



US 20090126892A1

(19) **United States**(12) **Patent Application Publication**
Janzer(10) **Pub. No.: US 2009/0126892 A1**(43) **Pub. Date: May 21, 2009**(54) **SHOE SUCTION PRESS ROLL**(52) **U.S. Cl. 162/358.3**(76) **Inventor: Josef Janzer, Gerstetten (DE)**(57) **ABSTRACT**

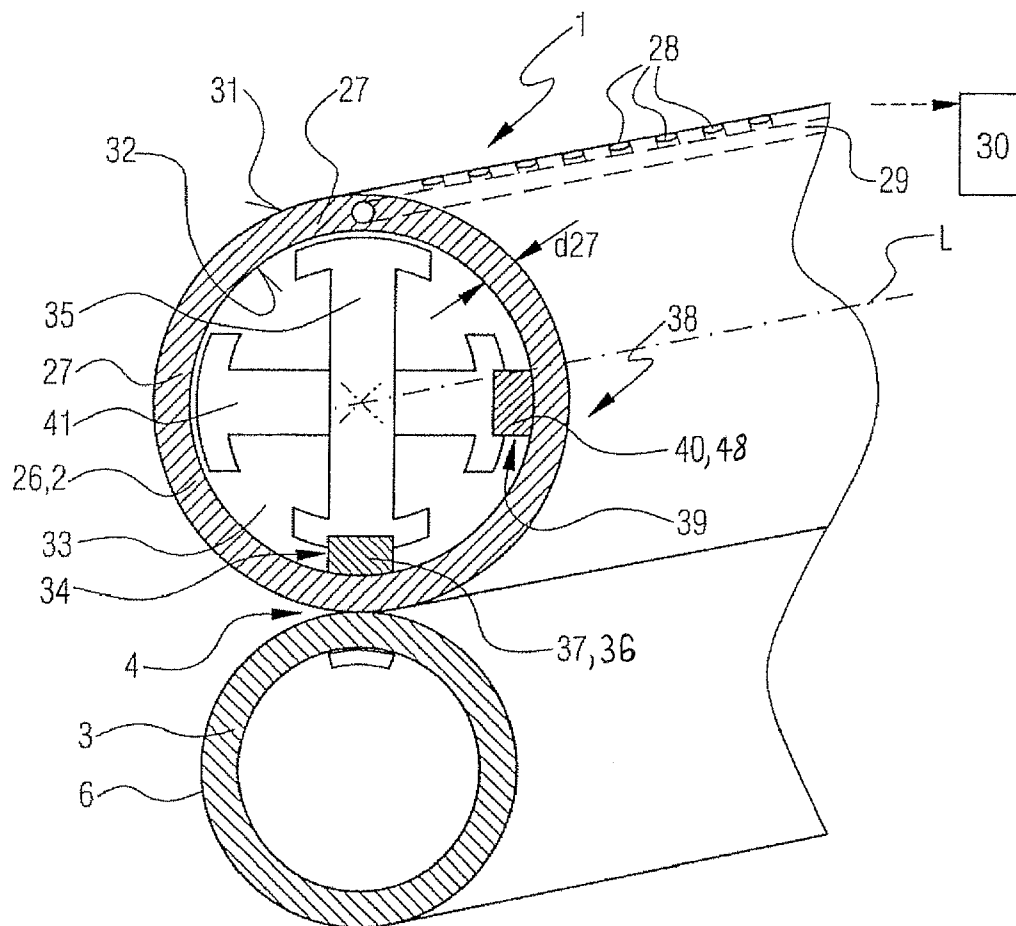
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(21) **Appl. No.: 12/123,810**(22) **Filed: May 20, 2008**(30) **Foreign Application Priority Data**

May 25, 2007 (DE) 10 2007 024 508.6

Publication Classification(51) **Int. Cl.**
D21F 3/08 (2006.01)

This invention relates to a press device with a suction press roll. According to the invention, a linear force increase can be achieved in press devices with suction press rolls of identical or smaller size than conventional suction press rolls by equipping the suction press rolls with a compliance compensator. Said compliance compensator is arranged parallel to the longitudinal axis of the suction press roll in said suction press roll. Different concepts are possible depending on the roll cover construction and the arrangement of the suction box, whereby the one first embodiment is characterized by the integration of a shoe press roll in the suction press roll. A second embodiment is characterized by the combination of a routing of connection channels between the press nip and the suction box through the roll cover with an integrated compliance compensator in the interior space enclosed by the roll cover.



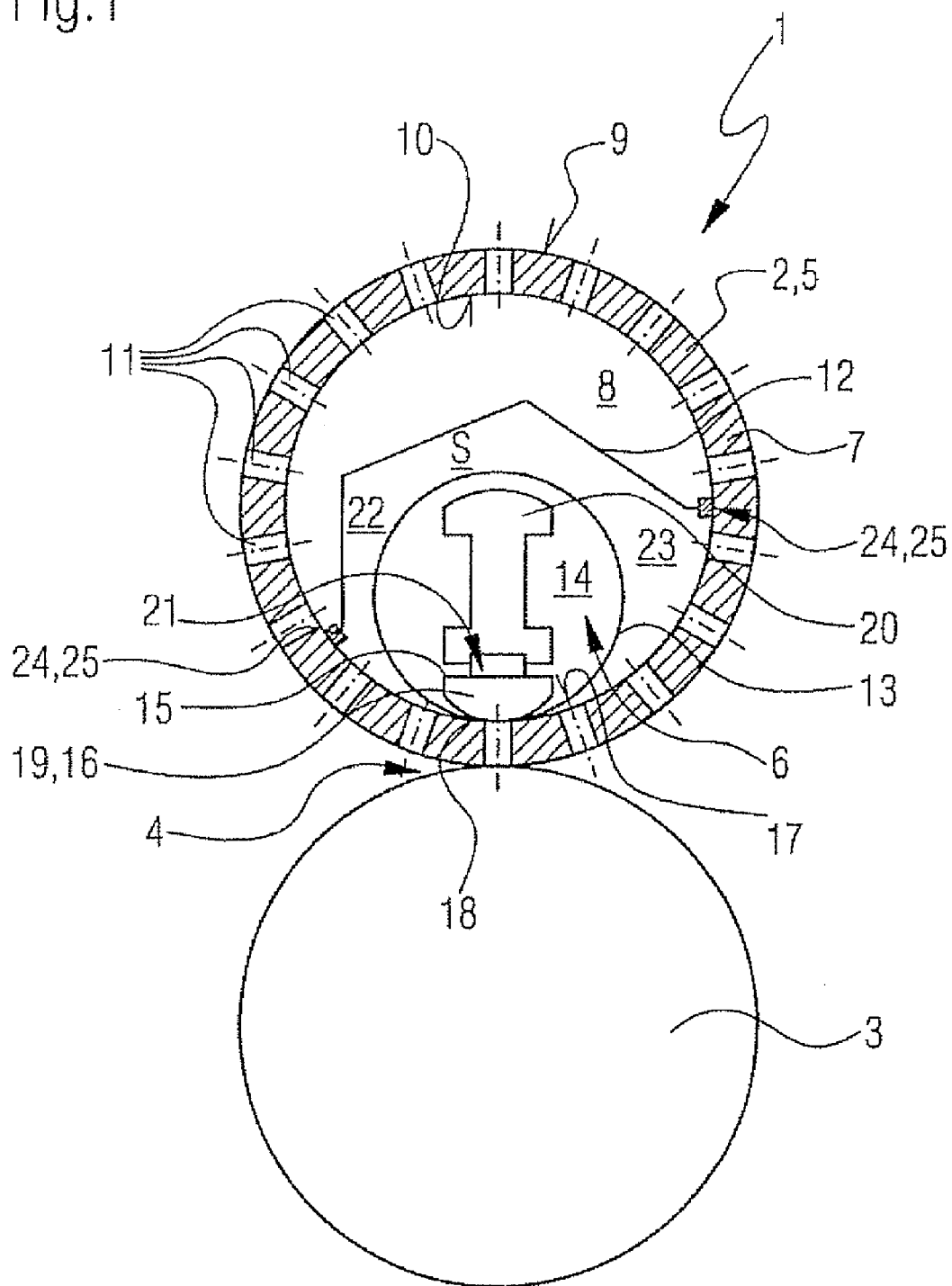


Fig.2

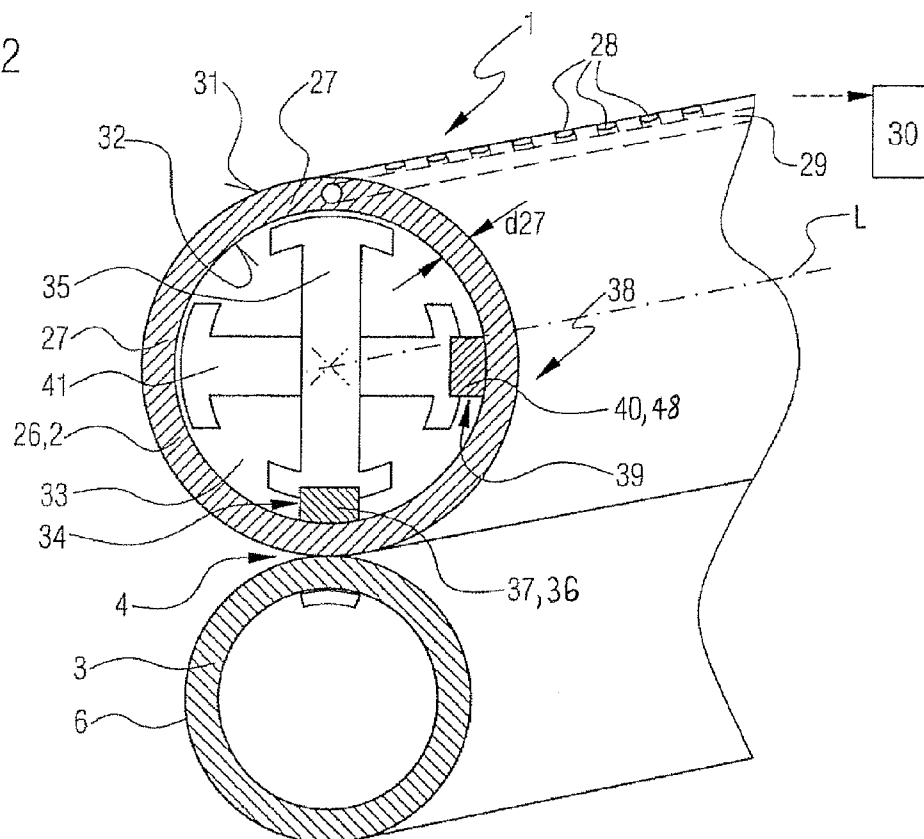


Fig.3

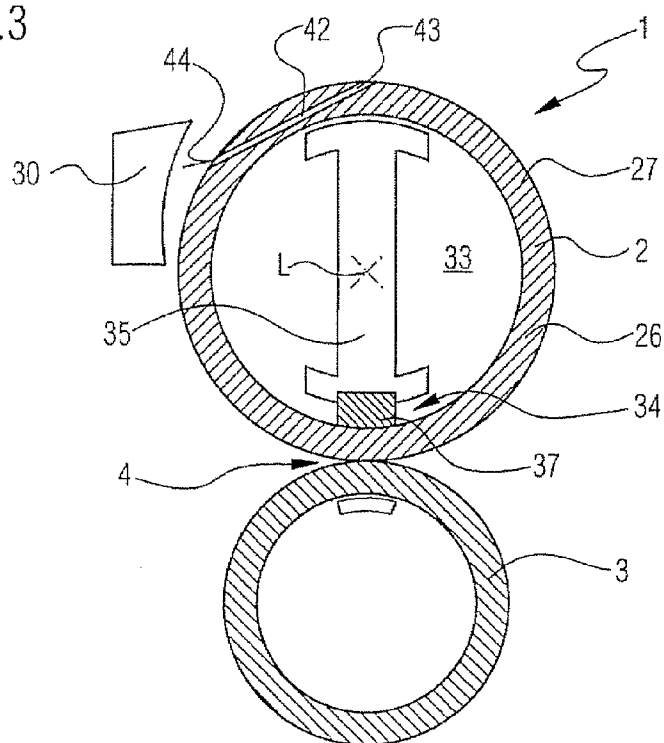
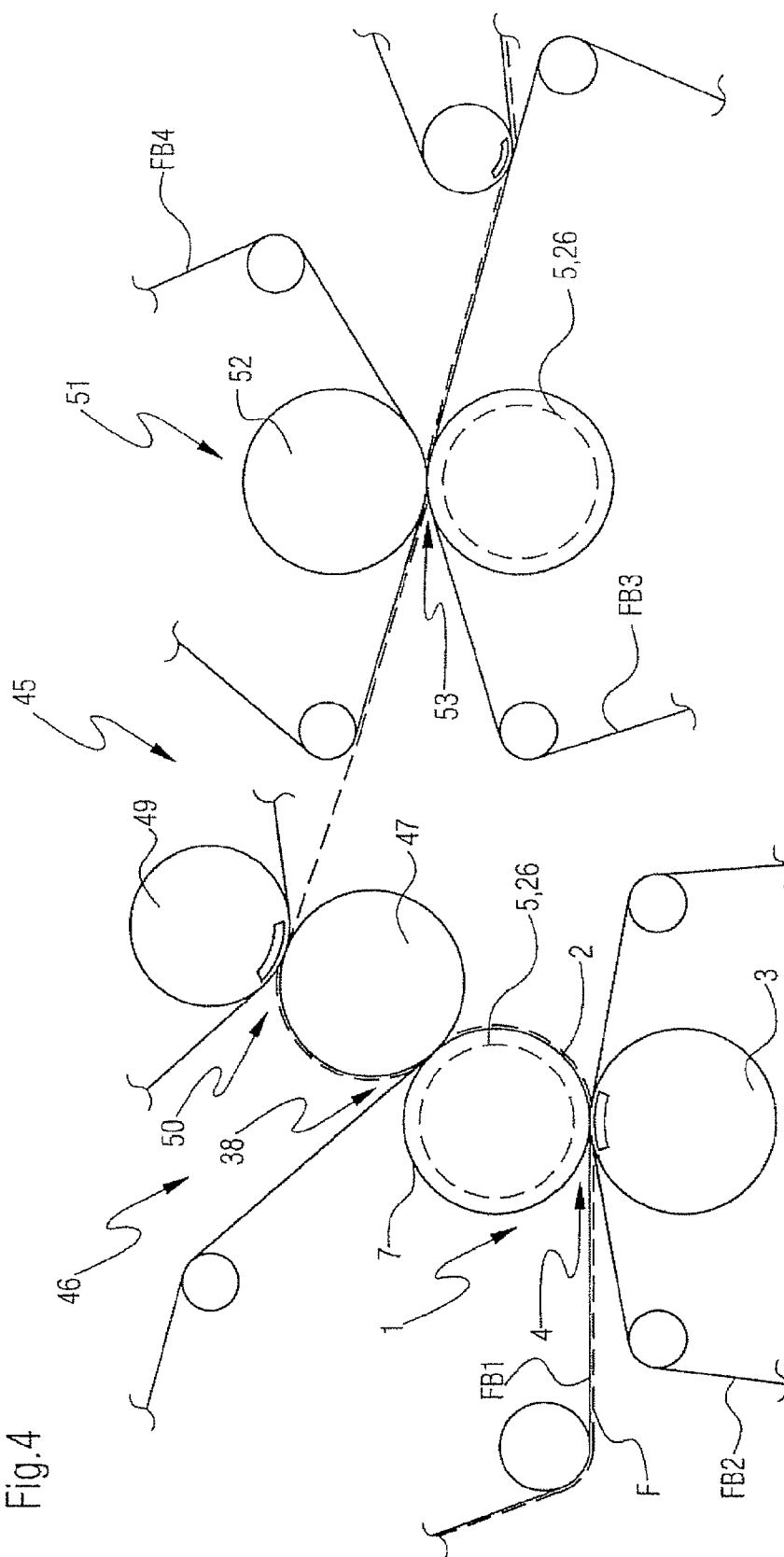


Fig. 4



SHOE SUCTION PRESS ROLL

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] This invention relates to a press device. Also it relates to a method for converting a press device in order to increase the linear force in an individual press nip, and to a multiple-nip press device.

[0003] 2. Description of the Related Art

[0004] Press sections on machines for producing fibrous webs are already known in numerous embodiments from the prior art. Different press concepts are realized depending on the number of press nips to be passed through and on the arrangement and construction of the rolls forming said press nips. In the individual press devices the press nips are created by way of two rolls, whereby one of the rolls can be constructed for example as a shoe press roll. From publication EP 1 445 375 A1 there is already known for example a Duo Nipcoflex arrangement. On said arrangement the fibrous web is passed in the region of the press section successively through two press nips which are formed by two press devices in series. The first press device is characterized in that a suction press roll interacts with a shoe press roll. In this case the suction press roll is configured, looking in the vertical direction, as an upper roll and characterized by a rigid, meaning non-flexible rotatable roll cover. To discharge fluid or the water emerging from the fibrous web in the press nip, provision is made on the roll cover for openings which extend from the outer circumference into the roll cover and are discharged out of said cover through channels extending over the width of the roll through the roll cover, whereby the discharging takes place into a suitable end-face receiving box. Also described in this publication is a compact press arrangement, whereby in this case the suction press roll is involved in constructing two press nips, in particular the first and the second press nip arranged successively in the fibrous web running direction. The third roll, which together with the suction press roll forms the second press nip, forms together with another suction press roll a third press nip. The passing of the fibrous web between the individual press nips always takes place on the surface of a roll with no free draw.

[0005] An embodiment of a suction press roll is known from DE 100 22 353 A1. Said embodiment has several channels on the roll cover, whereby each channel has two openings which are arranged offset to each other in the circumferential direction and lead out of the suction press roll, and outside the press nip there is at least one suction apparatus acting on the outer cover face of the roll cover, whereby the distance between the respective openings of the channels in the circumferential direction is selected such that during rotation of the roll cover the suction apparatus always stands in connection to at least a part of the openings momentarily in the press nip via their channels.

[0006] On embodiments of said kind, linear force increases are limited by the shell curvature permissible for the suction press roll cover. If said linear force is to be increased on a press device, it is necessary as a rule in the case of conversions to provide a larger suction press roll diameter, which in part cannot be installed at all or only at great expense in the existing construction space, which is fixed by the presence of additional devices such as ducts, doctor blades and supports, thus making complex conversions necessary or limiting the possibility of a linear force increase.

[0007] What is needed in the art is a suction press roll by way of which, compared to conventional suction press rolls with the same diameter, far higher linear forces can be produced in the press nip in interaction with the mating roll. The inventive solution should also be suitable in this case for retrofitting in existing press devices in order to increase the providable linear force.

SUMMARY OF THE INVENTION

[0008] According to the invention, a linear force increase can be achieved in press devices with suction press rolls of identical or smaller size than conventional suction press rolls by equipping the suction press rolls with a compliance compensator. Said compensator is arranged parallel to and in the longitudinal axis of the suction press roll, meaning it extends over the width of the suction press roll. Decisive for a compliance compensator is the provision of a closed surface. Two basic embodiments are possible according to the invention depending on the embodiment of the roll cover of the suction press roll.

[0009] According to the first basic embodiment of an inventive suction press roll on a press device, the suction press roll includes a perforated roll cover which encloses an interior space, whereby arranged in the interior space is a suction zone which extends at least over a sub-region of the inner circumference of the roll cover in the circumferential direction. According to the invention there is arranged in the inside of the roll cover a shoe press roll which acts or is made to act against the inner circumference of the roll cover of the suction press roll. By way of the shoe press roll it is possible, as the result of its closed cover, to apply, at the inner circumference of the press cover of the suction press roll, a higher bracing force onto said suction press roll over the width, meaning parallel to the longitudinal axis of the suction press roll, such that a counter-force to the force of the mating roll is generated in this region. Hence it is possible to establish an increase of the linear force in the press nip compared to conventional suction press rolls, whereby local or locally different linear force characteristics over the width of the suction press roll can be established depending on the embodiment. The establishment of said force characteristics can be effected in this case steplessly or in steps.

[0010] The shoe press roll in the interior space is arranged in the suction zone. The suction region extends parallel to the longitudinal axis of the suction press roll and, looking in the circumferential direction at the inner circumference, over a part of said circumference, whereby the arrangement of the suction zone is effected such that said zone extends, looking in the running direction of the fibrous web, at the inner circumference from a region in front of the press nip to behind said press nip. In this case the shoe press roll forms together with the suction box a pre-suction compartment, which looking in the fibrous web running direction becomes active in front of the press nip, and a holding zone which becomes active behind the press nip, meaning after the exit from said nip. The press cover of the suction press roll itself is equipped with through-openings which extend from the outer circumference of the press cover as far as the inner circumference, thus creating a connection between the outer circumference and the inner circumference of the suction press roll, in particular the suction zone.

[0011] The shoe press arrangement includes a circulating flexible belt which is pressed by way of a pressing-on unit against the inner circumference of the press cover of the

suction roller. On the one hand said circulating belt separates the suction region of the suction roll from the shoe pressing region and on the other hand it creates a suction zone boundary. In this case use is made of the fact that once evacuated suction bores maintain their vacuum in part even when no vacuum is applied. The belt is by comparison impermeable and has a closed cover face.

[0012] Classically bored suction press roll covers can be used as the suction press roll cover. Also, conventional suction press roll covers, which may be available in the case of a conversion, can be used here accordingly for retrofitting. The through-openings extend in radial direction from the outer circumference to the inner circumference, meaning perpendicular to the longitudinal axis of the suction press roll.

[0013] Similarly, the shoe press roll integrated in the suction press roll can be a standard version which needs to be modified only with regard to its installation in the suction press roll. The shoe press roll itself includes a pressing-on unit, preferably with a pressing-on element in the form of a press shoe, whose pressing-on face is constructed to be convex and extends partly in the circumferential direction and further over the width, meaning parallel to the longitudinal direction of the press roll. The bracing can be effected for example by way of piston elements, spring devices or pressure accumulator elements on a support element.

[0014] According to a particularly advantageous embodiment, the flexible press cover of the shoe press roll is made from a wear-free or high wear-resistant material in order to prevent unnecessary replacement of the flexible belt.

[0015] There are no restrictions with regard to the concrete embodiment of the suction box. In this connection it is also possible, with regard to the assignment of the suction device to said suction box, particularly at the side on the end faces, to resort to the possibilities existing from the prior art. The suction box in the interior space of the press roll is sealed from the inner circumference of the press cover by way of suitable sealing devices.

[0016] A second embodiment of the inventive solution consists of combining in one press roll two concepts known from the prior art. This is achieved in that the suction device no longer becomes active in the interior space and hence the fluid-gas mix no longer needs to be passed into the interior space of the press cover in order to be discharged from there but is passed directly through the press cover and evacuated preferably at the side in the region of the end faces. As the result, the inner face describing the inner circumference of the press cover can be kept closed, whereby the closed construction makes it possible to resort here to pressing-on units which enable the linear force to be established in particular over the width or parallel to the longitudinal axis of the press roll. This is achieved in that provision is made for pressing-on units which include one or a multiplicity of pressing-on elements which become active at the inner circumference or exert a pressure on said inner circumference in the direction of the press nip and hence create a bracing force in relation to the mating roll. Here it is possible, depending on the embodiment, to combine different sub-variants with each other.

[0017] According to a first sub-embodiment provision is made for only one bracing unit. According to another embodiment provision is made for pressing-on units of this kind for each individual press nip which can be formed on the suction press roll such that the inventively constructed suction press roll is also suitable for the construction of press nips with a higher establishable linear force. According to a particularly

advantageous embodiment provision is made therefore in addition for a second yoke on which piston elements active on the inner circumference can be braced for the purpose of the compliance compensator or a pressing-on element extending over the width. According to a particularly advantageous embodiment, the generatable linear force can be influenced likewise by way of the locally different, in particular zone-based control of the bracing elements, in particular piston elements. As the result, the precision adjustment of the compliance compensator is possible.

[0018] Passing the fluid-gas mix through the roll cover is advantageous in that the suction zone is not integrated in the roll and therefore the roll compliance does not limit the maximum possible linear force. The passage through the roll cover can be effected in various ways. According to a first embodiment, provision is made for openings which extend from the outer circumference of the roll cover in said cover and are discharged out of said cover via central channels or through-bores into the end-face regions and passed on from there via separate devices, meaning outside the roll. Another possibility, instead of connecting the bores via a central bore to a suitable suction device, is to route the bores through the press cover such that during operation in press devices the opening on the surface, meaning on the outer cover is always in the press nip and the second opening is in a region outside the press nip, whereby in this case a device for evacuation should also be provided.

[0019] The mating rolls of the inventively constructed suction press rolls can be rolls of various types of construction. According to a first embodiment, the mating roll can be constructed as a so-called Nipcoflex roll, meaning an extended press nip is obtained by passing a flexible roll cover over a concavely/convexly formed press shoe. According to another embodiment, the mating roll can also be a solid cover roll. This applies analogously also for the second embodiment.

[0020] By way of the inventive solution it is possible to exert an effect, in the press nip looking over the width of the machine, selectively on corresponding linear force increases and their repercussions and to actively control said repercussions.

[0021] According to a particularly advantageous further aspect, the inventive solution is used for suction press rolls on press devices for which provision is made for at least two suction press rolls of the same type on one press device. Compared to conventional suction press rolls without an inventive compliance compensator, inventive suction press rolls with identical or smaller diameter can be used for the same establishable line forces, which means that a simple replacement of conventional suction press rolls by inventively constructed suction press rolls is also possible for effecting a linear force increase.

[0022] The inventive solution can be used on a press apparatus, in particular a multiple-nip press apparatus including a first press device and a second downstream press device. The first press device includes a first roll, which together with a second roll as mating roll forms a first press nip and together with a central roll forms a second press nip downstream from the first press nip in the fibrous web running direction, and a third press nip which is constructed between the central roll and a third roll. Downstream from the first press device is a second press device which includes two rolls forming a further fourth press nip. In this case the first roll of the first press device and one roll of the second press device are constructed

as suction press rolls, preferably according to the invention. The suction press rolls are identical, as the result of which they can be exchanged and the stocks of spare parts reduced.

BRIEF DESCRIPTION OF THE DRAWINGS

[0023] The above-mentioned and other features and advantages of this invention, and the manner of attaining them, will become more apparent and the invention will be better understood by reference to the following description of embodiments of the invention taken in conjunction with the accompanying drawings, wherein:

[0024] FIG. 1 shows in a schematic simplified representation a press device with an inventively constructed suction press roll according to the first basic embodiment with an integrated shoe press roll;

[0025] FIG. 2 shows in a schematic simplified representation a press device with an inventively constructed suction press roll according to a second basic embodiment with an integrated compliance compensator;

[0026] FIG. 3 shows a further embodiment of an inventive suction press roll according to the second basic embodiment; and

[0027] FIG. 4 shows an application of inventively constructed suction press rolls with a multiplicity of consecutive press nips.

[0028] Corresponding reference characters indicate corresponding parts throughout the several views. The exemplifications set out herein illustrate embodiments of the invention, and such exemplifications are not to be construed as limiting the scope of the invention in any manner.

DETAILED DESCRIPTION OF THE INVENTION

[0029] Referring now to the drawings, and more particularly to FIG. 1, there is shown in a schematic simplified representation based on a press device 1, including a first press roll 2 and a second press roll 3 which together form a press nip 4, a particularly advantageous inventive embodiment of a suction press roll 5, which in the case shown conforms to the upper first press roll 2 in the installation position, with an integrated shoe press roll 6 arranged eccentrically to the suction press roll 5. A fibrous web (not shown here) is passed together with at least one felt belt through the press nip 4. In this case the suction press roll 5 acting as the first roll 2 has a rigid, meaning stable or inflexible perforated roll cover 7 which encloses an interior space 8 of the suction press roll 5 in the circumferential direction. The roll cover 7 is characterized by an outer circumference 9 and an inner circumference 10. In order to be able to resort to conventional roll covers, meaning a roll cover 7 with a perforation which is formed by through-openings which are orientated in radial direction and extend from the outer circumference 9 to the inner circumference 10, and thus enables a connection between the surroundings and the interior space 8, provision is made in the interior space 8 for at least one suction zone S which extends in the circumferential direction over at least a sub-region of the inner circumference 10 of the roll cover 7 and is formed in the simplest case by a positionally stable or stationary suction box 12. Said suction box is sealingly supported against the inner circumference 10. The discharging of the liquid-air mix sucked in via the through-openings 11 can be effected in this case in the direction of the end faces. According to the invention, a shoe press roll 6 is arranged in the interior space 8. Said shoe press roll is provided at the

inner circumference 10 in the installation position in the region of the press nip 4. The shoe press roll 6 includes a flexible circulating belt 13 and a pressing-on unit 15 arranged in the interior space 14 enclosed by the belt 13, including at least one or preferably a multiplicity of pressing-on elements 16 which with their surface forming a pressing-on face 18 and orientated toward the inner circumference 17 of the belt 13 can be pressed against said inner circumference. Preferably the pressing-on face 18 is constructed to be convexly curved. Hence the pressing-on unit 15 also acts indirectly against the inner circumference 10 of the roll cover 7 of the suction press roll 5, as the result of which the linear pressure in the press nip 4 is increased via the shoe press roll 6. The pressing-on unit 15 includes, as already explained, preferably a pressing-on element 16 in the form of a press shoe 19 which braces itself on a stationary supporting element 20 via device 21 for generating the required pressing force, for example in the form of a piston series or at least one, preferably a multiplicity of pressurized compartments. The pressure at the pressing-on element 16 is established via the device 21 between the press shoe 19 and the supporting element 20. Said establishing of the pressure can be effected over the width, meaning parallel to the longitudinal axis L of the suction press roll 5 steplessly or in steps as well as over the complete width and also on a zone basis. The suction box 12 is arranged such that it quasi encloses the shoe press roll 6, thereby forming a pre-suction compartment 22 and a holding zone 23. The circulating belt 13, which is impermeable to liquid and pressure, separates the suction region S of the suction press roll 5 from the region of the shoe press roll 6 and also creates a suction zone boundary. In this case use is made of the fact that a once evacuated suction bore in the form of the through-openings 11 maintains its vacuum in part even when no vacuum is applied. The sealing of the suction box 12 against the inner circumference 10 is effected by way of sealing devices 24, in particular in the form of sealing rails 25. The suction press roll 5 is arranged in the press device 1, looking in the vertical direction, preferably above the second roll 3. Other arrangements are likewise conceivable. Fluid is picked up via the through-openings 11, which extend from the outer circumference 9 to the inner circumference 10, is sucked into the suction box 12 and discharged out of said box. In this case the region on the inlet side between the suction box 12 and the shoe press roll 6 forms a pre-suction compartment 22 while the region of the suction zone S arranged on the outlet side of the press nip 4 acts as a holding zone 23 after the passage through the press nip. The region facing away from the press nip 4 is unaffected by the suction box 12. The suction box 12 extends in this case over a part of the inner circumference 10, whereby said sub-region extends from a region in front of the press nip 4 to behind the press nip 4. According to a particularly advantageous embodiment, the suction region extends in this case preferably over at least a quarter, in particular preferably over half of the inner face of the inner circumference 10 in the circumferential direction.

[0030] As already explained, the linear force in the press nip 4 can be varied by the device 21. Preferably a device for controlling the pressing-on force as a function of the linear force to be established is assigned to said device. With regard to the construction of the shoe press roll 6 it is possible to resort to conventional construction concepts. The press shoe 19 can be lubricated in this case hydrostatically and/or hydro-

dynamically. Actuation of the pressing-on elements is effected preferably hydraulically. Other embodiments are likewise possible.

[0031] FIGS. 2 and 3 show in a schematic and highly simplified representation based on a perspective view a first embodiment of a press device 1 with a compliance compensator according to the second basic embodiment. Here too the press device 1 includes two rolls, a first roll 2 and a second roll 3, whereby the first roll 2 is constructed as a suction press roll 26 and comprises a rigid roll cover 27. Both press rolls, the first press roll 2 and the second press roll 3, form together a press nip 4. The mating roll in the form of the second roll 3 can be constructed as various types. Said mating roll can be constructed as a shoe press roll with a flexible press cover with at least one pressing-on unit with a curved surface or as a solid roll 6. For example, the first roll 2 is constructed as an evacuated roll in the form of the suction press roll 26. Said suction press roll has, according to a first variant, on the surface of the roll cover 27 openings, in particular bores 28, which can be evacuated at the side on the end face of the roll cover 27. For this purpose provision is made in the simplest case for a multiplicity of bores 28, which extend preferably over the entire width of such a press device 1, meaning transverse to the machine direction when used on machines for producing fibrous webs, and can be distributed preferably also over the circumference. Assigned to a majority of such bores is a central suction channel 29 which interconnects said bores 28 and is coupled to a suction device 30 in the region of the end face of the first press roll 2, which is shown here only schematically in order to illustrate the function. The bores 28 extend in this case only in the roll cover 27, meaning from the outer circumference 31 in the direction of the inner circumference 32 of the roll cover 27 but not through it, and the central suction channel 29 extends through the roll cover thickness d_{27} of the roll cover 27. Hence there is no connection between the bores 28 and an interior space 33 enclosed by the roll cover 27. Hence the inner face describing the inner circumference 32 of the roll cover 27 is preserved as a closed face so that said face can brace itself evenly over the machine width on at least one supporting element 35. For this purpose the first press roll 2 includes in addition a pressing-on unit 34 which is arranged within the roll cover 27, in particular in the interior space 33, and braces itself on the supporting element 35. The pressing-on unit includes at least one, preferably several pressing-on elements 36, preferably in the form of piston elements 37, which are movable in relation to the face formed by the inner circumference 32, preferably perpendicular thereto, and are pressable against the inner circumference 32. The piston elements 37 are arranged parallel to the longitudinal axis L of the suction press roll 26, whereby said piston elements are controllable individually or jointly in groups. Through the inventive combination of an end-face evacuation and routing of the medium to be evacuated in the press cover 27, meaning without routing through the interior space 33 and evacuation from said space, the entire interior space 32 is available as a closed face on which the pressing-on elements 36, in particular piston-type bracing elements, can become active. It is thus possible in addition to create on embodiments of multiple-nip press devices for example a further second press nip 38 at the first press roll 2, whereby the bracing and the region of increased linear force is created by way of a further second pressing-on unit 39 which is arranged downstream from the first press nip 4 in the belt running direction or fibrous web running direction during operation of

the press device 1 at the outer circumference of the roll cover 27. The further pressing-on unit 39 serves in this case for bracing in the press nip 38. Here too the pressing-on unit 39 includes either a multiplicity of or one pressing-on element 40, preferably in the form of a piston element 48. FIG. 2 shows in this case an example on which optionally another yoke 41 is provided as a support element for the pressing-on unit 39. Said pressing-on unit has likewise preferably a multiplicity of piston elements which with their face facing the inner circumference 32 of the roll cover 27 become active at the inner circumference 32 of the roll cover 27. Other embodiments are possible. A compliance compensation can be realized through actuation of the pressing-on elements. Through the embodiment shown in FIG. 2 it is possible furthermore to provide a high degree of dewatering at the same time as a very high generatable linear force in the press nip. FIG. 2 shows in this case for example one possibility with a second supporting element 35 and a second pressing-on unit 39 in addition. Other embodiments are possible.

[0032] FIG. 3 shows analogously a press device 1 according to the second basic embodiment of the inventive solution with a pressing-on unit 34 which becomes active at the inner circumference 32 of the roll cover 27, which is constructed as a rigid, meaning non-flexible and hence dimensionally stable press cover. In the region of the pressing-on face it is possible in this case to generate very high linear forces in the press nip 4. On this embodiment the suction press roll 26 in the roll cover 27 has several channels 42, whereby each channel 42 has at least two openings 43, 44 which are arranged offset to each other in the circumferential direction and lead out of the suction press roll 26. The bores extend in this case not in radial direction, as shown in FIG. 2, but at an angle through the suction roll cover 27, whereby respectively one of the openings 43, 44 is connected in a functional position to the press nip 4 while the other interacts with a suction device 30 arranged outside the suction press roll 26. Here too provision is made in the interior space 33 of the first roll 2 for at least one pressing-on unit 34 which can be constructed analogously to the one shown and described in FIG. 2.

[0033] The second embodiment is characterized by a combination of the known characteristics of a rigid roll cover with openings for the purpose of evacuating or routing the fluid-gas mix through the cover 27 and an arrangement of a pressing-on unit 34 which becomes active at the inner circumference 32 of the roll cover 27 and braces said roll cover via said inner circumference on the supporting element, in particular yoke.

[0034] FIGS. 1 to 3 present possible embodiments of the suction press rolls. FIG. 4 presents a particularly advantageous use of inventively constructed suction press rolls 5 or 26 in a multiple-nip press apparatus 45 in the form of a Duocentri Nipcoflex press apparatus. FIG. 4 shows in a schematic and highly simplified representation a detail from the press apparatus 45 including a first press device 46 for forming three successively passable press nips together with a first roll 2 or a suction press roll 5 or 26 according to the first or the second embodiment, which together with a further second roll 3 as mating roll forms a first press nip 4. In addition provision is made for a central roll 47, which together with the first roll 2 constructed as a suction press roll 5 or 26 forms a further second press nip 38. In turn the central roll 47 forms together with a roll 49 a third press nip 50. The fibrous web F is passed between the first press nip 4 and the third press nip 50 respectively along the outer circumference on the indi-

vidual press rolls **2, 3, 47, 49**, whereby the passing is always performed together with a felt belt, at least in the first and third press nip **4**. In the illustrated case the passing of the fibrous web **F** is effected in the first press nip **4** between two felt belts **FB1** and **FB2**, whereby the first felt belt **FB1** enwraps the suction press roll **26, 5** and the second felt belt **FB2** as bottom belt enwraps the second roll **3**. In addition, the fibrous web **F** is passed directly along the surface of the central roll **47** and on said surface through the third, single-felted press nip **50**. After passing through the third press nip **50** the fibrous web **F** is passed through a further second, preferably double-felted press device **51** between the felt belts **FB3** and **FB4**. The press device **51** is again constructed such that it includes a roll in the form of a press roll **5** or **26** according to the first embodiment or the second embodiment, which together with a mating roll **52** forms a fourth press nip **53**. FIG. **4** thus describes a Duo Nipcoflex press arrangement with a downstream fourth press nip. The rolls **3** and **52** can be constructed as solid cover rolls or shoe press rolls. Preferably the first roll **2** and a roll of the second press device are identically constructed as suction press rolls in order to minimize stocks.

[0035] While this invention has been described with respect to at least one embodiment, the present invention can be further modified within the spirit and scope of this disclosure. This application is therefore intended to cover any variations, uses, or adaptations of the invention using its general principles. Further, this application is intended to cover such departures from the present disclosure as come within known or customary practice in the art to which this invention pertains and which fall within the limits of the appended claims.

LIST OF REFERENCE NUMERALS

[0036]	1 Press device
[0037]	2 First press roll
[0038]	3 Second press roll
[0039]	4 Press nip
[0040]	5 Suction press roll
[0041]	6 Shoe press roll
[0042]	7 Roll cover
[0043]	8 Interior space
[0044]	9 Outer circumference
[0045]	10 Inner circumference
[0046]	11 Through-openings
[0047]	12 Suction box
[0048]	13 Belt
[0049]	14 Interior space
[0050]	15 Pressing-on unit
[0051]	16 Pressing-on element
[0052]	17 Inner circumference
[0053]	18 Pressing-on face
[0054]	19 Press shoe
[0055]	20 Supporting element
[0056]	21 Device for generating a pressing-on force
[0057]	22 Pre-suction compartment
[0058]	23 Holding zone
[0059]	24 Sealing devices
[0060]	25 Sealing rail
[0061]	26 Suction press roll
[0062]	27 Press cover
[0063]	28 Bores
[0064]	29 Central suction channel
[0065]	30 Suction device
[0066]	31 Outer circumference
[0067]	32 Inner circumference

[0068]	33 Interior space
[0069]	34 Pressing-on unit
[0070]	35 Supporting element
[0071]	36 Pressing-on element
[0072]	37 Piston elements
[0073]	38 Second press nip
[0074]	39 Second pressing-on unit
[0075]	40 Pressing-on element
[0076]	41 Yoke
[0077]	42 Channel
[0078]	43 Opening
[0079]	44 Opening
[0080]	45 Press apparatus
[0081]	46 First press device
[0082]	47 Central roll
[0083]	48 Piston element
[0084]	49 Roll
[0085]	50 Third press nip
[0086]	51 Press device
[0087]	52 Mating roll
[0088]	53 Press nip
[0089]	F Fibrous web
[0090]	S Suction zone

What is claimed is:

1. A press device, comprising

a suction press roll including a rotatable perforated roll cover, at least one suction zone, and a first shoe press roll, said rotatable perforated roll cover including an inner circumference, said at least one suction zone extending over a region of said inner circumference in a circumferential direction, said first shoe press roll arranged in an inside of said rotatable perforated roll cover and acting against said inner circumference.

2. The press device according to claim 1, wherein said first shoe press roll includes a flexible circulating belt forming a flexible roll cover and a pressing-on unit assigned to said flexible circulating belt, said flexible circulating belt including an inner face, said pressing-on unit having at least one pressing-on element with a pressing-on face which is pressable against said inner face of said flexible circulating belt.

3. The press device according to claim 2, wherein said first shoe press roll includes a supporting element and a device for generating a pressing-on force, said pressing-on element being a press shoe which is at least one of hydrostatically and hydrodynamically lubricated, is braced on said supporting element, has a convex pressing-on face, and can be actuated via said device for generating said pressing-on force.

4. The press device according to claim 3, wherein said pressing-on force is generated at least one of hydraulically, pneumatically, and mechanically.

5. The press device according to claim 3, wherein said pressing-on force of said pressing-on unit is controllable parallel to a longitudinal axis of said suction press roll.

6. The press device according to claim 5, wherein said pressing-on force is controllable on a zone basis over a width of said suction press roll.

7. The press device according to claim 5, wherein said pressing-on force is controllable one of steplessly and in a plurality of steps.

8. The press device according to claim 1, wherein said suction press roll includes a stationary suction box, said suction zone being formed by said stationary suction box which can be loaded with a vacuum.

9. The press device according to claim 8, wherein said suction box is sealed against said inner circumference by a plurality of sealing devices.

10. The press device according to claim 1, wherein the press device forms a press nip, said suction zone including a) a pre-suction compartment between said inner circumference and said flexible circulating belt and b) a holding zone downstream from said press nip between said first shoe press roll and said inner circumference.

11. The press device according to claim 1, wherein said rotatable perforated roll cover includes an outer circumference and said rotatable perforated roll cover includes a plurality of perforations formed by a plurality of through-openings extending through said rotatable perforated roll cover from said outer circumference to said inner circumference in a radial direction.

12. The press device according to claim 1, further including a device for generating a vacuum in the suction zone, said device for generating a vacuum in the suction zone being assigned to said suction press roll at an end face of said suction press roll.

13. The press device according to claim 1, further including a mating roll for said suction press roll, said mating roll being a second shoe press roll.

14. The press device according to claim 1, further including a mating roll for said suction press roll, said mating roll being a solid cover press roll.

15. A press device, comprising:
a mating roll; and

a suction press roll including a roll cover, at least one suction device, a first pressing-on unit, and a stationary supporting element, said roll cover being rotatable and rigid, enclosing an interior space, and having at least one channel routed in said roll cover for coupling with said at least one suction device arranged outside said interior space and acting via said at least one channel on a surface of said roll cover, said roll cover including an inner circumference, said suction press roll and said mating roll forming a press nip, the press device including a region of said press nip, and said first pressing-on unit being arranged in said interior space, being braced on said stationary supporting element, and being active at said inner circumference of said roll cover in said region of said press nip with said mating roll.

16. The press device according to claim 15, wherein said suction press roll includes a second pressing-on unit which is arranged offset to said first pressing-on unit in a circumferential direction and which includes at least one pressing-on element which becomes active at said inner circumference.

17. The press device according to claim 16, wherein said suction press roll includes another stationary supporting element and at least one device for generating a pressing-on force, said first pressing-on unit including at least one pressing-on element, each of said pressing-on elements of said first and second pressing-on units being a piston element which is at least one of hydrostatically and hydrodynamically lubricated, is braced on one of said supporting elements, and can be actuated via said at least one device for generating said pressing-on force.

18. The press device according to claim 17, wherein said pressing-on force is generated at least one of hydraulically, pneumatically, and mechanically.

19. The press device according to claim 17, wherein each of said first and second pressing-on units includes a plurality of

said pressing-on elements, said pluralities of pressing-on elements being arranged over a width of said suction press roll parallel to a longitudinal axis of said suction press roll, each of said pressing-on elements configured for being actuated one of singly and in a group of said pressing-on elements.

20. The press device according to claim 15, wherein said roll cover includes an outer circumference and a plurality of openings worked into said outer circumference of said roll cover and wherein said at least one channel is at least one central suction channel which is arranged in said roll cover and which extends parallel to a longitudinal axis of said suction press roll through said roll cover and into which said plurality of openings worked into said outer circumference of said roll cover open.

21. The press device according to claim 15, wherein each said channel is arranged in said roll cover and has two openings which are arranged offset relative to each other in a circumferential direction and lead out of said suction press roll, said at least one suction device being outside said press nip and acting on an outer cover face of said roll cover, a distance between respective said two openings of each said channel in said circumferential direction being such that during rotation of said roll cover said at least one suction device always stands in connection to at least a part of said openings momentarily in said press nip via a respective said channel.

22. A method for converting a press device with a suction press roll, said method comprising the steps of:

replacing the suction press roll with another suction press roll to increase the establishable linear press in a press nip, said other suction press roll including a rotatable perforated roll cover, at least one suction zone, and a first shoe press roll, said rotatable perforated roll cover including an inner circumference, said at least one suction zone extending over a region of said inner circumference in a circumferential direction, said first shoe press roll arranged in an inside of said rotatable perforated roll cover and acting against said inner circumference.

23. A press apparatus, comprising:

a first press device including a first roll, a second roll, a central roll, and a third roll, said first roll and said second roll together forming a first press nip, said second roll being a mating roll, said first roll and said central roll together forming a second press nip arranged downstream from said first press nip in a fibrous web running direction, said central roll and said third roll forming a third press nip therebetween, one of said first roll, said second roll, said central roll, and said third roll of said first press device being a first suction press roll; and

a second press device arranged downstream from said first press device and including two rolls forming another press nip, one of said two rolls of said second press device being a second suction press roll.

24. The press apparatus according to claim 23, wherein said first roll of said first press device is said first suction press roll.

25. The press apparatus according to claim 23, wherein said first and second suction press rolls are identical.

26. The press apparatus according to claim 25, wherein each of said first and second suction press rolls includes a rotatable perforated roll cover, at least one suction zone, and

a first shoe press roll, said rotatable perforated roll cover including an inner circumference, said at least one suction zone extending over a region of said inner circumference in a circumferential direction, said first shoe press roll arranged in

an inside of said rotatable perforated roll cover and acting against said inner circumference.

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