

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
4 March 2004 (04.03.2004)

PCT

(10) International Publication Number
WO 2004/018210 A1

(51) International Patent Classification⁷: **B41F 27/10**

SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA,
UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(21) International Application Number:
PCT/EP2003/008556

(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(22) International Filing Date: 1 August 2003 (01.08.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
02425522.6 9 August 2002 (09.08.2002) EP

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Declarations under Rule 4.17:

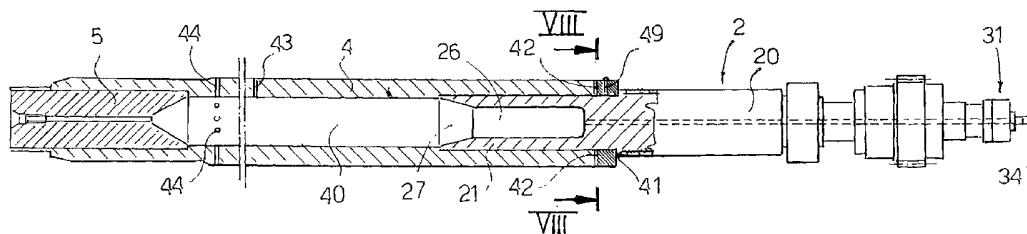
- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii)) for the following designation US
- of inventorship (Rule 4.17(iv)) for US only

Published:

- with international search report

[Continued on next page]

(54) Title: DEVICE AND METHOD FOR MOUNTING/DEMOUNTING SLEEVES ON/FROM A PRINTING CYLINDER, PARTICULARLY FOR A ROTARY PRINTING PRESS



(57) Abstract: A system for mounting/demounting sleeves (6, 7) on /from a print cylinder for a rotary printing press, wherein the print cylinder comprises a rotatable mandrel (2) and a sleeve carrying cylinder (4) integral with the mandrel (2) to support a sleeve (6) or an intermediate adapter (8) able to support a sleeve (7) with a large print format. The mandrel (2) has a first and a second duct (28, 29) communicating respectively with a chamber (40) inside the sleeve carrying cylinder (4) and with the outside. The sleeve carrying cylinder (4) has a plurality of radial holes (43, 44) which put said inner chamber (40) in communication with the outside. The adapter has a duct (82) able to be put into communication with the second duct (29) of the mandrel and a plurality of radial holes which put the duct (28) of the adapter into communication with the outside. The first and second duct (28, 29) of the mandrel are able to be connected to the pneumatic system of the press to introduce/suck air in an independent and separate manner through the radial holes (43, 44) of the sleeve carrying cylinder (4) or through the radial holes (88, 86) of the adapter (8).



— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

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DEVICE AND METHOD FOR MOUNTING/DEMOUNTING SLEEVES ON/FROM A PRINTING CYLINDER, PARTICULARLY FOR A ROTARY PRINTING PRESS

5 DESCRIPTION

The present invention refers to a device and to a method for mounting/demounting sleeves on/from a printing cylinder particularly for a rotary printing press and more particularly for a flexographic printing press.

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As is known, a rotary printing press provides a plurality of printing units comprising respective printing cylinders having on their outer surface a pattern or cliché and designed to be soaked with ink for printing. A sheet material is fed between the printing cylinders and a backing roller or drum, so that the pattern of the cliché is applied thereon.

15

A printing cylinder as a whole comprises a rotatable mandrel whereon is integrally mounted a sleeve-carrying cylinder. A format sleeve is axially inserted on the sleeve carrying cylinder. A pattern or cliché for printing is borne on the outer surface of the format sleeve.

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The print format, that is to say the development of the pattern printed on the sheet material, is defined by the outside diameter of the format sleeve. Therefore, for large print formats, large-sized sleeves - that is sleeves having large outside diameters - are required.

25

On account of economic considerations, in order to avoid the production of large diameter format sleeves, for large print formats use is made of an adapter in the form of an intermediate sleeve, which is inserted on the sleeve carrying cylinder of the mandrel. Then, the large diameter sleeve is inserted on the intermediate sleeve.

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For mounting of the format sleeve and/or of the adapter an air cushion system is used. That is to say, compressed air is fed into the mandrel and out from radial holes in the sleeve carrying cylinder so as to generate a tubular air cushion between the outer surface of the sleeve carrying cylinder and the inner surface of the sleeve or adapter. Said air cushion minimises friction and allows easy sliding of the sleeve on the sleeve carrying cylinder.

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When the sleeve reaches the end of stroke, its end abuts against one end of the mandrel. At this point the air supply is interrupted and thus the inner surface of the sleeve adheres perfectly to the outer surface of the sleeve carrying cylinder.

5

In the same manner, for demounting of the sleeve, compressed air is supplied to the mandrel, so as to create the air cushion which allows the sleeve to be removed from the sleeve carrying cylinder.

10 In the case of large format sleeves, an intermediate sleeve or adapter, fitted on the mandrel for example by means of a bayonet joint, with radial through holes to allow the passage of air must be provided. In fact, when the sleeve is to be mounted on the adapter, compressed air is fed to the mandrel. Consequently, the air passes through the holes in the adapter and a tubular air cushion is created between the outer surface of the adapter
15 and the inner surface of the sleeve. As a result the sleeve can easily be inserted onto the adapter.

Said system presents some drawbacks, above all when the sleeve must be removed from the adapter. In fact to remove the sleeve from the adapter, compressed air is fed to the
20 mandrel to create an air cushion between the sleeve and the adapter. It can happen that during extraction of the sleeve a movement of the adapter is also produced by friction. Said movement of the adapter causes misalignment of the holes of the adapter with the holes of the mandrel. As a result, together with the sleeve, the operator also extracts the adapter, which remains firmly adherent to the inner surface of the sleeve. Thus to recover
25 the adapter, the operator is obliged to cut the sleeve fitted thereon and to discard it, without being able to use it again, with considerable economic damage.

Said problem proves somewhat serious, precisely because at each change of production, pattern and format, it is necessary to change the sleeve of the print cylinder and said
30 sleeve changing operation proves somewhat delicate and awkward for the operator.

The object of the present invention is to eliminate the drawbacks of the prior art, providing a system for mounting/demounting sleeves on/from a printing cylinder, particularly for a rotary printing press, which is able to simplify the sleeve demounting
35 operation, especially in the case of large format sleeves inserted on an intermediate adapter.

In particular, an object of the invention is to allow mounting and demounting of the sleeve and of the adapter without being compelled to use bayonet joints, which require relative rotations between the coupled elements.

5

Another object of the present invention is to provide such a sleeve mounting/demounting system that is versatile and suitable to be applied to different types of rotary printing machines.

10 Yet another object of the present invention is to provide such a sleeve mounting/demounting system that is economical and simple to make.

These objects are achieved in accordance with the invention with the characteristics listed in appended independent claims 1 and 13.

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Advantageous embodiments of the invention are apparent from the dependent claims.

The system for mounting/demounting sleeves on/from a printing cylinder, particularly for a rotary printing press, according to the invention comprises a mandrel designed to be
20 rotatably mounted around its own axis on the printing press and a sleeve carrying cylinder mounted integral with the mandrel to support a sleeve or an intermediate adapter suitable to support a sleeve with a large print format.

The mandrel has at least one air inlet duct communicating with a plurality of holes which
25 pass through the sleeve carrying cylinder to allow air to be discharged on the outer surface of the sleeve carrying cylinder so as to be able to fit the adapter or the sleeve on the sleeve carrying cylinder.

The intermediate adapter has at least one air passage duct communicating with at least
30 one of said holes of the sleeve carrying cylinder and opening on the outer surface of the intermediate adapter so as to be able to fit the large format sleeve on the intermediate adapter.

According to the invention, it is provided the possibility of feeding air in a selective
35 manner:

- only on the outer surface of the sleeve carrying cylinder, through the holes of the sleeve carrying cylinder not communicating with said at least one duct of the intermediate adapter, or
- only on the outer surface of the intermediate adapter, through the holes of the sleeve carrying cylinder communicating with said at least one duct of the intermediate adapter.

In a preferred embodiment of the invention there are provided:

- a first duct formed in the mandrel and communicating with a chamber defined inside the sleeve carrying cylinder, in turn communicating with the holes of the sleeve carrying cylinder, and
- a second duct formed in the mandrel, not communicating with the inner chamber of the sleeve carrying cylinder and opening onto the outer surface of the sleeve carrying cylinder to be put into communication with said at least one duct of the adapter.

The first and the second duct of the mandrel are able to be put into communication with a pneumatic system of the machine, so as to be able to deliver/suck air selectively into each of them and thus through the holes of the sleeve carrying cylinder and through said at least one duct of the adapter.

With the system according to the invention, an air cushion or a vacuum can be created in a separate and autonomous manner between the outer surface of the sleeve carrying cylinder and the inner surface of the adapter or between the outer surface of the adapter and the inner surface of the sleeve mounted thereon.

Further characteristics of the invention will be made clearer by the detailed description that follows, referring to a purely exemplary and therefore non limiting embodiment thereof, illustrated in the appended drawings, wherein:

Figure 1 is a partially axial sectional view illustrating a printing cylinder assembly comprising a mandrel supporting a sleeve carrying cylinder, shown broken off;

Figures 1a, 1b and 1c illustrate in axial sectional and broken off views, respectively, a small format sleeve, a large format sleeve and an adapter for sleeves;

Figure 1d is an axial sectional view of the rear part of the mandrel of Figure 1,

Figure 1e is an enlarged view of a detail of the mandrel of Figure 1;

- 5 Figure 2 is an enlarged axial sectional view of the mandrel of Figure 1, but taken along a sectional plane at right angles with respect to that of Figure 1;

Figure 3 is a view from the rear of a connector for the input of air, forming part of the mandrel of Figure 1;

10

Figure 4 is an axial sectional view of the air connector taken along the sectional plane IV-IV of Figure 3;

Figure 5 is a cross sectional view of the adapter taken along the sectional plane V-V of Figure 1c;

15

Figure 6 is a diagrammatic view illustrating insertion of a small format sleeve on the sleeve carrying cylinder of the mandrel, wherein the sleeve is in axial section;

- 20 Figure 6a is an overall view illustrating the sleeve of Figure 6 mounted on the sleeve carrying cylinder;

Figure 7 is a diagrammatic view illustrating the insertion of an adapter for sleeves on the sleeve carrying cylinder of the mandrel, wherein the adapter is in axial section;

25

Figure 7a is an overall view illustrating the adapter of Figure 7 mounted on the sleeve carrying cylinder;

- 30 Figure 7b is a diagrammatic view illustrating the stage of the insertion of a large format sleeve on the adapter of Figure 7a, wherein the large format sleeve is in axial section;

Figure 7c is an overall view illustrating the large format sleeve mounted on the adapter;

Figure 8 is a cross sectional view along the sectional plane VIII-VIII of Figure 1.

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The system for mounting/demounting sleeves on/from a printing cylinder particularly for a rotary printing press according to the invention is described with the aid of the Figures.

Figures 1-1c show an exploded view of a printing cylinder assembly comprising a mandrel 2, a sleeve carrying cylinder 4 integral with the mandrel, a small format sleeve 6 (Figure 1a), a large format sleeve 7 (Figure 1b) and an adapter or intermediate sleeve 8 (Fig. 1c). The sleeve carrying cylinder 4, the sleeves 6 and 7 and the adapter 8 are shown broken off.

As shown also in Figure 2, the mandrel 2 is substantially cylindrical in shape and has a central portion 20 with a larger diameter, a front portion 21 designed to couple with the sleeve carrying cylinder 4 and a rear portion 22 with a smaller diameter.

The terms front and rear used hereunder refer respectively to the left hand side and the right hand side of Figures 1, 1a, 1b, 1c, 1d and 2.

As shown in Figure 1d, the rear portion 22 of the mandrel is rotatably supported by means of ball bearings 23, so that the mandrel can rotate around its own axis. Mounted on the ball bearings 23 are a register 24 at the front for transverse movement and a register 25 at the rear for longitudinal movement.

A cylindrical chamber 26, which has a flared front part 27 open toward the outside, is provided axially in the front portion 21 of the mandrel.

As shown in Figure 2, two longitudinal ducts 28 and 29, parallel to each other and equidistant with respect to the axis of the mandrel, are formed in the mandrel 2. The first longitudinal duct 28 is rectilinear and runs from the rear end of the rear part 22 of the mandrel to the front chamber 26 of the mandrel.

The second duct 29 is substantially L-shaped and has a long longitudinal portion which extends from the rear end of the rear part 22 of the mandrel to a short distance from the front chamber 26 of the mandrel, ending in a transverse portion 30 which opens radially to the outside of the side surface of the front part 21 of the mandrel, at a short distance from the central part 20 of the mandrel. In the side surface of the front part 21 of the mandrel wherein the radial duct 30 opens, an annular slot 36 is formed along a circumference around the side surface of the front part 21 of the mandrel.

Thus the first longitudinal duct 28 is in communication with the front chamber 26 of the mandrel, whilst the second duct 29 does not communicate with the front chamber 26 of the mandrel.

5 As shown in Figure 1, a connector 31 for input of air and/or for creation of vacuum is applied to the rear end of the mandrel 2.

As shown in Figures 3 and 4, the connector 31 is shaped like a cylindrical block and has a pair of tapered holes 32 disposed in diametrically opposite positions to receive a pair of
10 screws 38 (Figure 1), which are screwed longitudinally to the rear end of the mandrel 2 to lock the connector 31.

Moreover, the connector 31 has two threaded holes 33 disposed in diametrically opposite positions and spaced by an angle of about 90° from the holes 32. The threaded holes 33
15 are able to receive the two respective nozzles 34 connected to the pneumatic system of the printing press. The threaded holes 33 communicate with ducts 35 designed to be put in register with the respective ducts 28 and 29 of the mandrel. In this manner compressed air can be supplied in a separate and independent manner into the first duct 28 and into the second duct 29 of the mandrel.

20

Returning to Figure 1, the sleeve carrying cylinder 4 has on its inside and axially a circular chamber 40 open at the front and at the rear. The front part 21 of the mandrel is inserted into the rear part of the chamber 40 of the sleeve carrying cylinder and it is blocked therein by force fitting and by means of a welding line 41 (Figure 1e) performed
25 at the rear end of the sleeve carrying cylinder 4.

In the front part of the circular chamber 40 of the sleeve carrying cylinder, on the other hand, a stopper or cover 5, which engages by force fitting, is inserted. The front end of the cover 5 will be rotatably supported by special supports not shown.

30

Near its rear end the sleeve carrying cylinder 4 has a pin 49 (Figure 1e) which protrudes radially from its side surface, acting as a coupling pin for a coupling system.

As shown also in Figure 8, in register with the slot 36 of the front wall 21 of the mandrel
35 2 radial through holes 42 - preferably eight in number, disposed in diametrically opposite positions and equally spaced from each other by an angle of 45 degrees - are formed in

the sleeve carrying cylinder 4. The holes 42 put the annular slot 36, wherein the transverse duct 30 opens, into communication with the outside of the sleeve carrying cylinder 4.

- 5 In a central position, in the sleeve carrying cylinder 4 there is provided a radial through hole 43 which puts the inner chamber 40 of the sleeve carrying cylinder into communication with the outside.

10 In the front part of the sleeve carrying cylinder 1 radial holes 44 - preferably eight in number, disposed in diametrically opposite positions and equally spaced from each other by an angle of 45 degrees - are formed in proximity to the closing stopper 5.

The small format sleeve 6 comprises a cylindrical coupling, hollow on the inside and having an axial cavity 60 open at the front and at the rear. The sleeve 6 has substantially
15 the same length as the length of the sleeve carrying cylinder 4.

The outside diameter of the sleeve 6 defines the development of the outer side surface, that is to say the format for printing. The outer side surface of the sleeve 6 is shaped or embossed according to the pattern for printing.
20

The inside diameter of the sleeve 6 is substantially equal to or slightly greater than the outside diameter of the sleeve carrying cylinder 4, so that the sleeve 6 can be inserted thereon.

- 25 Moreover, in its inside surface, at one of its ends, the sleeve 6 has a slot 61 able to engage in the radial pin 49 of the sleeve carrying cylinder 4.

With reference to Figure 6, for mounting of the sleeve 6, the user feeds compressed air into the first channel 28 of the mandrel 2; as a result the air passes into the axial chamber
30 40 of the sleeve carrying cylinder through the axial chamber 26 of the mandrel and exits from the central radial hole 43 and from the front end radial holes 44 of the sleeve carrying cylinder 4. At this point the user axially inserts the sleeve 6 on the sleeve carrying cylinder 4, with formation of an air cushion between the outer surface of the sleeve carrying cylinder 4 and the inner surface of the sleeve 6 which facilitates axial
35 sliding of the sleeve 6.

When the sleeve 6 reaches the end of stroke (Figure 6a), the locating pin 49 of the sleeve carrying cylinder engages in the slot 61 of the sleeve 6 causing centring thereof. At this point the air supply into the first duct 28 of the mandrel is interrupted, so that the sleeve 6 adheres firmly to the sleeve carrying cylinder 4 and is ready for use.

5

Similarly, for demounting the sleeve 6 compressed air is supplied again into the first duct 28 of the mandrel so that an air cushion is generated between the outer surface of the sleeve carrying cylinder 4 and the inner surface of the sleeve 6 and then the sleeve 6 is extracted axially.

10

Coming now to Figure 1, reference numeral 7 designates a large format sleeve, that is to say a sleeve having a large outside diameter. The sleeve 7 is hollow on the inside and has an axial chamber 70 open at the front and at the rear. The sleeve 7 also has in its inner surface, at its rear end, a centring slot 71.

15

To save on material and to reduce the thickness of the large format sleeve 7, the inside diameter of the sleeve 7 is considerably greater than the outside diameter of the sleeve carrying cylinder 4. Consequently, the large format sleeve 7 cannot be inserted directly on the sleeve carrying cylinder 4. For this purpose an adapter device or intermediate sleeve 8 is used.

20

The adapter device 8 is shaped like a cylindrical coupling hollow on the inside, having an axial chamber 80 open at the front and at the rear. The inside diameter of the adapter 8 is substantially the same as or slightly greater than the outside diameter of the sleeve carrying cylinder 4, so as to be able to be inserted thereon, whereas the outside diameter of the adapter 8 is substantially equal to or slightly smaller than the inside diameter of the large format sleeve 7, so that the large format sleeve 7 can be inserted thereon.

25

The adapter 8 also has in its rear end a slot 81 disposed in its inner surface and a locating pin (not shown) protruding radially from its outer surface. The slot 81 of the adapter 8 serves for coupling with the pin 49 of the sleeve carrying cylinder and the pin of the adapter 8 serves for coupling with the slot 71 of the large format sleeve 7.

30

The adapter has a longitudinal duct 82, which extends for the most of its length. At its rear end the longitudinal duct 82 communicates with a transverse duct 83 which opens

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radially into the chamber 80 of the adapter 8, exactly in an annular slot 84 formed circumferentially in the inner surface of the adapter 8.

5 In a central position the adapter 8 has a radial hole 88 communicating with the longitudinal duct 82 and with the outside.

As shown also in Figure 5, at its front end the longitudinal duct 82 communicates with an annular duct 85 which follows a circumferential path inside the adapter 6. A plurality of radial ducts 86 which open to the outside branch off radially from the annular duct 85.
10 Eight radial ducts 86 are preferably provided, disposed in diametrically opposite positions and equidistant from each other by an angle of 45 degrees.

Mounting and demounting of the large format sleeve 7 with the aid of the adapter 8 will be described hereunder.
15

With reference to Figure 7, air is fed into the first duct 28 of the mandrel and the adapter 8 is slipped onto the sleeve carrying cylinder 4, in a similar manner to what is described for the insertion of the small format sleeve 6.

20 Then, as shown in Figure 7a, the slot 81 of the adapter engages with the pin 49 of the sleeve carrying cylinder. Subsequently the air is removed from the duct 28 so that the adapter 8 adheres firmly to the sleeve carrying cylinder 4.

It should be noted that in such a situation the rear radial holes 42 of the sleeve carrying cylinder 4 are in register with the annular slot 84 formed in the inner surface of the adapter 8 and communicating with the transverse portion 83 of the longitudinal duct 82 of the adapter.
25

As shown in 7b, at this point pressurised air is fed into the second duct 29 of the mandrel.
30 The pressurised air passes from the longitudinal duct 29 into the portion of transverse duct 30 and then into the annular slot 36 on the outer surface of the mandrel 2.

Then the air passes from the annular slot 36 of the mandrel 2, through the radial ducts 42 of the sleeve carrying cylinder, to the annular slot 84 on the inner surface of the adapter 8. Then the air passes from the annular slot 84 of the adapter 8, through the transverse duct 83, into the longitudinal duct 82 of the adapter 8.
35

Lastly, the air exits to the outside from the longitudinal duct 82 through the central radial hole 88 and, passing through the annular duct 85, exits from the front end holes 86 flowing to the outside. In this manner, when air is fed into the second longitudinal duct 29 of the mandrel, the adapter 8 simulates the same function as the sleeve carrying cylinder 4, expelling air onto its outside surface. Between the outer surface of the sleeve carrying cylinder 4 and the inner surface of the adapter 8, on the other hand, there is no compressed air.

At this point, as shown in Figure 7c, the large format sleeve 7 is inserted on the adapter 8, exploiting the air cushion that is created between the outer surface of the adapter 8 and the inner surface of the large format sleeve 7. When the slot 71 of the sleeve 7 comes into register with the reference pin (not shown) of the adapter, the air is removed from the second duct 29 of the mandrel, obtaining a perfect adherence of the sleeve 7 on the adapter 8.

For demounting of the sleeve 7, it is sufficient to feed pressurised air into the second channel 29 of the mandrel 2, so as to generate an air cushion between the outer surface of the adapter 8 and the inner surface of the sleeve 7. Thus the sleeve 7 is extracted from the adapter 8 without any risk of extracting the adapter 8 from the sleeve carrying cylinder 4, because there is perfect adherence between the outer surface of the sleeve carrying cylinder 4 and the inner surface of the adapter 8 and also because of the absence of a bayonet joint between the adapter and the sleeve carrying cylinder.

Once the sleeve 7 has been extracted, air is fed into the first duct 28 of the mandrel 2 to generate an air channel between the outer surface of the sleeve carrying cylinder 4 and the inner surface of the adapter, so as to be able to proceed with the extraction of the adapter from the sleeve carrying cylinder 4.

Numerous variations and modifications of detail within the reach of a person skilled in the art can be made to the present embodiment of the invention without departing from the scope of the invention as set forth by the appended claims.

CLAIMS

1. A device for mounting/demounting sleeves (6, 7) on/from a printing cylinder, particularly for a rotary printing press, said printing cylinder comprising:

- 5 - a mandrel (2) designed to be rotatably mounted around its own axis on the printing press, and
- a sleeve carrying cylinder (4) integral with the mandrel (2) to support a print format sleeve (6) or an intermediate adapter (8), shaped like a coupling, able to support a sleeve (7) with a large print format,
- 10 said mandrel (2) having at least one air inlet duct (28, 29) communicating with a plurality of holes (43, 44, 42) which pass through the thickness of the sleeve carrying cylinder (4) to allow discharge of air on the outer surface of the sleeve carrying cylinder (4) so as to be able to fit the adapter (8) or a sleeve (6) on said sleeve carrying cylinder (4),
- said intermediate adapter (8) having at least one air passage duct (82) communicating
- 15 with at least one (42) of said holes of the sleeve carrying cylinder and opening on the outer surface of the intermediate adapter (8) so as to be able to fit the large format sleeve (7) on the intermediate adapter (8),
- wherein means are provided which allow air to be supplied selectively:
- only on the outer surface of the sleeve carrying cylinder (4), through the holes (43, 44)
- 20 of the sleeve carrying cylinder not communicating with said at least one duct (82) of the intermediate adapter (8), or
- only on the outer surface of the intermediate adapter (8) through said at least one hole (42) of the sleeve carrying cylinder communicating with said at least one duct (82) of the intermediate adapter (8).

25

2. A device according to claim 1, characterised in that said at least one duct (82) communicates with a plurality of radial holes (88, 86) which pass through the thickness of the intermediate adapter (8).

30 3. A device according to claim 1, characterised in that said means which allow the air to be supplied selectively comprise:

- a first duct (28) formed in the mandrel (2) and communicating with a chamber (40) defined inside said sleeve carrying cylinder in turn communicating with said holes (43, 44) of the sleeve carrying cylinder, and
- 35 - a second duct (29) formed in the mandrel (2), not communicating with the inner chamber (40) of the sleeve carrying cylinder (4) and opening on the outer surface of the

sleeve carrying cylinder (4) to be put into communication with said at least one duct (82) of the adapter (8).

4. A device according to claim 1, characterised in that said mandrel (2) comprises a front part (21) able to engage into one end of the chamber (40) of the sleeve carrying cylinder (4) and a front chamber (26) in said front part (21) communicating with said first duct (28) and opened on the front end to communicate with the chamber (40) of said sleeve carrying cylinder (4).

5. A device according to claim 2, characterised in that said first duct (28) comprises a longitudinal length which extends from the free rear end of the mandrel (2) to said chamber (26) and said second duct (29) comprises a longitudinal length which extends from the free rear end of the mandrel (2) to near to said chamber (26), and a transverse portion (30) opening on an annular slot (36) on the outer side surface of the mandrel, and said sleeve carrying cylinder (4) has a plurality of radial through holes (42) disposed in register with said annular slot (36) of the mandrel.

6. A device according to claim 5, characterised in that said adapter (8) has on its outer surface an annular slot (84) designed to be put in register with said radial through holes (42) of the sleeve carrying cylinder (4) and a transverse duct (83) able to put said annular slot (84) into communication with said duct (82) of the adapter.

7. A device according to any one of the preceding claims, characterised in that said duct (82) of the adapter is disposed longitudinally for the most of the length of the adapter (8) and communicates at its front end with an annular duct (85) in turn communicating with said radial holes (86) opening on the outside of the adapter.

8. A device according to claim 5, characterised in that said radial holes (86) communicating with the annular duct (85) of the adapter (8) are eight in number, disposed in diametrically opposite positions and equally spaced apart by an angle of 45 degrees each other.

9. A device according to any one of the preceding claims, characterised in that in a central position of said adapter there is provided a radial hole (88) communicating with the outside and with said channel (82) of said adapter.

10. A device according to any one of claims from 3 to 8, characterised in that in a central position of said sleeve carrying cylinder (4) there is provided a radial through hole (43) communicating with the chamber (40) and in proximity to the front end of said sleeve carrying cylinder (4) there are provided a plurality of radial through holes (44) communicating with said chamber (40) and disposed in diametrically opposite positions.

11. A device according to any one of claims from 3 to 10, characterised in that it comprises a connector (31) for input/suction of air applied to the rear end of said mandrel (2), said connector (31) comprising a first pair of holes (32) to receive fixing screws and a second pair of threaded holes (33) to be put in register with said first and second duct (28, 29) of the mandrel to receive respective nozzles of the pneumatic system of the machine.

12. A device according to any one of the preceding claims, characterised in that said adapter (8) comprises at its rear end, in its inner surface, a slot (81) able to engage with a respective pin (49) provided at the rear end in the outer surface of said sleeve carrying cylinder (4).

13. A method for mounting/demounting sleeves (6, 7) on/from a printing cylinder, particularly for a rotary printing press, said printing cylinder comprising a mandrel (2) designed to be mounted rotatably around its own axis and a sleeve carrying cylinder (4) integral with the mandrel (2) to support a print format sleeve (6) or an intermediate adapter (8), shaped like a coupling, able to support a sleeve (7) with a large print format, the method comprising the steps of:

- feeding air into said mandrel (2) so that the air passes through thickness of the sleeve carrying cylinder (4) to exit only on the outer surface of the sleeve carrying cylinder (4) so as to be able to fit the intermediate adapter (8) or said sleeve (6) on the sleeve carrying cylinder (4), and
- feeding of air into said mandrel (2) so that the air passes through thickness of the sleeve carrying cylinder (4) and the intermediate adapter (8) so as to be able to fit the sleeve (7) with a large print format on the intermediate adapter (8).

14. A method according to claim 13, characterised in that the feeding of air into said mandrel (2) takes place selectively to allow the air to exit on the outer surface of the sleeve carrying cylinder (4) or on the outer surface of the intermediate adapter (8).

15. A method according to claim 13 or 14, characterised in that said supply of air into the mandrel (2) takes place by feeding air selectively:

- into a first duct (28) of the mandrel to exit on the outer surface of the sleeve carrying cylinder (8), or

5 - into a second duct (29) of the mandrel put in communication with at least one duct (82) of the intermediate adapter (8) to exit on the outer surface of the intermediate adapter.

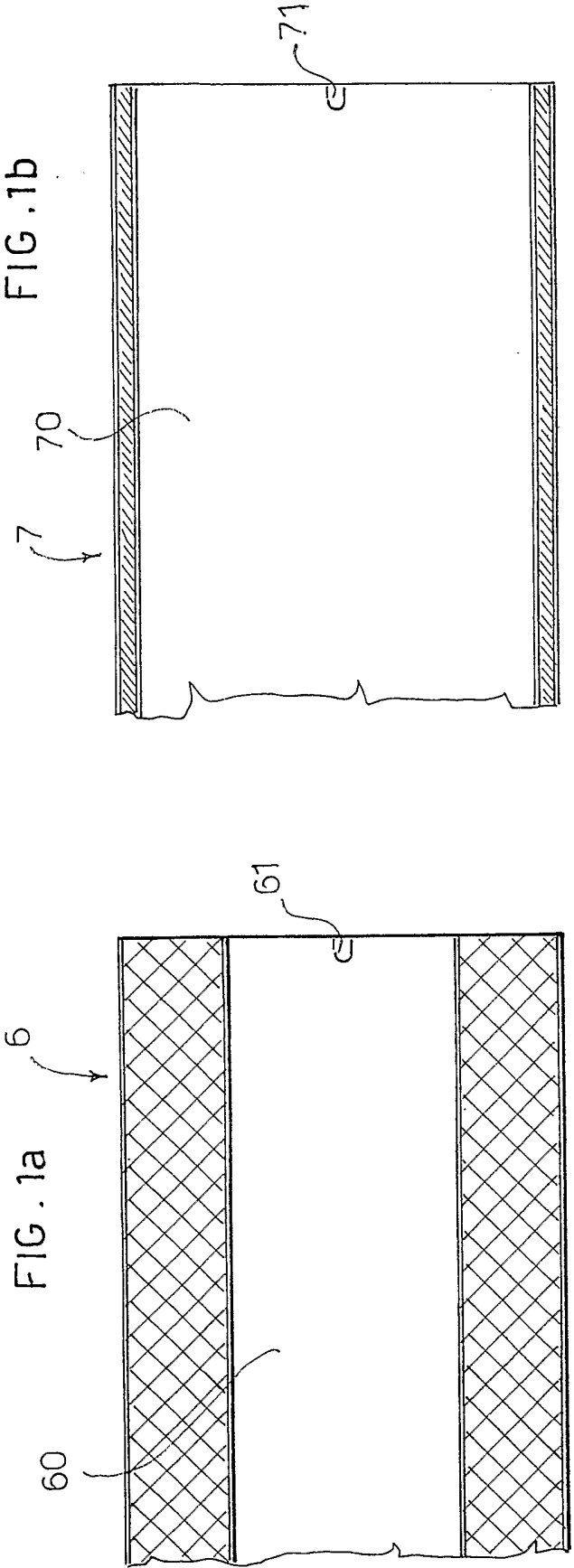
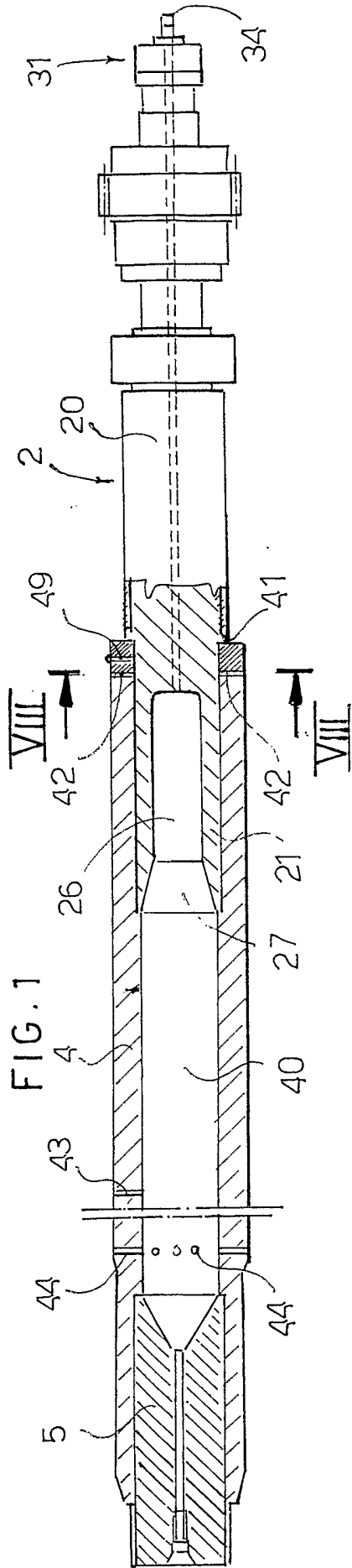


FIG. 1c

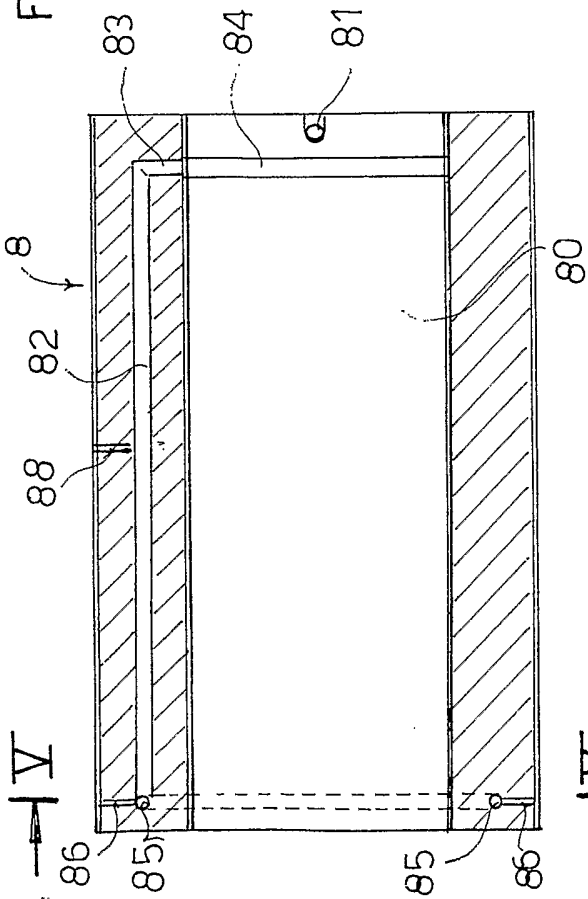


FIG. 1e

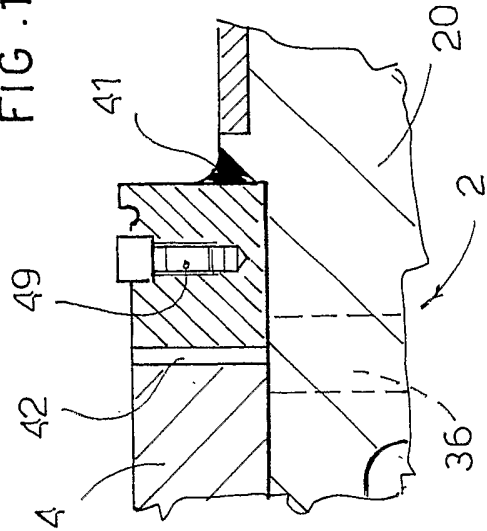
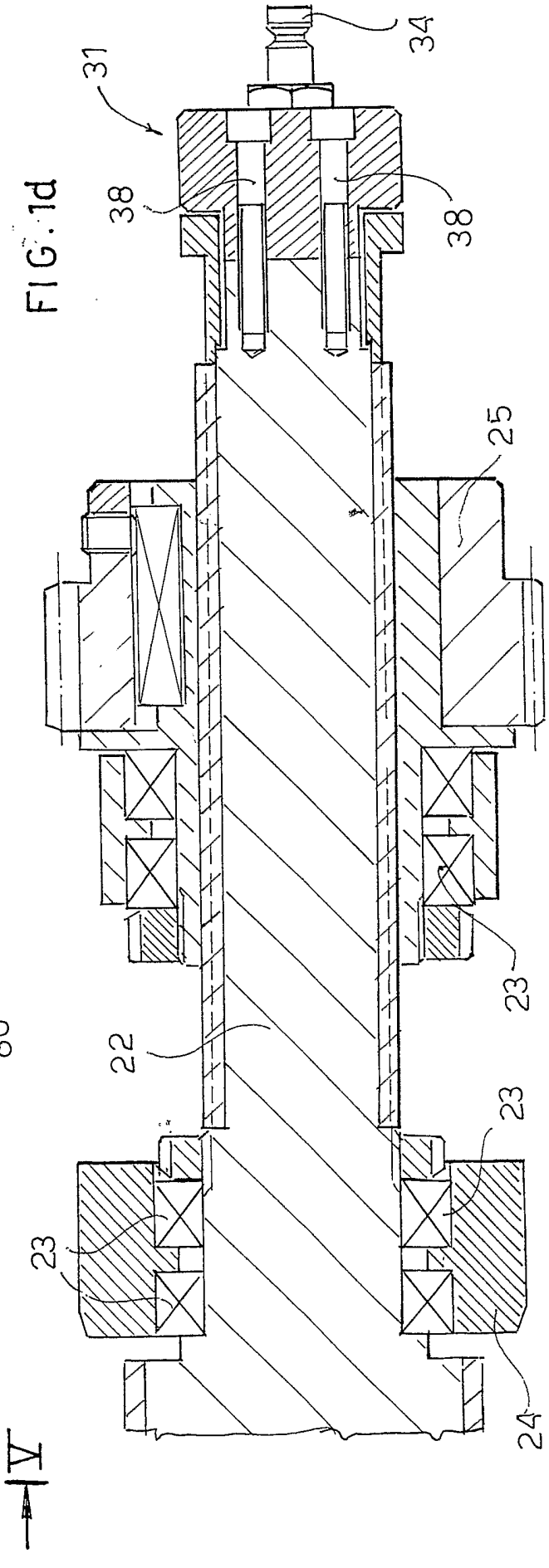
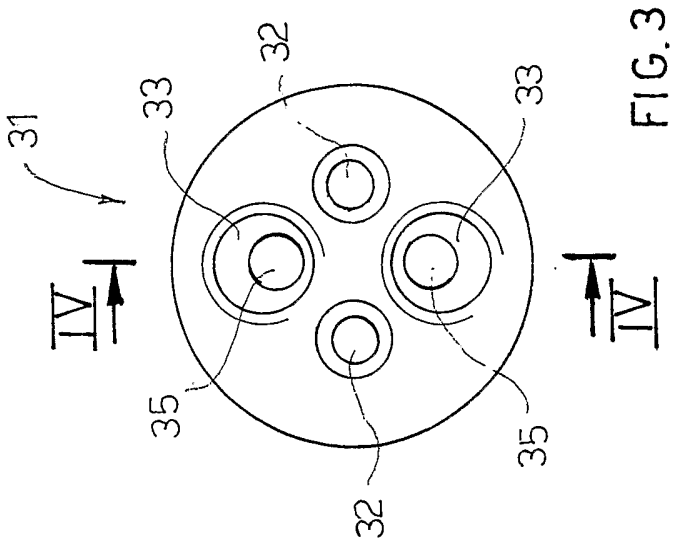
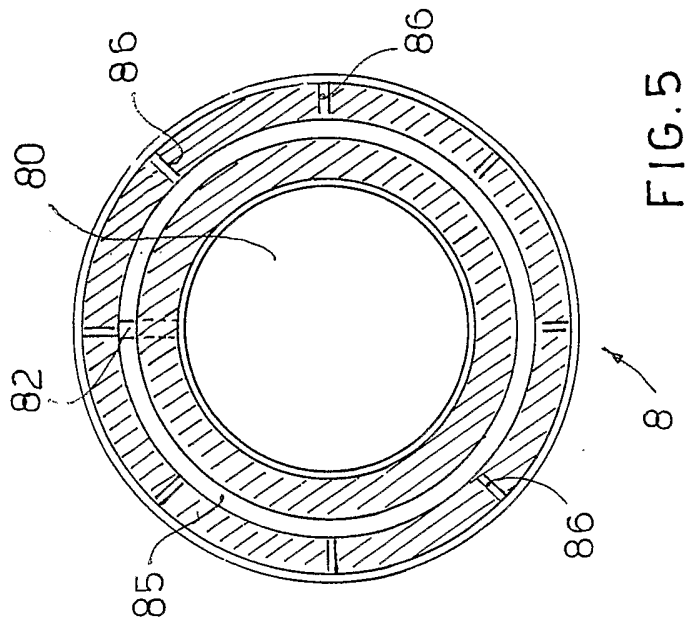
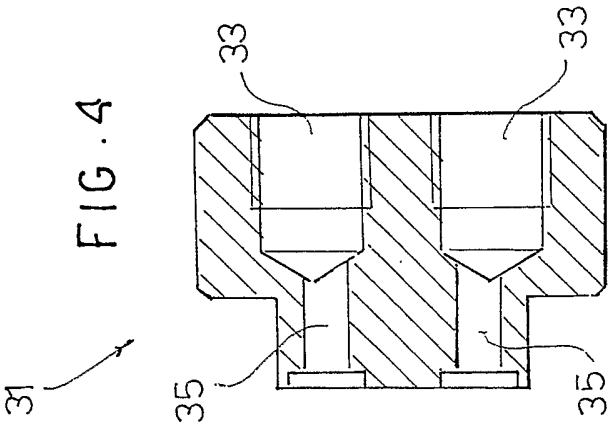
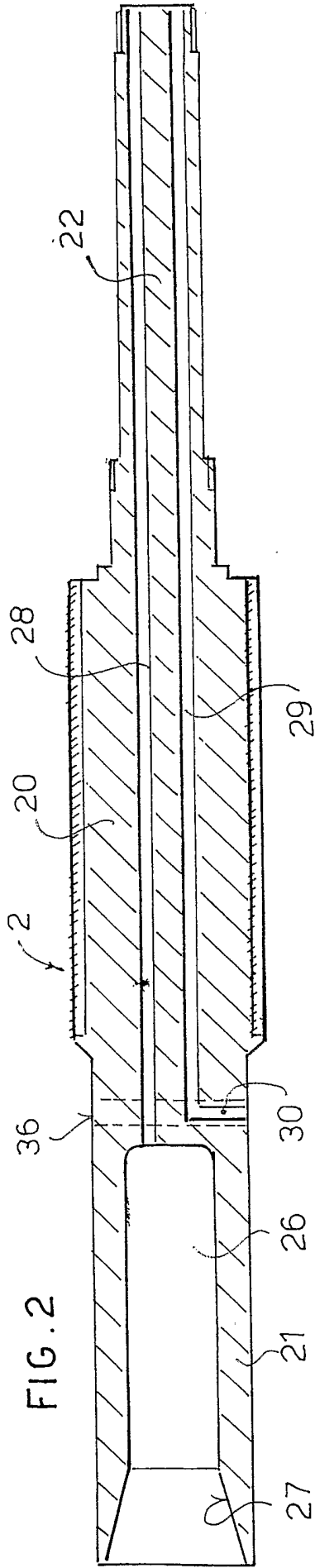


FIG. 1d





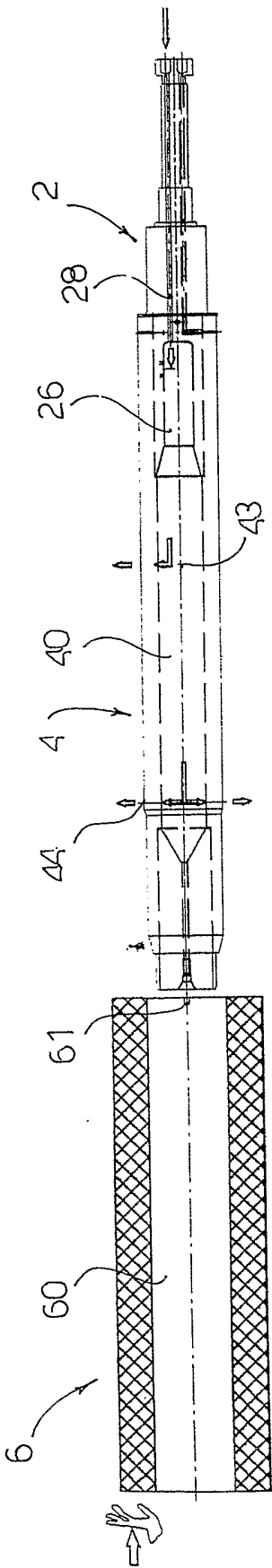


FIG. 6

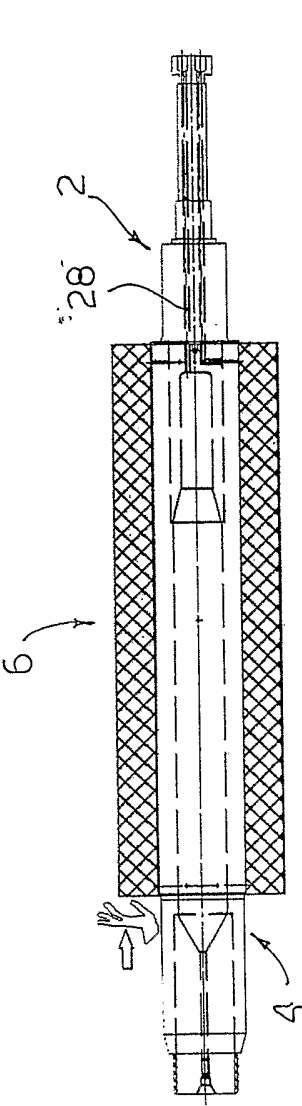


FIG. 6a

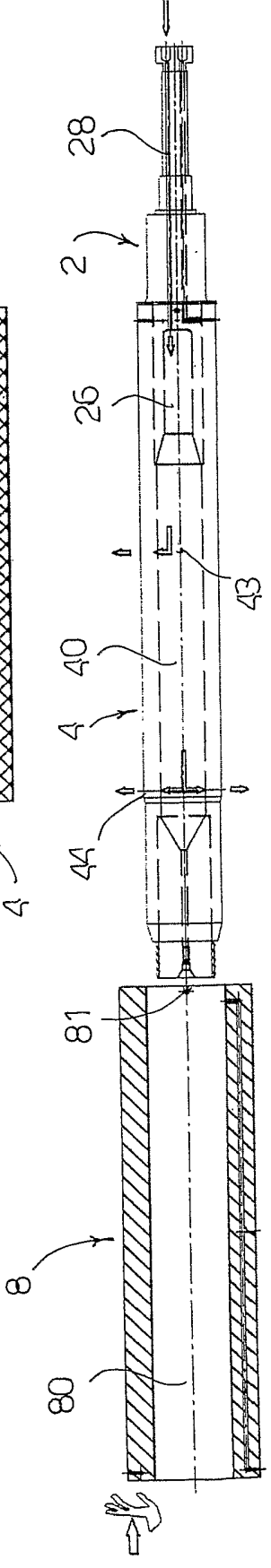


FIG. 7

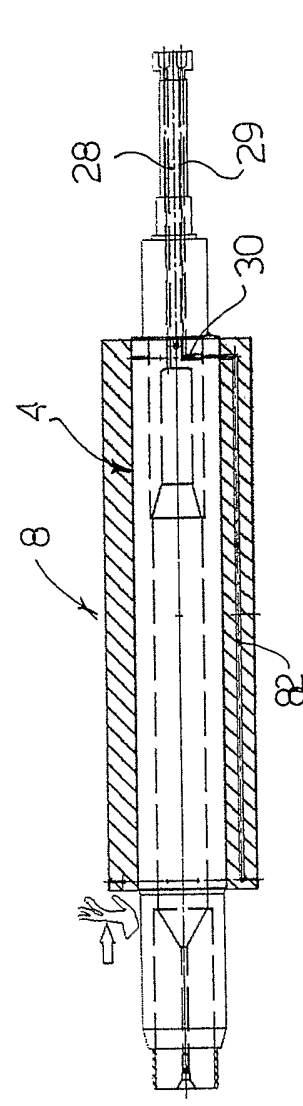
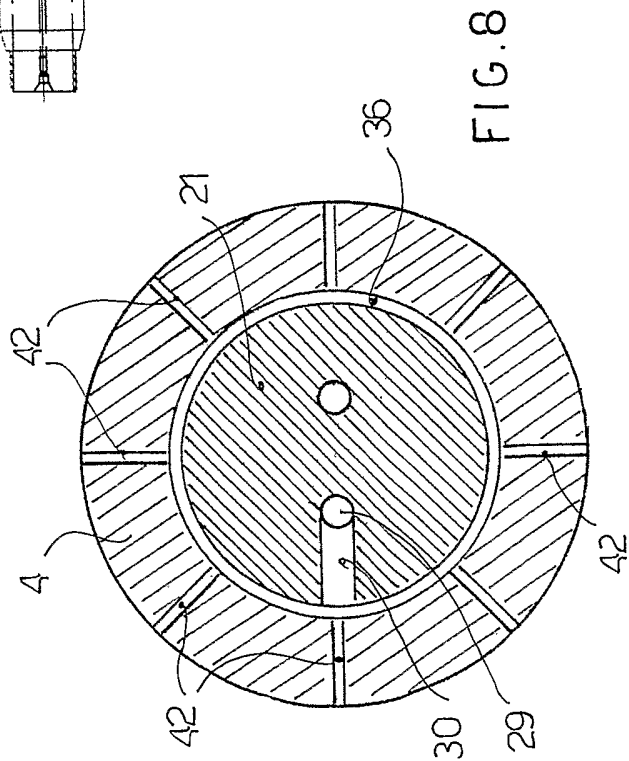
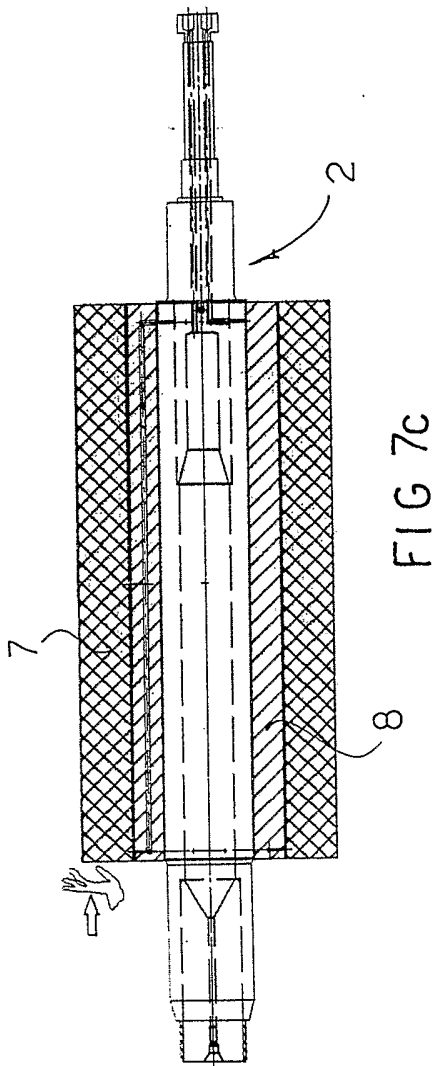
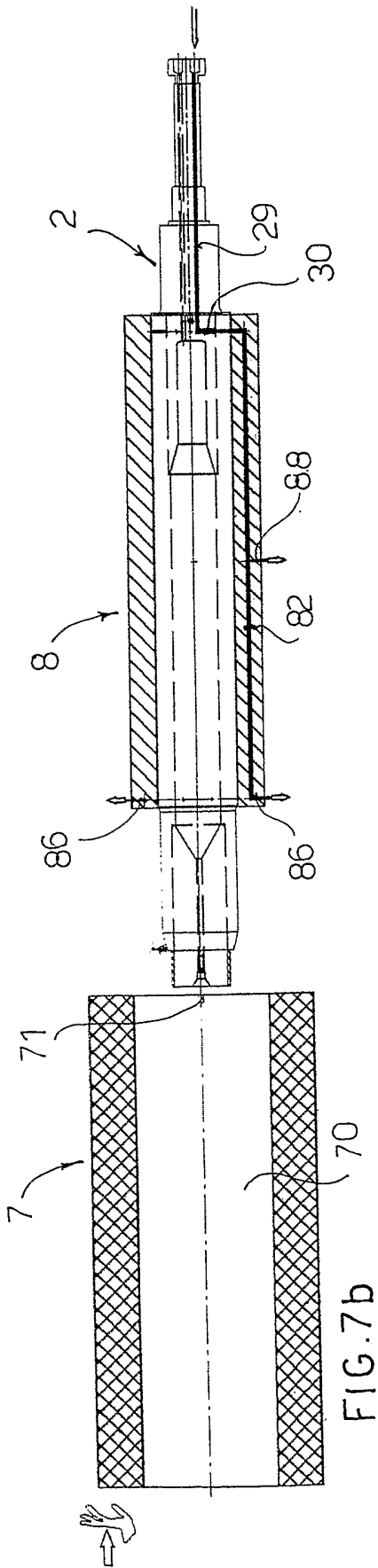


FIG. 7a



INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP 03/08556

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 B41F27/10

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 B41F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 01 89833 A (XYMID) 29 November 2001 (2001-11-29) page 4, paragraph 2 -page 5, paragraph 2; figures 2,3	1
A	EP 0 711 665 A (JEAN FRANCILLE) 15 May 1996 (1996-05-15) the whole document	1

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

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Date of the actual completion of the international search

17 December 2003

Date of mailing of the international search report

30/12/2003

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Authorized officer

Loncke, J

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP 03/08556

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