 29. The double-facer 25 includes a series of steam heated tables 34 over which the lower cover 22 and single faced web 16 are passed. The heat at approximately 180° gels the glue and causes a bond that sticks the single-faced web 16 to the lower cover sheet 22. The web is then transferred to a traction section of the apparatus.

[0026] In Figure 4 there is shown in more detail the contact means 31 shown in Figure 2. The contact means 31 consists of a contact bar comprising an elongate frame 32 extending across the paper sheet 16 which is travelling in the direction indicated at A, the frame 32

being formed principally by a rectangular tube. As described in the previous specification US-A-5,248,362, the frame 32 extends substantially across the entire width of the rotating glue roll 24. A series of side-by-side contact shoes 33 are pivotally connected to the frame 32 and depend therefrom. A slight gap is left between adjacent shoes 33. Each of the contact shoes 33 includes a contact portion 34 and a pivot portion 35 connected by pivot 36 to a bracket 37 of the frame 32. The contact surface of the contact portion 34 is preferably concave in shape approximating to the curvature of the outer surface of the glue roll 24.

[0027] Each shoe 33 has a biasing means, such as a compressed coil spring 38 to urge the contact portion 34 in a direction away from the frame 32 towards the single-faced sheet 16. The pressure applied by the shoe contact surface may be adjusted by providing the spring 38 with a desired spring force. Adjustment means may be provided to set a predetermined clearance between the surface of the glue roll 24 and the contact surface of the contact portion 34. The adjustment means includes an adjustment bolt 40 and nut 41 secured to an angle bracket 42 secured to the bracket 37. The end of the adjustment bolt 40 bears against the upper surface of each shoe 35 at the end thereof opposite the compressed coil spring 38. Thus the passage of the single-faced sheet 16 between the glue roll 24 and the shoe contact surface will cause deflection of the springs 38 thereby causing a backing pressure to be applied to the single-faced sheet 16 by the shoe contact portions 34. The clearance may be adjusted to accommodate slightly thinner or thicker single-faced sheets. The setting for the distance between the glue roll and the contact shoe may be typically 1.0mm.

[0028] With the use of the prior art contact bar as shown in Figure 4, the area of the sheet 16 which contacts an arc of the glue roll 24 is determined by the position of a separate wrapping roll 43 in the glue machine 19, together with the position of the leading roll 26 in the double-facer 25. Adjustment of the area in contact with the glue roll 24 of the sheet 16, is thus difficult to arrange, and also tensioning of the sheet 16 before contacting the glue roll 24 is difficult to adjust.

[0029] Referring to Figures 5 to 8c, there will now be described the improvement embodying the invention in the known apparatus described with reference to the previous Figures. Referring to Figure 5, there is provided tensioning apparatus 48, comprising an elongate rotary device 44 mounted on the frame 32 substantially parallel to the elongate frame and spaced therefrom upstream relative to the direction of movement of the sheet 16. The rotary assembly 44 is positioned so as to bear against the sheet 16 for tensioning the sheet before it passes to the glue roll 24. The rotary device 44 consists of a series of wheels 45 spaced apart across the rotary device 44. The wheels 45 are independently rotatably mounted on a shaft 46 for rotation in the direction indicated by the arrow B. The direction of rotation of the glue

roll is indicated in Figure 5 at C, and the direction of movement of the sheet is indicated by arrow A.

[0030] In Figure 6 there is shown the general location of the contact bar 31 and the tensioning apparatus 48 within the glue machine 19. The wrap roll 43 shown previously in Figure 4 is shown inside the glue machine, and a corresponding wrap roll 49 is provided for the second cover sheet 22 passing through the bottom of the glue machine 19, together with a further roll 50. The elongate rotary devices 44 is spaced from the frame 32, by being mounted at each end on two mounting plates 60 which protrude from the frame 32 rearwardly relative to the direction of movement of the sheet 16.

[0031] In Figure 7 there is shown in detail a positioning device 51, also shown in Figures 5 and 6, for varying the position of the rotary device 44 relative to the elongate frame 32 so as to vary the amount of the sheet 16 which is in contact with the glue roll when passing over the glue roll. The positioning device 51 comprises at each end of the shaft 46 a drive means 52 coupled between the frame 32 and a shaft support 47 in which the shaft is mounted. The drive means may comprise a pneumatic arrangement of piston 53 and cylinder 54.

[0032] As shown particularly in Figures 5 and 7, each end of the shaft 46 protrudes beyond the shaft support 47, through a slot 55 in a back plate 56 and rests, in its most downward position, on an angle limit stop 57. Operation of the drive means 52 allows raising and lowering of the bearing support 47, guided by the distal end of the shaft 46 moving up and down in the slot 55.

[0033] As shown in Figure 7, each wheel 45 is mounted on a bearing 58 secured to the shaft 46 by wheel bushes which are fixedly mounted on the shaft 46. Thus the individual wheels 45 can rotate independently on the shaft 46. The positions of the wheels 45 across the rotary device can be adjusted by means of collars 59. Each collar may be secured to the shaft 46 by set screws (not shown). By way of example, the wheels 45 may be made of urethane with a shore hardness of 90.

[0034] As shown in Figures 8a to 8c, the shaft 46 may be raised or lowered relative to the elongate frame 32 by operation of the piston and cylinder arrangement of the drive means 52. In Figure 8a, the shaft 46 is shown in a relatively raised position, with the piston 53 extended to one quarter of its stroke. In Figure 8b the shaft 46 is positioned at a lower position relative to the frame 32, the piston 53 being extended to one half of its stroke. In Figure 8c, the shaft 46 is at a yet lower position relative to the frame 32, with the shaft 53 extended to three quarters of its stroke. With the rotary device 44 in the position of Figure 8c, the sheet 16 is tensioned to a greater extent than in the position of Figure 8a. Also, with the rotary device 44 in the position of Figure 8c, the sheet 16 will wrap around a greater arc of the glue roll 24, than in the case of Figure 8a. Thus movement of the rotary tensioning device 44 can achieve variation in the tension applied to the sheet 16, and also variation in the area of the sheet which comes in contact with the glue roll.

[0035] Considering the overall operation of the contact bar, the frame 32 is mounted on two arms (not shown) one on each side of the glue roll, and these arms are moveable under pneumatic, electrical or hydraulic controls. When the machine is stopped, the controls lift the contact bar clear of the glue roll. When the machine starts, the controls lower the contact bar to a position having a predetermined spacing from the glue applicator roll. Because the tensioning apparatus 48 provided by the rotary device 44 is mounted on the elongate frame 32 of the contact bar, the whole tension unit 48 is lifted and lowered with the contact bar.

[0036] The operation of the tensioning apparatus provides two advantages. Firstly the tensioner is arranged to tension the single-faced paper sheet prior to the application of the glue to the tips of the flute of that sheet. Secondly the tensioner is arranged to pre-determine the amount of the single-faced sheet that touches the glue applicator roll. This can be done by adjusting the stroke of the cylinders by mechanical limit stops. In Figures 8a, 8b and 8c, it is shown that the mechanical limit stop provided by the angle limit stop 57 can be adjusted to one of three levels, and secured in place by bolts 63 which can be optionally placed in holes 64 in the end plate 56.

[0037] The objective of the angle limit stop 57 is to limit the stroke of the cylinder rod and consequently the movement of the shaft 46 and wheels 45. By adjustment of the position of the angle limit stop it is possible to pre-determine exactly the amount of contact the paper sheet has with the glue applicator roll. It has been found that, in the absence of the rotary device of the present invention, there are a number of variables in the positioning of components, and the line or path followed by the paper sheet through the machine. It is found that the angle of the paper entering the contact bar will vary from machine to machine. Also at each plant the height of the glue rolls relative to the height of the first steam chest in the heating section 30 varies, causing bonding problems. Also, as shown in Figure 2 at the glue machine 19, the upper glue applicator roll 24' has a distinctly different angle for the paper leaving the unit, in comparison with the lower glue applicator roll 24.

[0038] For these reasons, the positioning device in the embodiment shown has three positions for the angle limit stop, although more or less positions may be provided. With the use of the positioning device 51, it is possible to predetermine exactly the amount of contact the paper has with the glue application roll. By predetermining the entrance angle of the paper sheet to be the same, it is possible to standardise the paper line leaving the surface of the glue roll. The tensioning rotary device, together with the positioning device creates a paper line or path which will give a surface contact area chosen by the operator. This is especially important when, for example, three glue applicator rolls are used in one gluing machine.

[0039] The functions of the pneumatic cylinders in the embodiment shown are two-fold. When the machine is

stopped the contact bar is lifted away from the glue applicator roll. The rotary tensioning device also lifts under the power of the two pneumatic cylinders of the positioning device 51. This gives the operator easier access to feed the paper sheet 16 between the glue applicator roll 24 and the contact bar 31. When the machine is started, firstly the contact bar is lowered into its running position, and then subsequently the rotary tensioning device is lowered into its running position to tension the paper and obtain the correct paper line. The movement of the rotary tensioning device is achieved by operating a separate pneumatic hand operated valve having settings of raise and lower. If the rotary tensioning were to be kept permanently in its operating position, i.e. if the pneumatic cylinders were kept in their lower position, then when the contact bar was lowered into its operating position, the paper sheet 16 would be likely to break. Also, if the pneumatic cylinders were not raised independently of the contact bar, the operator would not only have difficulty in feeding the paper in by hand (which is done in all machines), but also it would be difficult to wash the machine when required.

[0040] Returning to consideration of the wheels 45, it is important in the embodiment shown that these are soft, to stop marking and crushing of the paper. Urethane is a preferred material for manufacture. However, like any material when in contact with paper, the material of the wheels will wear. When the wear increases, the effectiveness of the rotary tensioner deteriorates. The use of a non-wearing material is inappropriate. For example steel would be too heavy, and aluminium too expensive as a consumable item. To overcome these difficulties, there is preferably provided in the mounting arrangement between the contact bar 31 and the rotary device 44, shimming means which may be removed when wear occurs. For example as shown in Figures 5, 5a, 6 and 8a to 8c, there may be provided between the mounting plates 60 and the frame 32 a wear shim 66, at each end of the contact bar. As shown in Figure 5a, the wear shim 66 has apertures 67, to allow fitting around bolts 66 which secure the mounting plates 60 to the frame 32.

[0041] The function of the shim is as follows. When the wheels 44 have worn, for example by a 8mm, the shims 66 can be removed. The angle limit stop can then be lowered to its lower position and the entrance angle and paper line can be retained to its original setting. This gives the user of the overall paper making machine time to restock the wheels for replacement. When new wheels are fitted the shims are replaced again in the unit. By way of example, the thickness of the shim may be 10mm.

Claims

1. Apparatus for applying glue to a sheet of material comprising:

a glue roll (24) for applying glue to a sheet (16) of material passing over the glue roll;
 an elongate frame (32) positioned across the direction of movement of the sheet over the glue roll;
 contact means (31) mounted on the frame for urging the sheet into contact with the glue roll; and
 an elongate rotary device (44) mounted on the frame substantially parallel to the elongate frame and spaced therefrom upstream relative to the direction of movement of the sheet, the elongate rotary device (44) being positioned so as to bear against the sheet for tensioning the sheet before it passes to the glue roll;

characterised in that the elongate rotary device (44) is positioned so as to bear against the sheet (16) on the same side as the contact means (31).

2. Apparatus according to Claim 1 adapted for the manufacture of corrugated paper board, the apparatus comprising:

a single-facer assembly (14) for supplying a continuous single-faced corrugated paper sheet (16) comprising a fluted sheet (15) and a first cover sheet on one side of the fluted sheet; and
 a gluing machine (19) including said glue roll (24) arranged to apply glue to the flute tips of the single-faced sheet (16), for subsequent combination with a continuous second cover sheet (22) for facing the other side of the fluted sheet.

3. Apparatus according to Claim 1 or 2 including a positioning device (51) mounted on the frame (32) for adjusting the position of the rotary device (44) relative to the elongate frame (32) so as to predetermine the amount of the sheet (16) in contact with the glue roll (24) when passing over the glue roll.

4. Apparatus according to Claim 3 in which the positioning device (51) comprises means (52, 47) for moving the axis of the rotary device (44) relative to the frame (32) in a direction transverse to the direction in which the rotary device is spaced from the elongate frame.

5. Apparatus according to Claim 3 or 4 in which the positioning device (51) comprises at each end of the rotary device (44) a support (47) for the rotary device which is movably mounted on the frame (32) and drive means (52) coupled between the frame (22) and the support (47) for moving the support relative to the frame.

6. Apparatus according to Claim 5 in which the drive means (52) comprises a pneumatic piston (53) and cylinder (54) arrangement.

7. Apparatus according to Claim 5 or 6 in which the positioning device (51) includes at each end of the rotary device (44) an adjustable stop (57) mounted on the frame (32) to determine the operating position of the support (47).

8. Apparatus according to any preceding claim in which the rotary device (44) comprises a series of rollers (45) spaced apart across the elongate rotary device.

9. Apparatus according to Claim 8 in which the rollers (45) are independently rotatably mounted on a shaft (46) extending across the elongate rotary device (44).

10. Apparatus according to Claim 8 or 9, including an independent bearing (58) for each roller (45), each bearing being movable along the shaft, and means for securing each bearing on the shaft at a selected position so as to allow variation in the spacing of the rollers.

11. Apparatus according to any preceding claim in which the contact means (31) comprises a series of shoes (33) arranged in side-by-side relationship across the elongate contact means.

12. Apparatus according to Claim 11 in which each shoe (33) has a contact portion (34) for contacting the sheet (16) and a pivot portion (35) pivotally connected to the frame (32), the contact portion (34) being spaced from the pivot portion (35) in a first direction and the rotary device (44) being spaced from the contact means (31) in a second direction generally opposite to the first direction.

13. A method of applying glue to a sheet of material comprising:

passing a sheet (16) of material over a rotating glue roll (24);
 urging the sheet into contact with the glue roll as it passes over the glue roll by contact means (31) mounted on an elongate frame positioned across the direction of movement of the sheet over the glue roll; and
 tensioning the sheet by an elongate rotary device (44) mounted on said elongate frame substantially parallel to the elongate frame and spaced therefrom upstream relative to the direction of movement of the sheet, the elongate rotary device being positioned so as to bear against the sheet before it passes to the glue

roll;

characterised in that the elongate rotary device (44) bears against the sheet (16) on the same side as the contact means (31).

14. A method according to Claim 13 including applying glue to the flute tips of a single-faced corrugated paper board (16) sheet by passing the single-faced sheet of corrugated paper board over said rotating glue roll (24) with the flute tips oriented facing the roll. 10
15. A method according to Claim 13 or 14 including the step of adjusting the position of the rotary device (44) relative to the elongate frame so as to predetermine the amount of the sheet which is in contact with the glue roll when passing over the glue roll. 15
16. A method according to Claim 13 or 14 in which the position adjusting step comprises moving the axis of the rotary device (44) relative to the frame (32) in a direction transverse to the direction in which the rotary device is spaced from the elongate frame. 20
17. A method according to any of Claims 13 to 16 including urging the sheet (16) into contact with the glue roll (24) by passing the sheet between the glue roll and a series of shoes (33) arranged in side-by-side relationship across the elongate contact means (31). 25

Patentansprüche

1. Vorrichtung zum Aufbringen von Klebstoff auf eine Materialbahn umfassend:

eine Klebstoffrolle (24) zum Aufbringen von Klebstoff auf eine Materialbahn (16), die über die Klebstoffrolle läuft;
einen länglichen Rahmen (32), der quer zur Bewegungsrichtung der Bahn über die Klebstoffrolle angeordnet ist;
eine Kontakteinrichtung (31), die an dem Rahmen angebracht ist, um die Bahn in Kontakt mit der Klebstoffrolle zu zwingen; und
eine längliche drehbare Vorrichtung (44), die an dem Rahmen im wesentlichen parallel zu dem länglichen Rahmen angebracht ist und von diesem stromaufwärts relativ zur Bewegungsrichtung der Bahn beabstandet ist, wobei die längliche drehbare Vorrichtung (44) so angeordnet ist, dass sie an der Bahn anliegt, um die Bahn zu spannen, bevor sie zur Klebstoffrolle läuft; 40

dadurch gekennzeichnet, dass die längliche drehbare Vorrichtung (44) so angeordnet ist,

dass sie an der Bahn (16) auf derselben Seite wie die Kontakteinrichtung (31) anliegt.

2. Vorrichtung nach Anspruch 1, die zur Herstellung von Wellpappe ausgebildet ist, wobei die Vorrichtung umfasst:

eine Einseiten-Baugruppe (14) zur Zufuhr einer kontinuierlichen einseitigen Wellpappebahn (16), die eine geriffelte Bahn (15) und eine erste Abdeckbahn auf einer Seite der geriffelten Bahn aufweist; und
eine Klebemaschine (19) mit der Klebstoffrolle (24), die so ausgebildet ist, dass sie Klebstoff auf die geriffelten Spitzen der einseitigen Bahn (16) aufbringt, zur nachfolgenden Kombination mit einer kontinuierlichen zweiten Abdeckbahn (22), damit diese der anderen Seite der geriffelten Bahn zugewandt ist.

3. Vorrichtung nach Anspruch 1 oder 2 mit einer Positioniervorrichtung (1), die an dem Rahmen (32) angeordnet ist, um die Position der drehbaren Vorrichtung (44) relativ zu dem länglichen Rahmen (32) zu verstellen, um das Ausmaß der Bahn (16), das beim Passieren über die Klebstoffrolle in Kontakt mit der Klebstoffrolle (24) ist, vorzubestimmen.

4. Vorrichtung nach Anspruch 3, wobei die Positioniereinrichtung (51) eine Einrichtung (52, 47) aufweist zum Bewegen der Achse der drehbaren Vorrichtung (44) relativ zu dem Rahmen (32) in eine Richtung quer zur Richtung, in welcher die drehbare Vorrichtung von dem länglichen Rahmen beabstandet ist.

5. Vorrichtung nach Anspruch 3 oder 4, wobei die Positioniereinrichtung (51) an jedem Ende der drehbaren Vorrichtung (44) eine Stütze (47) für die drehbare Vorrichtung, die beweglich an dem Rahmen (32) angeordnet ist, sowie eine Antriebseinrichtung (52) aufweist, die zwischen dem Rahmen (22) und der Stütze (47) gekoppelt ist, um die Stütze relativ zu dem Rahmen zu bewegen.

6. Vorrichtung nach Anspruch 5, wobei die Antriebseinrichtung (52) eine pneumatische Kolben- (53) und Zylinder- (54) Anordnung aufweist.

7. Vorrichtung nach Anspruch 5 oder 6, wobei die Positioniereinrichtung (51) an jedem Ende der drehbaren Vorrichtung (44) einen verstellbaren Anschlag (57) aufweist, der an dem Rahmen (32) montiert ist, um die Betriebsposition der Stütze (47) zu bestimmen.

8. Vorrichtung nach einem der vorhergehenden Ansprüche, wobei die drehbare Vorrichtung (44) eine

Reihe von Rollen (45) aufweist, die quer über die längliche drehbare Vorrichtung beabstandet sind.

9. Vorrichtung nach Anspruch 8, wobei die Rollen (45) unabhängig voneinander drehbar an einer Achse (46) montiert sind, die sich quer über die längliche drehbare Vorrichtung (44) erstreckt. 5
10. Vorrichtung nach Anspruch 8 oder 9, mit einem unabhängigen Lager (58) für jede Rolle (45), wobei jedes Lager entlang der Achse beweglich ist, und einer Einrichtung zum Sichern jedes Lagers an der Achse an einer gewählten Position, so dass die Beabstandung der Rollen variiert werden kann. 10
11. Vorrichtung nach einem der vorhergehenden Ansprüche, wobei die Kontakteinrichtung (31) eine Reihe von Schuhen (33) aufweist, die Seite an Seite quer über die längliche Kontakteinrichtung angeordnet sind. 20
12. Vorrichtung nach Anspruch 11, wobei jeder Schuh (33) einen Kontaktabschnitt (34) für einen Kontakt mit der Bahn (16) und einen Schwenkabschnitt (35) aufweist, der schwenkbar mit dem Rahmen (32) verbunden ist, wobei der Kontaktabschnitt (34) von dem Schwenkabschnitt (35) in einer ersten Richtung beabstandet ist und die drehbare Vorrichtung (44) von der Kontakteinrichtung (31) in einer zweiten Richtung beabstandet ist, die generell entgegengesetzt zur ersten Richtung ist. 25 30
13. Verfahren zum Aufbringen von Klebstoff auf eine Materialbahn, umfassend: 35
 Führen einer Materialbahn (16) über eine sich drehende Klebstoffrolle (24);
 Zwingen der Bahn in Kontakt mit der Klebstoffrolle, während diese über die Klebstoffrolle läuft, durch eine Kontakteinrichtung (31), die an einem länglichen Rahmen angebracht ist, der quer zur Bewegungsrichtung der Bahn über die Klebstoffrolle angeordnet ist; und
 Spannen der Bahn durch eine längliche drehbare Vorrichtung (44), die an dem länglichen Rahmen im wesentlichen parallel zum länglichen Rahmen montiert ist und von diesem stromaufwärts relativ zur Bewegungsrichtung der Bahn beabstandet ist, wobei die längliche drehbare Vorrichtung so angeordnet ist, dass sie gegen die Bahn gestützt ist, bevor sie zur Klebstoffrolle gelangt; 40 45 50
dadurch gekennzeichnet, dass die längliche drehbare Vorrichtung (44) an der Bahn (16) auf derselben Seite wie die Kontakteinrichtung (31) gestützt ist. 55

14. Verfahren nach Anspruch 13, mit Aufbringen von Klebstoff auf die Riffel-Spitzen einer einseitigen Wellpappe- (16) Bahn durch Führen der einseitigen Wellpappebahn über die sich drehende Klebstoffrolle (24), wobei die Riffel-Spitzen so orientiert sind, dass sie der Rolle zugewandt sind.

15. Verfahren nach Anspruch 13 oder 14, mit dem Schritt des Einstellens der Position der drehbaren Vorrichtung (44) relativ zu dem länglichen Rahmen, um das Ausmaß der Bahn, die beim Passieren über die Klebstoffrolle in Kontakt mit der Klebstoffrolle ist, vorzubestimmen.

16. Verfahren nach Anspruch 13 oder 14, wobei der Schritt des Einstellens der Position das Bewegen der Achse der drehbaren Vorrichtung (44) relativ zu dem Rahmen (32) in eine Richtung quer zur Richtung, in welcher die drehbare Vorrichtung von dem länglichen Rahmen beabstandet ist, umfasst. 20

17. Verfahren nach einem der Ansprüche 13 bis 16, das das Zwingen der Bahn (16) in Kontakt mit der Klebstoffrolle (24), indem die Bahn zwischen der Klebstoffrolle und einer Reihe von Schuhen (33) durch läuft, die Seite an Seite quer über die längliche Kontakteinrichtung (31) angeordnet sind, einschließt.

Revendications

1. Appareil pour appliquer de la colle sur un matériau en feuille, comprenant :

un rouleau à colle (24) pour appliquer de la colle sur une feuille (16) d'un matériau passant sur le rouleau à colle ;
 un cadre (32) allongé, positionné dans la direction de déplacement de la feuille sur le rouleau à colle ;
 des moyens de contact (31), montés sur le cadre pour déplacer la feuille en contact avec le rouleau à colle ; et
 un dispositif rotatif (44) allongé, monté sur le cadre, sensiblement parallèlement au cadre allongé et à distance de celui-ci, en amont par rapport à la direction de déplacement de la feuille, le dispositif rotatif (44) allongé étant positionné de manière à porter contre la feuille, afin de mettre sous tension la feuille avant qu'elle passe au rouleau à colle ;

caractérisé en ce que le dispositif rotatif (44) allongé est positionné de manière à porter contre la feuille (16), du même côté que les moyens de contact (31).

2. Appareil selon la revendication 1, adapté pour la fa-

brication de panneaux en carton ondulé, l'appareil comprenant :

un ensemble de fabrication de papier simple face (14), pour fournir une feuille de papier (16) ondulée simple face continue, comprenant une feuille ondulée (15) et une première feuille de couverture placée sur une face de la feuille ondulée ; et
une machine d'encollage (19), comprenant ledit rouleau à colle (24), agencé pour appliquer de la colle sur les bouts d'ondulation de la feuille simple face (16) dans le but d'une combinaison subséquente à une deuxième feuille de couverture (22) continue, pour façonner l'autre face de la feuille ondulée.

3. Appareil selon la revendication 1 ou 2, comprenant un dispositif de positionnement (51) monté sur le cadre (32) pour ajuster la position du dispositif rotatif (44) par rapport au cadre allongé (32), afin de prédéterminer l'ampleur du contact de la feuille (16) avec le rouleau à colle (24) lors du passage sur le rouleau à colle. 20
4. Appareil selon la revendication 3, dans lequel le dispositif de positionnement (51) comprend des moyens (52, 47) pour déplacer l'axe du dispositif rotatif (44) par rapport au cadre (32) dans une direction transversale à la direction dans laquelle le dispositif rotatif est espacé du cadre allongé. 25
5. Dispositif selon la revendication 3 ou 4, dans lequel le dispositif de positionnement (51) comprend, à chaque extrémité du dispositif rotatif (44), un support (47) pour le dispositif rotatif, qui est monté de façon mobile sur le cadre (32), et des moyens (52), couplés entre le cadre (22) et le support (47), pour déplacer le support par rapport au cadre. 30
6. Dispositif selon la revendication 5, dans lequel les moyens d'entraînement (52) comprennent un agencement pneumatique à piston (53) et cylindre (54). 35
7. Dispositif selon la revendication 5 ou 6, dans lequel le dispositif de positionnement (51) comprend, à chaque extrémité du dispositif rotatif (44), une butée ajustable (57), montée sur le cadre (32) afin de déterminer la position de fonctionnement du support (47). 40
8. Dispositif selon l'une quelconque des revendications précédentes, dans lequel le dispositif rotatif (44) comprend une série de rouleaux (45) espacés les uns les autres sur le dispositif rotatif allongé. 45
9. Dispositif selon la revendication 8, dans lequel les rouleaux (45) sont montés à rotation indépendam-

ment, sur un arbre (46) s'étendant sur le dispositif rotatif (44) allongé.

10. Dispositif selon la revendication 8 ou 9, comprenant un palier (58) indépendant pour chaque rouleau (45), chaque palier étant déplaçable le long de l'arbre, et des moyens pour visser chaque palier sur l'arbre en une position sélectionnée, de manière à permettre une variation de l'espacement des rouleaux.
11. Dispositif selon l'une quelconque des revendications précédentes, dans lequel les moyens de contact (31) comprennent une série de patins (33) agencés en relation côte à côte sur les moyens de contact allongés.
12. Dispositif selon la revendication 11, dans lequel chaque patin (33) a une partie de contact (34), pour mise en contact de la feuille (16), et une partie de pivot (35) reliée à pivotement sur le cadre (32), la partie de contact (34) étant espacée de la partie de pivot (35), en une première direction, et le dispositif rotatif (44) étant espacé des moyens de contact (31), en une deuxième direction, globalement opposée à la première direction.
13. Un procédé d'application de colle sur une feuille de matériau, comprenant :
le passage d'une feuille (16) de matériau sur un rouleau à colle (24) rotatif ;
le placement de la feuille, en contact avec le rouleau à colle, lorsqu'elle passe sur le rouleau à colle, à l'aide de moyens de contact (31) montés sur un cadre allongé positionné dans la direction de déplacement de la feuille, sur le rouleau à colle ; et
la mise sous tension de la feuille par un dispositif rotatif (44) allongé monté sur ledit cadre allongé sensiblement parallèlement au cadre allongé et espacé de celui-ci en amont par rapport à la direction de déplacement de la feuille, le dispositif rotatif allongé étant positionné pour porter contre la feuille avant de passer au rouleau à colle ;

caractérisé en ce que le dispositif rotatif (44) allongé porte contre la feuille (16), du même côté que celui où se trouvent des moyens de contact (31).

14. Un procédé selon la revendication 13, comprenant l'application de colle aux bouts d'ondulation de la feuille de panneau du carton ondulé (16) simple face, par passage de la feuille simple de papier carton ondulé sur ledit rouleau à colle (24) rotatif, les bouts d'ondulation étant orientés pour se trouver face au

rouleau.

15. Un procédé selon la revendication 13 ou 14, comprenant l'étape d'ajustement de la position du dispositif rotatif (44) par rapport au cadre allongé, de manière à prédéterminer l'ampleur du contact de la feuille avec le rouleau à colle, lorsqu'elle passe sur le rouleau à colle. 5
16. Un procédé selon la revendication 13 ou 14, dans lequel l'étape d'ajustement de position comprend le déplacement de l'axe du dispositif rotatif (44) par rapport au cadre (32), dans une direction transversale à la direction dans laquelle le dispositif rotatif est espacé du cadre allongé. 10 15
17. Un procédé selon l'une quelconque des revendications 13 à 16, comprenant le placement de la feuille (16) en contact avec le rouleau à colle (24), par passage de la feuille entre le rouleau à colle et une série de patins (33), agencés en relation de côte à côte sur les moyens de contact (31) allongés. 20

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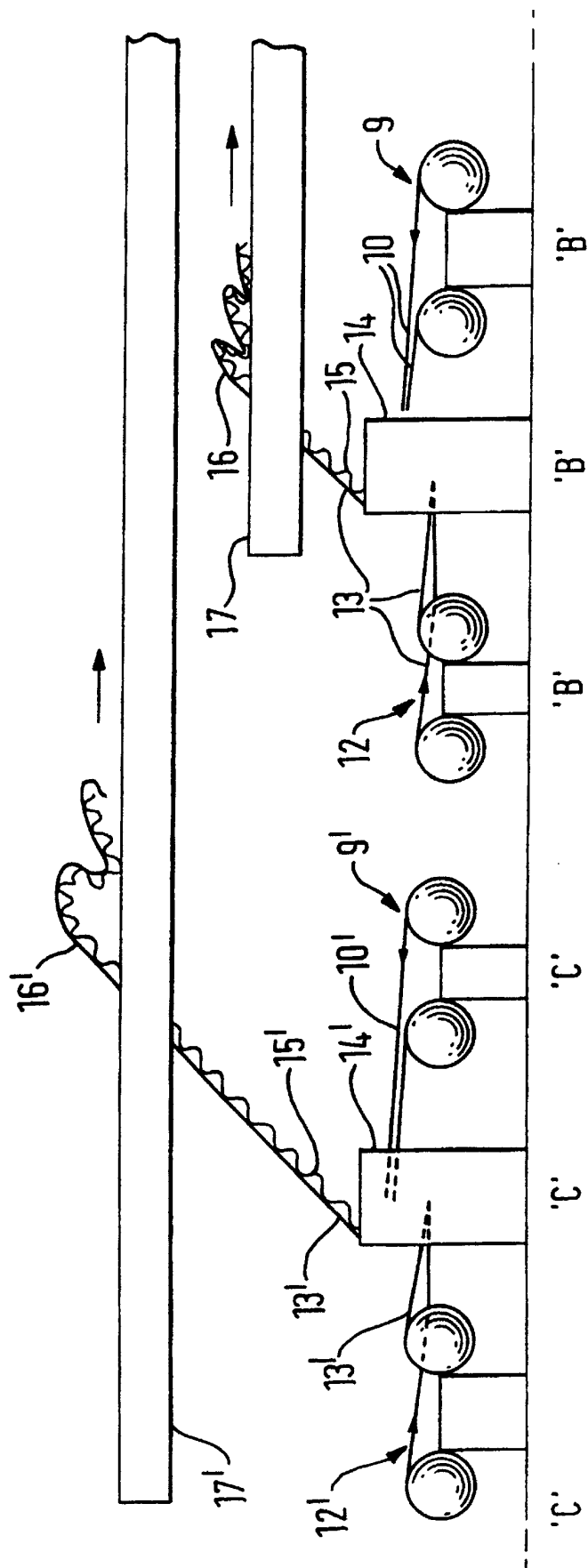


FIG.1

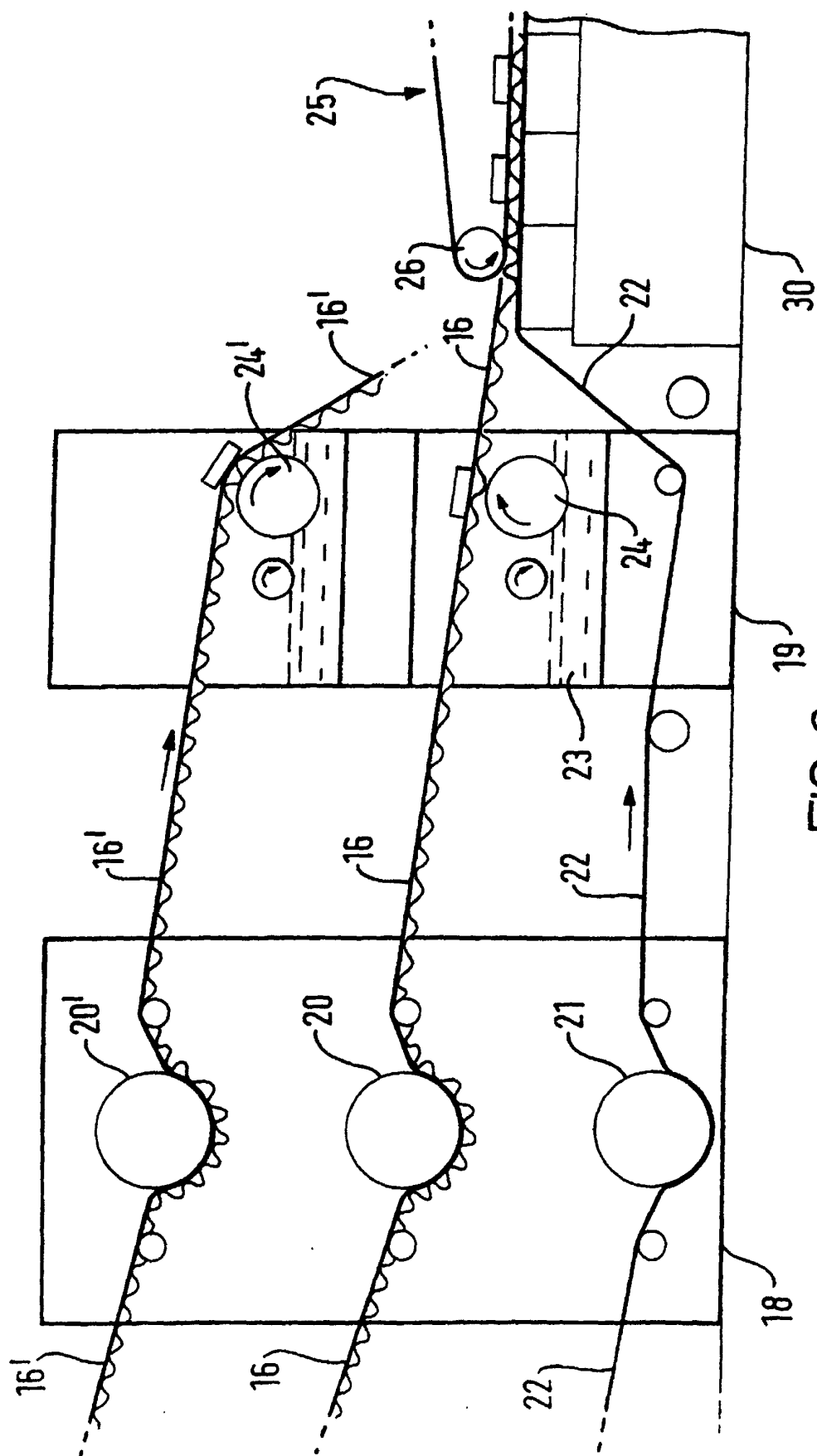


FIG. 2

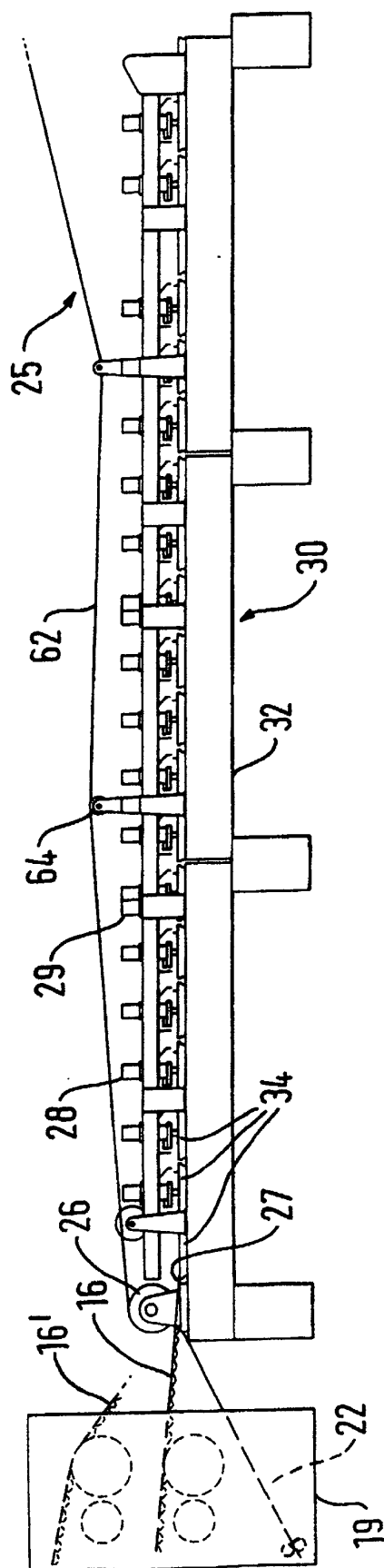
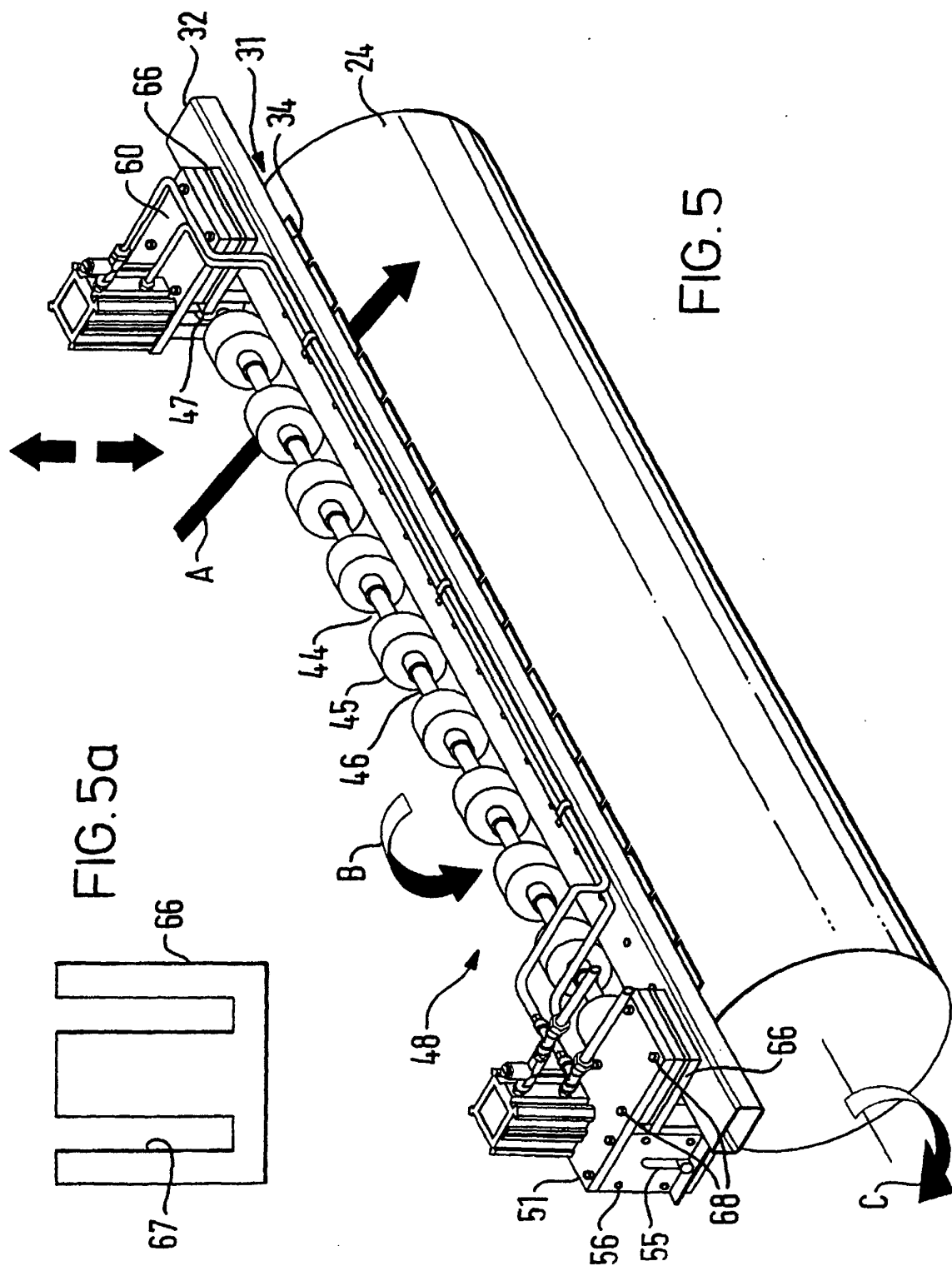


FIG. 3



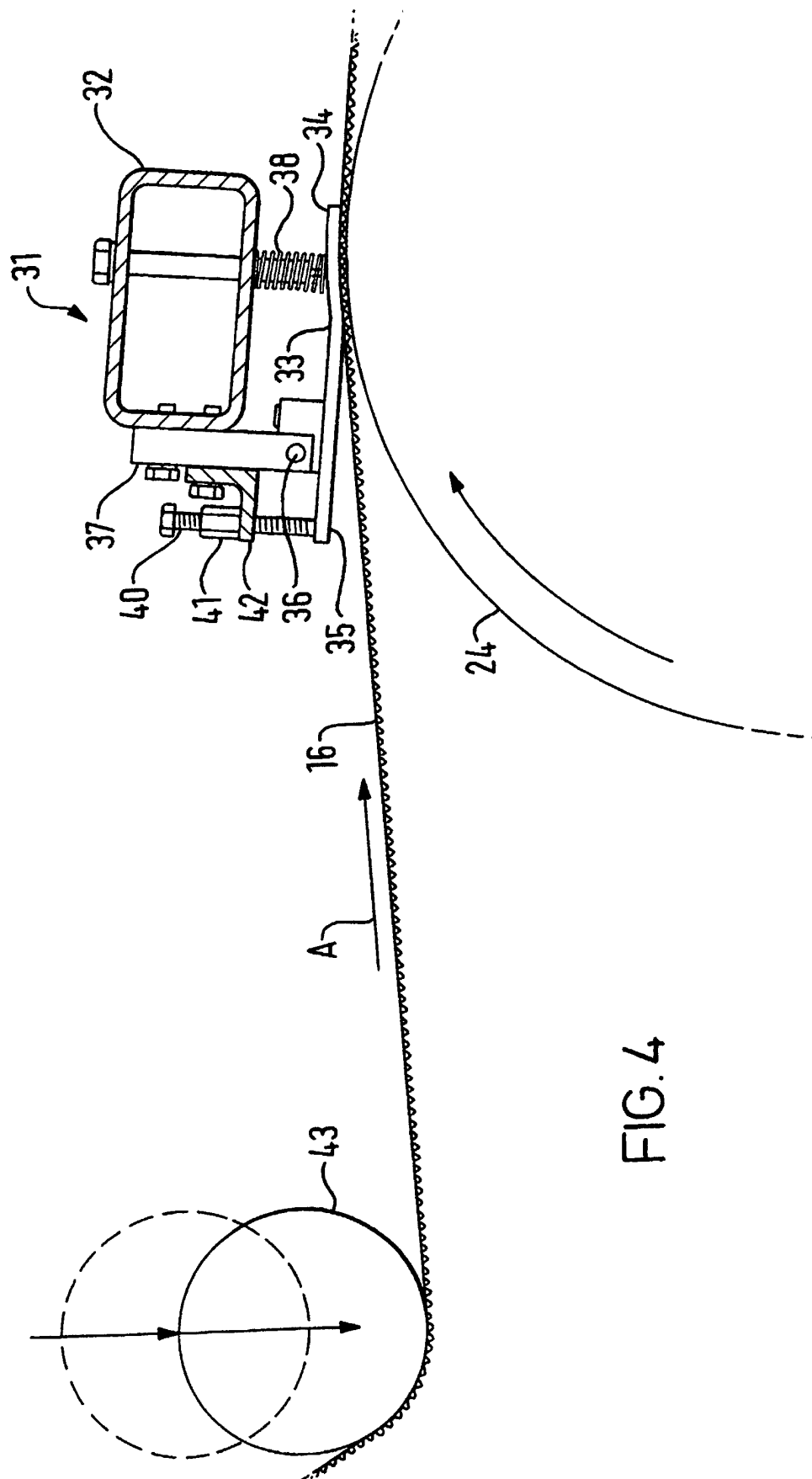
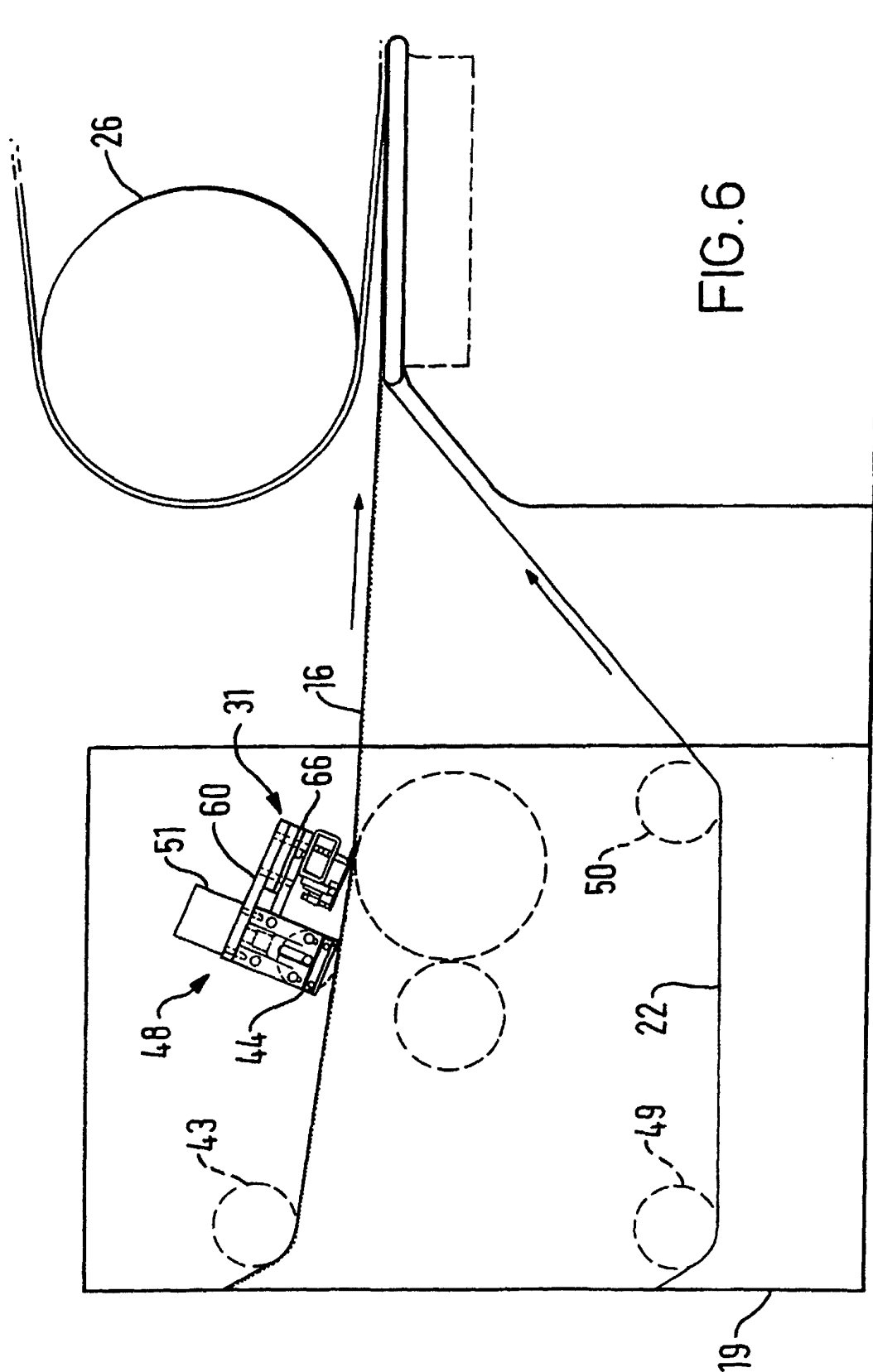
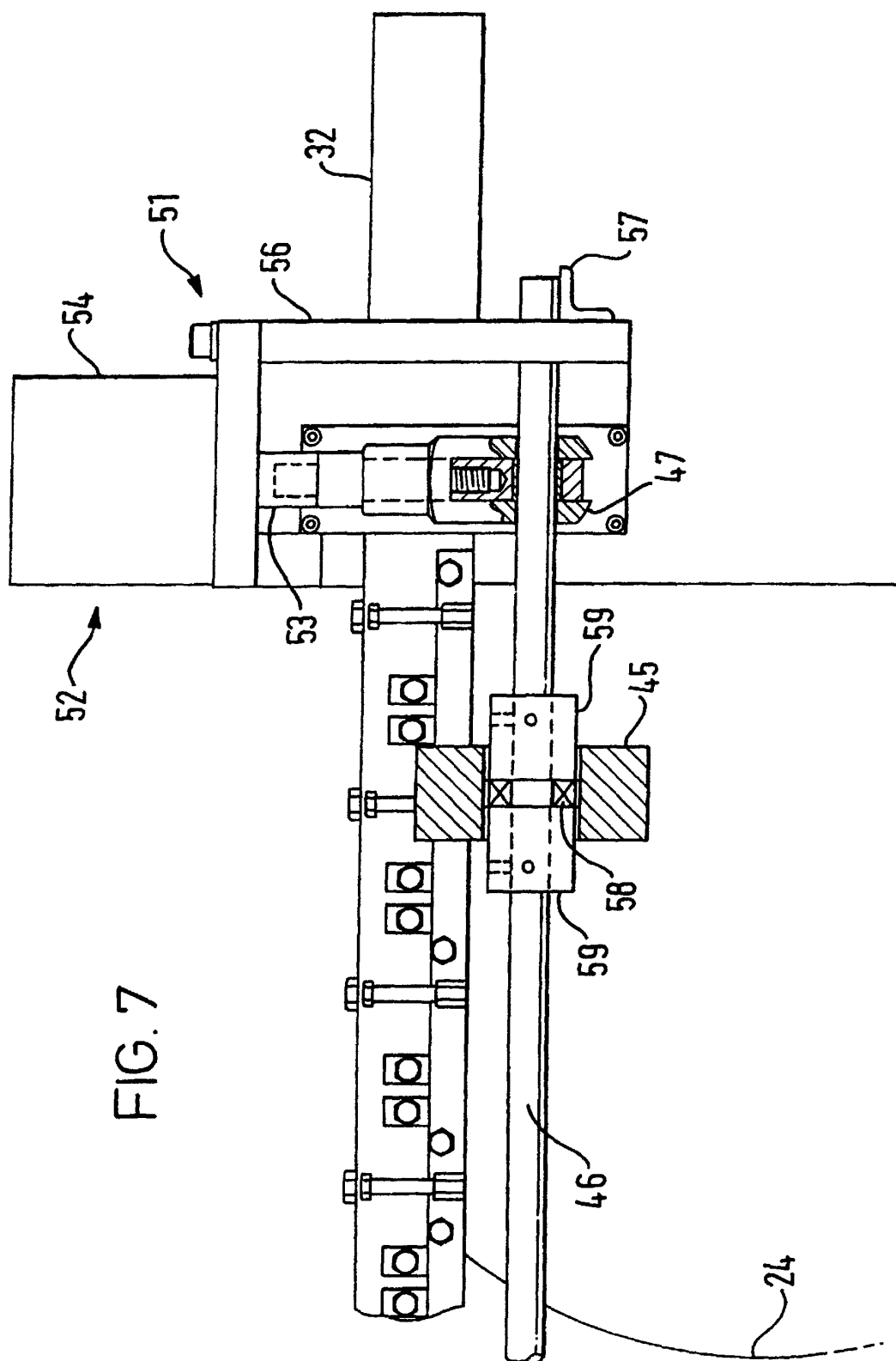


FIG. 4





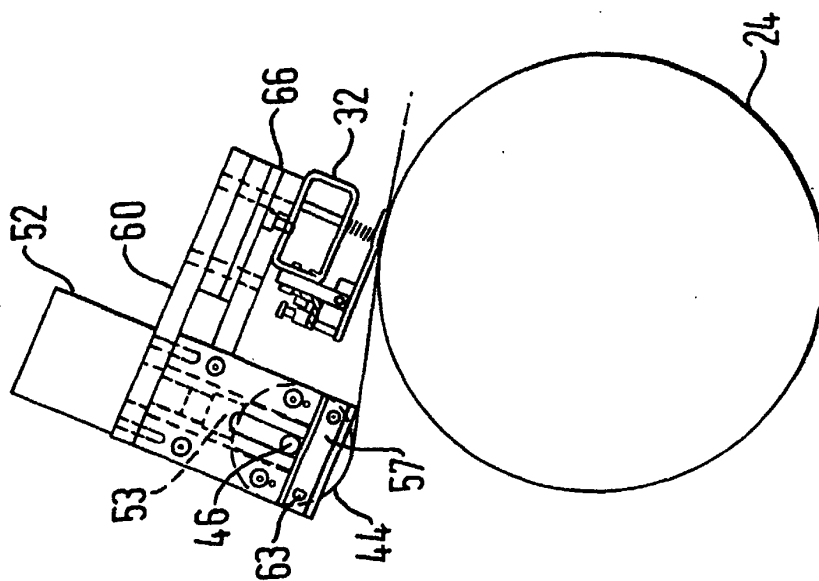


FIG. 8a

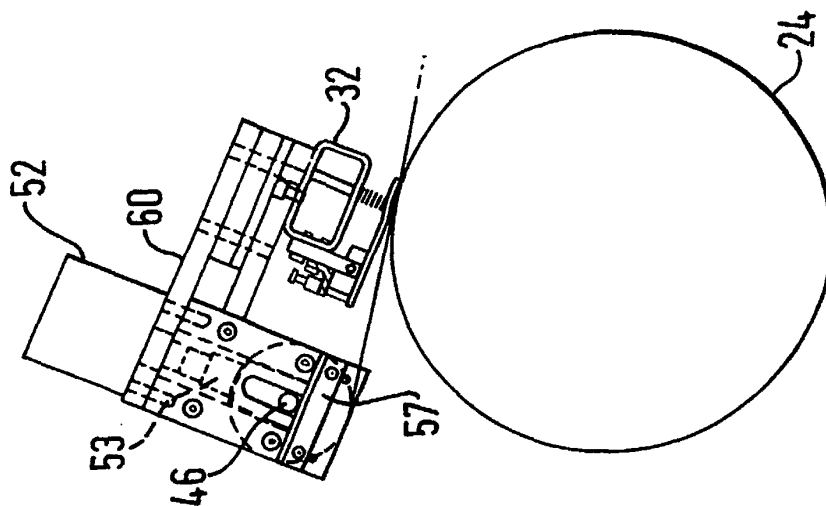


FIG. 8b

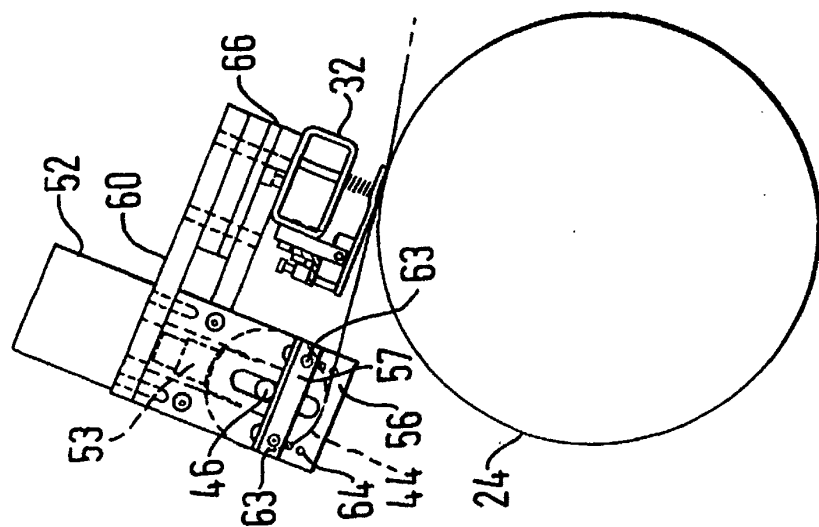


FIG. 8c