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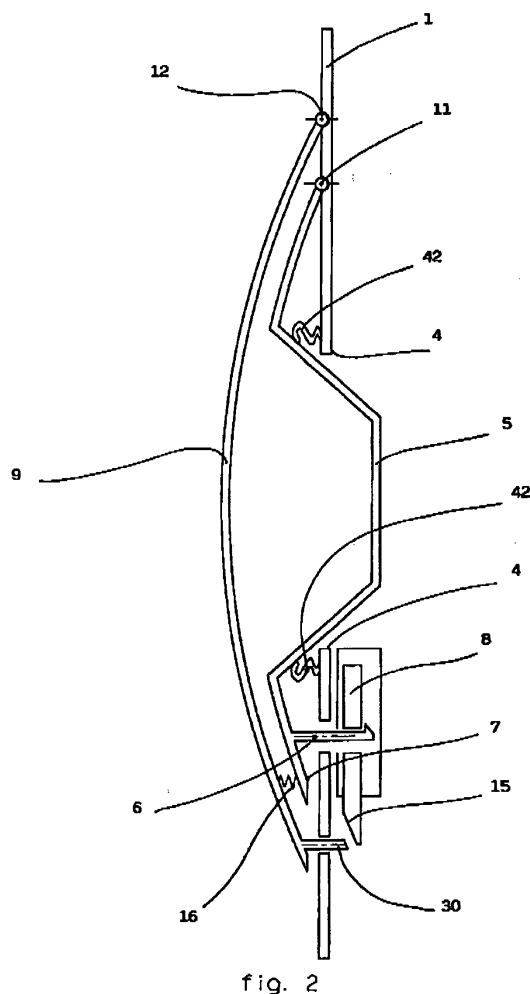
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(54) **Front loader washing machine with improved door**

(57) Front loader household washing machine comprising an outer cabinet (1) with a tub and a drum, both provided with respective openings (2,3) which correspond each other, a third opening placed on the front side of said cabinet, a door rotating on a first hinge on an edge of said third opening (4), a spiker, placed on a portion of the inner surface of the frame of said door, selectively controllable clasp means placed on the inner surface of said cabinet in correspondence to the portion of the inner edge of said third opening, able to selectively block/unblock said spiker (6) when said (5) door is closed, control means able for disengaging said clasp means, a pressure device, as a second door placed on the outer surface of said door and actionable by a pressure inwards, or as a button placed on the outer surface of said door; on the inner portion of said pressure device a prolonged element (30) is placed, able of being inserted into said clasp means (8), which are provided with a sliding element (15), actionable by the prolonged element, to disengage the engaging means by pushing the pressure device.



Description

[0001] The invention refers to an improved type of a front loader household washing machine, having an horizontal or inclined axis, and provided with a control for drum opening, which is particularly easy and simple to use.

[0002] In the following of this description the terms of "door" and "port-hole" will be used in equivalent way, even if in certain circumstances the front loader washing machines are provided both with a port-hole closing the tub, and an outer door overlapped to said port-hole; however in such a case it will be apparent that the terms used are meaning only the item closing the tub.

[0003] It is well known that in the front loader household washing machines the control to open the door is implemented through operating means acting on a special device of the door, said "spiker" which is engaged, with the door being closed, to a specific control device said "door-lock" assembled inside said machine.

[0004] The operation to be carried out on the machine in order to open the front door consists in acting on a particular mechanical or electronic command operating on said door-lock, switching it from one condition to another one, so that said spiker, which is solidly connected to said door, is disengaged and made loose; as a consequence the door itself is being disengaged from the machine cabinet, and may be opened.

[0005] In the actual practice the user which approaches the machine to open its front door has often its hands taken from the wash-load, or by other objects, that he brings with him; therefore the operator has to get rid of such objects to act on the washing machine.

[0006] Such a need requires a number of operations which could be avoided if one could act on the opening control without using the hands, or using them only for a trivial operation of frontal pushing.

[0007] Moreover, even if the control to make the door-lock to operate is placed on the front side, it generally consists in a button or similar placed on the upper portion of the front side, and therefore it is not generally possible to act on it if the user has its hands already taken.

[0008] In the household type and front loader drying machines it is possible to act on the front door or on the "port-hole" only, to disengage it from the cabinet; it is here reminded that such a possibility is allowed by the special circumstance that in said machines the drum is not full of water, but of slightly wet load only, and therefore it is not needed of providing the door with perfectly sealing gaskets when the door is closed.

[0009] As a consequence the door or port-hole may be closed or re-opened with a simple pressure on the door itself, as the back-stroke, the door is subjected to, due to the elastic reaction of the gasket, does not generate any risk of water leakage; such back-stroke is then used by devices which are generally known, which allows the coupling/uncoupling of the door, i. e. the engaging/disengaging of the relevant spiker with respect to the

door-lock, through a simple pressure on the outer side of the door.

[0010] As already mentioned, such possibility is not allowed to the front loader washing machines.

[0011] It is then desirable, and is the purpose of the instant invention, to carry out a front loader washing machine, provided with a washing tub, with a rotating drum and a front door and related closable port-hole, and with opening means which can be activated by the user even without a manual operation, and particularly such opening means have to be able to work thanks to just a push on the outer surface of the port-hole, or on a limited area of it.

[0012] A further scope of the invention is to place such opening means in a central position on the front face of the machine itself.

[0013] This purposes will be achieved by implementing a specific type of front loader washing machine provided with a tub, with a rotating drum inside it, with a front door closable by a relevant port-hole, as explained in the description that is given below by way of the non-limiting example with reference to the accompanying drawings, in which:

- fig. 1 shows a perspective view of a front loader washing machine generally known in the prior art,
- fig. 2 symbolically shows an enlargement according to the section A - A of fig. 1, showing a representation of a portion of the machine according to the invention, in a first embodiment and in a first operating condition,
- fig. 3 shows the perspective view corresponding to fig. 1, but in a different working condition,
- fig. 4 shows an enlarged view according to the section A-A of fig. 1, illustrating a portion of a second embodiment of the machine according to the invention, in a first operating condition,
- fig. 5 shows the view of fig. 4, but in a second and different operation condition.

[0014] With reference to fig. 1, an household washing machine according to the prior art comprises an outer cabinet 1 inside which a tub containing a rotating drum, not shown, are placed; said tub and drum are provided with respective openings 2 and 3 which correspond to each other, and on the front face of said cabinet 1 a third access is given, positioned basically ahead of said two openings 2 and 3 in a known way.

[0015] With reference to figure 2 and following, in order to close said third access a proper door is used, which is mounted on the circular edge of said third access through a suitable hinge 11; in order to block in the closing condition said door 5 the following devices are used:

- a proper spiker 6 applied on the inner surface of the frame 7 of the door,
- an clasping device 8, generally known as door-lock, placed on the inner surface of the edge of said third

access 4.

[0016] Said clasp device 8 and said spiker are respectively sized, designed and positioned in such a way so that said spiker is able of engaging with said device 8 when said door 5 is closed, and moreover said clasp device 8 can be activated so as to block/unblock said spiker, in such a way to grant both a permanent door closing, or its disengaging so that it can be opened.

[0017] According to this invention a prolonged element 30 is provided, which is supported by a pressure device, which will be better described later on, said element 30 being able to be inserted inside said cabinet, in the area of the edge of said third access 4, and suitable to act on a sliding element 15 comprised in, or associated to said clasp device 8, and able to selectively block/unblock said spiker, according to the position taken by said sliding element 15.

[0018] The arrangement and disposition of the just defined devices are such that when the door is closed, said spiker is engaged to the device 8, and if no manual command is exerted on the machine, said prolonged element 30 remains in a still state, that is it doesn't act on said sliding element 15 comprised in the clasp device 8.

[0019] Therefore in such a condition the spiker 6 keeps on to be engaged to the device 8 and the door 5 remains closed.

[0020] When instead one pushes the pressure device in a proper way, said prolonged element 30 is in its time pushed inwards, engaging to the sliding element 15, operating it in such a way as to disengaging said spiker 6, which makes the door disconnected.

[0021] The figures 2 and 3 show the just described two different conditions.

[0022] With regard to said pressure device, and referring to the figures 2 and 3, it may be formed by a second port-hole 9, placed outside of said first port-hole 5, and hinged by a respective second hinge 12, which may be placed directly on, or even close to, the first hinge of the port-hole 5.

[0023] Preferably said second port-hole 9 is positioned exactly on said first port-hole 5 in a way to cover or mask it, so that the user is likely to feel that what he is looking is the true port-hole and not a control means, and hinged by a respective second hinge 12, which may be placed, or not, on the first hinge 11 of the port hole 5.

[0024] This solution offers the remarkable advantage both in the aesthetics, due to the fact that the "visible" command for the door opening is fully eliminated, and of functional nature, offered by the fact that the opening command itself is not limited to only a small area, for instance a button, on the front side of the machine, but to a very wide and central area on the machine front side, and so of very easy workability.

[0025] With reference to figures 4 and 5, a different and quite cheaper embodiment consists of implementing said pressure device as a button 40 placed and sliding into an hole 41 passing through said port-hole 5.

[0026] Of course said button has to be placed outside of the fitting perimeter of the gasket 42 which assures the door sealing, in order to prevent the liquor of the washing bath from leaking out through said hole 41.

[0027] Finally it is apparent that the still state of said pressure device is assured by a proper spring 16, which urges it towards the most external position when the door is closed; apparently it helps avoiding also unintentional and not wanted but possible actions of said door-lock when the door itself is being closed.

Claims

1. Front loader household washing machine comprising:

- an outer cabinet (1),
- a tub containing a related cylindrical drum, both provided with respective openings (2, 3) which correspond each other,
- a third opening (4) placed on the front side of said cabinet, substantially ahead to said opening (2) of said drum,
- a door, formed as a port-hole (5) rotating on a first hinge (11) on an edge of said third opening, and suitable to selectively open and close it,
- engaging means (6), preferably shaped as a spiker, placed on a portion of the inner surface of the frame (7) of said door (5),
- selectively controllable clasp means (8) of said cabinet, placed on the inner surface of said cabinet in correspondence to the portion of the inner edge of said third opening (4), able to selectively block/unblock said engaging means (6) when said door is closed,
- control means able to control the operation (disengagement) of said clasp means (8),

characterized in that said control means comprise:

- a pressure device, placed on the outer surface of said door (5), and which can be activated by a push from the outside of said third opening (4) inwards,
- an element suitable to be inserted (30), firmly connected to said pressure device and oriented inwards of said cabinet (1) when said door (5) is closed,
- a sliding device (15) able of being engaged by said element (30), which can be inserted, when said door is closed and said pressure device is being pushed, and in such condition being able of disengaging said engaging means (6) from said clasp means (8).-

2. Washing machine according to claim 1, characterized in that said pressure device comprises an el-

ement shaped as a port-hole (9) which is placed outside of said first door (5), and is rotating around a second hinge (12) positioned on the edge of said third opening, preferably close to said first hinge (11), or coincident to it.

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3. Washing machine according to claim 1, **characterized in that** said pressure device comprises a pushing means, as a button (13), placed on the outer surface of said door (5).

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4. Washing machine according to any of the preceding claims, **characterized in that** elastic means are provided (16) on the inner side of said pressure device, and which are able of urging outwards and in a still position said pressure device, and that said elastic means (16) are placed between said pressure device and said door (5).

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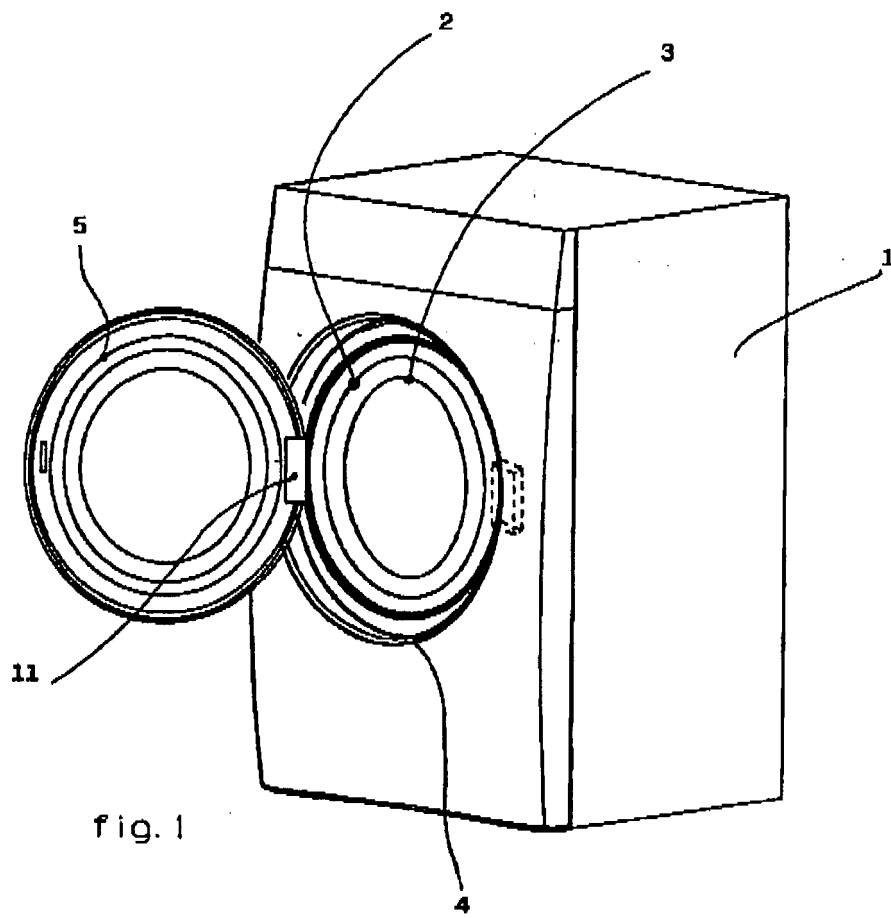
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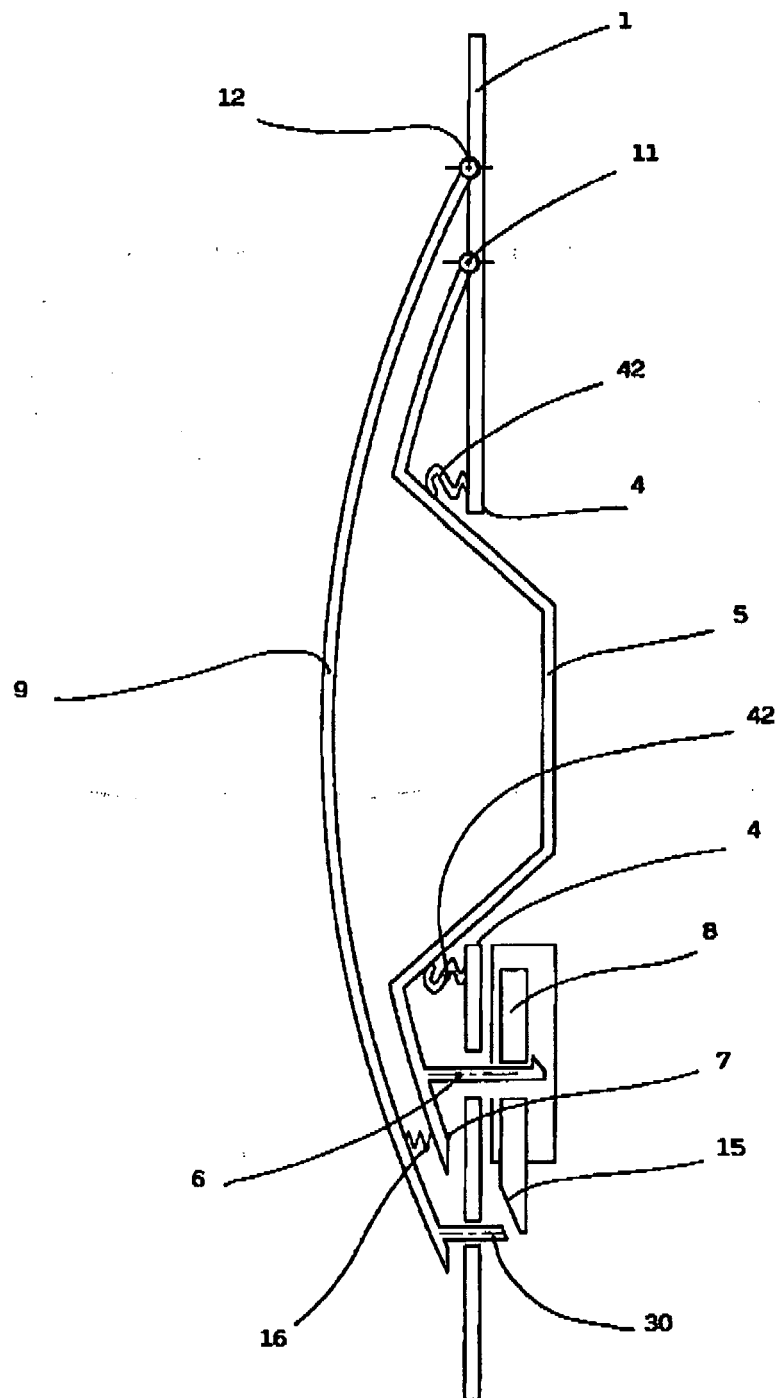


fig. 2

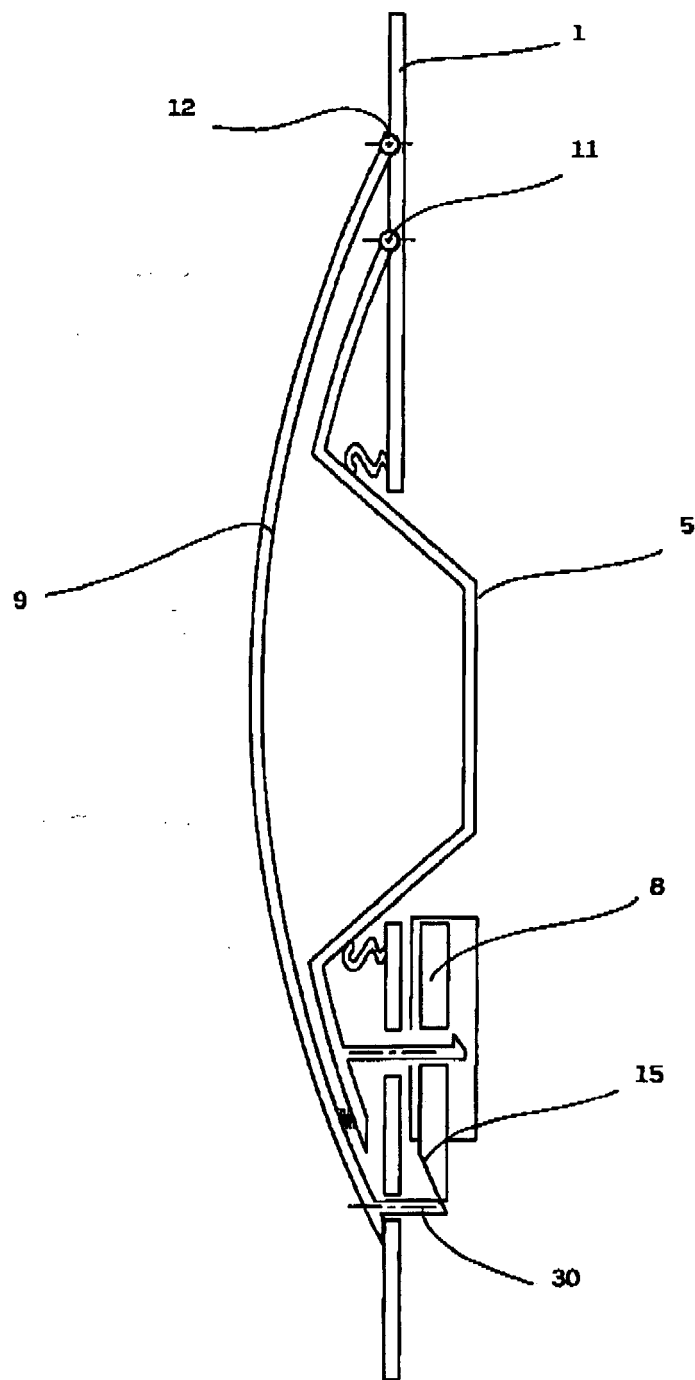


fig. 3

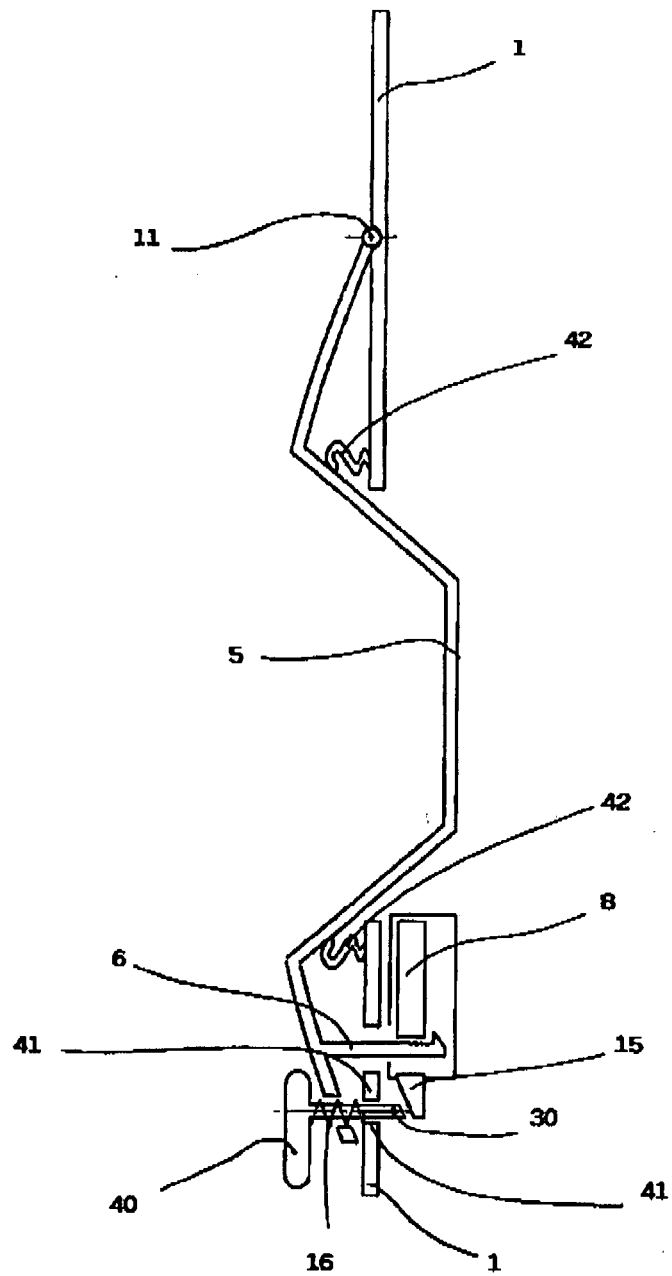


fig. 4

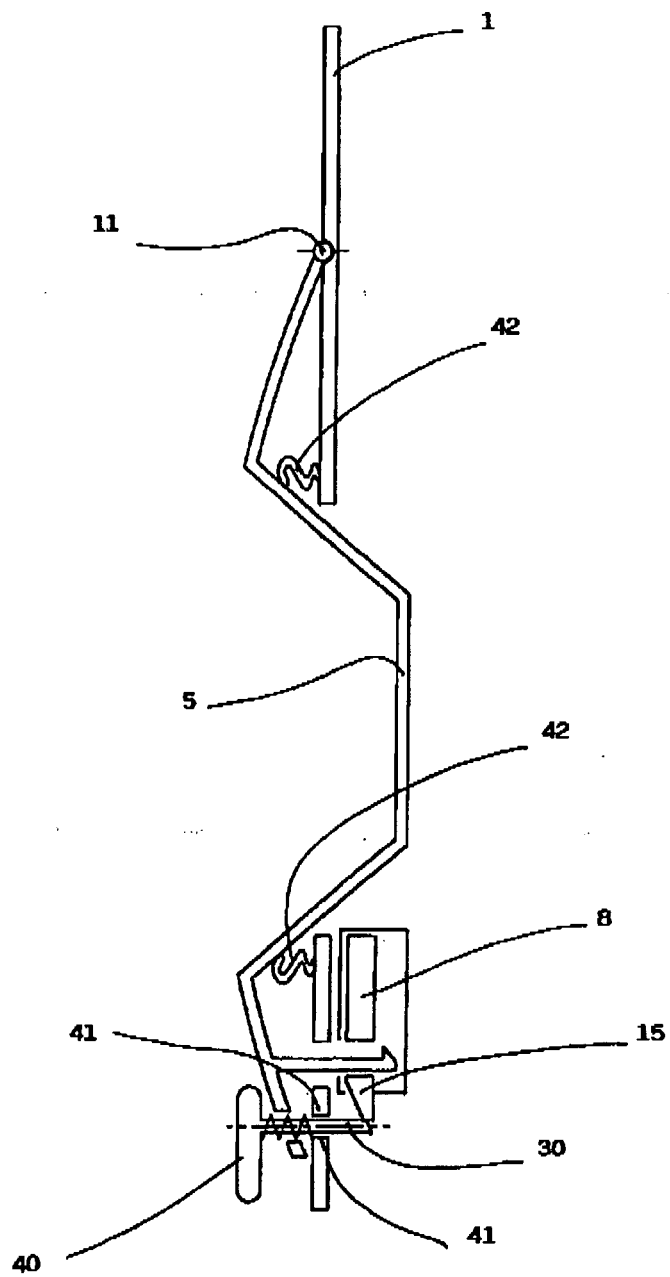


fig. 5



European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 07 00 3961

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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			TECHNICAL FIELDS SEARCHED (IPC)
			D06F
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 12 July 2007	Examiner DIAZ, M
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 07 00 3961

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
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