



Europäisches Patentamt  
European Patent Office  
Office européen des brevets



(11) **EP 0 915 209 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
12.05.1999 Bulletin 1999/19

(51) Int. Cl.<sup>6</sup>: **E03D 1/14**

(21) Application number: **97117663.1**

(22) Date of filing: **05.11.1997**

(84) Designated Contracting States:  
**AT BE CH DE DK ES FI FR GB GR IE IT LI LU MC  
NL PT SE**

(71) Applicant: **Candystand Ltd.**  
**London W1H 0HQ (GB)**

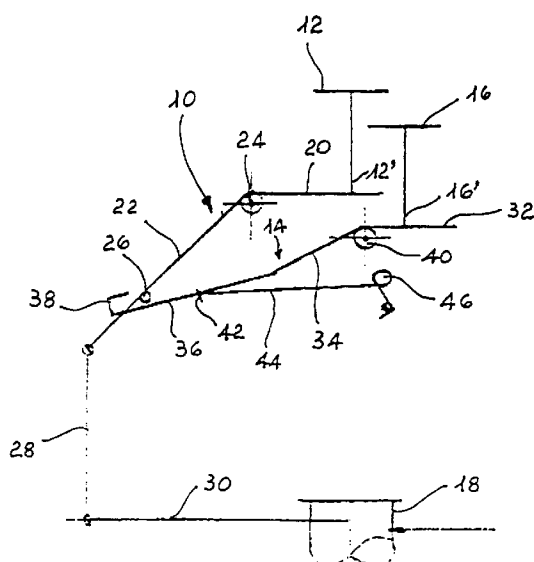
(72) Inventor: **Nessi, Luciano**  
**London, W1H 0HQ (GB)**

(74) Representative: **Lecce, Giovanni**  
**Dott. Giovanni Lecce & C. S.r.l.**  
**Via G. Negri 10**  
**20123 Milano (IT)**

(54) **Economising device for toilet cisterns**

(57) An economising device for toilet cistern integrates a waste valve (18) obtained from plastic material or other suitable materials, comprising a primary lever-system (10), connected on the one side to a push-button (12) and on the other side to said valve (18), and a second lever-system (14) activated by a second push-button (16) for its interaction with said primary lever-system (10).

**FIG. 1**



**EP 0 915 209 A1**

## Description

[0001] The present invention relates to an economising device for toilet cisterns.

[0002] More particularly, the present invention relates to a device for toilet cisterns provided with means suitable to limit - if needed - the water flow from the cistern into the underlying toilet bowl to which it is connected.

[0003] As is known, the traditional toilet groups installed in bath-rooms or service rooms comprise a toilet bowl to which an overlying cistern is associated, which cistern is the water collection tank, fed by the mains. Cisterns, either on sight or fitted into the wall, comprise a waste valve, controlled through lever-systems activated generally by a push-button protruding from said cisterns; the latter contains also a float ball with a faucet suitable to stop the water flow in the cisterns once the prefixed liquid level has been reached.

[0004] In these realisations of the known art, the activation of the push-button causes the total flowing into the bowl of the water quantity contained in the cistern; this leads in many cases to a useless waste of water, as to clean or wash the bowl a limited amount of water would suffice. The problem associated to the rationalisation of water resources is increasingly felt and the laws of many countries impose norms oriented in this direction. Considering the huge number of sanitary installations existing in a given territory and the daily and repeated use of the same, it is easy to understand that the saving of even a minimum amount of waste water, for at least a part of the interventions, leads to a marked reduction in the global consumption.

[0005] The cisterns of the known art which provide for the possibility of a differentiated water waste generally include mechanisms that are very complex from the point of view of construction, and whose activation is awkward, which involves high costs for their realisation and difficulties in regulation and maintenance.

[0006] Object of this invention is to obviate the above drawbacks.

[0007] More particularly, object of the invention is to provide an economising device for toilet cisterns such as to allow a water flow in alternative and calibrated amounts, without the need of complex or awkward interventions by users.

[0008] A further object of the invention is to provide an economising device as defined above, wherein the supply of a partial amount of water in the bowl is obtained directly and following one only intervention by users.

[0009] A further object of the invention is to provide an economising device for toilet cisterns that can always ensure a high level of resistance and reliability in the time.

[0010] These and still other objects are achieved by the economising device for toilet cisterns of the present invention, incorporating a waste valve from plastic material or other suitable materials, which comprises a primary lever-system connected on the one side to a

push-button and on the other side to said waste valve, as well as a secondary lever-system activated by a second push-button for its interaction with said primary lever-system.

[0011] The construction and functional characteristics of the economising device for toilet cisterns of the present invention will be better understood thanks to the following description wherein reference is made to the attached drawings which represent a preferred non limiting embodiment, and wherein:

Figure 1 shows schematically the device of the present invention in the condition of non utilisation; Figure 2 shows schematically the same device during the water supply stage with complete flowing into the bowl of the water contained in the cistern, Figure 3 shows schematically the same device during the water supply stage with partial flowing into the bowl of the water contained in the cistern; Figures 4 and 5 concern an alternative embodiment of the economising device of the present invention.

[0012] With reference to the aforementioned figures, the economising device of the present invention basically comprises a primary lever-system 10, associated to a push-button 12, a secondary lever-system 14 associated to a second push-button 16, and a waste valve 18 of a known type, located in correspondence of the lower opening of the toilet cistern, axially sliding in the same. The primary lever-system 10 is constituted, according to a preferred non critical embodiment, by a plurality of arms connected and articulated with one another, moved through push-button 12. In particular, said lever-system 10 comprises a first arm 20, connected on the one side with push-button 12, and on the opposite side, with a second arm 22; the connection between said arms is of the articulated type, to allow the angle orientation of the same, progressively variable, under the effect of the pressure exercised from up downwards on said push-button 12. In correspondence of the connection point between arms 20 and 22, a fulcrum element is formed, while an extension 26, having the form of a cylindrical pawl or other suitable form, protruding for a limited extent on at least one side, is integral with arm 22. To arm 22 there is articulated a further arm or tie-rod 28, articulatably connected to a horizontal branch 30 of lever-system 10; said branch 30 is connected with its free end to valve 18 of the toilet cistern (not represented).

[0013] Advantageously, the whole of arms 20, 22, 28 and branch 30, which form altogether the primary lever-system 10 of the economising device of the present invention is incorporated in an envelope from plastic material which is installed in the toilet cistern; there protrudes from it the free end of arm 20, which is connected, through means known in themselves, for instance quick hooks, to the lower end 12' of push-button 12, and branch 30, entirely or partly, which is con-

nected to valve 18. Figure 1 which represents schematically the economising device, shows the exemplifying orientation of said arms 20, 22, 28 and branch 30, which in the resting position: i.e. in a position of non utilisation, are arranged according to a configuration having a substantially trapezoid development: arm 20 is connected to push-button 20 and is orthogonally arranged with respect to said branch 30 and arm 20, while the intermediate arm 22 is diagonally oriented, at an angle comprised, by way of example, between 30 and 60°. Advantageously, the fulcrum element 24 is constituted by an extension obtained integrally with one of the inner walls of an envelope (not represented) containing the whole device.

**[0014]** According to a preferred embodiment, the secondary lever-system 14 is constituted by a lever-system or stiff arm formed by sectors angularly oriented relatively to one another, and is placed on a lower plane with respect to the primary lever-system 10. In detail, lever-system or arm 14 comprises a first portion or branch 32 connected with the lower end 16' of push-button 16, near push-button 12, an intermediate branch 34 and an end portion or branch 36, whose end is partly bent on itself upwards to define a hook or small spike 38. In its overall configuration, the lever-system 14 defines a tendentially sinusoid orientation: with reference to Figure 1, wherein it is schematically represented in the resting stage, said lever-system has the first branch 32 substantially parallel to arm 20 of the primary lever-system 10, the intermediate branch 14 inclined downwards at an angle comprised, by way of example, between 300 and 330° with respect to branch 32, and the end branch 36 angularly oriented upwards, to a reduced extent with respect to the angle of the preceding one. Branch 36 is anyhow so oriented as to touch or to approach extension 26 of arm 22 also in conditions on non utilisation of the economising device. Said configuration of lever-system 14 is, in any case, only an example, as it can have a mixed-linear development or a continuous concave-convex development. In correspondence of the connection point between portions or branches 32, 34 of the lever-system 14 a fulcrum element 40 is formed on which the same lever rests and tilts following the pressure exercised on push-button 16; said fulcrum 40 is advantageously constituted by an extension or pawl integral with at least one of the inner walls of the container which incorporates, just as the primary lever-system 10, also the secondary lever-system or lever 14. Along branch 36 of said lever there is formed, preferably at about half-development, a protrusion 42, constituted by an eyelet or the like, for hooking an end of an elastic means 44, such as for instance a helical spring; the opposite end of said elastic means 44 is anchored to a stable support 46, formed for instance by a hook or extension integral with one of the inner wall of the envelope wherein both lever-systems 10 and 14 are housed. All the elements that constitute said lever-systems, i.e. arms 20, 22, 28, branch

30 and lever 14 are preferably from plastic material, for instance, PVC or other suitable materials, like the envelope (not represented) that incorporates them. Push-buttons 12, 16, possibly formed by plates or plaques, protrude from the toilet cistern or align to a front of the same, if the latter should be on sight and fixed to the wall; if the toilet cistern should be integrated in the masonry, said push-button may comprise conventional transmission means to transfer in the vertical direction the thrust radially exercised on the same and to activate, consequently, the lever-systems 10 and/or 14.

**[0015]** During the discharge of the water contained in the toilet cistern, the alternative use of push-buttons 12, 16 causes the flow into the underlying bowl of different amounts of liquid, as specified hereafter. If all of the water contained in the toilet cistern should be discharged, in order to perform an accurate cleaning of the bowl, there is activated push-button 12 connected to the primary lever-system 10; the compression of said push-button, whose end of stroke is determined by the maximum possible lifting of the conventional waste valve 18, causes the articulated movement of the various arms 20, 22 and 28 and branch 30 of the primary lever-system 10, which takes up the configuration represented schematically in Figure 2. In particular, arm 20 orientates angularly downwards, drawing upwards arm 22 to which it is articulated thanks to the support defined by fulcrum 24; consequently, also arm 28 lifts taking up an angular position outwards in the direction indicated by arrow A, and draws upwards branch 30 connected at one end with the waste valve 18. The latter disengages then from the retaining seat and allows water to flow from the toilet cistern into the underlying bowl. In this case, there is a complete water flow, as said waste valve returns to its seat by gravity according to the conventional system. The activation of push-button 12 does not affect in the least the secondary lever-system 14.

**[0016]** Vice-versa, should it be sufficient to have a reduced amount of water flowing into the bowl from the toilet cistern, push-button 16 is activated, which is directly connected to the secondary lever-system 14 and indirectly to the primary lever-system 10. In this case, the pressure exercised on push-button 16 causes first of all the tilting of lever 14, as shown in Figure 3; said lever, which meets fulcrum 40 in the connection portion between the first branch 32 and the intermediate branch 34 and meets systematically extension 26 of arm 22 with the end arm 36, lifts progressively and draws upwards also the lever-system 10, as schematised by arrow B of Figure 2 and, as a whole, in Figure 3. The lifting action is exercised starting from pawl or protrusion 26, which is captured by the hook or small spike 38. This movement causes the elements that form the lever-system 10 to take up the same configuration previously described and referred to the complete water discharge, but involves also the tensioning of the elastic member or spring 44, connected on the one side to lever 14 and, on the other side, to support 46, while the

hooking of the extension or pawl 26, formed on arm 22 by hook 38 causes the end of stroke of the secondary lever-system or arm 14. As a consequence, by releasing push-button 16 once it has reached the end of stroke point, spring 44 contracts and draws downwards branch 22 of the primary lever-system 10 with what is connected to it, determining the closing of waste valve 18 and the ensuing interruption of the water flow, as also branch 30 lowers. During the movement of lever 14 through push-button 16, such water flow takes place but is advantageously partial, just sufficient to wash the bowl. Depending on the positioning of extension 26 on arm 22 and the length of branch 26 carrying the small pawl 38, it is obviously possible to vary the amount of the partial discharge of water which preferably amounts to about half the total contents of the toilet cistern.

[0017] With reference to Figures 4 and 5, which represent schematically an alternative embodiment of the economising device of the present invention, the secondary lever-system 14 that controls push-button 16, is advantageously provided with an arm 50 from plastic material, metal or other suitable materials on which a movable balance weight 52 is applied, by means of a threading or by a friction system or the like.

[0018] Preferably, said arm 50 is constituted by a stem from plastic material having a continuous thread, and the balance weight 52 is formed, according to a non critical embodiment, by a metal body, for instance from brass, for the calibrated and adjustable screwing on said stem. Arm 50 carrying the balance weight 52 is brought to or integrally obtained with the front end of lever 36 and is located near hook 38 or in the vicinity of the same, not to interfere with the articulated means that form the primary lever-system 10.

[0019] As can be noticed from Figures 4 and 5, said arm 50 and said balance weight 52 determine the variable supply of water from the toilet cistern according to the position of said balance weight 52. The supply time reduces as the position of the balance weight 52 approaches the upper part of arm 50, and vice-versa; such adjustment may be advantageously obtained in a calibrated way either on the installation or afterwards.

[0020] As can be inferred from the above description, the advantages achieved by the invention are obvious.

[0021] The economising device for toilet cisterns of the present invention allows to alternately discharge variable amounts of water according to the specific needs.

[0022] Particularly advantageous is the possibility of causing the flow from the toilet cistern of a reduced and prefixed amount of water by simply acting on a push-button and activating it until the end of stroke point is reached, without the need of evaluating the time necessary for the operation.

[0023] However, the invention, as described hereabove and claimed hereafter, has been proposed only by way of example, being understood that many variants and modifications may be introduced in the same, all of

them falling in any case within the scope of the invention concept.

[0024] In particular, possible structural inversions or alternative locations are possible of the components or parts that form as a whole the economising device of the present invention.

## Claims

1. An economising device for toilet cisterns incorporating a waste valve (18) from plastic material or other suitable materials, comprising a primary lever-system (10) connected on the one side to a push-button (12), and on the opposite side to said valve (18), and a secondary lever-system (14) activated by a secondary push-button (16) for its interaction with said primary lever-system (10).
2. The economising device according to claim 1, wherein the primary lever-system (10) is constituted by a plurality of arms, namely a start arm (20), an intermediate arm (22), an end arm (28) and a branch (30) articulated with one another at least in correspondence of a fulcrum or supporting point (24).
3. The economising device according to the preceding claims, wherein the supporting point (24) is located in correspondence of the connection zone between said arms (20) and (22) and is constituted by an extension integral with the internal front of at least one of the walls of an envelope wherein said device is at least partly incorporated.
4. The device according to the preceding claims, wherein at the free end of arm (28) a branch (30) is articulatably fastened, connected on the opposite front to the waste valve (18) in correspondence of its upper end.
5. The device according to the preceding claims, wherein an extension (26) protruding from at least a front of the intermediate arm (22) is integral with said arm.
6. The device according to the preceding claims, wherein the secondary lever-system (14) is constituted by a rigid and shaped arm, connected in a position near an end to said push-button (16) and provided, in correspondence of the opposite end, with a hook-shaped element (38), oriented upwards, integral with said arm or connected to the same.
7. The device according to one or more of the preceding claims, wherein the lever-system (14) is constituted by a first branch (32), a second branch (34) angularly oriented with respect to the preceding

one and an end branch (36) having an opposite angular orientation with regard to said intermediate branch, the hook or pawl (38) being obtained at the free end of branch (36).

5

8. The economising device according to one or more of the preceding claims, wherein the connection zone between branches (32), (34) of the lever-system (14) meets a lever point (40) constituted by an extension integral with the internal front of at least one of the walls of the envelope that incorporates said device. 10
9. The device according to one or more of the preceding claims, wherein lever (14) is provided with an extension (42) for hooking an end of an elastic member (44) connected at the opposite end to a rigid support (46) integral with said envelope. 15
10. The device according to one or more of the preceding claims, wherein the secondary lever-system (14) is substantially comprised between arms (20), (22), (28) of the primary lever-system (10) with which it interacts following the activation of push-button (16). 20  
25
11. The economising device according to claim 1, wherein an arm (50) carrying a balance weight (52) is articulatably connected to the secondary lever-system (14) activated by push-button (16). 30
12. The economising device according to one or more of the preceding claims, wherein said arm (50) is at least partly provided with a thread for the variable location on the same of the balance weight (52) provided with a correspondingly threaded axial hole. 35
13. The economising device according to one or more of the preceding claims, wherein said arm (50) and said balance weight (52) are from plastic material or metal or other suitable materials. 40
14. The economising device according to one or more of the preceding claims, wherein the balance weight (50) is friction-fitted on along arm (50). 45
15. The economising device according to one or more of the preceding claims, wherein push-buttons (12) (16) protrude from the toilet cistern or are aligned with the same along a same front or different fronts. 50

55

FIG. 1

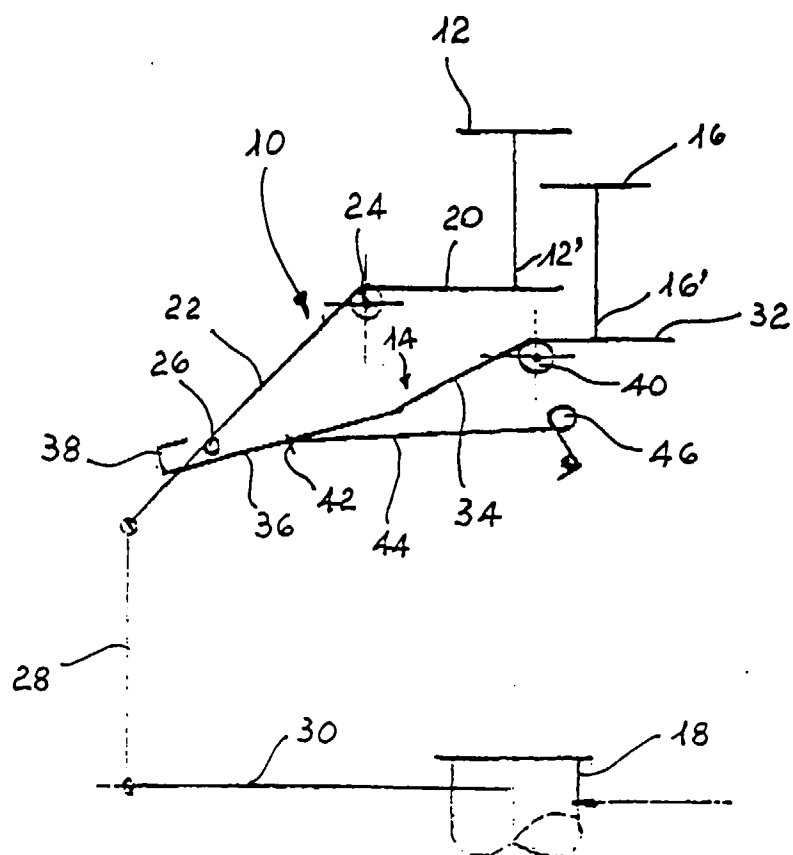


FIG. 2

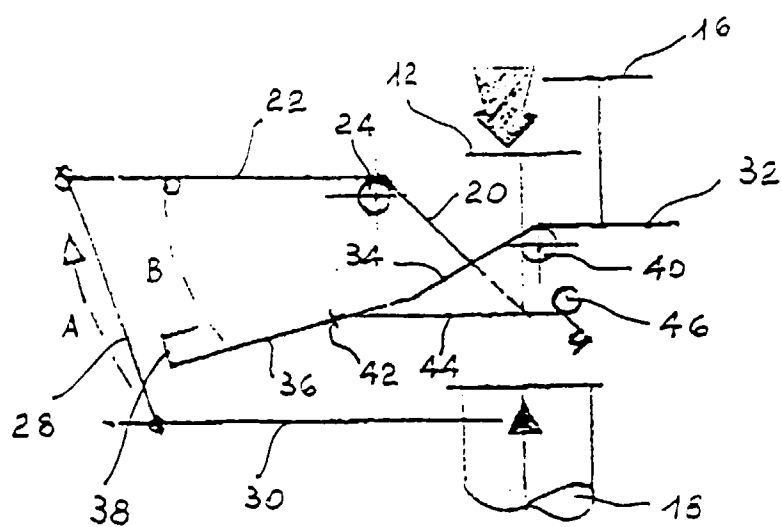


FIG. 3

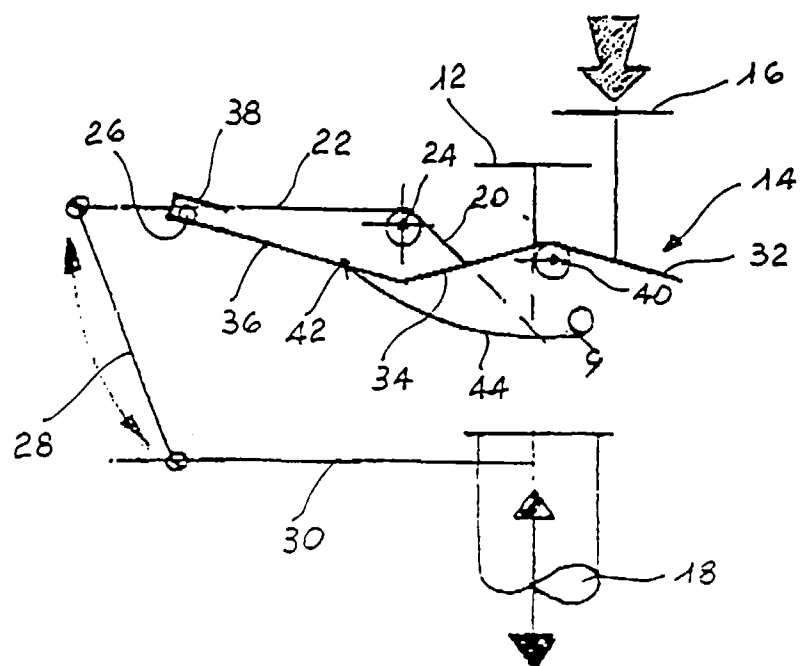


FIG. 4

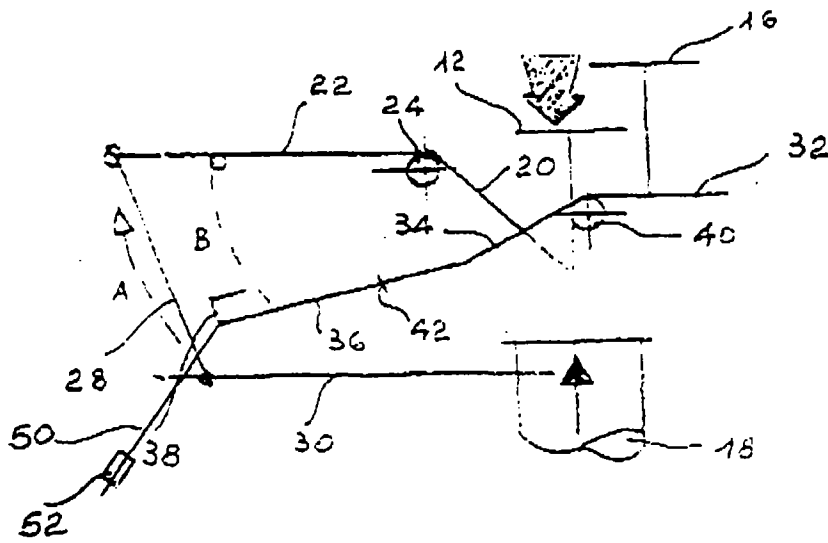
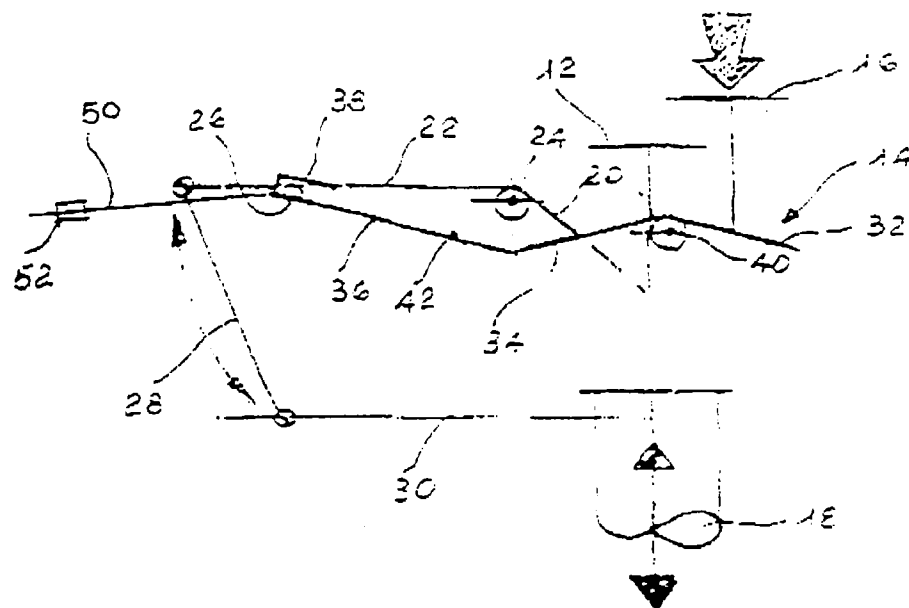


FIG. 5







European Patent  
Office

# EUROPEAN SEARCH REPORT

Application Number  
EP 97 11 7663

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.6)
X	AU 580 783 B (CROSER) * page 9, line 17 - page 11, line 11; figure 3 *	1-4, 11	E03D1/14
X	EP 0 448 092 A (MARABESE) * the whole document *	1, 2	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			E03D
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
THE HAGUE		17 April 1998	Hannaart, J
<p>CATEGORY OF CITED DOCUMENTS</p> <p>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</p> <p>T : theory or principle underlying the invention  E : earlier patent document, but published on, or after the filing date  D : document cited in the application  L : document cited for other reasons</p> <p>&amp; : member of the same patent family, corresponding document</p>			

EPO FORM 1503 03/82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 97 11 7663

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
The members are as contained in the European Patent Office EDP file on  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

17-04-1998

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
AU 580783 B	02-02-89	AU 4343485 A	19-12-85
EP 448092 A	25-09-91	IT 1239412 B	20-10-93
		AT 112347 T	15-10-94
		DE 69104246 D	03-11-94
		DE 69104246 T	26-01-95
		ES 2063993 T	16-01-95