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(54) Tubular decorating means

(57) Roller decorating means for decorating items (3) comprises tubular transferring means (2) arranged to transfer a decorating product to said items (3), supporting means (4) associated with said tubular transferring means (2) and fixing means arranged to fix said tubular transferring means (2) to said supporting means (4), said fixing means comprising elastic connecting means (6) arranged to press said tubular transferring means (2) against said supporting means (4).

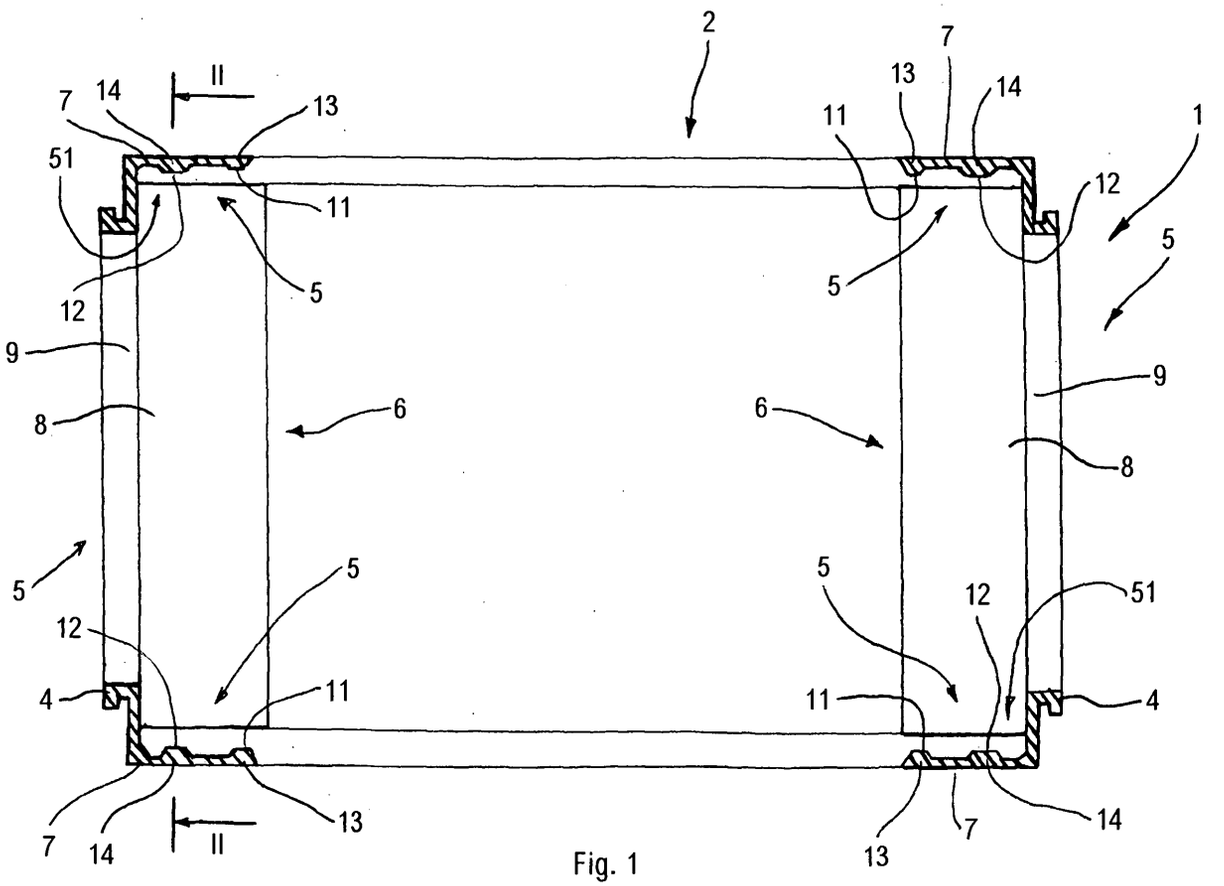

Fig. 1

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Description

[0001] The invention relates to tubular decorating means, particularly for decorating ceramic products.

[0002] Exist in the prior art silk-screen printing machines provided with silk-screen printing screens formed by a tubular skirt coupled with end flanges. The screens can be internally coupled with a pair of struts that are suitable for keeping the screens tightened during storage and are arranged to be removed when the screens are assembled on the aforementioned silk-screen printing machines in operating conditions.

[0003] The tubular skirt is permanently connected to the end flanges, for example by means of gluing.

[0004] This makes the above-disclosed silkscreen printing screens bulky and difficult to transport.

[0005] Furthermore, printing rollers are known for decorating flexo-printing machines of ceramic tiles, comprising a tubular decorating element, externally carved so as to define a decorative pattern to be printed on the tiles.

[0006] Also in these printing rollers, are internally provided tensioning struts that must be removed when the rollers are mounted on the decorating machines.

[0007] Analogously to the above-disclosed silkscreen printing screens, the printing rollers are rather bulky, which makes transport and storage difficult.

[0008] Furthermore, at the moment of mounting, the aforementioned printing rollers must be axially tightened so as to distance from one another the end flanges with which the aforementioned printing rollers are provided. Tightening is rather critical, inasmuch as it may cause the deformation of the decorative pattern and, therefore, negatively affect print quality.

[0009] Such printing rollers, being flabby, may be subjected to ovalization or to torsional deformation during operation.

[0010] In order to compensate for this drawback, printing rollers have been developed having a greater rigidity, the printing rollers comprise a support body made of plastic material, for example a polymeric resin, having the form of a hollow cylinder, on the outside of which is provided a tubular body made of elastomeric material, such as silicon, for example.

[0011] The tubular body is provided with a smooth external surface arranged to interact with a visible face of the ceramic products to be decorated. On the aforementioned external surface a plurality of cavities is formed, obtained for example by means of laser beam engraving, which cavities are arranged according to a preset pattern to be impressed on the aforementioned visible face.

[0012] Opposite ends of the support body are solidly fixed, for example by means of gluing, to flanges suitable for enabling the roller to be mounted on a decorating machine.

[0013] The above-disclosed printing rollers do not substantially have deformations or ovalizations during use.

[0014] Such printing rollers, however, are rather bulky and hard to handle.

[0015] A further drawback of the aforementioned printing rollers consists of a certain manufacturing complexity due, in particular, to difficulties with which may meet fixing the tubular body to the support body.

[0016] An object of the invention is to improve the tubular decorating means of the prior art.

[0017] Another object of the invention is to obtain tubular decorating means having reduced dimensions.

[0018] A further object of the invention is to obtain tubular decorating means easier to transport.

[0019] A further object of the invention is to obtain tubular decorating means having great rigidity and being particularly easy to manufacture.

[0020] In a first aspect of the invention, there is provided roller decorating means for decorating items, comprising tubular transferring means arranged to transfer a decorating product to said items, supporting means associated with said tubular transferring means and fixing means arranged to fix said tubular transferring means to said supporting means, characterised in that said fixing means comprises elastic connecting means arranged to press said tubular transferring means against said supporting means.

[0021] In one embodiment, said supporting means comprises a pair of flanges each one of which is suitable for being associated with a respective end of the tubular transferring means.

[0022] In a further embodiment, the elastic connecting means comprises a pair of elastic sleeves suitable for being inserted inside the tubular transferring means and for being positioned in such a way that each one of the aforementioned ends of the tubular transferring means is interposed between one of the aforementioned elastic sleeves and a wall delimiting the flange, so as to movably fix the tubular transferring means to the flanges.

[0023] Owing to this aspect of the invention, it is possible to obtain roller decorating means provided with tubular transferring means that can be separated from the respective supporting means when the roller decorating means has to be stored and/or transported.

[0024] The tubular transferring means may therefore take on a folded configuration that enables its dimensions to be significantly limited.

[0025] In a second aspect of the invention, there is provided sleeve decorating means for decorating items, comprising flexible supporting means and transferring means associated with said flexible supporting means and arranged to transfer a decorating product to said items, characterised in that said flexible supporting means is embedded in said transferring means.

[0026] Owing to this aspect of the invention, it is possible to obtain sleeve decorating means in which flexible supporting means is solidly fixed to transferring means.

[0027] In one embodiment, the flexible supporting means is made of a material that is substantially inex-

tensible and preferably geometrically stable at least in the absence of external forces.

[0028] In another embodiment, the flexible supporting means comprises a plastic laminate.

[0029] In a further embodiment, the aforementioned plastic laminate comprises a plurality of through holes.

[0030] The flexible supporting means is made of a material sufficiently rigid so as to ensure that a regular cylindrical form is maintained when the roller is not subjected to external forces, as occurs for example during handling, storage and during phases of mounting on and dismounting from a decorating machine.

[0031] Furthermore, the flexible supporting means enables the sleeve decorating means to be folded, keeping itself parallel to its longitudinal axis, in such a way as to limit the volume occupied by the sleeve decorating means not in use.

[0032] In a third aspect of the invention, there is provided handling means suitable for being associated with roller decorating means, said roller decorating means comprising tubular transferring means at opposite ends of which supporting elements are fixed, the handling means comprising rod means having a first end suitable for being connected with a first supporting element of said supporting elements and a second end suitable for being connected with a second supporting element of said supporting elements, characterised in that said rod means can be positioned externally to said tubular transferring means, in such a way as to promote the movement of said roller decorating means.

[0033] In one embodiment, the rod means comprises a first pipe sliding inside a second pipe between which pipes there is provided return elastic means suitable for making the first pipe to be received inside the second pipe.

[0034] In a further embodiment, at opposite ends of the rod means, there is provided connecting means arranged to cooperate with portions of the first supporting element and of the second supporting element.

[0035] Owing to this aspect of the invention, it is possible to obtain handling means that enables movement of the decorating rollers to be simplified.

[0036] The invention may be better understood and implemented with reference to the attached drawings, which illustrate some exemplifying and not limiting embodiments thereof, in which:

Figure 1 is a partially sectioned side view of tubular decorating means according to the invention;

Figure 2 is a cross-section taken along the plane II-II of Figure 1;

Figure 3 is a partially sectioned and fragmented schematic side view of one embodiment of tubular decorating means according to the invention;

Figure 4 is a view like the one in Figure 3, showing a further embodiment of tubular decorating means according to the invention;

Figure 5 is a fragmented cross-section of transferring means of tubular decorating means of Figure 1;

Figure 6 is a partially sectioned front view, of tubular decorating means according to the invention associated with respective actuating means;

Figure 7 is a view like the one in Figure 1 showing handling means associated with tubular decorating means.

[0037] With reference to Figures 1 and 2, it is shown roller decorating means 1 comprising sleeve decorating means 2 suitable for transferring a decorating product onto an item to be decorated, for example a ceramic support 3 (Figure 3).

[0038] The sleeve decorating means 2 can comprise a silkscreen printing screen, or a skirt in elastomeric material, or finally a skirt in elastomeric material inside which a laminar element in a material flexible and substantially inextensible is embedded, as will be better disclosed below.

[0039] The roller decorating means 1 further comprises a pair of flanges 4 associable with opposite ends 5 of the sleeve decorating means 2 to enable the roller decorating means 1 to be mounted on decorating machines.

[0040] The roller decorating means 1 further comprises elastic connecting means 6 arranged to movably fix the ends 5 to the flanges 4.

[0041] The flanges 4 comprise walls 7 defining cylindrical chambers 51 arranged to receive the ends 5.

[0042] The elastic connecting means 6 comprises a pair of laminas 8 that can be folded in such a way as to form sleeves 10 arranged to press the ends 5 against the walls 7.

[0043] As shown in Figure 2, the laminas 8 may take on a folded mounting configuration, indicated by A, in which they can be positioned in relation to the walls 7, and an extended locking configuration, indicated by B, in which they fix the sleeve decorating means 2 to the flanges 4.

[0044] During mounting the roller decorating means 1, first of all, an end 5 is inserted inside the cylindrical chamber 51 of the respective flange 4.

[0045] Next, a lamina 8 is taken into the folded mounting configuration A and inserted inside the sleeve decorating means 2 by an opening 9 obtained in the flange 4.

[0046] The lamina 8 can be manually maintained by an operator in the folded mounting configuration A.

[0047] The aforementioned operator then releases the lamina 8, after positioning it, in such a way that the latter takes on the extended locking configuration B.

[0048] To dismount the roller decorating means 1, operations analogous to the above-disclosed ones are followed.

[0049] First of all, it is possible to act on the sleeve 10, by inserting a hand through the opening 9, so as to take it from the extended locking configuration B to the folded mounting configuration A.

[0050] Subsequently, the flange 4 is separated from the sleeve decorating means 2 and lastly the lamina 8 is removed.

[0051] The sleeve decorating means 2 is provided, at each end 5, with a first groove 11 and with a second groove 12.

[0052] Each flange 4 is provided, at the wall 7, with a first projecting element 13 and with a second projecting element 14 both arranged to be received respectively in the first groove 11 and in the second groove 12.

[0053] The first groove 11, the second groove 12, the first projecting element 13 and the second projecting element 14 thus act as fixing promoting means arranged to improve adhesion of sleeve decorating means 2 to the flanges 4.

[0054] With reference to Figure 5, there is shown sleeve decorating means 2 comprising flexible supporting means 15 and transferring means 16 associated with the flexible supporting means 15 and suitable for transferring a decorating product onto ceramic supports 3 to be decorated.

[0055] The flexible supporting means 15 is made of a material substantially inextensible which is preferably geometrically stable at least in the absence of external forces.

[0056] Advantageously, the flexible supporting means 15 comprises a laminate 17 made of plastic material provided with a plurality of through holes 19.

[0057] The sleeve decorating means 2 is shaped in such a way that the laminate 17 is embedded inside the transferring means 16.

[0058] In this way, a perfect adhesion to the laminate 17 of the material making up the transferring means is obtained.

[0059] Advantageously, the transferring means 16 can comprise a tubular printing element 18 in elastomeric material, for example silicon rubber, on a face 20 of which is made a plurality of cavities forming a preset ornamental pattern and suitable for receiving a ceramic enamel that has to be deposited on a visible surface of the ceramic supports 3.

[0060] With reference to Figures 3 and 4, the sleeve decorating means 2, during operation, can be tightened between roller means 21 that make them to rotate in a direction indicated by the arrow R.

[0061] In this way, the sleeve decorating means 2 is driven to interact with ceramic supports 3 positioned on conveying means 26 that advances them in the direction indicated by the arrow F.

[0062] As shown in Figure 3, the roller means 21 may comprise a first roller 23 and a second roller 24 rotatable on axes arranged substantially at the same vertical level in such a way that the portion of the sleeve decorating means interacting with the ceramic supports 3 identifies a substantially horizontal lie.

[0063] Inside the sleeve decorating means 2, there is provided pressing means 22, comprising, for example, a pressing roller 25, the pressing means 22 being arranged to promote the transferring of the enamel from the aforementioned cavities to the ceramic supports 3.

[0064] Alternatively, as shown in Figure 4, the roller means 21 can comprise a third roller 27 and a fourth roller 28 arranged at different vertical levels, so that the rotation axes of the third roller 27 and of the fourth roller 28 are substantially contained within the same vertical plane.

[0065] In such a case, the fourth roller 28 acts as pressing element making the face 20 of the sleeve decorating means 2 to interact with the ceramic supports 3.

[0066] As shown in Figure 6, the roller means 21 can be provided with pegs 29 protruding from a side surface 30 of the roller means 21 and engaged in hole means 31 obtained in the sleeve decorating means 2.

[0067] Advantageously, the hole means 31 is obtained in end portions 32 of the laminate 17 protruding from the tubular element 18.

[0068] With reference to Figure 7, there is shown roller decorating means 1 with which is associated handling means 33 arranged to promote the transport of the roller decorating means 1.

[0069] The handling means 33 comprises rod means 34 having a first end 35 suitable for being connected to a first flange 4a of the roller decorating means 1 and a second end 36 suitable for being connected to a second flange 4b of the roller decorating means 1.

[0070] The rod means 34 comprises a first pipe 37 slidable inside a second pipe 38 between which is provided a return spring 41 exerting a force acting in the direction indicated by the arrow F1 so as to make the first pipe 37 to be received inside the second pipe 38.

[0071] The rod means 34 further comprises a pin 39 integral with the first pipe 37 and suitable for being received in a respective slot 40, made in the second pipe 38, so as to guide the sliding of the first pipe 37 in relation to the second pipe 38 and to prevent the rotation of the first pipe 37 in relation to the second pipe 38.

[0072] The rod means 34 is provided at the first end 35 and at the second end 36 with connecting means 42 arranged to cooperate with portions of the first flange 4a and of the second flange 4b.

[0073] The connecting means 42 comprises a first bar 43 and a second bar 44 projecting substantially perpendicularly to the rod means 34, respectively, from the first end 35 and from the second end 36.

[0074] To the first bar 43 and to the second bar 44 are respectively fixed a first projecting element 45 and a second projecting element 46 that are substantially parallel to the rod means 34, in such a way that the first projecting element 45 and the second projecting element 46 face each other.

[0075] The first flange 4a and the second flange 4b are provided with slots 47 arranged to receive the first projecting element 45 and the second projecting element 46.

[0076] During operation, an operator grasps the first pipe 37 and the second pipe 38 and, by exerting a force

acting in the direction F2 that is opposite to the direction F1, moves the first end 35 away from the second end 36 by a distance that is greater than the length of the roller decorating means 1.

[0077] Next, after the first projecting element 45 and the second projecting element 46 have been positioned inside the respective slots 47, the operator releases the first pipe 37 and the second pipe 38, which are made to slide one inside the other by the return spring 41.

[0078] The handling means 33 further comprises locking means 48 arranged to prevent the first pipe 37 and the second pipe 38 to slide one in relation to the other.

[0079] The locking means 48 comprises a locking screw 49 connected to the second pipe 38 and arranged to interact with the first pipe 37, such locking screw 49 being rotationally actuatable by a knob 50.

Claims

1. Roller decorating means for decorating items (3), comprising tubular transferring means (2) arranged to transfer a decorating product to said items (3), supporting means (4) associated with said tubular transferring means (2) and fixing means arranged to fix said tubular transferring means (2) to said supporting means (4), **characterised in that** said fixing means comprises elastic connecting means (6) arranged to press said tubular transferring means (2) against said supporting means (4).

2. Roller decorating means according to claim 1, wherein said elastic connecting means (6) comprises lamina means (8) arranged to movably fix said tubular transferring means (2) to said supporting means (4).

3. Roller decorating means according to claim 2, wherein said lamina means (8) defines sleeve means (10) that are elastically deformable.

4. Roller decorating means according to any one of the preceding claims, wherein said supporting means (4) comprises wall means (7) defining chamber means (51) arranged to receive ends (5) of said tubular transferring means (2).

5. Roller decorating means according to claim 4, as appended to claim 2, or 3, wherein said lamina means (8) is associable with said supporting means (4) in such a way that said ends (5) are interposed between said lamina means (8) and said wall means (7).

6. Roller decorating means according to claim 4, as appended to claim 2, or 3, or according to claim 5, wherein said lamina means (8) is elastically deformable so as to arrange itself in such a way as to be associable in a shapingly coupled manner with said wall means (7).

7. Roller decorating means according to any one of the preceding claims, and further comprising fixing promoting means (11, 12, 13, 14) arranged to improve the adhesion of said tubular transferring means (2) to said supporting means (4).

8. Roller decorating means according to claim 7, as appended to any one of claims 4 to 6, wherein said fixing promoting means comprises projecting elements (13, 14) protruding from said wall means (7) and cooperating with relative grooves (10, 11) obtained in said tubular transferring means (2).

9. Roller decorating means according to claim 7, as appended to any one of claims 4 to 6, wherein said fixing promoting means comprises grooves obtained in said wall means (7) and suitable for receiving respective projecting elements protruding from said flexible transferring means (2).

10. Roller decorating means according to any one of the preceding claims, wherein said tubular transferring means (2) comprises flexible supporting means (17) and printing means (18) associated with said flexible supporting means (17) in such a way that the supporting means (17) is embedded in said printing means (18).

11. Roller decorating means according to claim 12, wherein said flexible supporting means (17) comprises a plurality of through holes (19).

12. Roller decorating means according to claim 10, or 11, wherein said flexible supporting means (17) is made of a material that is substantially inextensible and preferably geometrically stable, at least in the absence of external forces.

13. Roller decorating means according to any one of claims 10 to 12, wherein said flexible supporting means comprises a plastic laminate (17).

14. Roller decorating means according to any one of claims 10 to 13, wherein said printing means (18) comprises an elastomeric material.

15. Roller decorating means according to claim 14, wherein said elastomeric material comprises silicon rubber.

16. Sleeve decorating means for decorating items (3), comprising flexible supporting means (17) and transferring means (18) associated with said flexible supporting means (17) and arranged to transfer

a decorating product to said items (3), **characterised in that** said flexible supporting means (17) is embedded in said transferring means (18).

17. Sleeve decorating means according to claim 16, wherein said flexible supporting means (17) comprises a plurality of through holes (19).

18. Sleeve decorating means according to claim 16, or 17, wherein said flexible supporting means (17) is made of a material that is substantially inextensible and preferably geometrically stable, at least in the absence of external forces.

19. Sleeve decorating means according to any one of claims 16 to 18, wherein said flexible supporting means comprises a plastic laminate (17).

20. Sleeve decorating means according to any one of claims 16 to 19, wherein said transferring means (18) comprises an elastomeric material.

21. Sleeve decorating means according to claim 20, wherein said elastomeric material comprises silicon rubber.

22. Sleeve decorating means according to any one of claims 16 to 21, and further comprising supporting means (4) associated with said transferring means (18) and/or with said flexible supporting means (17) and arranged to enable said sleeve decorating means (2) to be mounted on decorating machines.

23. Sleeve decorating means according to claim 22, and further comprising fixing means arranged to fix said transferring means (18) and/or said flexible supporting means (17) to said supporting means (4).

24. Sleeve decorating means according to claim 23, wherein said fixing means comprises elastic connecting means (6) arranged to press said transferring means (18) and/or said flexible supporting means (17) against said supporting means (4).

25. Sleeve decorating means according to claim 24, wherein said elastic connecting means (6) comprises lamina means (8) arranged to movably fix said transferring means (18) and/or said flexible supporting means (17) to said supporting means (4).

26. Sleeve decorating means according to claim 25, wherein said lamina means (8) defines elastically deformable sleeve means (10).

27. Sleeve decorating means according to any one of claims 24 to 26, wherein said supporting means (4) comprises wall means (7) defining chamber means (51) arranged to receive ends (5) of said transferring means (18) and/or of said flexible supporting means (17).

28. Sleeve decorating means according to claim 27, as appended to claim 25, or 26, wherein said lamina means (8) is associable with said supporting means (4) in such a way that said ends (5) are interposed between said lamina means (8) and said wall means (7).

29. Sleeve decorating means according to claim 27, as appended to claim 25, or 26, or according to claim 28, wherein said lamina means (8) is elastically deformable so as to arrange itself in such a way as to be associable in a shapingly coupled manner with said wall means (7).

30. Sleeve decorating means according to any one of claims 16 to 29, and further comprising fixing promoting means (11, 12, 13, 14) arranged to improve the adhesion of said transferring means (18) and/or of said flexible supporting means (17) to said supporting means (4).

31. Sleeve decorating means according to claim 30, as appended to any one of claims 27 to 29, wherein said fixing promoting means comprises projecting elements (13, 14) protruding from said wall means (7) cooperating with relative grooves (10, 11) obtained in said transferring means (18) and/or in said flexible supporting means (17).

32. Sleeve decorating means according to claim 30, as appended to any one of claims 27 to 29, wherein said fixing promoting means comprises grooves obtained in said wall means (7) and suitable for receiving respective projecting elements protruding from said transferring means (18) and/or from said flexible supporting means (17).

33. Sleeve decorating means according to any one of claims 16 to 21, and further comprising roller means (21) between which said transferring means (18) and said flexible supporting means (17) are tightened.

34. Sleeve decorating means according to claim 33, wherein said roller means (21) comprises a first roller (23) and a second roller (24) rotatable in relation to axes placed substantially at the same vertical level.

35. Sleeve decorating means according to claim 34, and further comprising pressing means (22) arranged inside said transferring means (18) and inside said flexible supporting means (17) and suitable for transferring said decorating product onto

said items (3).

36. Sleeve decorating means according to claim 33, wherein said roller means (21) comprises a further first roller (27) and a further second roller (28) that are rotating in relation to axes placed at different vertical levels, said axes being contained on a plane extending substantially vertically.

37. Sleeve decorating means according to claim 36, wherein one of said further first roller (27) and of said further second roller (28) acts as pressing element for transferring said decorating product onto said items (3).

38. Sleeve decorating means according to any one of claims 16 to 37, wherein parts (32) of said flexible supporting means (17) protrude from said transferring means (18).

39. Sleeve decorating means according to claim 38, as appended to any one of claims 33 to 37, and further comprising hole means (31) obtained in said parts (32) and suitable for receiving actuating peg means (29) projecting from said roller means (21).

40. Handling means suitable for being associated with roller decorating means (1), said roller decorating means comprising tubular transferring means (2) at opposite ends (5) thereof supporting elements (4) are fixed, said handling means comprising rod means (34) having a first end (35) suitable for being connected to a first supporting element (4a) of said supporting elements (4) and a second end (36) suitable for being connected to a second supporting element (4b) of said supporting elements (4), **characterised in that** said rod means (34) can be positioned externally to said tubular transferring means (2) in such a way as to promote transferring said roller decorating means (1).

41. Handling means according to claim 40, wherein said rod means (34) is provided with connecting means (42) arranged to cooperate with portions of said first supporting element (4a) and of said second supporting element (4b).

42. Handling means according to claim 41, wherein said connecting means (42) comprises first bar means (43) and second bar means (44) projecting substantially perpendicularly to said rod means (34), respectively from said first end (35) and from said second end (36).

43. Handling means according to claim 42, wherein to said first bar means (43) and to said second bar means (44), first projecting element (45) and second projecting element (46), arranged substantially parallel to said rod means (34), are respectively fixed, in such a way that said first projecting element (45) and said second projecting element (46) face each other.

44. Handling means according to claim 43, wherein said first supporting element (4a) and said second supporting element (4b) are provided with seat means (47) arranged to receive said first projecting element (45) and said second projecting element (46).

45. Handling means according to any one of claims 40 to 44, wherein said rod means (34) comprises a first pipe (37) slidable inside a second pipe (38) between which there is provided return elastic means (41) suitable for making said first pipe (37) to be received inside said second pipe (38).

46. Handling means according to claim 45, wherein said rod means comprises a pin (39) that is integral with said first pipe (37), or with said second pipe (38), and that is suitable for being received in a respective slot (40), obtained in said second pipe (38), or in said first pipe (37), so as to guide the sliding of said first pipe (37) in relation to said second pipe (38) and to prevent the rotation of said first pipe (37) in relation to said second pipe (38).

47. Handling means according to claim 45, or 46, and further comprising locking means (48) arranged to prevent said first pipe (37) and said second pipe (38) to slide one in relation to the other.

48. Handling means according to claim 47, wherein said locking means (48) comprises locking-screw means (49) connected to said second pipe (38) and arranged to interact with said first pipe (38).

49. Handling means according to claim 48, wherein said locking-screw means (49) is rotationally actuatable by a knob (50).

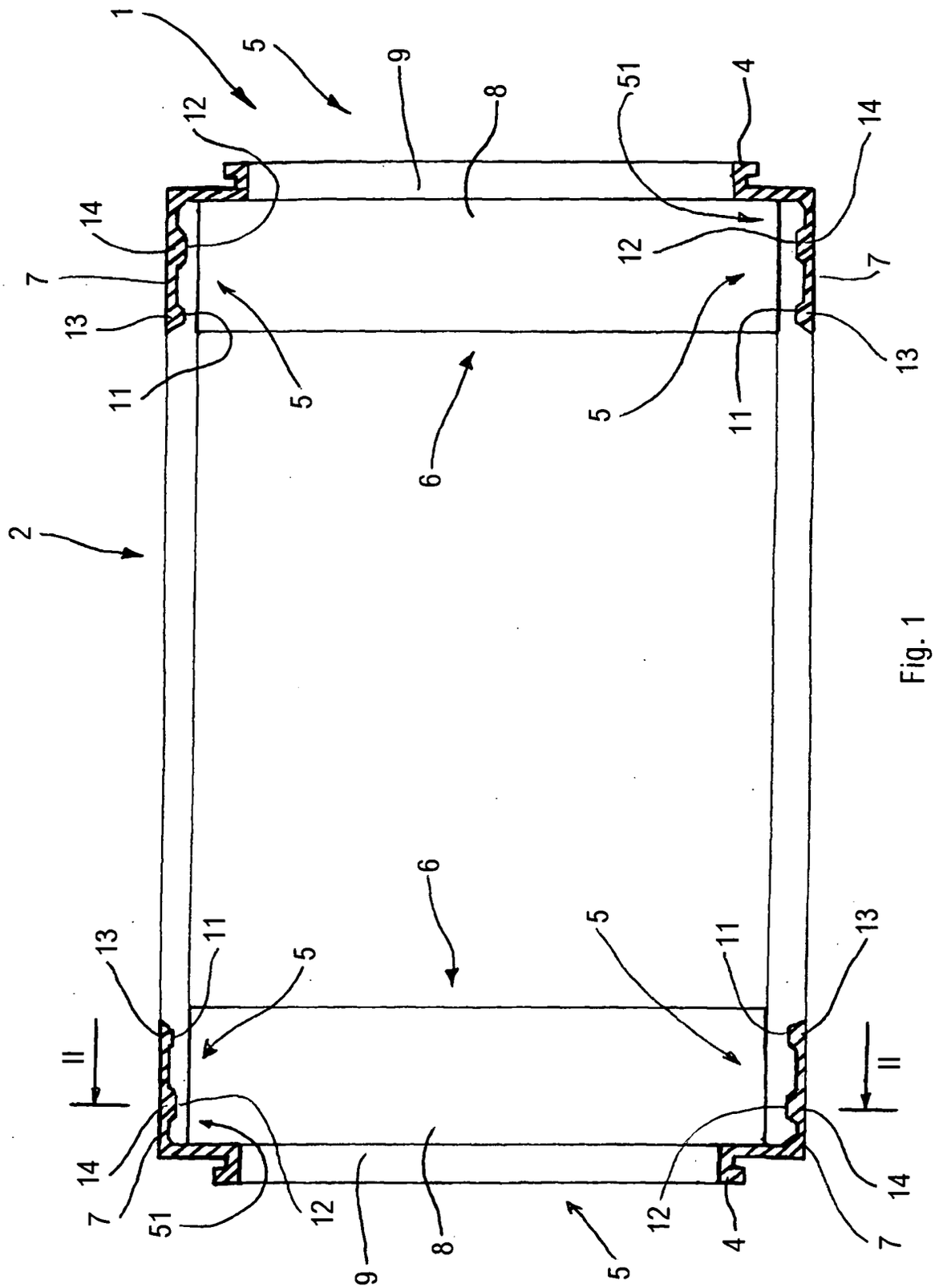

Fig. 1

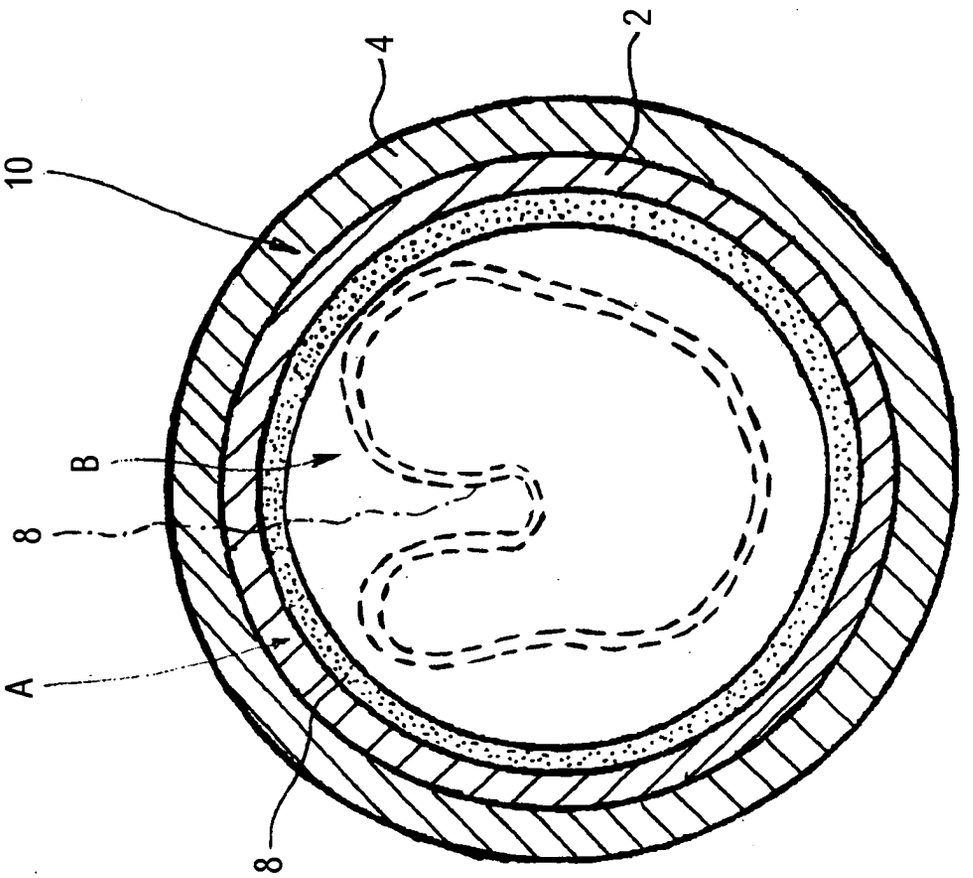

Fig. 2

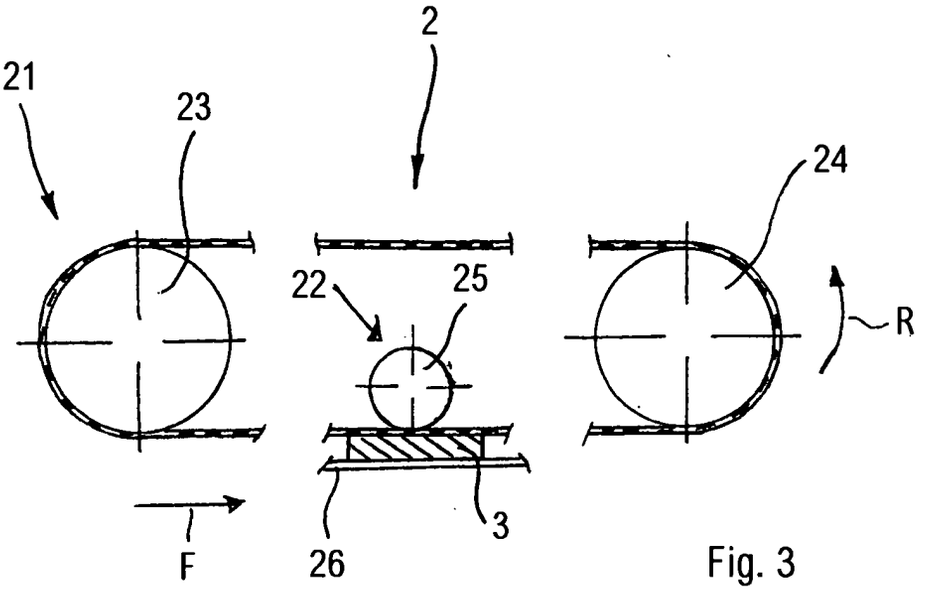

Fig. 3

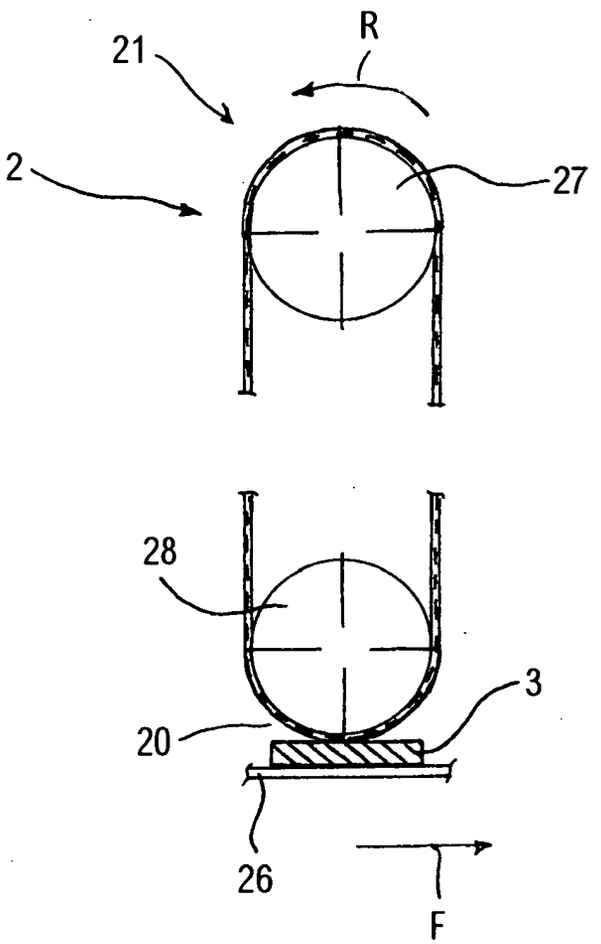

Fig. 4

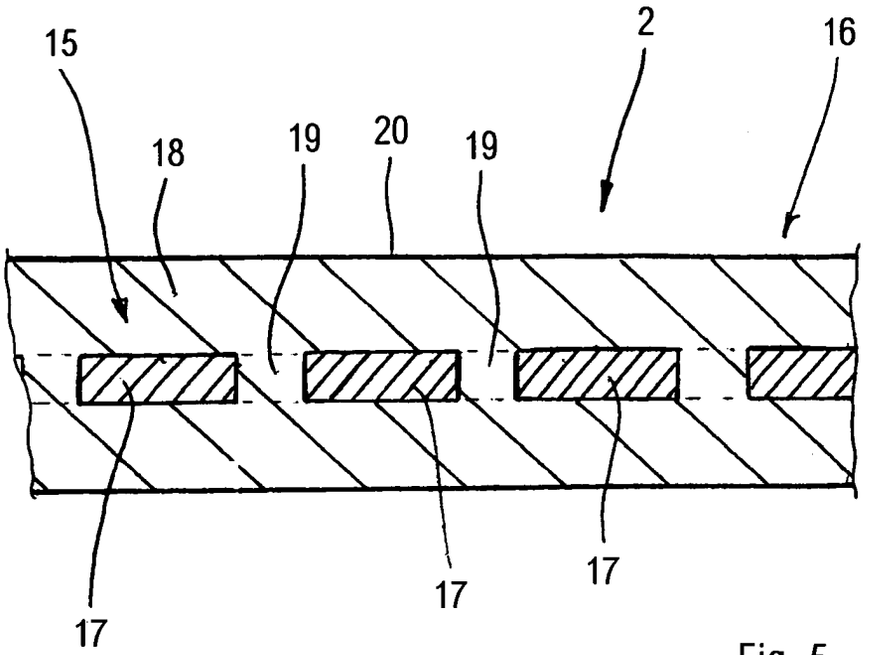

Fig. 5

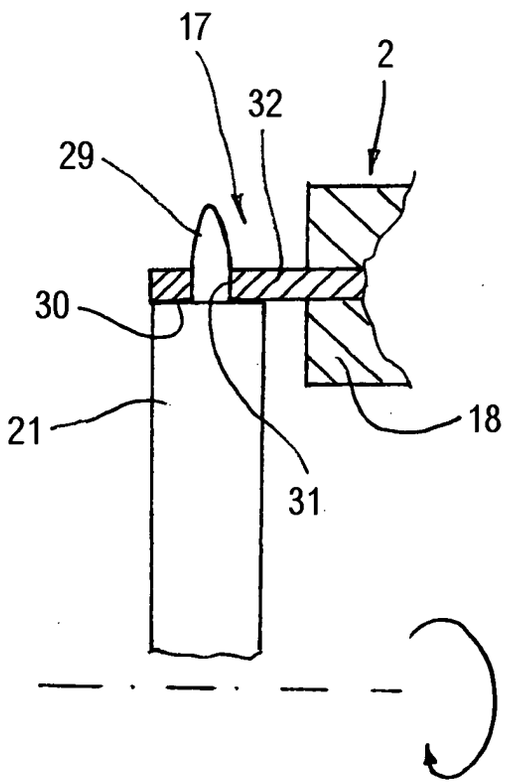

Fig. 6

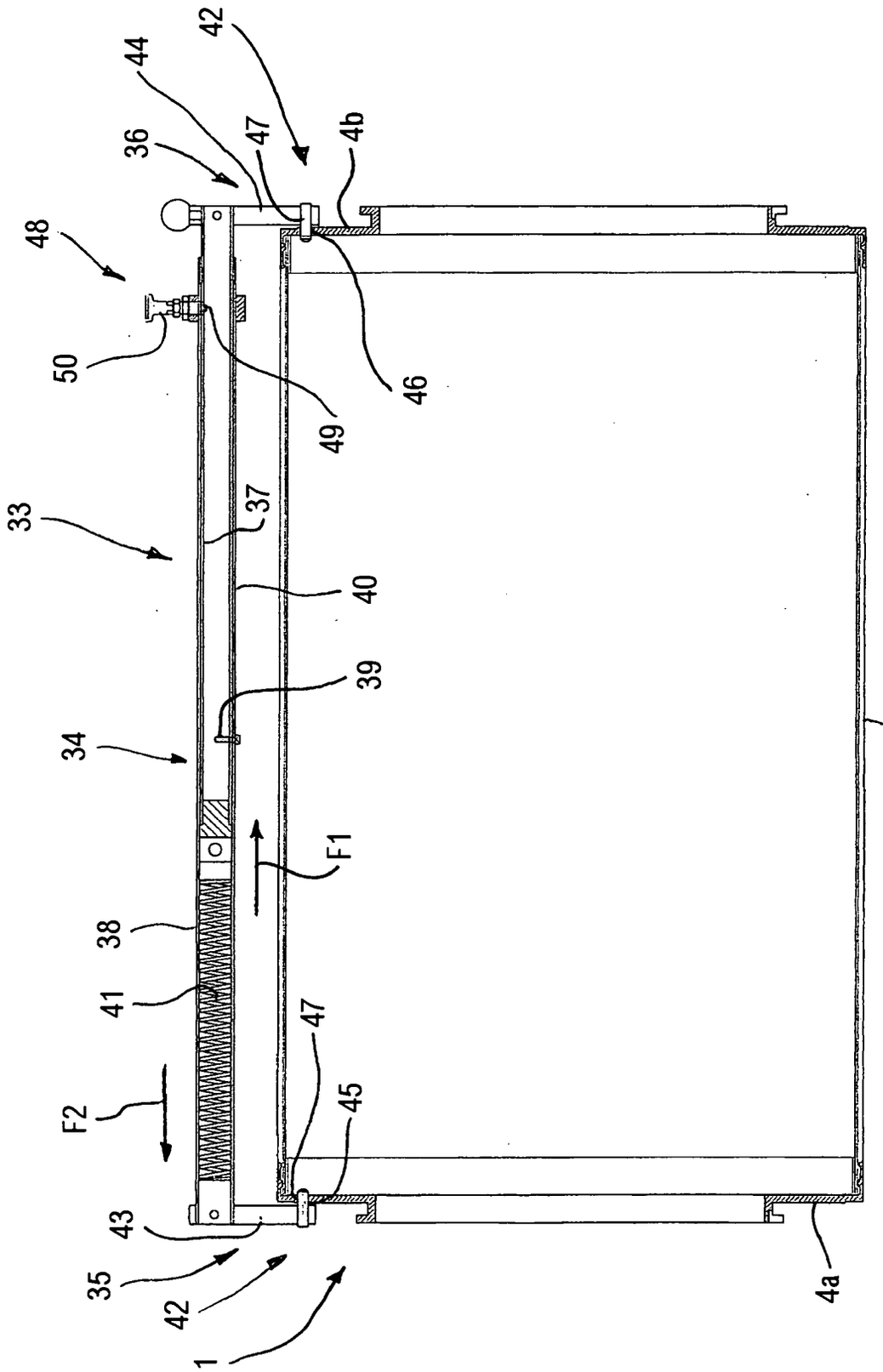
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Fig. 7

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 04 00 3990

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	US 4 044 669 A (ALMEDAHLS) 30 August 1977 (1977-08-30) * the whole document *	1	B41F13/11 B28B11/00
A	AT 294 868 B (ZIMMER) 10 December 1971 (1971-12-10) * the whole document *	1	
A	NL 1 007 430 C (STORK SCREENS) 7 January 1998 (1998-01-07) * the whole document *	1	

TECHNICAL FIELDS SEARCHED (Int.Cl.7)

B41F
B28B
B41N
B41C

~~The present search report has been drawn up for all claims~~

Place of search	Date of completion of the search	Examiner
The Hague	24 August 2004	Loncke, J

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

European Patent Office

Application Number
EP 04 00 3990

CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

[X] Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):

11-15

[ ] No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

[ ] All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

[ ] As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

[ ] Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

[ ] None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 04 00 3990

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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24-08-2004

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82