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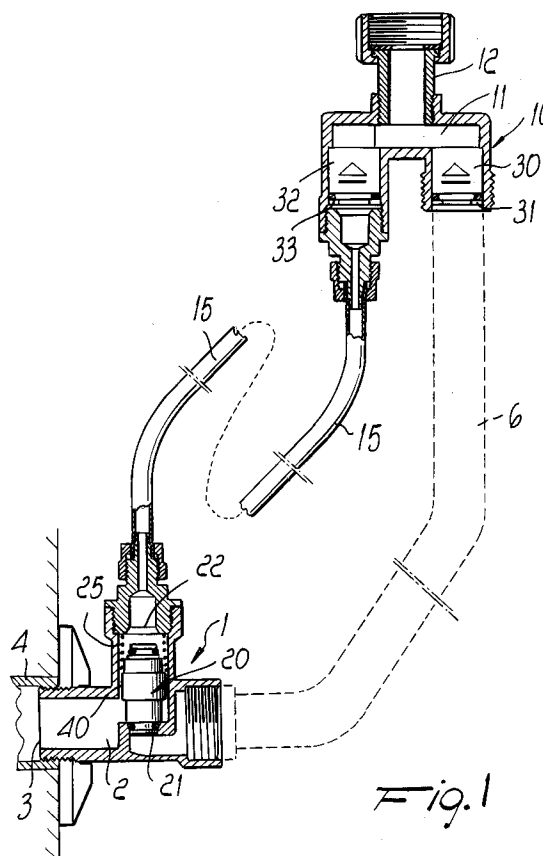
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I-20123 Milano (IT)(54) **Device for interrupting delivery of fluid to control leakages from a duct.**

(57) Device for protecting a fluid flow duct with elements for interrupting delivery to prevent leaks along the flow duct having the particularity of comprising an intake chamber (2) located upstream of a fluid flow duct (6) to be protected and a delivery chamber (11) located downstream of the fluid flow duct (6). An auxiliary connection duct (15) runs between the intake chamber (2) and the delivery chamber (11). A shutter (20) is located in the intake chamber (2) and controls the ports (21,22) for connection to the fluid flow duct (6) and to the auxiliary duct (15). The shutter (20) is normally closed on said port (21) for connection to the fluid flow duct (6) and opens when a load loss occurs in the delivery chamber (11). There are also one-way valve elements (30,32) located at the ports (31,33) for the connection of the fluid flow duct (6) and of the auxiliary duct (15) to the delivery chamber (11) and suitable to allow the flow of fluids from the ducts (6,15) to the delivery chamber (11) but not vice versa.

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The present invention relates to a device for protecting a fluid flow duct with means for interrupting delivery if leaks occur along the flow duct.

As is known, in many fields in which it is necessary to deliver fluids, whether liquid or gaseous, there is the problem of being able to intervene automatically to interrupt delivery of the fluid if leaks occur along the duct.

A typical case involves the portion of pipe that allows to connect water delivery faucets to the water supply system.

This pipe portion, normally constituted by a hose, tends to break due to various causes, such as for example a sudden increase in the pressure in the distribution system, or a crack in the hose caused by undue bending and the like; this leakage is particularly dangerous, since the water flow continues to supply the leak, causing severe damage, if it is not possible to intervene quickly.

In order to solve this problem, solutions have already been devised that in practice are based on the use of electric valves which are located on the delivery duct and are controlled by humidity sensors which, by detecting the presence of water on the floor, cause the intervention of the electric valve which closes the circuit.

Obviously these solutions are considerably complicated both structurally and in terms of installation, and are therefore extremely expensive; accordingly, their use is considerably limited.

A principal aim of the present invention is indeed to solve the problem described above by providing a device for protecting a fluid flow duct with means for interrupting delivery if leaks occur along the flow duct, said device being able to operate without having to use electric valves or in any case an external electric power supply, but simply by using the pressure of the fluid being supplied.

Within the scope of this aim, a particular object of the invention is to provide a protection device that can be installed without having to modify the conditions that typically occur for example when a faucet is installed.

Another object of the present invention is to provide a protection device wherein the supply of fluid to the duct is normally blocked and allowed only when the delivery is opened and the flow of fluid is required.

Another object of the present invention is to provide a device for protecting a fluid flow duct with means for interrupting delivery to prevent leaks along the flow duct which, by virtue of its particular constructive characteristics, is capable of giving the greatest assurances of reliability and safety in use and is furthermore competitive from a merely economical point of view.

This aim, these objects and others which will become apparent hereinafter are achieved by a device for protecting a fluid flow duct with means for interrupting delivery to prevent leaks along the flow duct, according to the invention, characterized in that it comprises: an intake chamber located upstream of a fluid flow duct to be protected; a delivery chamber located downstream of said fluid flow duct; an auxiliary connection duct that runs between said intake chamber and said delivery chamber; a shutter that is located in said intake chamber, controls the ports for connection to said fluid flow duct and to said auxiliary duct, is normally closed on said port for connection to said fluid flow duct, and opens when a load loss occurs in said delivery chamber; and one-way valve means which are located at the ports for the connection of said fluid flow duct and of said auxiliary duct to said delivery chamber and are suitable to allow the flow of fluids from said ducts to said delivery chamber.

Further characteristics and advantages will become apparent from the description of a preferred but not exclusive embodiment of a device for protecting a fluid flow duct, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

figure 1 is a schematic sectional view of the device according to the invention in the condition in which fluid delivery is not required;

figure 2 is a view of the device in the condition for delivering fluid.

With reference to the above figures, the device for protecting a fluid flow duct with means for interrupting delivery to prevent leaks along the flow duct comprises an intake body 1 which internally forms an intake chamber 2 having an inlet 3 for connection, for example, to a water supply system 4.

The body 1 is arranged upstream of a fluid flow duct 6 to be protected. The duct 6 is connected to a delivery body 10 that forms a delivery chamber 11 connected, by means of a delivery outlet 12, to a fixture for draining off the liquid constituted, for example, by a faucet.

An auxiliary duct 15 runs between the intake body 1 and the delivery body 10 and has the purpose of forming a pressure compensation element the function whereof will become apparent hereinafter.

The auxiliary duct 15 is advantageously provided by means of a tube made of a plastic material of the type commercially known by the trade mark RILSAN and has a smaller useful passage section than the duct 6.

A shutter 20 is provided inside the chamber 2 and controls the port 21 for connection to the duct 6 and the port 22 for connection to the auxiliary

duct 15.

The shutter 20 is pushed by elastic means 25 which, in normal conditions, push it so that it closes the port 21.

Normal conditions are defined as those in which use is not required, i.e. when the faucet is in closed position.

At the delivery body 10 there is a first one-way valve 30 arranged on the port 31 for the connection of the duct 6 and a second one-way valve 32 arranged on the port 33 for the connection of the auxiliary duct 15.

Both one-way valves 30 and 32 are arranged so as to allow the flow of fluid from the ducts toward the delivery chamber 11 but not vice versa and therefore also act as an element preventing the backward flow toward the water supply system.

In normal conditions, i.e. when the faucet is closed, a balance of static pressures is produced in the system and therefore the shutter 20 is pushed so that it closes against the port 21 and connection along the duct 6 is consequently prevented; accordingly, any damage to said duct does not allow leakages of fluid except for the limited amount of fluid which is inside said duct.

The shutter 20 is accommodated in the chamber 2 so as to form, around said shutter, an annular region 40 for seepage toward the auxiliary duct 15 which allows fluid to flow toward the duct 15.

If the faucet is opened, the static pressure drops inside the delivery chamber 11 and therefore fluid starts to flow along the auxiliary duct 15.

The flow of fluid along the auxiliary duct 15, by passing through the seepage region 40, in practice drags the shutter 20, opening the port 21 and moving the shutter 20 so that it closes against the port 22 for connection to the auxiliary duct 15.

As soon as the faucet is closed again, the pressure balance thus produced causes the elastic thrust applied by the spring 25 to return the shutter 20 so that it closes against the port 21, consequently protecting the duct 6.

It is evident that in this condition, should the duct 6 break, the leakage of fluid is extremely limited since the duct, in normal conditions, i.e. when the faucet is closed, is not connected to the supply system.

In a similar manner, it is noted that should the auxiliary duct 15 break, after the initial fluid flow step the shutter 20 is moved so as to close the port 22 and is kept closed by the static pressure applied by the supply pressure of the water supply system.

From what has been described above it is thus evident that the invention achieves the intended aim and objects and in particular the fact is stressed that a device is provided which allows to protect a fluid flow duct with means that are ac-

tuated by the very pressure of the supplied fluid without having to resort to electric valves or other constructive complications.

Furthermore, no particular modifications are performed from the point of view of installation, since the intake body 1 and the delivery body 10 are applied normally, respectively to the pipe for connection to the water system and to the faucet or in any case to the delivery element.

Another important aspect is furthermore constituted by the fact that undue fluid stagnation is not produced with the above described arrangement, since the fluid that remains inside the auxiliary duct 15 is in practice replaced every time the delivery is opened, since during the initial step the fluid that reaches the delivery is the fluid contained in the duct 15, and therefore said fluid is replaced each time.

The invention thus conceived is susceptible to numerous modifications and variations, all of which are within the scope of the inventive concept.

All the details may furthermore be replaced with other technically equivalent elements.

In practice, the materials employed, as well as the shapes and dimensions, may be any according to the requirements.

Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the scope of each element identified by way of example by such reference signs.

Claims

1. Device for protecting a fluid flow duct with means for interrupting delivery to prevent leaks along the flow duct, characterized in that it comprises: an intake chamber (2) located upstream of a fluid flow duct (6) to be protected; a delivery chamber (11) located downstream of said fluid flow duct (6); an auxiliary connection duct (15) that runs between said intake chamber (2) and said delivery chamber (11); a shutter (20) that is located in said intake chamber (2), controls the ports (21,22) for connection to said fluid flow duct (6) and to said auxiliary duct (15), is normally closed on said port (21) for connection to said fluid flow duct, and opens when a load loss occurs in said delivery chamber (11); and one-way valve means which are located at the ports (31,33) for the connection of said fluid flow duct (6) and of said auxiliary duct (15) to said delivery chamber (11) and are suitable to allow the flow of fluids from said ducts (6,15) to said delivery chamber

(11).

2. Protection device according to claim 1, characterized in that said auxiliary duct (15) has a smaller useful passage section than said fluid flow duct (6). 5
3. Protection device according to the preceding claims, characterized in that it comprises elastic means (25) acting on said shutter (20) to push it so that it closes on said port (21) for connection to said fluid flow duct. 10
4. Protection device according to one or more of the preceding claims, characterized in that it comprises, around said shutter (20), an annular seepage region (40) that allows fluid to flow toward said auxiliary duct (15), said seepage being suitable to drag said shutter (20) so that it closes against said port (22) for connection to said auxiliary duct when the fixture for draining off the liquid is opened. 15 20

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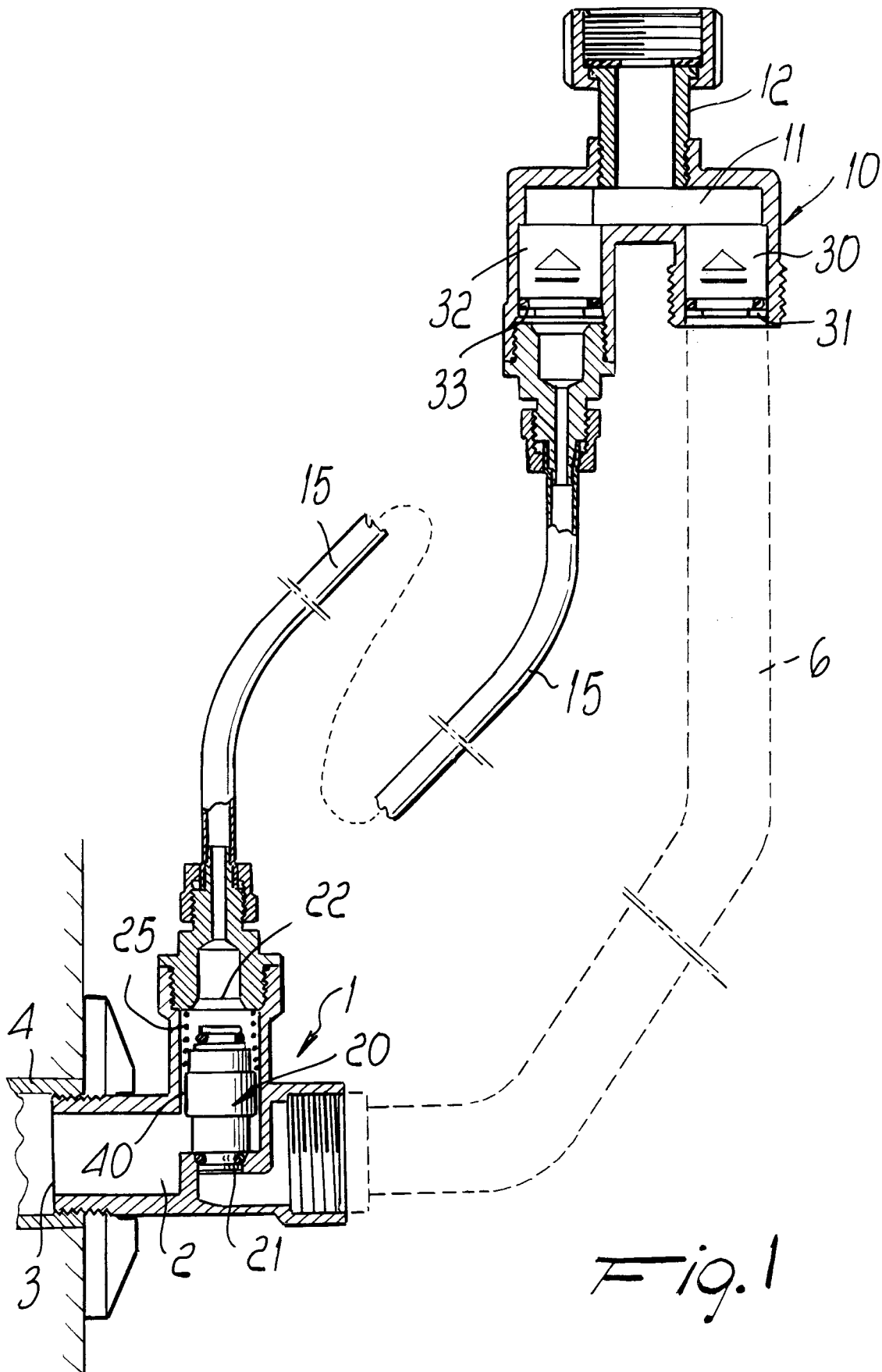
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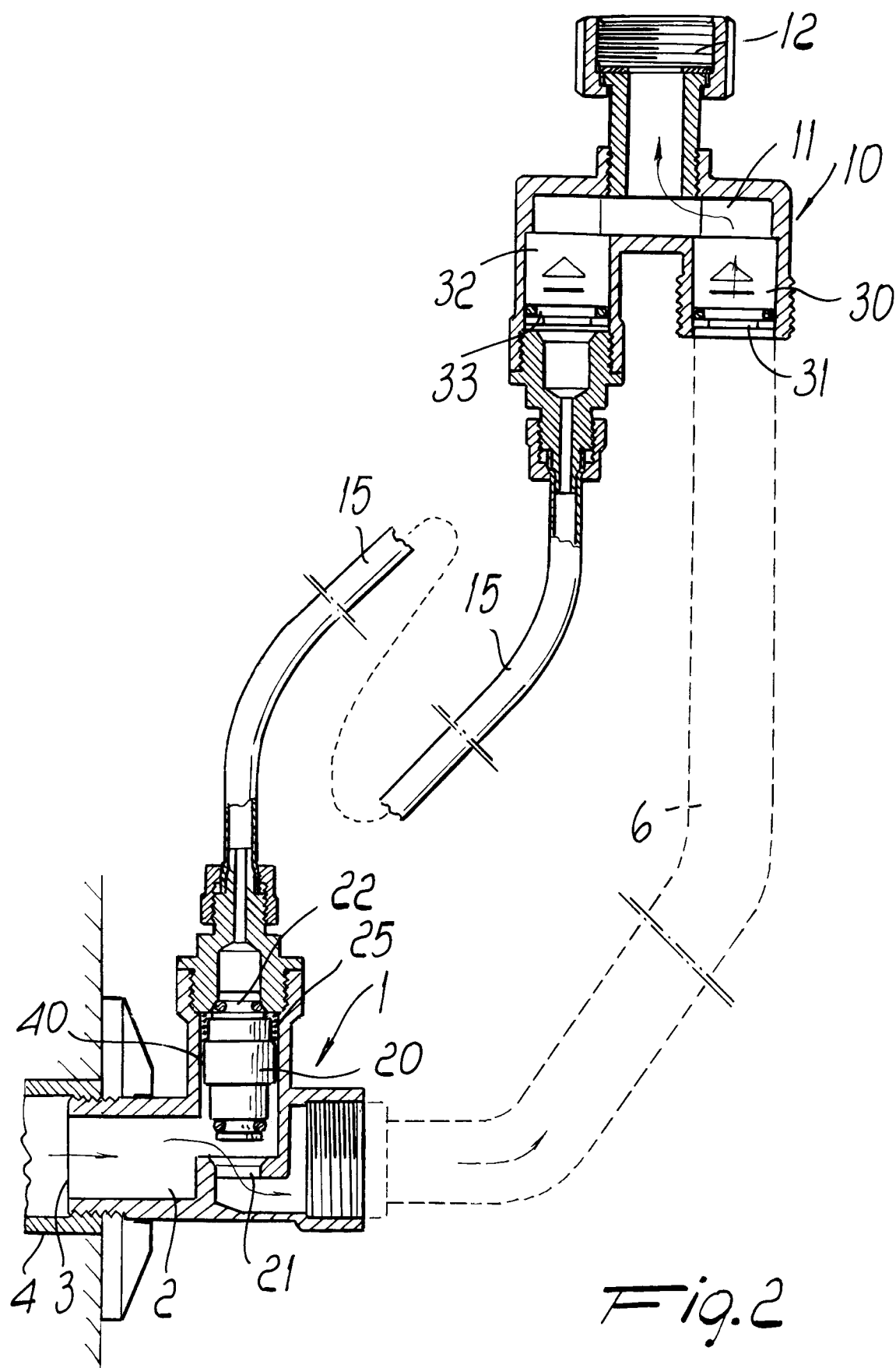
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EUROPEAN SEARCH REPORT

Application Number
EP 94 10 6393

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.5)
Y	GB-A-1 294 382 (F. W. TALBOT & COMPANY LIMITED)	1-3	F17D5/02 B67D5/32
A	* page 3, line 45 - line 89 * * page 3, line 113 - line 127 * * figures 1-3,5 *	4	
Y	GB-A-2 056 629 (CARL SCHENCK AG)	1-3	
A	* page 1, line 112 - page 2, line 24; figure *	4	
A	GB-A-2 150 712 (GLYCO-ANTRIEBSTECHNIK GMBH) * abstract; figure 1 *	1	
A	GB-A-2 123 531 (THE SECRETARY OF STATE FOR INDUSTRY (UNITED KINGDOM)) * figures 3,4 *	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.5)
			F17D B67D G01M F16K
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 11 August 1994	Examiner Martinez Navarro, A
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application I : document cited for other reasons & : member of the same patent family, corresponding document	