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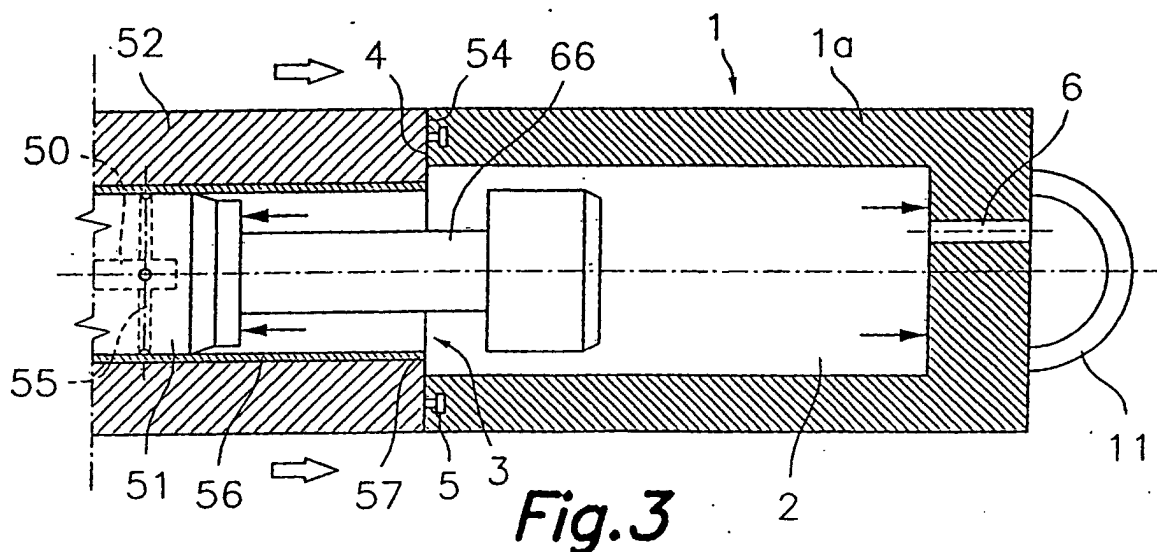
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(54) **DEVICE FOR REMOVING PRINTING CYLINDER SLEEVES**

(57) It can be applied to printing cylinders comprising a shaft (51) on which a liner (52, 53) is mounted, means for fastening such liner on the shaft and pneumatic means to facilitate that the liner slides on the shaft. The device comprises a chamber (2) delimited by a wall (1a) fastened on or forming a part of a end of the liner and by surfaces which pertain to the shaft (51), means

(50, 60) being provided to introduce compressed air in such chamber (2) and the arrangement relative to an internal surface of such wall (1a) and the said surfaces pertaining to the shaft (51) being such that the pressure which impinges on such surfaces generates removal strength components in the sliding direction and in opposite senses on such shaft and on such liner, respectively.



Description

Field of the invention

[0001] This invention refers to a device for removing printing cylinder liners using removing strength components generated by compressed air in a chamber coupled with the liner to be removed. The device foresees the use, at least in part, of already existing pneumatic means to facilitate that the liner slides on the shaft to introduce compressed air in such chamber.

Background of the invention

[0002] The current printing rolls comprise a corelike shaft on which a liner is mounted, means being provided to releasably fasten such liner on the shaft and pneumatic means for facilitating that the liner slides on the shaft to be removed. Such liner is usually an external liner, such as a screening or cliché-holding rollers or an intermediate liner on which such external liner is mounted. The means for fastening the liner on the shaft are usually of two kinds. A first kind comprises expansion bushings associated to the exterior of the shaft ends and mechanically or hydraulically associated to catch or release the liner. Another kind comprises friction means formed by a deformable layer of compressible material associated to the liner cylindric internal wall. In this case, the said pneumatic means to facilitate that the liner slides on the shaft include forming an air bag between such deformable layer and the shaft by injecting compressed air through passageways of the shaft which communicate with a duct existing lengthwise the internal of the shaft and connected by one of its ends to a source of compressed air supply. Most of such passageways are concentrated close to the end of the shaft from which the liner is to be removed and the compressed air of the air bag exhausts to the environment around such end.

[0003] The Spanish application for a patent N° 200001274 by this applicant discloses improvements to the cliché-holding rollers for flexographic machines including means for forming an air bag as above disclosed with the aim of facilitating that the liners slide and therefore are placed and removed.

[0004] Effectively removing the liner is carried out with the assistance of the said air bag, by hand. However, and depending on the factors such as the kind of liner, the time the roller has been in the machine, the presence of ink residues, etc., the hand removing process is hindered and the said air bag is insufficient to be able to easily remove the liner.

[0005] An object of this invention is to contribute with a device for removing liners from printing cylinders, such cylinders being of the kind which comprise means for forming an air bag to facilitate that the liner slides on the shaft or on an intermediate liner, such device being capable to generate, through supplying compressed air, removing strength components in an axial direction and

in opposite senses capable to have the liners sliding on the shaft.

[0006] Another object of this invention is to provide a device of this kind in which the compressed air supply comes from the said means for forming the air bag.

Explanation of the invention

[0007] Above objects are achieved, according to this invention, by providing a device for removing printing cylinders liners, such cylinders being of the kind which comprise a corelike shaft on which the liner is mounted, means being provided for releasable fasten such liner on the shaft and pneumatic means for facilitating that the liner slides on the shaft for its removal. The device essentially comprises a chamber delimited by a wall fastened to or forming part of an end portion of the liner and by surfaces pertaining to the shaft, means being provided to introduce compressed air in such chamber, and the relative arrangement of an internal surface of such wall and of the said surfaces pertaining to the shaft being such that the pressure which impinges on such surfaces generates removing strength components in the liner sliding direction and in opposite senses on such shaft and on such wall fastened to or forming part of the liner, respectively.

[0008] According to an embodiment, the said wall forms a body which defines such chamber, which is open by a mouth. This body can be fastened to the liner by means of a releasable locking device so that such mouth encompasses within its perimeter at least an end of the shaft. Pneumatic means are capable to introduce compressed air in such chamber and with it to generate the said removing strength components. Thus, the effect of the compressed air within the said chamber makes that this later, together with the hollow interior of the liner, acts as a pneumatic cylinder to displace the shaft as a piston.

[0009] The said liner mounted on the shaft can be an external liner, such as a screening or cliché-holding liner, or an intermediate liner on which in turn is mounted such external liner. In the first case, the body which defines the chamber can be fastened to the external liner, while in the second case the body can be fastened either to the intermediate liner or to the external liner, to remove either of them and, in the practice, the device has available a set of two bodies, one suitable for the intermediate liner and the other for the external liner.

[0010] According to an example of embodiment of this invention, the said means to introduce compressed air in the chamber include at least part of the said pneumatic means provided for facilitating that the external or the intermediate liner slides on the shaft. Such pneumatic means are known and comprise a duct arranged within the shaft in a direction lengthwise it connected to a compressed air supply, and first passageways within the shaft which radially communicate such longitudinal duct with a first deformable layer of a compressible material

interposed between the external and the intermediate liner and the shaft, under such first deformable layer an air bag can be created by the effect of the compressed air injected through such duct and passageways which are, most of them, concentrated close to the end of the shaft through which the liner is to be removed, and the compressed air of the air bag exhausts through the said end. The device uses such compressed air escaping from the air bag to fill the chamber thanks to the fact that the chamber mouth has a size sufficient to communicate through it the said end of the air bag with the inside of the chamber.

[0011] To facilitate that the external liner slides on the intermediate liner, known pneumatic means comprise second passageways radially arranged through the intermediate liner, which communicate at least some of such first passageways with a second deformable layer of a compressible material, interposed between the external liner and the intermediate liner, under which second deformable layer a second air bag can be created. In this case, the mouth has the size sufficient to communicate through it an end of such second air bag with the inside of the chamber. According to an alternative construction, the pneumatic means comprise shifts communicating such second passageways with an area of such surface of the end of the intermediate liner comprised within a perimeter of the chamber mouth. In the crossing of the second passageway with such shift, a valve member is arranged which can be changed from a first position, in which the compressed air coming from the longitudinal duct is directed towards the deformable second layer through the second passageways and a second position, in which the compressed air coming from the longitudinal duct is directed towards the chamber through the shift. A tool is provided to carry out such change of position of the valve member, having access to it through corresponding shift from its opening in the surface of the liner end, before coupling the body defined by the chamber. With the valve at the first position and a chamber fastened to the external liner this later would be removed having it sliding on the intermediate liner, while with the valve at the second position and a chamber fastened to the intermediate liner, the intermediate liner would be made sliding on the shaft.

[0012] Another example of embodiment of this invention can be applied to printing rollers in which the means for releasably fastening the external liner or the intermediate liner on the shaft would comprise extensible elements associated to the shaft, mechanically or hydraulically driven and on which the said means for facilitating to slide by means of an air bag are only present between the external liner and the intermediate liner. In this case, the means for introducing compressed air in the chamber of the device of the invention include, at least part of the said pneumatic means for facilitating that the external liner slides on the intermediate liner, which are analogous to those above disclosed to create corresponding air bag. Here also the mouth has a size suffi-

cient for communicating through an end of such air bag with the inside of the chamber to make the external liner slides on the intermediate liner, or the second passageways include shifts and valve members analogous to those above disclosed with which the external liner can selectively slide on the intermediate liner or this later on the shaft.

[0013] In another variation of the embodiment, the surface of the end of the intermediate liner where the body defining the chamber is coupled is a final portion of a cylindric external surface, coaxial to the centerline of the shaft in which holes are opened as outlets from the second passageways, and a corresponding surface of the body, arranged around the mouth is an internal surface facing such cylindric surface of the liner, and it is formed between both surfaces, in the lack of the external liner, a space closed at its external end by sealing means and communicated by its internal end with the chamber through, for example, channels or offsets formed in an annular protuberance of an internal wall of the chamber which is abutting against a end flat surface of the intermediate liner to communicate such space with the chamber.

[0014] The device of this invention also provides an example of embodiment in which the means to introduce compressed air in the chamber are independent from the pneumatic means to facilitate the liners slide with respect to each other or with respect to the shaft. In this case, the chamber comprises an inlet which can communicate directly with a duct connected to a compressed air supply. Optionally such inlet can directly communicate with a duct connected to a compressed air supply. Optionally, such inlet comprises a retaining valve and such duct is finished in a nozzle which can be releasably coupled to the inlet.

[0015] Last, according to another embodiment, such wall delimited by the chamber does not form a detachable body but it is integral with an end of the liner and comprises a hole through which a final configuration of the shaft passes, provided to support and guide it. Between such hole and such final configuration dynamic sealing means are arranged which allow that the wall slides on the final configuration. The means for introducing compressed air in the chamber include at least part of the said pneumatic means to facilitate that the liner slides on the shaft.

Short explanation of the drawings

[0016] These and other characteristics and advantages will be more apparent from following detailed description of specific examples of embodiment with reference to the drawings appended in which:

Fig. 1 to 3 are cross sectional views which show an explanatory sequence of the operation of the device of this invention according to an example of embodiment;

Fig. 4 to 6 are cross sectional views showing variations of the embodiment of Fig. 1 to 3;

Fig. 7 and 8 are cross sectional views showing variations of another example of embodiment of the device of the invention;

Fig. 9 is a cross sectional view showing another additional example of embodiment of the invention; and

Fig. 10 and 11 are cross sectional views showing another additional example of embodiment of the invention in two different positions of operation.

Detailed description of examples of embodiment

[0017] According to this invention, and as it is shown in the figures in general, the removing device can be applied to printing cylinders of the kind comprising, as it is well-known, a corelike shaft 51 on which a liner is mounted, which can be, as it is shown in Fig. 1 to 3, 10 and 11, an external liner 52, or, as it is shown in the remaining figures, an intermediate liner 53 on which such external liner 52 is mounted. The external liner 52 is typically a cliché-holding liner or a screening liner. Such printing cylinders include, as it is also well-known, means provided to releasably fasten such liner on the shaft 51 and pneumatic means to facilitate that the liner slides on the shaft 51 to be removed. For this, the device comprises a body 1 defining a chamber 2 open by a mouth 3 and a surface 4, 4a, 4b which delimits such mouth 3, fully surrounding it. Such body 1 can be fastened to such liner 52, 53 by means of a releasable locking device 5, such as a bayonet lock, so that such surface 4, 4a, 4b remains significantly tight coupled to a corresponding surface 54, 54a, 54b of the liner end 53, 53 and encompassing within the mouth 3 perimeter, an end of the shaft 51. Such chamber 2 of the body 1 is capable of operatively housing a final configuration 66 or shaft 51 gudgeon, provided for supporting and guiding it in the printing machine. Means 50, 55, 60, 65 are provided to introduce compressed air in the chamber 2 and with it generate removing strength components in an axial direction capable of making the liner slides on the shaft 51.

[0018] In the example of embodiment of the device of the invention, disclosed with respect to Fig. 1 to 6, a printing cylinder is applied in which the fastening means of the external liner 52 to the shaft 51 consist in the friction exerted by a deformable layer 56, of a compressible material, associated to a cylindric internal surface of the external liner 52, on the cylindric external surface of the shaft 51. On its hand, the said pneumatic means to facilitate that an external liner 52 slides on the shaft 51 comprise a duct 50 within the shaft 51, in the longitudinal direction thereof, connected to a compressed air supply and first passageways 55 within the shaft 51 which communicate such longitudinal duct 50 with such deformable layer 56. When compressed air is injected through the duct 55 from the opposite end of the shaft 51, an air

bag is created between the deformable layer 56 and the shaft which facilitates their mutual sliding. When there exists an intermediate liner 53, the deformable layer 56 is fastened to the internal surface of the intermediate cylinder 53 while a second deformable layer 59 is fastened to the external cylinder 52 to make contact with the external surface of the intermediate cylinder 53. Second passageways 58 run radially through the intermediate liner 53 to communicate at least some of such first passageways 55 with such second deformable layer 59 under which a second air bag is formed.

[0019] Referring now concretely to Fig. 1 to 3, the device is shown in three consecutive steps of its operation, applied to remove an external cylinder 52 from a shaft 51. In a first step (Fig. 1), the body 1 is brought close to the end of the printing cylinder to be coupled and fastened to the external liner 52. The surface 54 of the end of such external liner 52 on which the body 1 is coupled is a flat annular surface, significantly perpendicular to the shaft 51 centerline and the corresponding surface 4 of the body 1, which is arranged around the mouth 3, is also a flat annular surface. In a second step (Fig. 2), the body 1 is already coupled to the external liner 52 and fastened to it, for example by means of a bayonet lock 5. The mouth 3 has a size sufficient to communicate, in coupling situation, an end 57 of such first air bag with the interior of the chamber 2 through it. Last, in a third step (Fig. 3), the compressed air injected by the opposite end (not shown) of the shaft 51 arrives to the deformable layer 56 through the duct 50 and passageways 55 to form the said air bag between the deformable layer 56 and the shaft 51, and the compressed air exhausts by the end 57 of the air bag to the chamber 2. The pressure within the chamber 2 generates removing strength components shown with solid arrows which combined with the air bag, makes that the external lined 52 joined to the body 1 slides with respect to the shaft 51 in the direction shown by hollow arrows. The removing strength components are proportional to the air pressure in the chamber 2 and the area of the cross section (and, therefore, the diameter) of the shaft 51. Even keeping the supply air pressure constant, the pressure within the chamber 2 can be regulated by means of the variation of the passageways of an exhaust hole 6 provided in the body 1, which communicates the chamber 2 with the external environment. Advantageously, the exhaust hole 6 is located at the axial end of the body 1, close to a handle 11, that an operator can regulate the said passageway of the exhaust hole 6 by means of the finger of a hand seizing such handle 11. By means of the touch sensitivity and the perception of the removing strength it is easy for the operator to accurately carry out such regulation. Alternatively, obturating such exhaust hole 6 can be carried out by hand with the assistance, for example, of an obturating plate (not shown) rotatably or slidably mounted on the body 1.

[0020] Now referring to Fig. 4, an example of embodiment is shown equivalent to that disclosed with respect

to Fig. 1 to 3, but applied to a printing cylinder in which the external liner 52 is mounted on an intermediate liner 53 which in turn is mounted on the shaft 51, the said first and second deformable layers 56, 59 being communicated with the duct 50 through the first and second passageways 55, 58. In this figure, the body 1 is fastened to the intermediate liner 53 so that the chamber 2 receives compressed air from the end 57 of the first air bag and the removing strength generated will make that the assembly of both liners 52, 53 slides on the shaft 51. The air of the second air bag exhausts outside from its end 57a. However, the air of the first air bag, suitably regulated, is sufficient to carry out the removal of the assembly. With a body 1 having a suitable configuration to fasten it on the external liner 52 (not shown) the air can be collected from the ends 57 and 57a of both air bags and thus make that the external liner 52 slides on the intermediate liner 53.

[0021] This possibility can be controlled in a more accurate way by means of the variation shown in Fig. 5 and 6 in which shifts 61 are arranged which communicate such second passageways 58 with an area of the surface 54 of the end of the intermediate liner 53 comprised within the perimeter of the mouth 3 of the chamber 2. In the crossing of each second passageway 58 with its corresponding shift 61 a valve member 62 is arranged which can be changed from a first position, in which the compressed air from the longitudinal duct 50 is directed to the second deformable layer 59 through the second passageway 58 and a second position in which the compressed air from the longitudinal duct 50 is directed to the chamber 2 through the shift 61. In Fig. 5, the body 1 has a surface 54a around the mouth 3 suitable to be fastened to a corresponding surface 54a of the external liner 52 and with the valve member 62 at the said first position, the generated removing strength component will make that the external liner 52 slides on the intermediate liner 53. In the Fig. 6, the body 1 has a suitable configuration to be fastened to the intermediate liner 53 and, with the valve member 62 in the said second position, the generated removing strength component will make that the assembly of the external liner 52 and the intermediate liner slide on the shaft 51 or, in the event that an external liner has been previously removed, the intermediate liner 53 on the shaft 51. To carry out such change of position of such valve member 62, a hand-operated tool (not shown) has been provided capable to have access to it through the corresponding shift 61 from its opening in the surface 54, 54a of the end of such intermediate liner 52.

[0022] In Fig. 7 to 9, another example of embodiment of the device of the invention is shown, applied to a printing cylinder in which such means to releasably fasten the external liner 52 or the intermediate liner 53 on the shaft 51 comprise extensible elements associated to the shaft 51 mechanically or hydraulically driven, for example, expansion hydraulic bushings 51a and in which such means 50, 55 to introduce the compressed air in

the chamber 2 include at least part of such pneumatic means to facilitate that the external liner 52 slides on the intermediate liner 53, which are similar to those disclosed with relation to the example of embodiment of Fig. 4 to 6 for creating the second air bag. The mouth 3 of the chamber 2 could have a size sufficient to communicate through an end 57b of such air bag with the interior of the chamber 2 to receive the compressed air from it (not shown).

[0023] In the variation of the Fig. 7, valve members 62 are shown which can be changed from and to a first and a second positions to selectively direct the compressed air to the deformable layer 59 through passageways 58a or to the chamber 2 through shifts 61a, respectively. The operation is analogous to the disclosed above with relation to the Fig. 5 and 6 and same tool can be used for changing from and to the first and second positions.

[0024] In Fig. 8 a variation is shown in which the surface 54b of the end of such intermediate liner 53 is a end portion of a cylindric external surface, coaxial to the shaft 51 centerline where outlets from the second passageways 58a are open while the surface 4b, which is arranged around the mouth 3, is an internal surface facing such surface 54b, being formed between both surfaces 4b, 54b, in lack of the external liner, a space 9 closed at its external end by sealing means 8, such as a O ring and communicated by its internal end with the chamber 2, for example, through channels or offsets 7 formed on an annular protuberance 10 of the internal wall of the chamber 2 which is abutting against a final flat surface of the intermediate liner 52 for communicating such space 9 with the chamber 2. Locking means are arranged 5 in this annular protuberance and flat final surface. The external liner would have previously removed by means of a body 1 similar to the shown in Fig. 5.

[0025] Last, Fig. 9 shows another example of embodiment applied to a cylinder with expansion hydraulic bushings, although it could also be applied to any kind of cylinder with liners because, in it, the means for introducing compressed air in the chamber 2 are independent of the pneumatic means to facilitate that the liners slide. Thus, in the device of the Fig. 9, the body 1 is analogous to the one disclosed with respect to any of the Fig. 1 to 7, and although it shows it connected to the intermediate liner 53, although it could be fastened to the external liner 52, but they comprise an inlet 65 to the chamber 2 which can communicate with a duct 60 connected to a compressed air supply. Optionally, the said inlet 65 comprises a retaining valve 64 and such duct 60 is ending in a nozzle 63 which can be releasably coupled to the inlet 65 and it can be associated to handles provided with a catch for regulating the compressed air passageway, for example, a gun like (not shown). Alternatively, the connection/disconnection of such inlet 65 to/from such duct 60 can be carried out by means of a quick connector.

[0026] The device according to the examples of embodiment disclosed up to now can be easily automated. For this, such body 1 is mounted at the end of a handling arm (not shown), for example, of the robotic kind, capable to automatically fasten/release it to/from such liner and to control the air exhaust to carry out the removal operation.

[0027] Last, it is referred to Fig. 10 and 11 in which another example of embodiment is shown in which such wall 1a delimiting the chamber 2 is integral with an end of the external liner 52 instead of forming a detachable body 1, as above disclosed. The said wall 1a comprises a hole 67 through which a final configuration 66 of the shaft 51 is passing provided for supporting and guiding it. In the case that this configuration 66, requires a final stop 69, such final stop 69 can be dismountable, for example, by means of a screw device 70. Between such hole 67 and such final configuration 66 dynamic sealing means 68 are arranged, such as an O ring and the like, which prevent that the compressed air exhausts from the chamber while it allows that the wall 1a slides along the configuration 66. In the example illustrated, the means 50 for introducing compressed air in the chamber 2 use, as disclosed with relation to Fig. 1 to 3, the said pneumatic means for facilitating that the liner 52 slides on the shaft 51.

[0028] Fig. 10 shows the device idle, suitable for the rollers carrying out their functions, for example, in a printing machine, while in the Fig. 11 the device is shown operating, in which the compressed air within the chamber 2 generates extraction strengths, stated by the solid arrows, which makes the liner 52 slides joined to the wall 1a with respect to the shaft 51 in the direction stated by hollow arrows. Obviously, the extraction strength will stop when the wall 1a arrives to the end of the configuration 66 and the compressed air exhausts through the hole 67, but an inertia will be created which, combined with the lower coefficient of dynamic friction, will be sufficient to allow that the liner is finished to be removed by hand.

[0029] Although the invention has been described with relation to specific examples of embodiment, these have not a limiting nature but an illustrating purpose and a man of the art would be able to introduce new variations or combine some of the variations disclosed with different kinds of engraving cylinders without being beyond the scope of this invention as defined in the claims appended.

Claims

1. Device for removing printing rollers liners, such printing cylinders being of the kind which comprise a corelike shaft (51) on which a printing liner is mounted, means being provided for releasably fastening such liner on the shaft (51) to be removed, **characterized in that** it comprises a chamber (2)

delimited by a wall (1a) fastened to or forming part of an end portion of the liner and by surfaces pertaining to the shaft (51), means (50, 60) being provided to introduce compressed air in such chamber (2), and the relative arrangement of an internal surface of such wall (1a) and of the said surfaces pertaining to the shaft (51) being such that the pressure which impinges on such surfaces generates removing strength components in the liner sliding direction and in opposite senses on such shaft and on such wall (1a) fastened to or forming part of the liner, respectively.

2. Device according to claim 1, **characterized in that** such wall (1a) delimiting the said chamber (2) forms a body (1) in which the chamber (2) is open by a mouth (3) surrounded by a surface (4, 4a, 4b), such body (1) can be fastened on such liner by means of a releasable lock device (5) with such surface (4, 4a, 4b) coupled significantly tight to a surface (54, 54a, 54b) of the liner end and encompassing within the perimeter of the mouth (3) an end of the shaft (51)

3. Device according to claim 2, **characterized in that** such liner is an external liner (52) or an intermediate liner (53) on which such external liner (52) is mounted, such body (1) can be fastened to such external liner (52) or such intermediate liner (53) with such surface (4, 4a, 4b) coupled significantly tight to a surface (54, 54a, 54b) of the end of it.

4. Device according to claim 3, **characterized in that** such means (50, 55) to introduce compressed air in the chamber (2) include at least part of the said pneumatic means to facilitate that the external liner (52) or intermediate liner (53) slides on the shaft (51) which comprise a duct (50) within the shaft (51), lengthwise the same, connected to a compressed air supply and first passageways (55) within the shaft (51) which communicate such longitudinal duct (50) with a first deformable layer (56) of a compressible material, interposed between the external liner (52) or the intermediate liner (53) and the shaft (51) under which deformable layer (56) a first air bag can be created.

5. Device according to claim 4, **characterized in that** such mouth (3) has a size sufficient to communicate through it a end (57) of the first air bag with the interior of the chamber (2).

6. Device, according to claim 4, **characterized in that** such pneumatic means comprise second passageways (58) through the intermediate liner (53) which communicate at least some of such first passageways (55) with a second deformable layer (59), of a compressible material, interposed between the

external liner (52) and the intermediate liner (53), under which second deformable layer (59) a second air bag can be created.

7. Device, according to claim 6, **characterized in that** the mouth (3) has a size sufficient to communicate through it a end (57a) of such second air bag with the interior of the chamber (2).
8. Device according to claim 6, **characterized in that** it comprises at least a shift (61) which communicates at least one of such second passageways (58) with an area of such surface (54) of the end of the intermediate liner (53) comprised within the perimeter of the mouth (3) of the chamber (2), a valve member (62) being arranged in the crossing of the second passageway (58) with such shift (61) which can be changed from/to a first position, in which the compressed air coming from the longitudinal duct (50) is directed towards the second deformable layer (59) through the second passageway (58) and a second position in which the compressed air coming from the longitudinal duct (50) is directed towards the chamber (2) through the shift (61).
9. Device according to claim 3, **characterized in that** such means for releasably fastening the external liner (52) or intermediate liner (53) on the shaft (51) comprise extendable elements associated to the shaft (51) mechanically or hydraulically driven, and such means (50, 55) to introduce compressed air in the chamber (2) including at least part of such pneumatic means to facilitate that the external liner (52) slides on the intermediate liner (53) which comprise a duct (50) within the shaft (51) lengthwise the same, connected to a compressed air supply and first passageways (55) within the shaft (51) which communicate such longitudinal duct (50) with second passageways (58a) through the intermediate liner (53) communicating with at least some of such first passageways (55) with a deformable layer (59), of a compressible material, interposed between the external liner (52) and the intermediate liner (53), under such deformable layer (59) an air bag can be created.
10. Device according to claim 9, **characterized in that** such mouth (3) has a size sufficient to communicate through an end (57a) of such air bag with the interior of the chamber (2).
11. Device, according to claim 9, **characterized in that** it comprises at least a shift (61) communicating at least one of such second passageways (58a) with an area of such surface (54a) of the end of the intermediate liner (53) comprised within the perimeter of the mouth (3) of the chamber (2), a valve member (62) being arranged in the crossing of the second

passageways (58a) with such shift (61) which can be changed from/to a first position, in which the compressed air coming from the longitudinal duct (50) is directed to the second deformable layer (59) through the second passageways (58a) and a second position in which the compressed air coming from the longitudinal duct (50) is directed to the chamber (2) through the shift (61).

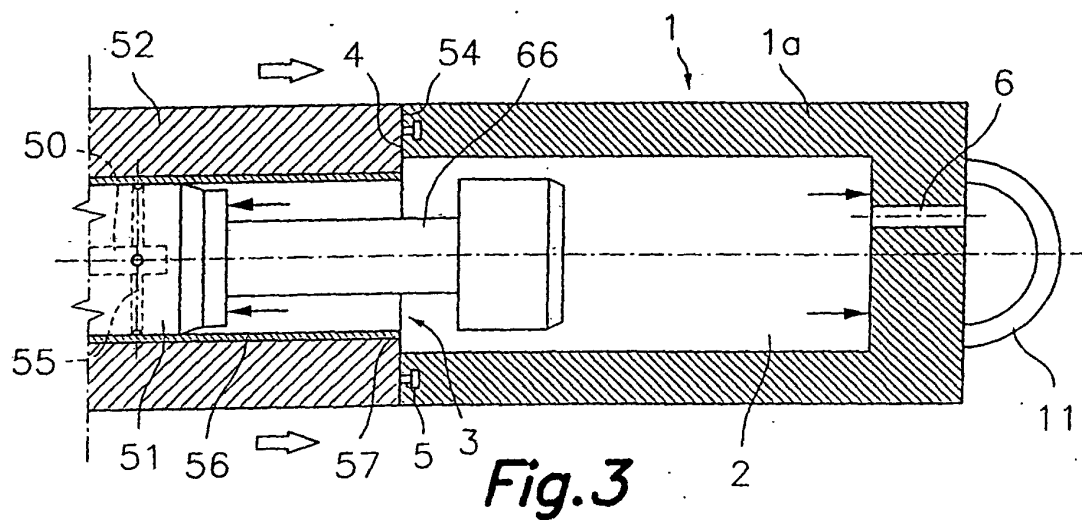
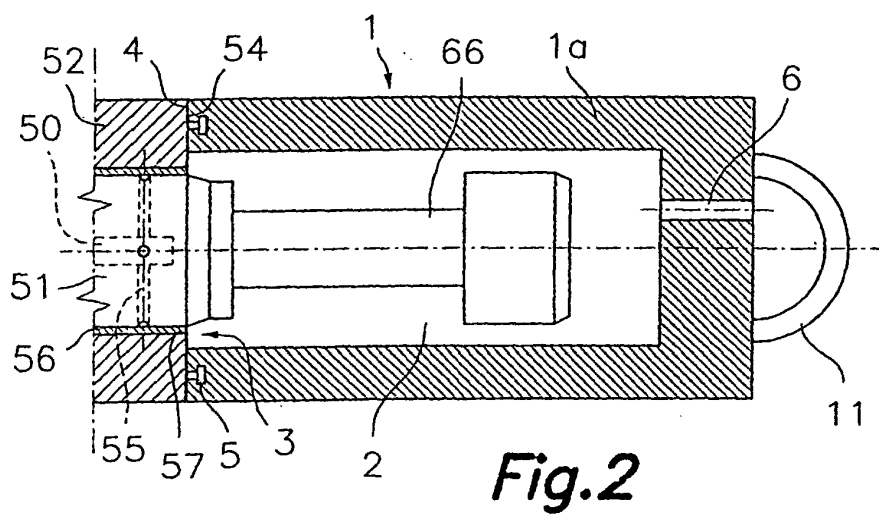
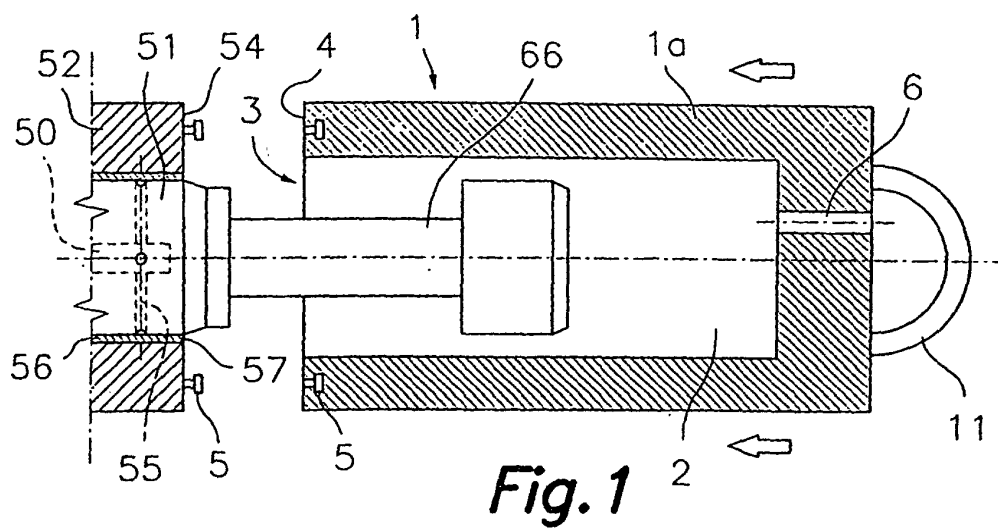
12. Device according to claim 8 or 11, **characterized in that** a tool has been provided to carry out such change of position of the valve member (62), having access to it through corresponding shift (61) from its opening in the surface (54, 54a) of the end of such intermediate liner (52).
13. Device, according to claim 9, **characterized in that** such surface (54b) of the end of such intermediate liner (53) is a end portion of a cylindric external surface, coaxial to the shaft (51) centerline in which outlets are open from the second passageways (58a) and such surface (4b) which is arranged around the mouth (3), is an internal surface facing such surface (54b), a space (9) remaining formed between both surfaces (4b, 54b) in lack of the external liner, which is closed at its external end by sealing means (8) and communicated by its internal end with the chamber (2).
14. Device, according to claim 13, **characterized in that** it comprises channels or offsets (7) formed in an annular protuberance (10) of the body (1) which is abutting against a end flat surface of the intermediate liner (52) to communicate such space (9) with the chamber (2).
15. Device according to claim 3, **characterized in that** such means (60, 65) to introduce compressed air in the chamber (2) comprise an inlet (65) to the chamber (2) in the body (1) which can communicate with a duct (60) connected to a compressed air supply.
16. Device according to claim 15, **characterized in that** such inlet (65) comprises a retaining valve (64) such duct (60) ending in a nozzle (63) which can be releasably coupled to the inlet (65).
17. Device according to claim 16, **characterized in that** such nozzle is associated to a handle provided with a catch for regulating the compressed air passage.
18. Device, according to claim 17, **characterized in that** it comprises a quick connector for connecting/disconnecting such inlet (65) to/from such duct (60).
19. Device, according to any of the claims 1 to 12, **characterized in that** such surface (54) of the end of

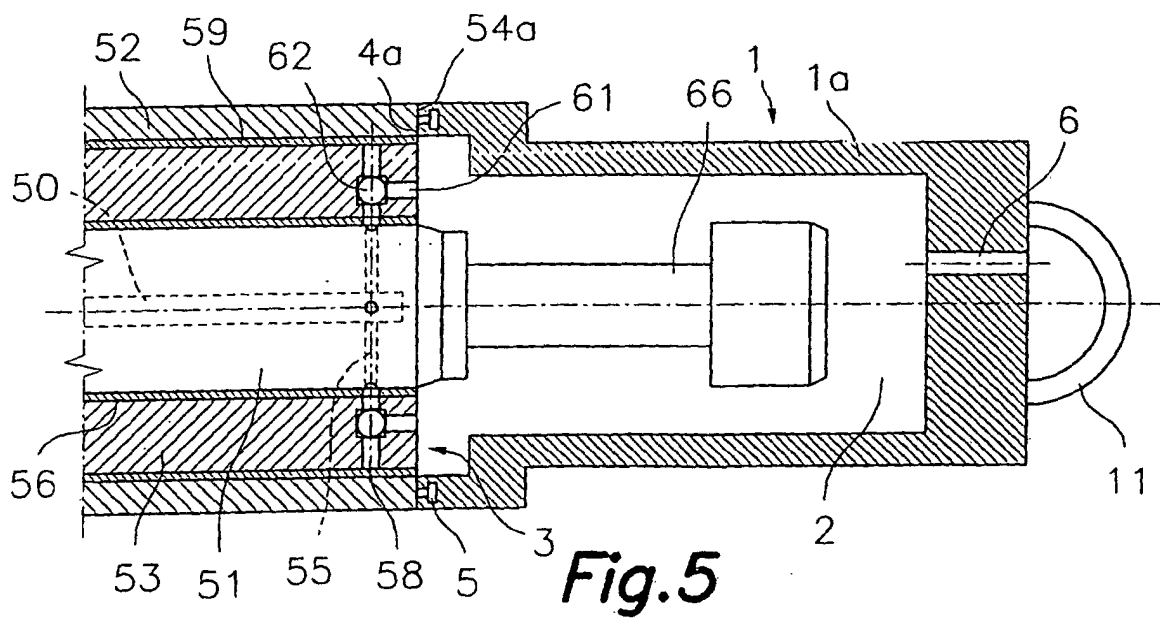
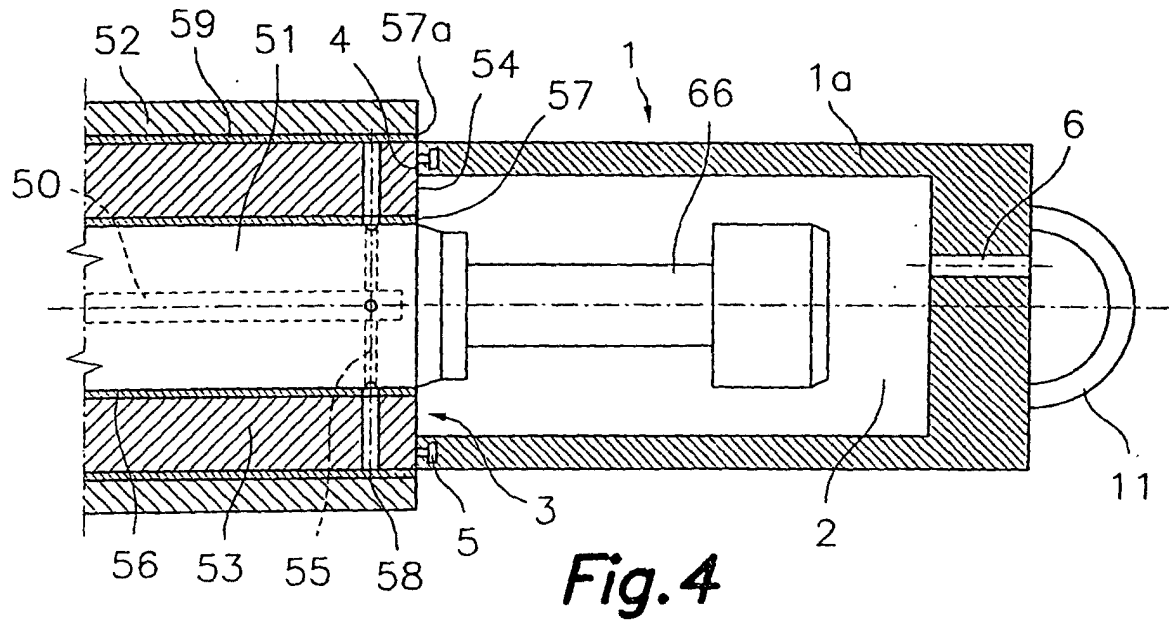
such external liner (52) or intermediate liner (53) is a flat annular surface significantly perpendicular to the shaft (51) centerline and such surface (4) which is arranged, around the mouth (3) is a corresponding flat annular surface.

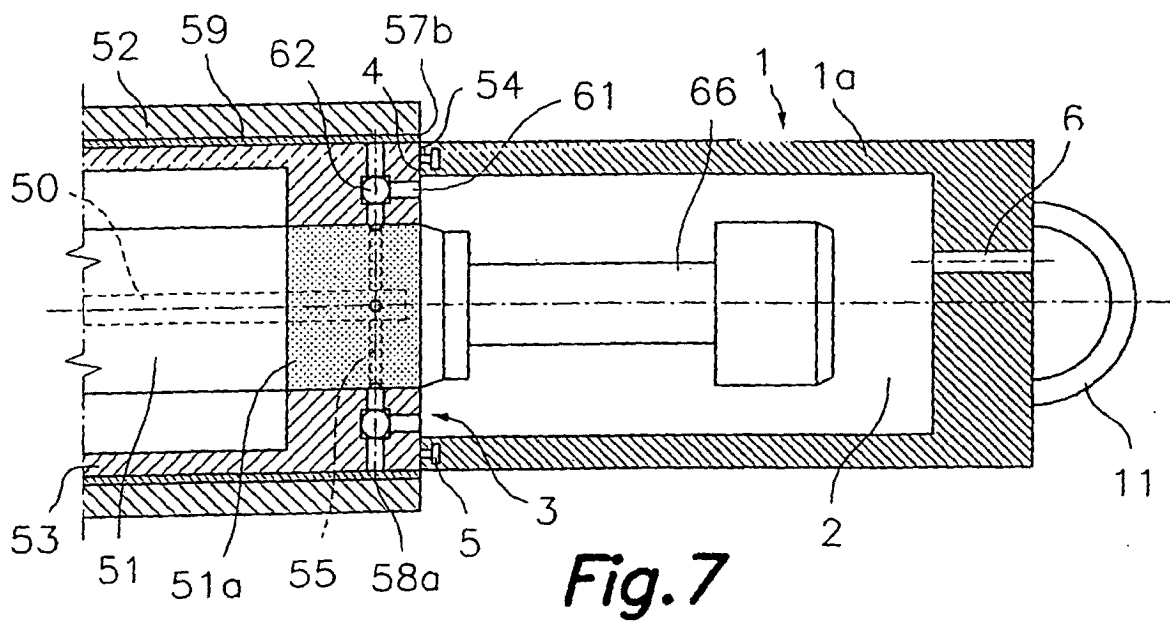
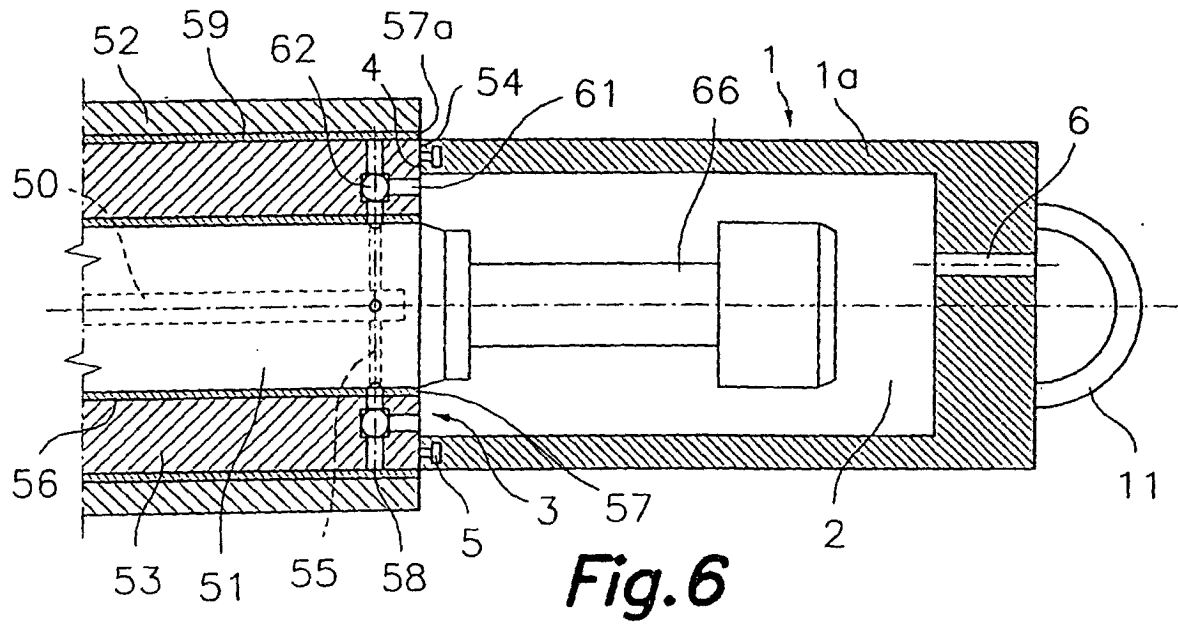
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20. Device, according to any of the preceding claims **characterized in that** such releasable lock device (5) between the body (1) and the external liner (52) or intermediate liner (53) comprises a bayonet lock. 10
21. Device, according to any of the preceding claims, **characterized in that** the chamber (2) of the body (1) can operatively house a final configuration (66) of the shaft (51) provided for supporting and guiding it. 15
22. Device, according to any of the preceding claims, **characterized in that** such body (1) comprises at least an exhaust hole (6) which communicates the chamber (2) with the external environment, the passageway of such exhaust hole (6) can be regulated in order to regulate with it such removal strength. 20
23. Device, according to claim 22, **characterized in that** such exhaust hole (6) is located close to a handle (11) integral with the body (1), the said passageway of the exhaust hole (6) can be hand regulated by touching it with a finger of one hand seizing such handle (11). 25
30
24. Device, according to claim 3, **characterized in that** the said external liner (52) is a cliché-holding or screening liner. 35
25. Device, according to claim 3, **characterized in that** such body (1) is mounted at the end of a handling arm capable of automatically fastening/releasing such liner to carry out the removal operation. 40
26. Device, according to claim 1, **characterized in that** such wall (1a) delimiting the chamber (2) is integral with a end of the liner and comprises a hole (67) through which a final configuration (66) of the shaft (51) passes, provided for supporting and guiding it, dynamic sealing means (68) being provided between such hole (67) and such final configuration (66), such means (50) including , to introduce compressed air in the chamber (2) at least part of the said pneumatic means to facilitate that the liner slides on the shaft (51). 45
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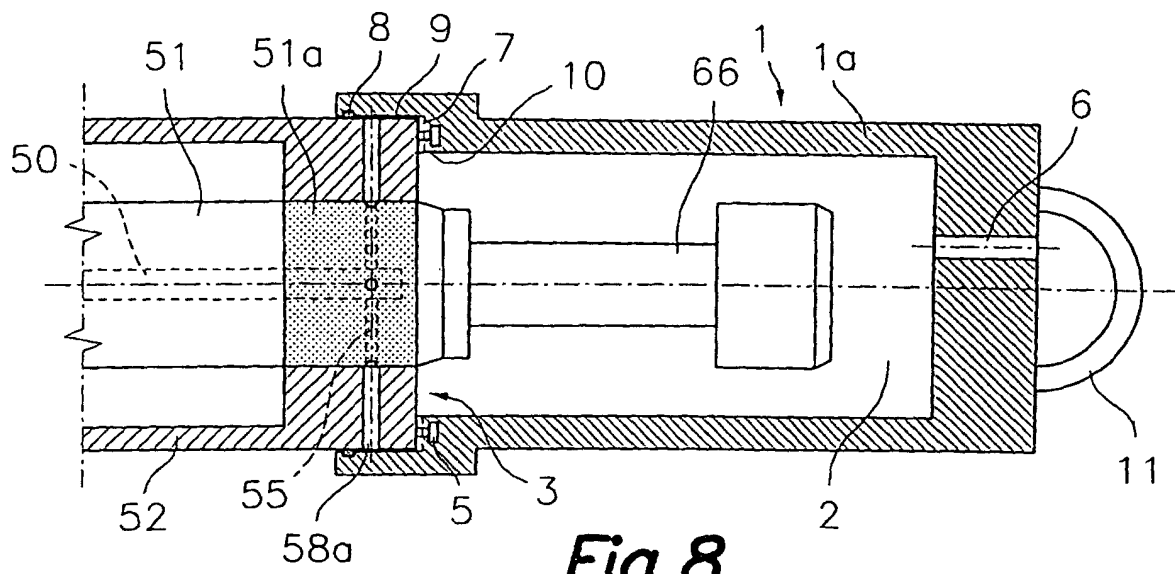


Fig. 8

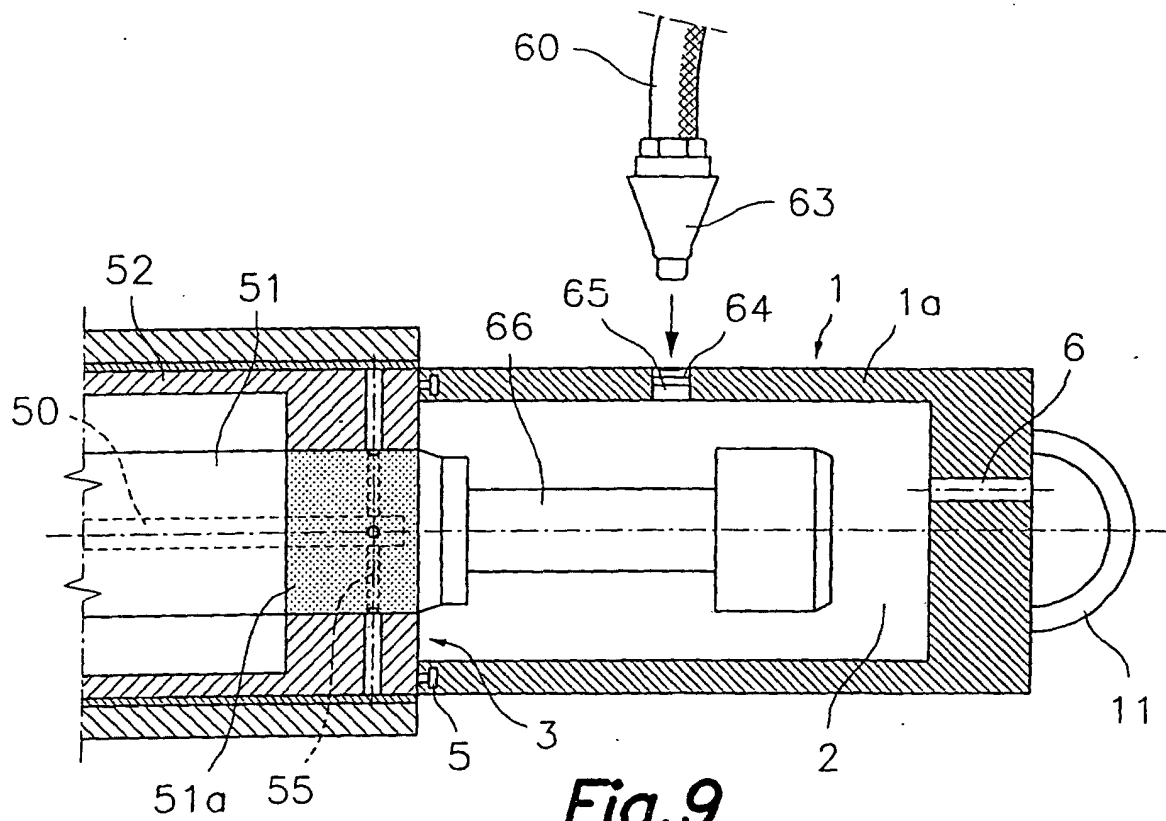
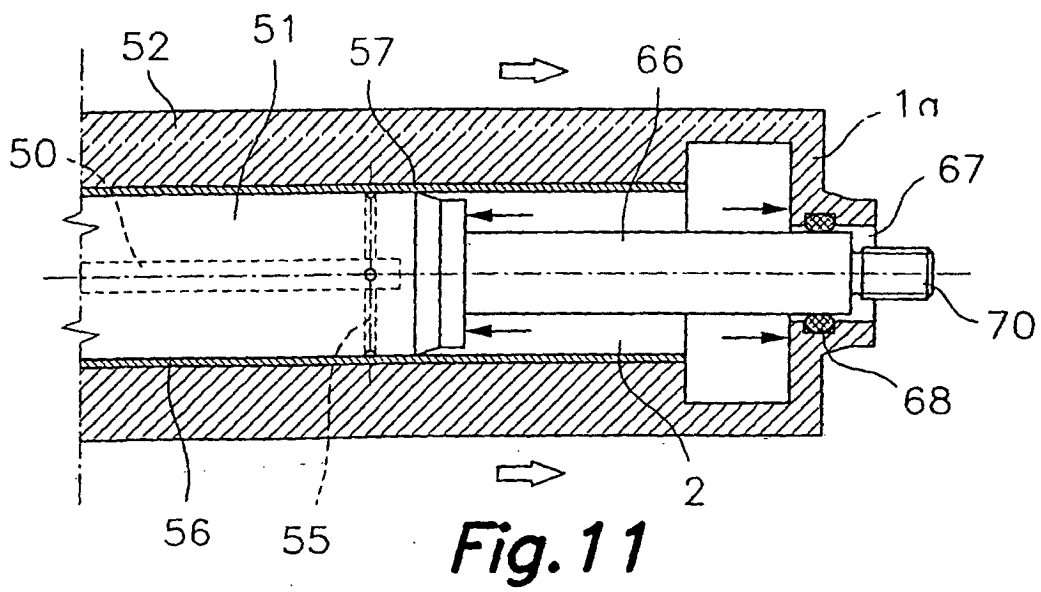
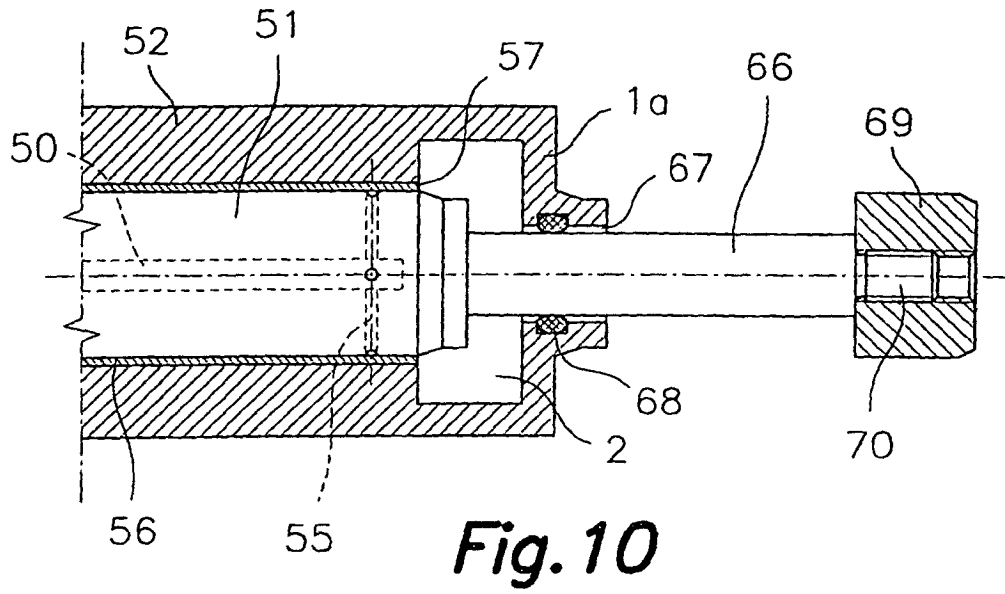


Fig. 9



INTERNATIONAL SEARCH REPORT

International application No.

PCT/ES02/00220

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 B 41 F 13/16, B 41 N 6/00, B 41 L 31/00, 38/00

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 B 41 F+, B 41 L+, B 41 N+

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 practicable, search terms used)

CIBEPAT, EPODOC, WPI, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y A	US 5706731 A (FRANCILLE et al.) 13.01.1998, columns 4 and 5, figures	1-3, 15-19 4-7, 9, 10, 13, 20 8, 11, 14, 21-26
X Y A	US 5904095 A (NELSON) 18.05.1999, columns 3 - 5, figures	1 3-7, 9, 10, 13, 20 8, 14, 24
X Y A	EP 0791477 A2 (PRAXAIR S.T. TECHNOLOGY, INC.) 27.08.1997, column 8 line 41-column 10, line 24, figures	1 3-7, 9 1, 2, 8, 14, 24
X Y A	US 5819657 A (ROSSINI) 13.10.1998, column 5, line 41-column 12, line 45, figures	1 3-7 8, 24
Y A	US 5481975 A (SCHULZ) 09.01.1996, column 4, line 41-column 7, line 11, figures	3-7, 9 1, 2, 8

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

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Date of the actual completion of the international search

17 FEB 2003 (17.02.03)

Date of mailing of the international search report

21 FEB 2003 (21.02.03)

Name and mailing address of the ISA/

S.P.T.O.

Authorized officer

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INTERNATIONAL SEARCH REPORT

International application No. PCT/ES02/00220

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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 Information on patent family members

International Application No

PCT/ES02/00220

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