(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 0 915 209 B1

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
03.09.2003 Bulletin 2003/36

(51) Int Cl.[7]: **E03D 1/14**

(21) Application number: **97117663.1**

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

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

Ökonomische Vorrichtung für Toilettenspülkasten

Dispositif économique pour des citernes de toilette

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

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

(73) Proprietor: **Candystand Ltd.**
London W1H OHQ (GB)

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

(74) Representative: **Lecce, Giovanni**
Dott. Giovanni Lecce & C. S.r.l.
Via Fratelli Ruffini, 9
20123 Milano (IT)

(56) References cited:
EP-A- 0 448 092
AU-B- 580 783

EP 0 915 209 B1

Printed by Jouve, 75001 PARIS (FR)

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 or sight on 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] AU-A-580 783 discloses an economising device for toilet cisterns as defined in the preamble of claim 1.

[0008] 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.

[0009] 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.

[0010] 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.

[0011] These and still other objects are achieved by an economising device for toilet cisterns having the features of claim 1.

[0012] 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 preferred non limiting embodiments 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.

[0013] 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 tierod 20, 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).

[0014] 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 connected 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.

[0015] 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 of 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.

[0016] 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 outsidewards 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, these 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.

[0017] 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.

[0018] 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.

[0019] 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.

[0020] 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 toiler 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.

[0021] As can be inferred from the above description, the advantages achieved by the invention are obvious.

[0022] The economising device for toilet cisterns of the present invention allows to alternately discharge variable amounts of water according to the specific needs.

[0023] 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.

[0024] However, the invention, as described herebove 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 as defined by the appended claims.

[0025] 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), made from suitable material, comprising:

   - a primary lever-system (10) for complete discharge of the cistern connected on one side to a primary push-button (12) and on the opposite side to said valve (18), said primary lever-system (10) comprising 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), and being integral with an extension (26) protruding on at least a front of the intermediate arm;
   - secondary lever-system (14) for partial discharge of the cistern connected near a first end to a secondary push-button (16) and activated by said secondary push-button (16) with means for the interaction of said secondary lever-system (14) with said primary lever-system (10),

   characterised in that
   the economising device is at least partially incorporated into an envelope and that
   said means for the interaction beween said secondary and primary lever-systems is constituted of a hook-shaped element (38), provided at the second end of the secondary lever-system (14), which, when said secondary lever-system (14) is activated acts on the extension (26) causing the primary lever-system (10) to take up the configuration of complete water discharge; and

   - a tensioning means (44,52), in the form of either an elastic means or an arm carrying a balance weight, said tensioning means being connected to the secondary lever-system operating at the end of stroke of the secondary lever-system (14) to determine the closing of the waste valve (18) and the interruption of the water flow.

2. The economising device according to claim 1, **characterised in that** the supporting point (24) is located in correspondence of the connection zone between the start arm (20) and the intermediate arm (22) and it is constituted by an extension integral with the internal front of at least one wall of the envelope.

3. The economising device according to claim 1 or 2, **characterised in that** the branch (30) is articulately

fastened, on one front, to the free end of the end arm (28) and, on the opposite front, to the waste valve (18).

4. The economising device according to any one of the preceding claims, **characterised in that** the prodruding extension (26) is integral with the intermediate arm (22).

5. The economising device according to any one of the preceding claims, **characterised in that** the secondary lever-system (14) is constituted of a rigid and shaped arm connected, in a position near one end, to the secondary push-button (16) and provided, in correspondence of the opposite end, with the hook-shaped element (38) integral with or connected to said arm.

6. The economising device according to any one of the preceding claims, **characterised in that** the secondary lever-system (14) is constituted of a first branch (32), connected, in a position near one end, to the secondary push-button (16); a second branch (34), angularly oriented with respect to the first branch (32); and an end branch (36) having an opposite angular orientation with respect to said second branch (34) and being provided at the free end with the hook-shaped element (38); said first (32), second (34) and end (36) branches being articulated to each other and a fulcrum element (40), consituted of an extension integral with at least one of the walls of the envelope, being arranged in correspondence of the connection zone between the first (32) and the second (34) branches.

7. The economising device according to anyone of the preceding claims, **characterised in that** the elastic means (44) has an end fixed to a protrusion (42) provided on the end branch (36) of the secondary lever-system (14), and the opposite end connected to a rigid support (46) integrally formed on one wall of the envelope.

8. The economising device according to claim 7, **characterised in that** the protrusion (42) is provided at about half-development of the end branch (36).

9. The economising device according to one any of the preceding claims from 1 to 6, **characterised in that** the balance weight (52) is movably and adjustably inserted on the arm (50) arranged in the front end of the end branch (36), near the hook-shaped element (38)

10. The economising device according to claim 9, **characterised in that** the arm (50) is at least partially provided with a thread and the balance weight (52) is provided with a correspondingly threaded axial hole.

11. The economising device according to claim 9, **characterised in that** the balance weight (52) is friction-fitted on the arm (50).

12. The economising device according to anyone of the preceding claims from 9 or 11, **characterised in that** the arm (50) is a stem from plastic material and the balance weight (52) is a metal body.

13. The economising device according to any one of the preceding claims, **characterised in that** the start (20), the intermediate (22) and the end (28) arms and the branch (30) of the primary lever-system (10) and the first (32), second (34) and end (36) branches of the secondary lever-system (14) are made from plastic material.

14. The economising device according to any one of the preceding claims, **characterised in that** the primary (12) and the secondary (16) push-buttons are formed by plates which protrude from the toilet cistern or are aligned with said toilet cistern along the same or different fronts.

Patentansprüche

1. Spareinrichtung für Toilettenspülkästen, die ein Ablassventil (18), das aus geeignetem Material hergestellt ist enthält, umfassend:

- ein primäres Hebelsystem (10) für die vollständige Entleerung des Spülkastens, das auf einer Seite an einen primären Druckknopf (12) und auf der gegenüberliegenden Seite an das Ventil (18) gekoppelt ist, wobei das primäre Hebelsystem (10) einen Startarm (20), einen Zwischenarm (22), einen Endarm (28) und einen Zweig (30) umfasst, die miteinander zumindest in Entsprechung einer Hebelstütze oder einem Stützpunkt (24) gelenkig verbunden sind, und mit einem Fortsatz (26), der zumindest aus einem Vorderteil des Zwischenarms herausragt, einstückig ausgebildet sind;
- sekundäres Hebelsystem (14) für die teilweise Entleerung des Spülkastens, das nahe bei einem ersten Ende an einen sekundären Druckknopf (16) gekoppelt ist und durch den sekundären Druckknopf (16) mit Einrichtungen für die Wechselwirkung des sekundären Hebelsystems (14) mit dem primären Hebelsytem (10) aktiviert wird,

dadurch gekennzeichnet, dass
die Spareinrichtung zumindest teilweise in einer Verkleidung aufgenommen ist und dass die Einrich-

tungen für die Wechselwirkung zwischen den sekundären und primären Hebelsystemen durch ein hakenförmiges Element (38) gebildet ist, das an dem zweiten Ende des sekundären Hebelsystems (14) vorgesehen ist, welches, wenn das sekundäre Hebelsystem (14) aktiviert ist, auf den Fortsatz (26) wirkt, wobei bewirkt wird, dass das primäre Hebelsystem (10) die Konfiguration der vollständigen Wasserentleerung einnimmt; und

- eine Spanneinrichtung (44, 52) in Form entweder einer elastischen Einrichtung oder eines Armes, der ein Balancegewicht trägt, wobei die Spanneinrichtung an das sekundäre Hebelsystem gekoppelt ist und an dem Ende des Hubes des sekundären Hebelsystems (14) arbeitet, um das Schließen des Ablassventiles (18) und die Unterbrechung der Wasserströmung festzulegen.

2. Spareinrichtung gemäß Anspruch 1, **dadurch gekennzeichnet, dass** der Stützpunkt (24) in Entsprechung mit der Kopplungszone zwischen dem Startarm (20) und dem Zwischenarm (22) angeordnet ist und durch einen Fortsatz gebildet ist, der mit dem inneren Vorderteil zumindest einer Wand der Verkleidung einstückig ausgebildet ist.

3. Spareinrichtung gemäß Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** der Zweig (30) auf einem Vorderteil gelenkig an dem freien Ende des Endarmes (28) und auf dem gegenüberliegenden Vorderteil an dem Ablassventil (18) befestigt ist.

4. Spareinrichtung gemäß einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** der herausragende Fortsatz (26) mit dem Zwischenarm (22) einstückig ausgebildet ist.

5. Spareinrichtung gemäß einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** das sekundäre Hebelsystem (14) aus einem festen und geformten Arm gebildet ist, der an einer Position nahe bei einem Ende an den sekundären Druckknopf (16) gekoppelt ist und in Entsprechung mit dem gegenüberliegenden Ende mit dem hakenförmigen Element (38) versehen ist, das mit dem Arm einstückig ausgebildet oder an diesen gekoppelt ist.

6. Spareinrichtung gemäß einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** das sekundäre Hebelsystem (14) aus einem ersten Zweig (32), der in einer Position nahe bei einem Ende an den sekundären Druckknopf (16) gekoppelt ist; einem zweiten Zweig (34), der bezüglich dem ersten Zweig (32) winklig orientiert ist; und einem Endzweig (36) mit bezüglich dem zweiten Zweig (34) in gegengesetzt winkliger Orientierung und welcher an dem freien Ende mit dem hakenförmigen Element (38) versehen ist, gebildet ist; wobei die ersten (32), zweiten (34) und End (36)-Zweige aneinander gelenkig befestigt sind und ein Hebelstützenelement (40), das aus einem Portsatz gebildet ist, welcher mit zumindest einem der Wände der Verkleidung einstückig ausgebildet ist, wobei das Hebelstützenelement in Entsprechung mit der Kopplungszone zwischen dem ersten (32) und dem zweiten (34) Zweig angeordnet ist.

7. Spareinrichtung gemäß einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die elastische Einrichtung (44) ein Ende aufweist, dass an einen Vorsprung (42) befestigt ist, der auf dem Endzweig (36) des sekundären Hebelsystems (14) vorgesehen ist und das gegenüberliegende Ende an einem festen Träger (46) gekoppelt ist, der einstückig auf einer Wand der Verkleidung gebildet ist.

8. Spareinrichtung gemäß Anspruch 7, **dadurch gekennzeichnet, dass** der Vorsprung (42) auf etwa halber Abwicklung des Endzweiges (36) vorgesehen ist.

9. Spareinrichtung gemäß einem der vorhergehenden Ansprüche 1 bis 6, **dadurch gekennzeichnet, dass** das Balancegewicht (52) beweglich und einstellbar an dem Arm (50) eingesetzt ist, der an dem vorderen Ende des Endzweiges (36) nahe bei dem hakenförmigen Element (38) angeordnet ist.

10. Spareinrichtung gemäß Anspruch 9, **dadurch gekennzeichnet, dass** der Arm (50) zumindest teilweise mit einem Gewinde versehen ist und das Balancegewicht (52) mit einem entsprechend mit Gewinde versehenen axialen Loch versehen ist.

11. Spareinrichtung gemäß Anspruch 9, **dadurch gekennzeichnet, dass** das Balancegewicht (52) reibschlüssig auf dem Arm (50) befestigt ist.

12. Spareinrichtung gemäß einem der vorhergehenden Ansprüche 9 bis 11, **dadurch gekennzeichnet, dass** der Arm (50) ein aus Plastikmaterial hergestellter Stiel und das Balancegewicht (52) ein Metallkölper ist.

13. Spareinrichtung gemäß einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** der Start-, (20), der Zwischen-, (22) und der End-, (28) arm und der Zweig (30) des primären Hebelsystems (10) und der erste (32), zweite (34) und End-, (36) Zweig des sekundären Hebelsystems (14) aus Plastikmaterial hergestellt sind.

14. Spareinrichtung gemäß einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** der

primäre (12) und der sekundäre (16) Druckknopf durch Platten gebildet sind, welche aus dem Toilettenspülkasten herausragen oder mit dem Toilettenspülkasten entlang derselben oder unterschiedlicher Vorderteile ausgerichtet sind.

Revendications

1. Economiseur pour réservoir de chasse d'eau incorporant une vanne (18) de décharge, réalisée en matériau approprié, comprenant :

un système (10) de levier principal pour décharge complète du réservoir de chasse d'eau relié, d'un côté, à un bouton-poussoir principal (12) et, de l'autre côté, à ladite vanne (18),
ledit système (10) de levier principal comprenant un bras initial (20), un bras intermédiaire (22), un bras terminal (28) et une branche (30) articulés les uns par rapport aux autres, au moins en correspondance avec un point (24) d'appui ou de support, et étant d'un seul tenant avec un prolongement (26) faisant saillie sur au moins un côté du bras intermédiaire ;
un système (14) de levier secondaire pour décharge partielle du réservoir de chasse d'eau relié, à proximité d'une première extrémité, à un bouton-poussoir secondaire (16) et actionné par ledit bouton-poussoir secondaire (16) par l'interaction dudit système (14) de levier secondaire et dudit système (10) de levier principal,

caractérisé en ce que

l'économiseur est au moins partiellement incorporé dans une enveloppe et **en ce que** ledit moyen d'interaction entre lesdits systèmes de leviers secondaire et principal est constitué d'un élément en forme de crochet (38), réalisé au niveau de la seconde extrémité du système (14) de levier secondaire, qui, lorsque ledit système (14) de levier secondaire est actionné, agit sur le prolongement (26) en amenant le système (10) de levier principal à prendre la configuration d'une décharge complète d'eau ; et

un moyen (44, 52) de traction, sous la forme soit d'un moyen élastique soit d'un bras portant un contrepoids, ledit moyen de traction étant relié au système de levier secondaire en opérant à la fin de la course du système (14) de levier secondaire pour déterminer la fermeture de la vanne (18) de décharge et l'arrêt de l'écoulement d'eau.

2. Economiseur selon la revendication 1, **caractérisé en ce que** le point (24) de support est situé en correspondance avec la zone de liaison entre le bras initial (20) et le bras intermédiaire (22) et est constitué d'un prolongement d'un seul tenant avec la face intérieure d'au moins une paroi de l'enveloppe.

3. Economiseur selon la revendication 1 ou 2, **caractérisé en ce que** la branche (30) est fixée de façon articulée, d'un côté, à l'extrémité libre du bras terminal (28) et, au côté opposé, à la vanne (18) de décharge.

4. Economiseur selon l'une quelconque des revendications précédentes, **caractérisé en ce que** le prolongement en saillie (26) est d'un seul tenant avec le bras intermédiaire (22).

5. Economiseur selon l'une quelconque des revendications précédentes, **caractérisé en ce que** le système (14) de levier secondaire est constitué d'un bras rigide et de forme profilée, relié à une position proche d'une extrémité, au bouton-poussoir secondaire (16), et est pourvu, en correspondance avec l'extrémité opppsée, de l'élément en forme de crochet (38) d'un seul temant avec ledit bras ou relié à celui-ci.

6. Economiseur selon l'une quelconque des revendications précédentes, **caractérisé en ce que** le système (14) de levier secondaire est constitué d'une première branche (32) reliée, à une position proche d'une extrémité, au bouton-poussoir secondaire (16) ; d'une deuxième branche (34), orientée de manière angulaire par rapport à la première branche (32) ; et d'une branche terminale (36) ayant une orientation angulaire opposée par rapport à la deuxième branche (34) et étant pourvue, à l'extrémité libre, de l'élément en forme de crochet (38) ; lesdites première branche (32), deuxième branche (34) et branche terminale (36) étant articulées les unes par rapport aux autres et un élément (40) formant point d'appui, constitué d'un prolongement d'un seul tenant avec au moins l'une des parois de l'enveloppe, étant agencé en correspondance avec la zone de liaison entre la première branche (32) et la deuxième branche (34).

7. Economiseur selon l'une quelconque des revendications précédentes, **caractérisé en ce qu'**une extrémité du moyen élastique (44) est fixée à une saillie (42) réalisée sur la branche terminale (36) du système (14) de levier secondaire et **en ce que** l'extrémité opposée est reliée à un support rigide (46) formé d'un seul tenant avec une paroi de l'enveloppe.

8. Economiseur selon la revendication 7, **caractérisé en ce que** la saillie (42) est réalisée à mi-chemin de la branche terminale (36).

9. Economiseur selon l'une quelconque des revendications précédentes de 1 à 6, **caractérisé en ce**

que le contrepoids (52) est introduit de façon mobile et réglable sur le bras (50), agencé à l'extrémité avant de la branche terminale (36), à proximité de l'élément en forme de crochet (38).

10. Economiseur selon la revendication 9, **caractérisé en ce que** le bras (50) est pourvu au moins partiellement d'un filetage et **en ce que** le contrepoids (52) est pourvu d'un trou axial taraudé de manière correspondante.

11. Economiseur selon la revendication 9, **caractérisé en ce que** le contrepoids (52) est monté par friction sur le bras (50).

12. Economiseur selon l'une quelconque des revendications précédentes 9 ou 11, **caractérisé en ce que** le bras (50) est une tige en matière plastique et **en ce que** le contrepoids (52) est un corps métallique.

13. Economiseur selon l'une quelconque des revendications précédentes, **caractérisé en ce que** les bras initial (20), intermédiaire (22) et terminal (28) et la branche (30) du système (10) de levier principal et la première branche (32), la deuxième branche (34) et la branche terminale (36) du système (14) de levier secondaire sont en matière plastique.

14. Economiseur selon l'une quelconque des revendications précédentes, **caractérisé en ce que** les boutons-poussoirs principal (12) et secondaire (16) sont formés par des lames qui font saillie du réservoir de chasse d'eau, ou sont alignés avec ledit réservoir de chasse d'eau le long de celui-ci ou le long de côtés différents.

FIG. 1

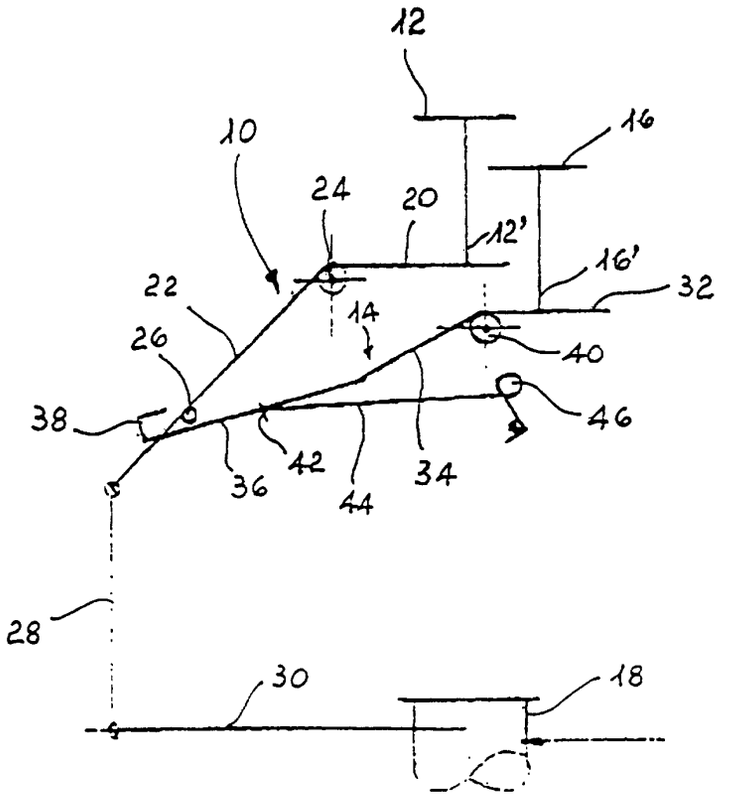

12
16
10
24
20
12'
16'
32
22
14
26
40
38
46
36
42
44
34
28
30
18

FIG. 2

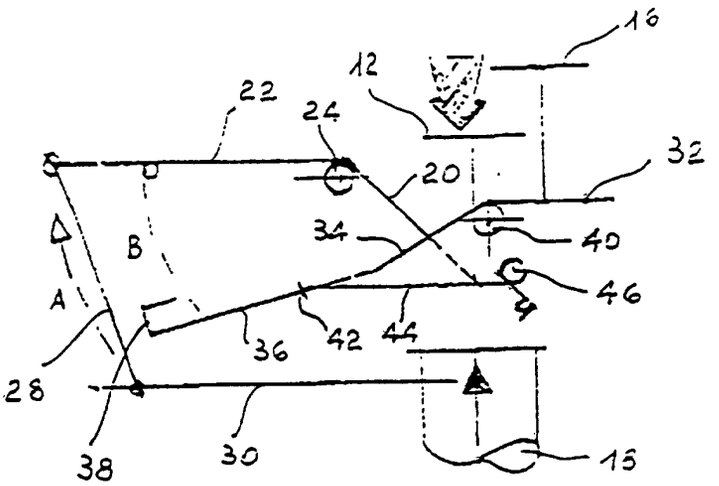

16
12
22
24
32
20
34
40
B
A
46
36
42
44
28
38
30
15

FIG. 3

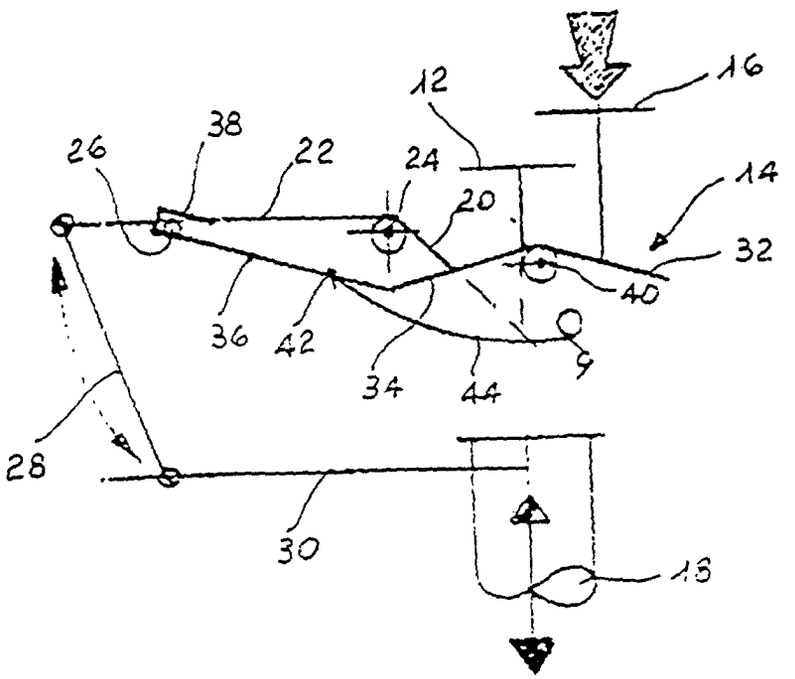


FIG. 4

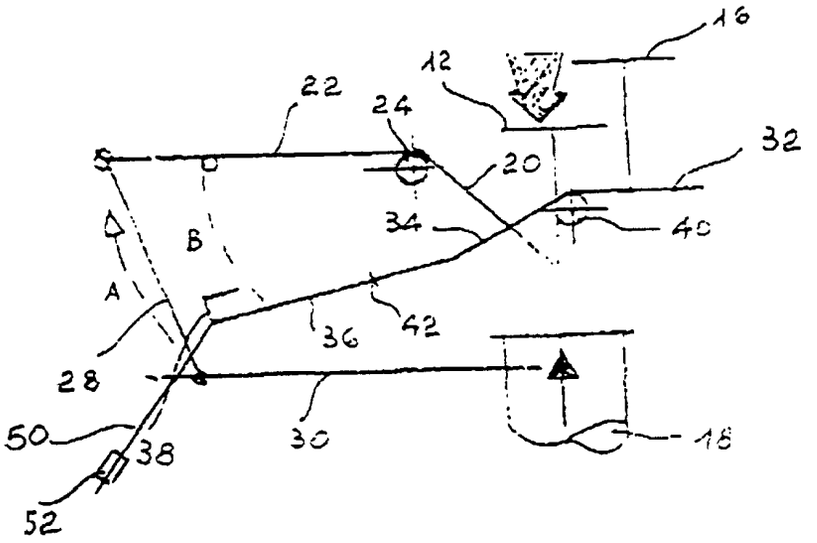
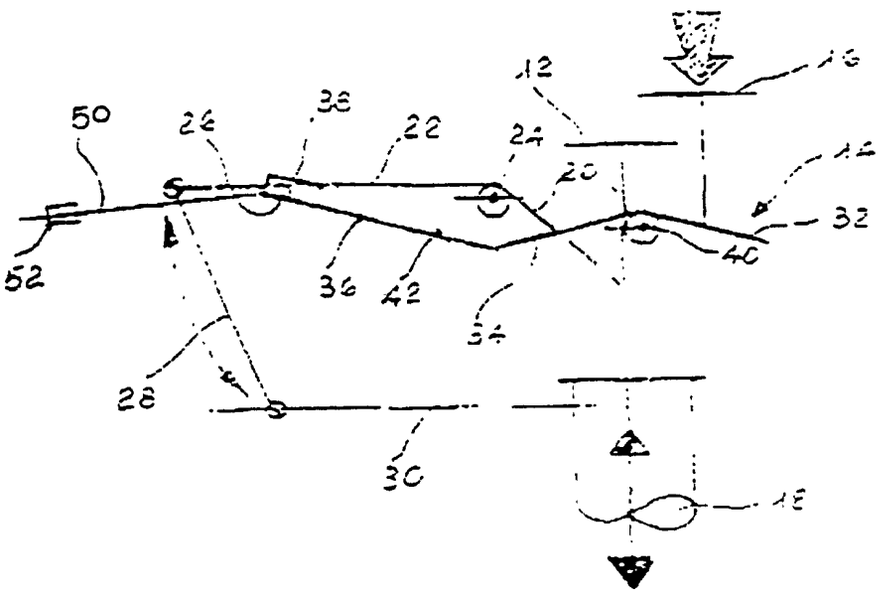

16
12
22
24
20
32
34
40
B
A
36
42
28
50
38
30
18
52

FIG. 5


12
16
50
26
38
22
24
14
20
32
52
40
36
42
34
28
30
18