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(54) Improved lance particularly for steam delivery, and apparatus for cleaning surfaces so obtained

(57) Improved lance, particularly for the steam delivery, and apparatus for the cleaning of surfaces so obtained, of the type consisting of a movable body containing a boiler, as well as a lance, connectable to the first by means of an extension flexible hose provided with a quick connection device and including a pistol on which are provided control means for allowing the delivery of steam jets, characterized in that control means transform a pressure signal into an electric signal that continues when the pressure directly exerted on a membrane persists and stops with the release, alternatively, said pressure, obtaining an electric signal which remains stable up to the following disconnection pressure impulse.

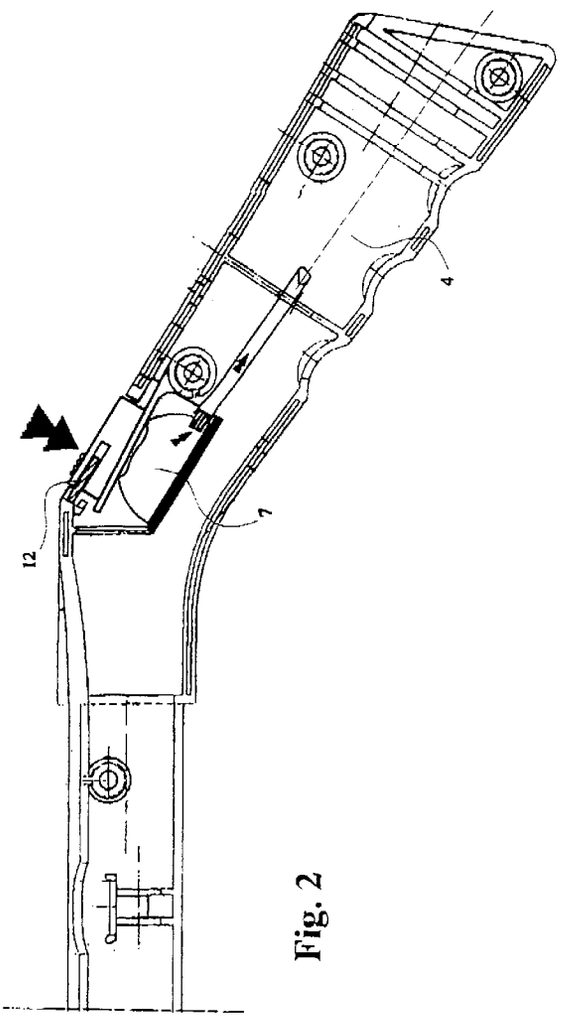

Fig. 2

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Description

This invention has for object an improved lance particularly for steam delivery, and apparatus for the cleaning of surfaces so obtained.

The innovation, finds particular even if not exclusive application in the field of the electric domestic appliances as safety-device for operating the controlled delivery of a steam jet.

Presently, mainly in the field of the electric domestic appliances, are often requested the so called steam appliances, that is those apparatuses, traditionally connectable to the mains, that being provided of a boiler delivery steam on control, to have it delivered on the surfaces by means of suitable extension piping or alternatively allowing the use of other accessories. As logic consequence the attention of the field operators is focused on such apparatuses, quickening a daily search for solutions which are innovative and improving if compared to the ones already existing with the purpose of making the product suitable to the always increasing needs of the user.

A traditional electric domestic appliance, for example, can consist essentially of a steam producing boiler, enclosed on the inside of a covering body, aesthetically pleasant, that contains also its operation controlling electric part, preferably provided with underlying means for facilitating the movement on the ground of the apparatus. Said boiler, on the outside, is additionally provided with a mouth for topping up the liquid, which projecting from said body provides a large closing screw plug. Always on the surface of the body, may be provided some pilot lights that, whether or not lighted, allow to check the condition of the boiler, and if necessary some ON/OFF controls for the activation. Peripherically, said body provides a quick connector for allowing the connection of a flexible hose, of the known type, which ends with a pistol provided with handle, generally anatomical, which in its turn supports the delivery lance, practically made of a stiff extension tube having, on its end, a suitably shaped delivery drawhole. On the handle, only for the user's comfort, are provided remote controls also for the continuous delivery of the steam produced by the corresponding boiler. More in detail, a traditional control device, may consist of a ON/OFF switch of the electric type, placed at the top along the pistol body. Said switch, is electrically connected to the boiler and specifically to a valve, by means of the wire embedded in the same flexible hose that lets the steam in. The latter tube provides, respect to the opposite end of the engagement with the pistol and of the delivery drawhole, a plug which being enclosed into a box for the quick connection of the flexible hose to the apparatus, fits into a corresponding socket, provided on the body.

The drawbacks of the present solution, are soon understood, since the safety factor is practically inexistent. The problem, in synthesis is caused by the constant presence of current near the handle, and therefore being able incidentally to harm the user. Wires and connections, even if safety ones, as the control button, can come naturally in contact with steam and condensate liquid, on one side making more dangerous the use of the apparatus, on the other being subjected to a progressive degradation of the quality of materials because of the high temperatures and of the almost constant presence of liquid. From this may derive, consequently, malfunctions of the apparatus relative to the controls on the handle and to the quick connections, which require frequent maintenance interventions .

A first solution to the above-mentioned problems, consisted in providing the use of low tension current regarding only the activation of the controls existing on the handle. In such case, it was necessary to provide a transformer, placed on the inside of the apparatus body, which besides requiring a particular housing having to be well insulated, involved a certain increasing of the costs, as well as of the apparatus weight and relative dimensions. Characteristics, these latter ones, that do not suit the actual user's needs, also considering the fact that anyway there still remains some electric current on the inside of the handle.

The problem of safety in this kind of apparatuses is so much felt, that some Countries, require to carry out particular tests for issuing the certification, to avoid being excluded from the market. And it is also with this purpose, that an Italian Firm of the field, has recently introduced and developed an apparatus which seems to exclude the presence of electric current near the handle. It is substantially, a cable-winding pawl, which fixed on the handle and largely protruding with a knob to be easily rotated in one direction or in the other, allows the pulling and the contextual release of a cable, probably in nylon. The action of the cable, that runs on the inside of a sheath in the flexible extension, should finally allow the mechanical excitation of a traditional type valve placed on the inside of the apparatus, whether or not allowing the delivery of a steam jet, through a common flexible hose.

Even such a solution, if on one side seems to adequately solve the problem of the presence of current in the handle, on the other brings other problems. Among these, can be noticed a certain difficulty in operating the knob, giving it little handiness, while secondly, because of the critical work conditions, it may be subjected to wearing and jamming, or at least to a progressive stiffening of the opening control. All this means having a complex machine, put on the market at a considerable purchase cost, to which the user must add also that of maintenance.

The aim of this invention is also that to obviate the above-mentioned drawbacks.

This and other aims are reached with this innovation according to the characteristics as in the included claims, by solving the problems presented by means of an improved lance particularly for the steam delivery, and apparatus for the cleaning of surfaces so obtained,

of the type made up of a movable body containing a boiler, as well as a lance, connectable to the first one by means of an extension flexible hose provided with device for the quick connection; and including a handle on which are provided control means for allowing the delivery of steam jets, in which said control means transform a pressure signal into an electric signal that continues when the pressure directly exerted on a membrane persists and stops with the release, alternatively, said pressure, obtaining a stable electric signal up to the following disconnection pressure impulse; consisting essentially of:

- a ON/OFF button , made up of an oscillating lever, projecting from the pistol, and provided with locking device for a stable signal;
- a membrane, of the pneumatic or hydraulic type, housed on the inside of the pistol, on whose surface can be directly positioned the ON/OFF button;
- a capillary, preferably internal to the extension flexible hose, which on one side is connected to said membrane, on the other side is ending with a male connection, integral with the device for the quick connection of the flexible hose to the boiler;
- a pressure switch, enclosed in the apparatus, as signal to the valve for the delivery of the steam jet, which provides external means for the sealing connection of the quick connection as terminal of said corresponding capillary.

In such way, through the considerable inventive contribution whose effect consists of an immediate technical progress are achieved different advantages. First of all, during the use, it is possible to obtain maximum safety conditions for the user, as in the handle there are not electric parts that can somehow interfere with the limbs. Secondly, the particularity of the device, offers fair guarantees of effectiveness, improving on the whole its functionality and operating simplicity, and consequently, making less frequent the maintenance interventions. Finally, also by the structural point of view, the device appears much less complex than the previous ones, being reproducible at industrial level with a good quality-price ratio.

These, and other advantages will appear from the following detailed description of a preferred embodiment solution with the help of the enclosed schematic drawings whose details are not to be considered limitative but only illustrative. Figure 1., represents a sectional view of a half-shell of a handle for the delivery of steam jets, whose push button is in a static condition.

Figure 2., is again a section view of the same handle as in previous Figure, but whose push button is shown in a condition different from the previous one, in this case of a dynamical type.

Figure 3. is a total view referring to the connection of a flexible hose to the corresponding capillary coming from the handle, with the respective apparatus on the ground provided with boiler for steam generation.

Figure 4. represents in particular the connection of a capillary coming from the handle, with a pressure switch associated in the steam generating apparatus.

Figure 5. represents a view, partially in section, of the same connection as in Figure 4.

Figure 6. is an exploded view of the components that make up the connection of a connecting capillary coming from the handle, as in Figures 4. and 5., with the respective steam generating apparatus.

Finally, Figure 7. represents a front view of the male connection, associated on the capillary end, on the part opposite to the handle. Also referring to the figures, it can be noticed in the first place that an apparatus (A) for generating steam, is provided essentially of a boiler (1) traditionally supplied by the mains, and of relative operating controls, placed on the body. As a rule, from said boiler projects at least one tubule intercepted by a valve (2) that regulates the steam inflow in the following flexible hose (3), which leads to a suitable pistol (4) downwards provided also of at least one delivery drawhole. Typical characteristic of the flexible hose (3) is that of allowing the connection and viceversa to the apparatus (1) placed on the ground, whenever needed, by means of an end (3') provided with suitable quick connection means.

On the inside of said flexible hose (3) that conducts the steam flow towards the delivery pistol (4), is provided a capillary (5) that projects from said pistol (4) provided with anatomical handle, until reaching the apparatus on the ground (1). More in detail, the pistol (4) is of the type consisting of two half-shells, of which at least one provides the making of a seat (6), essentially made up of retaining walls, and on whose inside is housed a membrane (7) preferably of the pneumatic type but not excluding the hydraulic alternative. Said membrane (7), rests firmly on a base surface (6'), and preferably consists of a hemispherical bubble in PVC, to which is connected the opposite end (5') of the capillary (5). Above the seat (6) and the corresponding membrane (7) is obtained in said pistol (4), an opening (10), able to house a push button (8) of the type supported by a lever arm (8') having as fulcrum a nearby pin (9).

The body, in the hypothesis a parallelepiped, of the push button (8) is rather large to provide on the upper part (8") a suitable surface on which to exert a slight pressure with the fingers. A slider (11), with the knurled surface is provided on the upper part of the push button (8), for allowing a slide (12) to make a longitudinal movement, and in such a case to come out from the push button (8), where is obtained the corresponding seat. Such condition appears particularly advantageous, wherever there is a need for a constant operation of the push button (8), in place of the traditional impulses. More in detail, in Figure 2. it's better shown the mentioned situation, consequently the push button (8) that will be in a lowered position, compresses, being provided with an underlying flat surface, also constantly the

upper part of the membrane (7). The push button (8) position of stability, is obtained by acting on the slider (11) that determines the movement of the slide (12) disposing itself underneath the top plane of the pistol. The slide end (12) thus protruding, is therefore placed in line with a holding tooth (13) obtained from the same pistol (4).

In a dynamical condition, the push button (8), positioned on the bubble membrane (7), determines a displacement of the fluid from this latter towards the capillary (5). To this latter, on the opposite end (5") is connected, by means of suitable quick connector, a pressure switch (14), said pressure switch being enclosed in the apparatus (1) that provides for the steam generation. The pressure switch (14), measuring a pressure variation emits a signal to the valve (2) that regulates the emission of the steam flow from the boiler towards the flexible hose (3), viceversa said valve (2), not receiving any signal remains in closed position.

A particularity, consists of the end (3') for the quick and complete connection, to the apparatus (1), both of the flexible hose (3) and of the capillary (5). More in detail said end (3') provides at least one leading end (15), made up of an essentially cylindrical body, which on one side (15') engages the end (5") of the capillary (5), on the other includes monolithically a male connection (16), suitable to be inserted on the inside of a reduction element (17) housed by joint coaxially to a cylindrical seat (14') obtained in the pressure switch (14). The reduction element (17) thus being interposed, consists mainly of a cylindrical body, internally provided of a sealing gasket (17'), from which project two opposite tongues (17"), elastically yielding, and each provided on the end of a corresponding hook. These tongues, in joining the leading end (15) of the capillary (5), to the end (14') of the pressure switch (14), yield, in correspondence of openings (18'), respectively two diametrically opposite ones, obtained peripherally respect to a disc (18) integral with the male connection (16), until they pass over these same ones, therefore, once released, tending to diverge and therefore to be fixed.

Claims

1. Improved lance, particularly for the steam delivery, and apparatus for the cleaning of surfaces so obtained, of the type consisting of a movable body containing a boiler (1), as well as a lance, connectable to the first by means of an extension flexible hose (3) provided with a quick connection device (3') and including a pistol (4) on which are provided control means for allowing the delivery of steam jets, characterized in that control means (8) transform a pressure signal into an electric signal that continues when the pressure directly exerted on a membrane persists (7) and stops with the release, alternatively, said pressure, obtaining an electric signal which remains stable up to the following disconnection pressure impulse.

2. Lance and apparatus for improved steam generation, according to claim 1., characterized in that they comprise:

   - a ON/OFF button (8), made up of an oscillating lever (8'), projecting from the delivery pistol, and provided with locking device for a stable signal;
   - a membrane (7), of the pneumatic or hydraulic type, housed on the inside of the pistol, on whose surface can be directly positioned the ON/OFF button (8);
   - a capillary (5), preferably internal to the extension flexible hose (3), which on one side (5') is connected to said membrane, on the other (5") is ending with a male connection (15-16), integral with the device for the quick connection (3') of the flexible hose to the boiler;
   - a pressure switch (14), enclosed in the apparatus (1), for the steam jet delivery valve, which provides external means for a sealing connection of the quick connection (16) as ending part of said corresponding capillary (5).

3. Lance and apparatus for improved steam generation, according to claims 1. and 2., characterized in that a delivery pistol (4), is of the type obtained by at least two half-shells, of which at least one provides the realization of a seat (6), essentially made up of retaining walls, and on whose inside is housed a membrane (7); said membrane (7), resting steadily on a base surface (6').

4. Lance and apparatus for improved steam generation, according to the previous claims, characterized in that a membrane (7) consists preferably of a hemispherical bubble in PVC, to which is connected the end (5') of a capillary (5) inserted into the pistol (4).

5. Lance and apparatus for improved steam generation, according to the previous claims, characterized in that above the seat (6) and the membrane (7) thus housed is obtained in said pistol (4), an opening (10), containing a push button (8) of the type supported by a lever arm (8') having as fulcrum an adjacent pin (9).

6. Lance and apparatus for improved steam generation, according to the previous claims, characterized in that on the inside of the flexible hose (3) that conducts the steam flow towards the delivery pistol (4), is provided a capillary (5) that projects from said pistol (4), up to the apparatus (1).

7. Lance and apparatus for improved steam generation, according to the previous claims, characterized in that the push button (8) provides a knurled slider (11), associated to a longitudinally movable slide (12), being obtained on its inside.

8. Lance and apparatus for improved steam generation, according to the previous claims, characterized in that the end of the slide (12) at stroke end, is placed on line with a holding tooth (13) obtained from the pistol itself (4).

9. Lance and apparatus for improved steam generation, according to the previous claims, characterized in that the end (5") of the capillary opposite to the leading end (5') connected to the membrane (7) is connected, by suitable quick connector, to a pressure switch (14), said pressure switch being enclosed in the apparatus (1) that provides for the steam generation.

10. Lance and apparatus for improved steam generation, according to the previous claims, characterized in that an end (3'), for connecting the flexible hose (3) to the apparatus (1), provides at least one leading end (15), which on one side (15') engages the end (5") of the capillary (5), on the other includes monolithically a male connection (16), suitable to be inserted on the inside of a reduction element (17).

11. Lance and apparatus for improved steam generation, according to the previous claims, characterized in that the reduction element (17) is coaxially received by joining to a cylindrical seat (14') obtained in the pressure switch (14).

12. Lance and apparatus for improved steam generation, according to the previous claim, characterized in that the reduction element (17) includes a cylindrical body, internally provided of a sealing gasket (17'), from which project two opposite tongues (17"), elastically yielding , and each provided of a corresponding hook on the end.

13. Lance and apparatus for improved steam generation, according to the previous claims, characterized in that the opposite tongues (17"), are inserted in corresponding openings (18'), passing over these same, respectively two diametrically opposite ones, obtained peripherally respect to a disc (18) integral with the male connection (16).

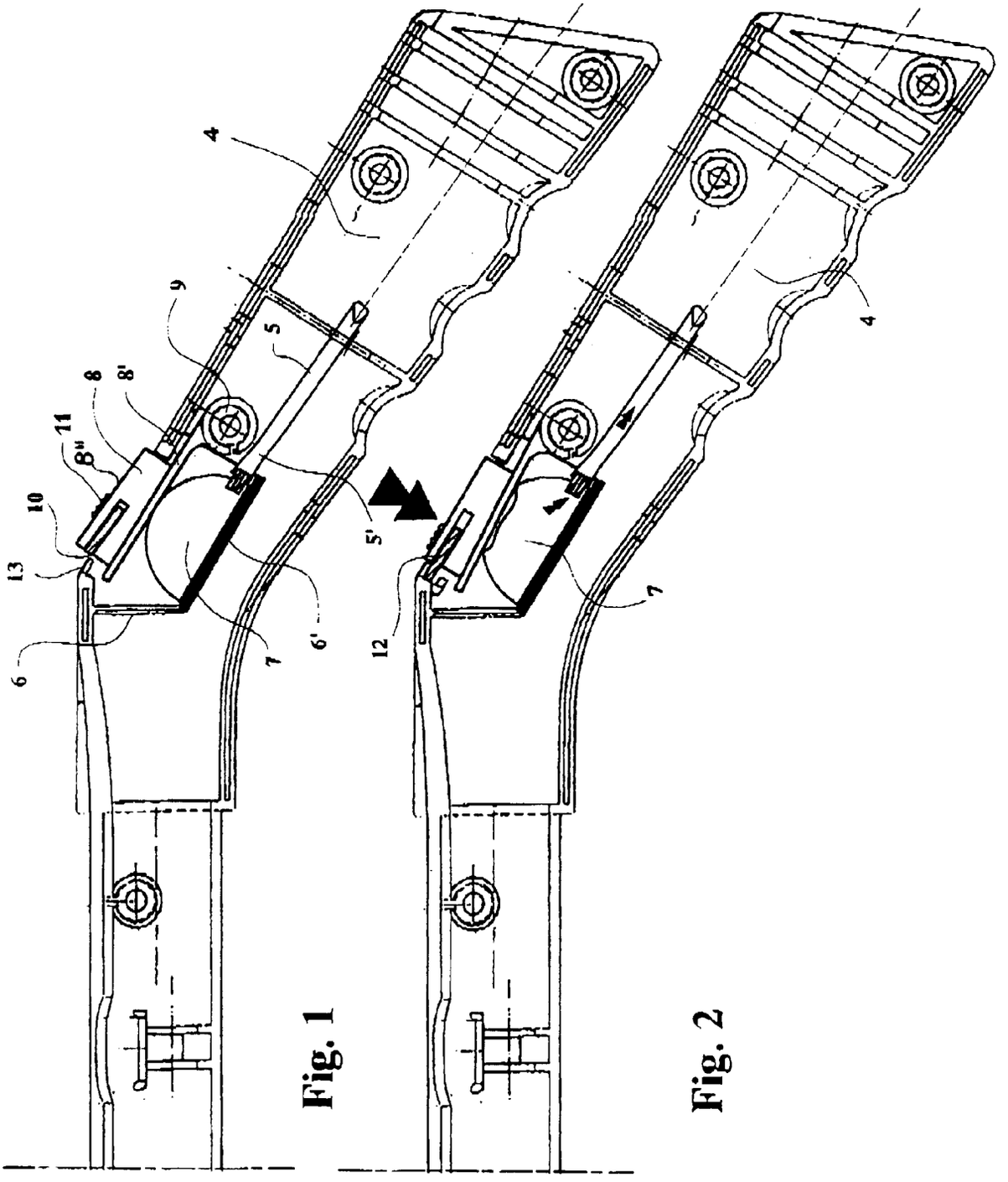

Fig. 1

Fig. 2

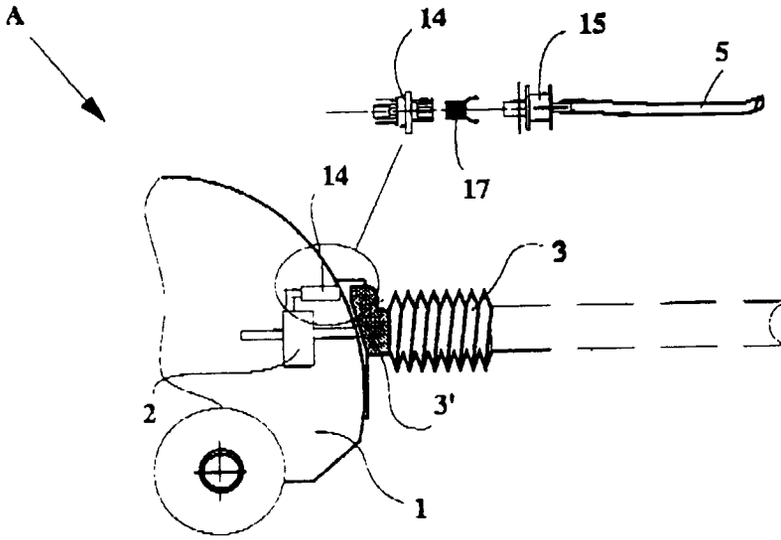

Fig. 6

Fig. 3

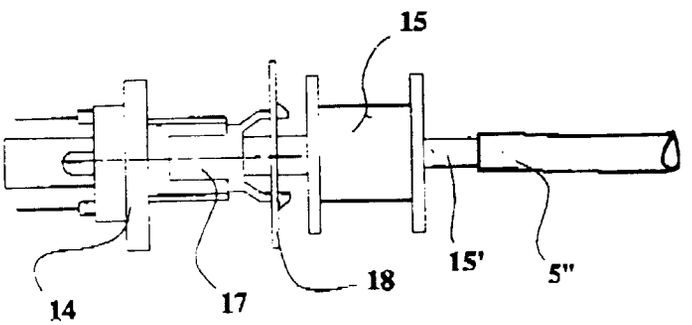

Fig. 4

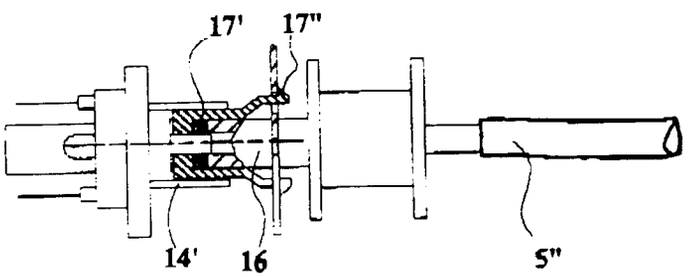

Fig. 5

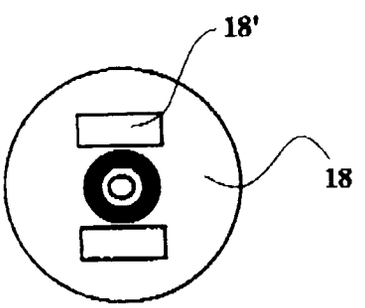

Fig. 7