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Naegeli

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[45] **July 30, 1974**

[54] **APPARATUS FOR IMPREGNATING TEXTILE FIBERS**

[75] Inventor: **Werner Naegeli,** Winterthur, Switzerland

[73] Assignee: **Pavena AG,** Basel, Switzerland

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[21] Appl. No.: **347,351**

Related U.S. Application Data

[63] Continuation of Ser. No. 187,966, Oct. 12, 1971, abandoned.

[30] **Foreign Application Priority Data**

Oct. 12, 1970 Switzerland 15070/70

[52] **U.S. Cl.** ..... **19/66 R,** 19/150

[51] **Int. Cl.** **D01b 3/04**

[58] **Field of Search** .... 19/66 R, 150; 28/1.6, 72.14; 68/22 B

[56] **References Cited**

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Primary Examiner—Dorsey Newton

Attorney, Agent, or Firm—Werner W. Kleeman

[57] **ABSTRACT**

An apparatus for continuously impregnating a throughpassing textile fiber arrangement with liquid, comprising a pair of discs rotatably supported in a machine frame and arranged with circumferential surfaces opposite to each other for throughpassing the fiber arrangement between said circumferential surfaces. Two cover plates are provided, each of which is laterally arranged at face sides of said pair of discs and having a surface opposite to said face sides of said pair of discs, said cover plates covering said face sides with a small clearance between said surface and said face sides and being located in the machine frame. The discs and the cover plates are arranged shiftable relative to each other, as viewed in the direction of axes of rotation of the discs, and openings are provided in the cover plates and arranged at a region of the cover plates opposite to said face sides of said pair of discs for supplying under pressure impregnating liquid to said face sides.

14 Claims, 8 Drawing Figures

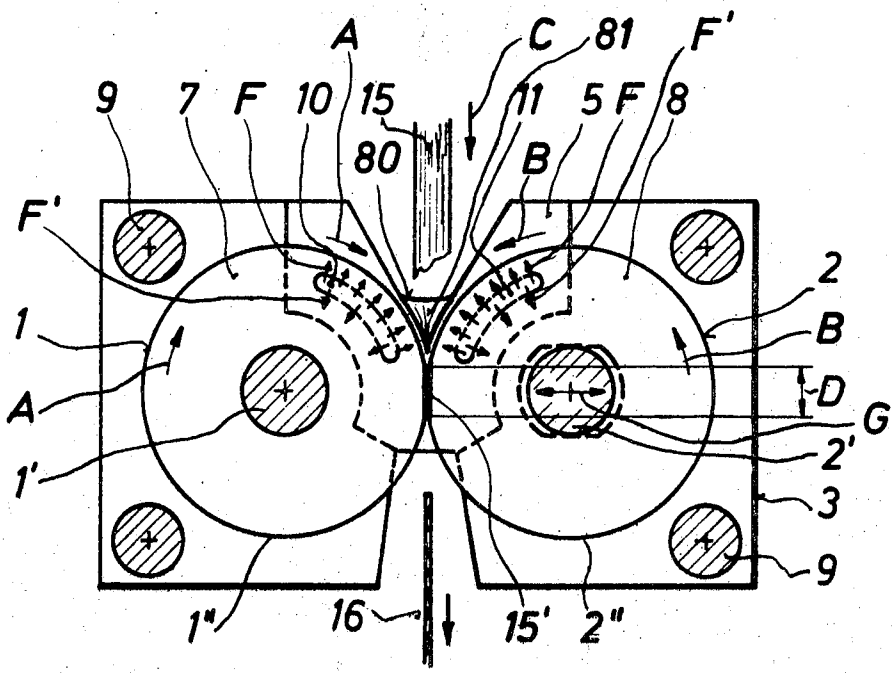


FIG. 1

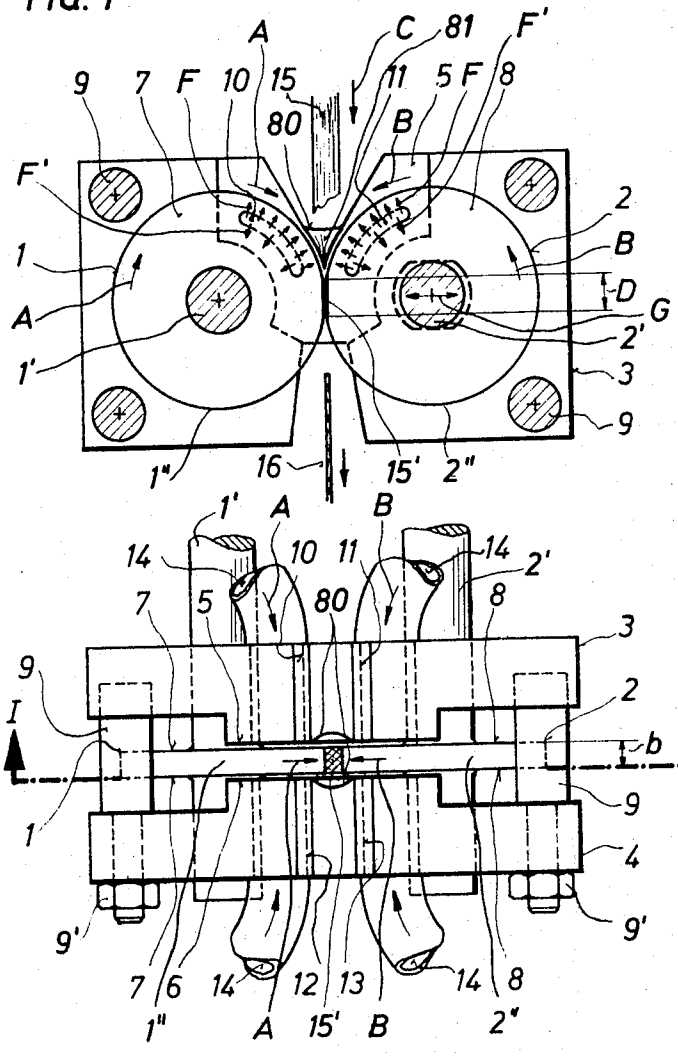

A
C
81
F'
9
7
F
10
15
11
5
F
8
80
B
F'
2
B
1
D
A
G
2'
1'
3
9
1"
16
15'
2"
1'
A
B
14
10
11
14
2'
7
5
80
8
3
9
I
2
I
b
1
9
4
9'
9'
7
6
14
12
13
14
8
1"
A
15'
B
2"

FIG. 2

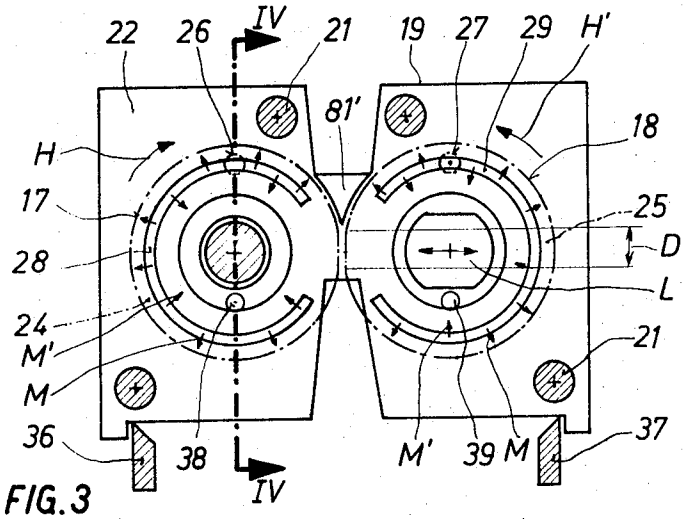

22
26
IV
21
19
27
29
H'
81'
18
H
17
25
D
28
L
24
M'
21
M
36
38
IV
M'
39
M
37

FIG. 3

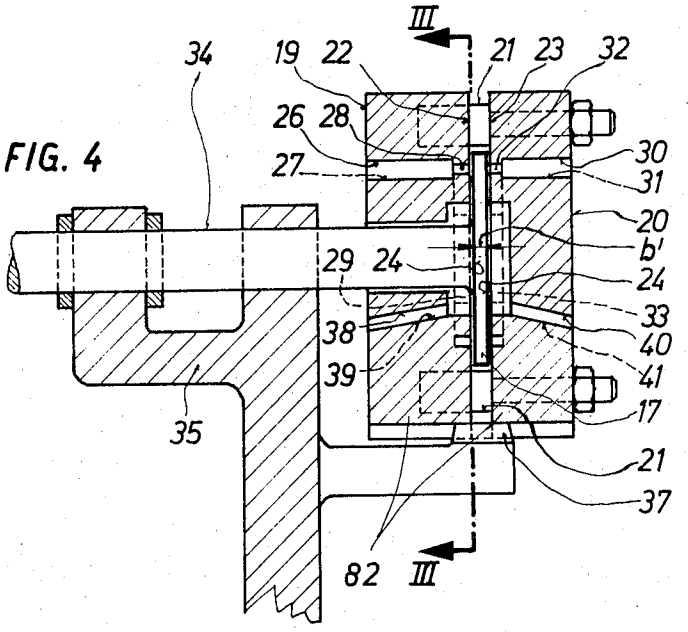
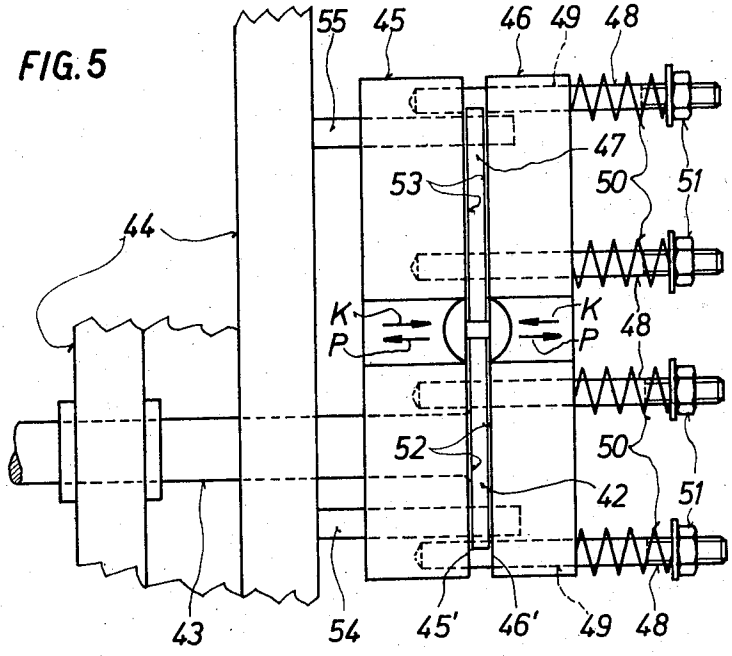

III
34
19
22
21
23
32
26
28
30
27
31
20
b'
29
24
24
33
38
40
39
41
17
35
21
37
82
III

FIG. 4

FIG. 5


55
45
46
49
48
47
53
50
51
44
K
P
K
P
48
52
50
42
51
43
54
45'
46'
49
48

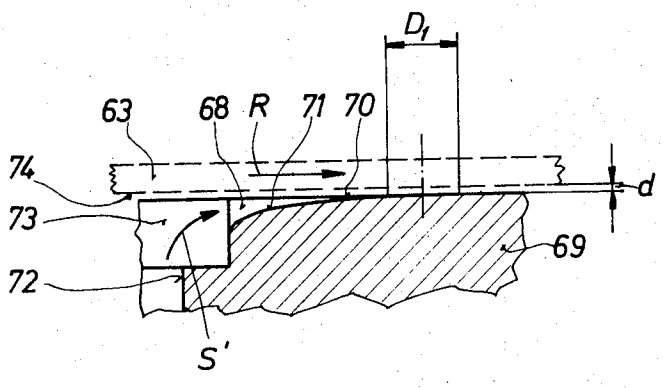

D_1
63
68
R
71
70
74
73
72
S'
69
d

FIG. 8

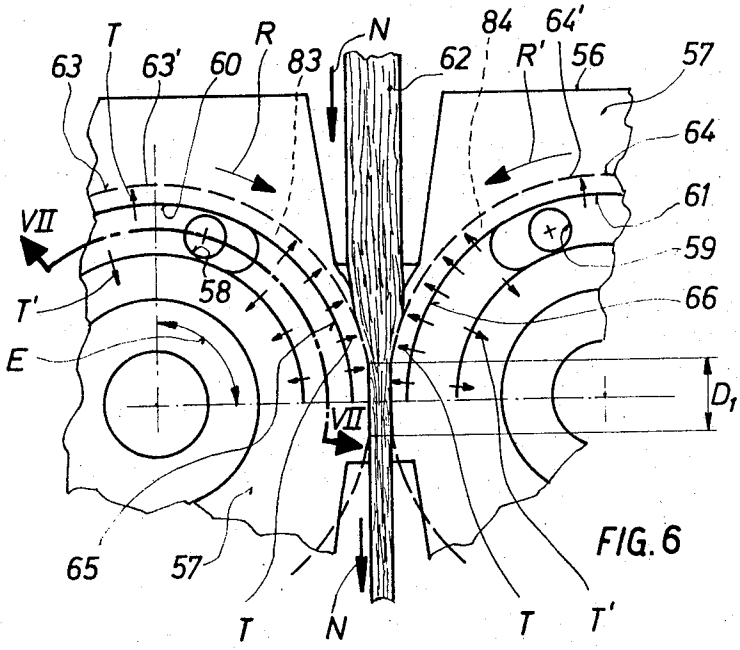

T
R
N
84
64'
63
63'
60
83
62
R'
56
57
64
61
VII
59
58
66
T'
E
D1
VII
65
57
T
N
T
T'

FIG. 6

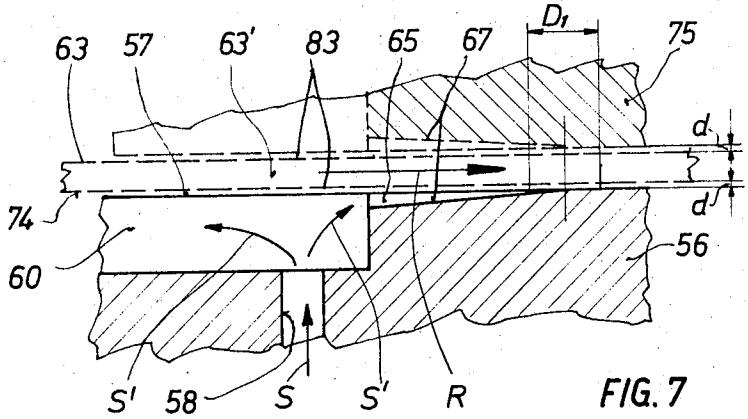

D1
63
57
63'
83
65
67
75
d
d'
74
60
56
S'
58
S
S'
R

FIG. 7

APPARATUS FOR IMPREGNATING TEXTILE FIBERS

CROSS-REFERENCE TO RELATED CASE

This is a continuation of my commonly assigned, copending U.S. application, Ser. No. 187,966, filed Oct. 12, 1971, now abandoned and entitled "Apparatus for Impregnating Textile Fibers."

BACKGROUND OF THE INVENTION

The present invention concerns an apparatus for continuously impregnating a textile fiber arrangement with liquid.

The term "fiber arrangement" is to be understood as comprising natural as well as man made staple fibers, such as produced as a continuous untwisted arrangement, e.g. as card sliver or draw frame sliver or as web at the delivery side of a drafting arrangement. This term also is to be understood to comprise bundles or strands of endless filaments.

The term "liquid," in the singular or plural, is to be understood to comprise water or solvents or any solutions, dispersions and emulsions of any materials (e.g. adhesives, dyestuffs, etc.) in water and/or other solvents.

The term "impregnate" is to be understood to comprise the coating of the individual fibers or the individual filaments respectively of the fiber arrangement with a film of liquid as well as also a homogeneous, fine droplet-type distribution of the liquid in the fiber arrangement or a combination of both.

From U.S. Pat. Nos. 3,323,176 and 3,426,389 there are known devices for treating a fiber arrangement with liquid by means of a pair of discs in which the fiber arrangement is allowed to be penetrated by the liquid before passing through a pressure zone formed by the pair of discs and lateral cover plates, in which pressure zone the fiber sliver is condensed under high specific pressure into a compact sliver.

Notwithstanding the fact that the clearance between the face sides of the pair of discs and its lateral cover plates is kept as small as possible, jamming of fibers passing through the device between the discs and their cover plates cannot be avoided due to the extraordinary fineness of the fibers. In the delivery zone of the impregnated sliver previously jammed fibers form so-called "moustaches" or fiber beards, extending from the cover plates, which causes disturbances in operation.

By further reducing the clearance between the face sides of the pair of discs and the lateral cover plates there is merely achieved temporary improvement. Since now the clearance is too small, wear of the discs and/or of the lateral cover plates is considerably increased and the above-mentioned jamming of fibers sets in anew. Also it has been found that the total clearance between the discs and cover plates often shifts to one side, so that the clearance on one side of the discs is increased. Jamming of fibers between the discs and their cover plates thus is further promoted and uniform condensation of the fiber mass in the pressure zone is impaired.

SUMMARY OF THE INVENTION

It is a primary object of the present invention to provide an improved apparatus for impregnating a fiber arrangement with liquid which effectively overcomes the aforementioned disadvantages.

A further considerable object of this invention has reference to an improved apparatus for continuously impregnating a fiber arrangement with liquid in order to avoid penetration of the extraordinarily fine fibers between the discs and the cover plates.

Now in order to implement these and still further objects of the invention, which will become more readily apparent as the description proceeds, there is provided an apparatus for continuously impregnating a throughpassing textile fiber arrangement with liquid which comprises a pair of discs rotatably supported in a machine frame and arranged with circumferential surfaces opposite to each other for throughpassing the fiber arrangement between said circumferential surfaces. There are also provided two cover plates, each of which is laterally arranged at face sides of said pair of discs and having a surface opposite to said face sides of said pair of discs, said cover plates covering said face sides with a small clearance between said surface and said face sides and being located in the machine frame. The discs and the cover plates are arranged to be shiftable relative to each other, as viewed in the direction of the axes of rotation of the discs. Openings provided in the cover plates are arranged at a region of the cover plates opposite to said face sides of said pair of discs for supplying under pressure impregnating liquid to said face sides.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be better understood and objects other than those set forth above, will become apparent when consideration is given to the following detailed description thereof. Such description makes reference to the annexed drawings wherein:

FIG. 1 is a cross-sectional view along line I—I of FIG. 2 of an apparatus for continuously impregnating a fiber arrangement with liquid;

FIG. 2 illustrates a top plan view of the apparatus according to FIG. 1;

FIG. 3 is a cross-sectional view along line III—III of FIG. 4 of an alternative embodiment of the apparatus shown in FIGS. 1 and 2;

FIG. 4 is a cross-sectional view along line IV—IV of FIG. 3 of the embodiment shown in FIG. 3;

FIG. 5 is a top plan view of a further embodiment of the apparatus according to FIGS. 3 and 4;

FIG. 6 schematically illustrates a detail which can be used in all embodiments herein disclosed;

FIG. 7 is a cross-sectional view along line VII—VII of FIG. 6; and

FIG. 8 schematically illustrates a variant of the embodiment shown in FIG. 7.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The apparatus for continuously impregnating a fiber arrangement according to FIGS. 1 and 2 consists of a pair of discs 1 and 2 of the same diameter, and laterally arranged rigid cover plates 3 and 4, the cover plate 3 being mounted on a machine frame (not shown in FIGS. 1 and 2), but like machine frame 35 depicted in FIG. 4. The discs 1 and 2 are rotatably supported on a shaft 1' and 2' respectively and axially shiftable between the cover plates 3 and 4. The disc 1 is rotatable in the direction indicated by arrow A. For rotating the

disc 1 the shaft 1' can be connected with a suitable drive (not shown). The disc 2 can rotate in the direction indicated by arrow B and furthermore is subjected to a loading force, under the influence of which this disc 2 is shiftable with respect to the disc 1 in the directions indicated by the double arrow G and can adapt its position to the material cross-section of fiber material passing through a pressure zone of a length D (FIG. 1), formed by the discs 1, 2, i.e. by circumferential surfaces or peripheral portions thereof and the cover plates 3 and 4 respectively. The cover plates 3 and 4 are each provided with a raised or elevated pressure surface forming limiting planes or surfaces 5 and 6 situated opposite to face sides 7 and 8 respectively of the discs 1 and 2 respectively (FIG. 2). The limiting planes 5 and 6 of the cover plates 3 and 4 are maintained at a mutual distance from one another by spacer studs 9 and are rigidly interconnected by screws 9' (FIG. 2). For the infeed or introduction of an impregnating liquid the cover plates 3 and 4 are provided with openings 10, 11 and 12, 13 respectively connected to supply ducts 14 and merging with the limiting planes 5 and 6 respectively, facing the pair of discs 1 and 2. The distance between the limiting planes 5 and 6 exceeds the width b of the discs 1 and 2 and can be approximately in the range of $b+0.01$ mm to $b+0.3$ mm, thus providing a small clearance between the face sides 7, 8 and the limiting planes 5, 6 of the cover plates 3, 4 respectively. The distance can depend on the viscosity and the type of liquid used, the pressure of the liquid in the supply ducts 14, the elasticity of the disc material, and the pressure between the discs 1, 2.

As seen in the direction indicated by the arrow C, in which direction an untwisted fiber arrangement 15 is fed to the apparatus, in front of the pressure zone D the circumferential surfaces 1'' and 2'' as well as a portion 80 of the cover plates 3, 4 define a converging room or space 81 for consolidating the fiber arrangement 15 by guiding the same at all sides.

The impregnating liquid is brought in or supplied via the supply ducts 14 at a uniform and high pressure and via the openings 10, 11 and 12, 13 respectively, and is forced out in the directions of the arrows F and F' indicated in FIG. 1 along the disc face side-limiting planes 5 and 6 respectively of the pair of discs 1 and 2 respectively. Thus, the clearance between the face sides 7, 8 of the discs 1, 2 and the limiting planes 5, 6 of the cover plates 3, 4 constantly remain filled with impregnating liquid. Owing to the supply of liquid from all sides, i.e. to both the face sides 7 and 8, under equal pressure as prevails in the supply ducts 14 and owing to the symmetry of the opposed pressure surfaces in the limiting planes 5 and 6 the axially shiftable discs 1 and 2 adapt themselves to equal liquid film thickness on both disc face sides 7 and 8, i.e. the discs 1 and 2 automatically are centered to the middle position with respect to the cover plates 3, 4.

If the discs 1 and 2 rotate in the direction of the arrows A and B respectively, liquid flows along the limiting planes 5, 6 in the direction of the arrows F towards the circumferential surfaces 1'' and 2'' of the discs 1 and 2 and owing to the movement of the circumferential surfaces 1'' and 2'' is transported into the converging space or room 81.

During continuous impregnation of the fiber arrangement 15, the material path of travel of which has been shown interrupted in FIG. 1 to improve the clarity in illustration, the fiber arrangement is imbued with liquid at the converging space or room 81, passes through the pressure zone D where the fiber arrangement 15 is subjected to a high specific pressure, and is delivered as an impregnated compact untwisted fiber arrangement 16. Because of the flow of the liquid in the direction of the arrows F the danger of fibers becoming jammed between the face sides 7, 8 of the discs 1, 2 and their lateral cover plates 3, 4 during the passage of the material is substantially eliminated and cannot occur.

An alternative embodiment of the apparatus from that depicted in FIGS. 1 and 2 has been shown in FIGS. 3 and 4. To improve clarity in illustration a pair of discs 17 and 18 has been merely indicated in FIG. 3 by broken lines. Lateral cover plates 19 and 20 are screwed tgether by means of spacer studs 21 so that they form a rigid block 82, the distance between their limiting planes 22 and 23 exceeding the width b' of the discs 17 and 18 respectively having the face sides 24 and 25 respectively. In contrast to the arrangement of FIGS. 1 and 2 here the face sides 24 and 25 of the discs 17 and 18 respectively are covered along the entire circumference and almost completely by the limiting planes 22 and 23 so that a guiding area for the discs 17 and 18 is increased.

The cover plate 19 is provided with openings formed as bores 26 and 27 for introducing the impregnating liquid. These bores 26 and 27 open into liquid distribution grooves 28 and 29 arranged at the region of and opposite to the face sides 24 and 25 of the discs 17 and 18 respectively. Plate 20, analogous to plate 19, is likewise symmetrically provided with bores 30 and 31 merging with their corresponding liquid distribution grooves 32 and 33 respectively. In the same manner as described for the embodiment of FIGS. 1 and 2 the bores 26 and 27 can be connected to supply ducts, similar to the ducts 14.

The disc 17 is supported and guided axially by a shaft or axle 34 in machine frame 35, and can be connected to a suitable drive (not shown) in order to rotate the disc 17 in the direction indicated by arrow H. The cover plates 19 and 20 screwed together and formed into the rigid block 82 are guided in the plane of the discs 17 and 18 by the face sides 24 of the disc 17. For precise positioning in the plane of the discs 17 and 18 the cover plate block 82 is merely supported on two stops 36 and 37 connected with the machine frame 35. Thus, there is not present any rigid connection between the cover plate block 82 and the machine frame 35. Other than disc 17, the disc 18, which is arranged to be rotatable in the direction indicated by arrow H', is supported to be axially shiftable. Furthermore, the disc 18 is arranged to be displaceable or shiftable in the directions indicated by the double arrow L in order to adapt its position to the thickness of the fiber material in the pressure zone D, under a loading pressure acting on the disc 18. Correct guiding of the disc 18 in the plane determined by the disc 17 is effected via its face sides 25 by the limiting planes 22 and 23 of the cover plates 19 and 20 respectively.

Similar to the embodiment of FIGS. 1 and 2 here also a converging space or room 81' is located in front of the pressure D for consolidating the fiber arrangement 15.

In operation the impregnating liquid is introduced via the bores 26 and 27 of the cover plate 19 and via the bores 30 and 31 of the cover plate 20 under equal and

relatively high pressure and via the liquid distribution grooves **28, 29** and **32, 33** respectively, and is forced out against the face sides **24** and **25** of the pair of discs in the direction indicated by the arrows M and M' (FIG. 3). As already described with respect to the arrangement of FIGS. **1** and **2**, the small clearances provided by the width between the face sides **24, 25** and the limiting planes **22, 23** constantly remain filled with liquid. The disc **17** which is guided axially and rigidly supported in the machine frame **35** is to be considered as the master disc and the rigid cover plate block **82** merely supported by the stops **36** and **37** thus is automatically centered axially into the plane determined by the disc **17** owing to the liquid films of equal thickness generated on both face sides **24**, i.e. the cover plate block floats, as seen in the axial direction of the disc **17** in the middle of the disc **17.** Depending upon e.g. the viscosity and the type of impregnation liquid used, the pressure in the supply duct, and the elasticity of the disc material, the thickness of the liquid film on both face sides **24** of the disc **17** can be chosen in the range of 0.005 mm to 0.15 mm. The axially easily shiftable and sufficiently movably supported disc **18** in turn adapts its position with respect to the cover plate block **82** via liquid films of equal thickness on both face sides **25,** so that it is centered into the disc plane determined by the disc **17.**

The impregnation liquid flowing from the liquid distribution grooves **28, 29** and **32, 33** in the direction indicated by the arrows M' towards the inside of discs **17, 18** is collected and drained via bores **38, 39** and **40, 41** provided in the cover plates **19** and **20** respectively opposite to an inside area of the face sides **24, 25** of discs **17** and **18** respectively. The liquid drained through the bores **38, 39** and **40, 41** can be recycled into a liquid system provided for feeding liquid to the bores **26, 27** and **30, 31** respectively by any suitable and therefore not particularly illustrated means.

In the impregnating apparatus according to FIGS. **3** and **4** floating self-alignment of the lateral cover plates **19** and **20** on one disc of the pair of discs **17, 18** is achieved, whereas the other disc of the pair of discs **17, 18** is aligned with the disc plane by the cover plates. Maintenance of this alignment guiding principle takes into account the extraordinary precision required for such an impregnating apparatus in view of the fineness of the fiber material, reduces manufacturing cost and insures long term maintenance of the precision even if individual parts of the apparatus are exchanged.

A variant embodiment of the apparatus from that shown in FIGS. **3** and **4** is depicted in top plan view in FIG. **5.**

A master disc **42** is supported and guided axially by an axle or shaft **43** in a machine frame **44.** Face sides **52** of the disc **42** are enclosed by cover plates **45** and **46** forming limiting planes **45'** and **46'** respectively located opposite the face sides **52.** A disc **47** is also axially easily movably arranged and sufficiently movably supported in the disc plane by any suitable means not particularly shown in the drawing. Face sides **53** of the disc **47** are also laterally covered by the cover plates **45** and **46,** the limiting planes **45'** and **46'** also being arranged opposite to these face sides **53.** In the cover plate **45** tension studs **48** are rigidly anchored in an arrangement like that of FIG. **3.** In the cover plate **46** there are provided aligning bores **49** corresponding to the tension studs **48.** By means of elastic elements, e.g. in the form of pressure springs **50,** and the nuts **51,** there is generated an area pressure acting in the direction indicated by arrows K on the face sides **52** and **53** of the discs **42** and **47** respectively as a reaction force, which pressure K can be pre-set as desired. The cover plates **45** and **46** resiliently or flexibly urged against the pair of discs **42, 47** align themselves onto the master disc **42** and analogous to the arrangement shown in FIGS. **3** and **4** are supported by stops **54** and **55.**

Similar to the apparatus construction of FIGS. **3** and **4** the cover plates **45** and **46** are provided with supply openings and liquid distribution grooves through which the impregnating liquid is forced out against the face sides **52** and **53** of the discs **42** and **47** respectively. Owing to the symmetry of the pressure surfaces of the cover plates **45** and **46** and to the supply of impregnating liquid on each face side **52** and **53** under equal pressure there are generated supporting liquid films between the face sides **52** and **53** of the pair of discs **42** and **47** and the cover plates **45** and **46** holding the pair of discs in a floating state with respect to the cover plates. A supporting force, acting in a direction indicated by the arrows P, and generated by the liquid pressure at the face side pressure areas, balances the area pressure K generated by the springs **50.** With a given viscosity and type of impregnating liquid, the thickness of the supporting liquid film and the liquid throughput easily can be adapted to the fiber material to be processed by adapting the pressure of the liquid and/or by adapting the area pressure K. Thus, at all times optimum operating conditions can be established, and friction and wear between the discs **42, 47** and the cover plates **45, 46** can be kept to a minimum.

In FIGS. **6** and **7** there is shown a detail which can be used in all embodiments of the apparatus described hereinbefore.

A cover plate **56** having a limiting plane or surface **57** is provided with openings **58** and **59** respectively, for introducing the impregnating liquid. The openings **58** and **59** merge with distribution grooves **60** and **61** respectively. In an input quadrant E of a fiber arrangement **62,** which passes through the apparatus in the direction of the arrows N, the cover plate **56** is provided with converging recesses **65** and **66** extending in the direction of rotation of the discs **63** and **64** indicated by the arrows R and R' respectively. The disc circumferential surfaces **63'** and **64'** are merely indicated with broken lines in FIG. **6** for improved clarity. The converging recesses **65** and **66** are covered by disc face sides **83** and **84** respectively and connected with the supply openings **58** and **59** and the liquid distribution grooves **60** and **61** respectively. According to FIG. **7,** depicting a developed section along line VII—VII of FIG. **6,** the converging recess **65** is formed or bounded by wedge surface **67** and the converging recess **66** likewise by its associated wedge surface **67** at the cover plate **75.** The term input quadrant as employed herein, designates the quadrant of the circumferential surfaces **63', 64'** which faces the fiber arrangement **62** entering the apparatus.

According to the further embodiment depicted in FIG. **8,** a converging recess **68** also can be constituted by a circular surface **71** merging asymtotically into the limiting surface **70** of the cover plate **69.**

It has proven to be advantageous if the converging recesses **65, 66** and **68** respectively merge with the limiting surfaces **57** or **70** respectively in a region thereof

which lies beyond the pressure zone formed between the circumferential surfaces **63'** and **64'** but within a length D_1 of the pressure zone, and preferably they merge in or extend into the middle of the length D_1 of the pressure zone (FIG. **6**).

During operation of the apparatus impregnating liquid is supplied under equal pressure to the converging recesses **65, 66** or **68** respectively through the supply openings **58, 59** or **72** (FIG. **8**) respectively as indicated by arrow S and the distribution grooves **60, 61** or **73** respectively as indicated by arrow S', the impregnating liquid flowing off in the direction indicated by the arrows T and T' shown in FIG. **6** between the limiting plane **57** or **70** respectively and the face side **74** of the disc **63** forming a liquid film of a thickness *d* (FIGS. **7** and **8**).

Of course, strict symmetry with respect to the discs **63, 64** is maintained as indicated in FIG. **7** by the opposite plate **75** shown with broken lines and as described with reference to FIGS. **1** through **5**, i.e. each apparatus is provided with four converging recesses arranged mutually symmetrically.

For continuously impregnating the fiber arrangement **62** the pair of discs **63** and **64** is rotated in the direction of the arrows R, R' so that the impregnating liquid brought in under low pressure, e.g. below 10 Atm. (above atmospheric pressure) is increasingly compressed in the region of the recesses **65, 66** or **68** respectively (FIGS. **7** and **8**) under hydrodynamic action. As a result the pressure in the liquid film successively increases, which pressure finally reaches a very high pressure at a film thickness *d* within the range of 0.005 mm to approximately 0.15 mm. Thus, it is possible to create in the liquid film a counter-pressure equal to, or higher than, the high specific pressure between the discs **64, 63** in the pressure zone D_1, e.g. up to 200 kg/cm².

In this manner there is avoided jamming of fibers between the disc face sides and the lateral cover plates in the input quadrant of the fiber arrangement in spite of the low initial pressure of the introduced impregnating liquid, so that disturbance-free operation of the apparatus is insured. Since at the same time a liquid film is maintained on the disc face sides in the pressure zone of the pair of discs in spite of the high pressure, friction and wear are reduced to a minimum. As low initial pressures are applied, simpler devices can be used in the liquid system.

If discs provided with an elastic rim, known as such, e.g. made of rubber, are used, the rubber practically is not subject to wear, as the high pressure in the liquid film prevents lateral deformation of the elastic rim, i.e. the elastic properties e.g. of the rubber are determined also by the pressures prevailing in the liquid film.

The axial dimensions *b* and *b'* of the discs are in no way limited to the relations indicated in the drawings, but they also can be chosen to be much larger, i.e. a multiple of the disc diameter. This choice of course depends upon the fiber arrangement to be processed.

While there is shown and described present preferred embodiments of the invention, it is to be distinctly understood that the invention is not limited thereto, but may be otherwise variously embodied and practiced within the scope of the following claims.

What is claimed is:

1. An apparatus for continuously impregnating a throughpassing textile fiber arrangement with liquid comprising, in combination:

a. a machine frame;

b. a pair of discs rotatably supported at said machine frame, said pair of discs having circumferential surfaces arranged opposite to one another for the throughpassage therebetween of the fiber arrangement, said pair of discs further incorporating face sides;

c. two cover plates, each of which is laterally arranged at the face sides of said pair of discs, said cover plates each having a surface situated opposite the neighboring face sides of said pair of discs, said cover plates covering said face sides with a small clearance existing between the surface of each cover plate and the neighboring face sides of said discs;

d. means for supporting said two cover plates at said machine frame;

e. means for arranging said pair of discs and said two cover plates so as to be shiftable relative to one another with respect to the direction of the axes of rotation of said discs;

f. said cover plates being provided with openings disposed at a region of said cover plates situated opposite the neighboring face sides of said pair of discs for supplying the impregnating liquid under pressure to said neighboring face sides of said pair of discs;

g. said pair of discs and said cover plates being arranged with respect to one another so as to form a pressure zone acting at all sides of the fiber arrangement to form such fiber arrangement into a compact fiber sliver under high specific pressure.

2. The apparatus as defined in claim **1**, further including means for mutually rigidly connecting said cover plates with one another.

3. The apparatus as defined in claim **1**, further including means for elastically connecting said cover plates with one another for elastically aligning said cover plates against said pair of discs.

4. The apparatus as defined in claim **3**, wherein said elastically connecting means comprises aligning members rigidly mounted at one of said cover plates, the other of said cover plates being shiftably arranged on said aligning members for shiftably aligning said other cover plate, and elastic elements rigidly connected with said other cover plate for elastically urging said other cover plate towards said one cover plate.

5. The apparatus as defined in claim **1**, further including liquid distribution grooves arranged at the region of said cover plates opposite the neighboring face sides of said discs and communicating with said openings for supplying the impregnating liquid.

6. The apparatus as defined in claim **1**, further including means for rigidly supporting one of said discs at said machine frame, means connected with said machine frame for supporting said cover plates to be shiftable relative to said one of said discs for shiftably aligning said cover plates in a plane defined by said one of said discs which is rigidly supported at the machine frame.

7. The apparatus as defined in claim **6**, further including means supporting the other of said discs so as

to be shiftable relative to said cover plates for aligning said other of said discs in said disc plane.

8. The apparatus as defined in claim **1,** wherein said cover plates further include converging recesses arranged at the respective surfaces thereof located opposite to the neighboring face sides of said discs and extending in an input quadrant of said fiber arrangement and in the direction of rotation of said discs, said input quadrant being defined by a quadrant of said circumferential surfaces facing the fiber arrangement entering the apparatus.

9. The apparatus as defined in claim **8,** further including liquid distribution grooves arranged at the region of said cover plates located opposite said face sides of said discs, said converging recesses being in flow communication with said openings via said distribution grooves.

10. The apparatus as defined in claim **8,** wherein each said converging recess is formed by a substantially wedge surface.

11. The apparatus as defined in claim **8,** wherein said converging recesses are formed by a circular surface extending asymptotically with respect to said surface of the associated cover plate which is situated opposite to the neighboring face sides of said discs for asymptotically merging with said surface.

12. The apparatus as defined in claim **8,** wherein said converging recesses extend into a region of said surface of the associated cover plate located opposite to the neighboring face sides of said discs which lies beyond the pressure zone but within a length of said pressure zone.

13. The apparatus as defined in claim **1,** wherein said surface of each cover plate defines a limiting plane which at least faces the neighboring face sides of said discs.

14. The apparatus as defined in claim **12,** wherein said converging recesses extend into the region of said surface which lies in the middle of said length of said pressure zone.

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