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DRAIN SYSTEM FOR LAUNDRY WASHING MACHINES

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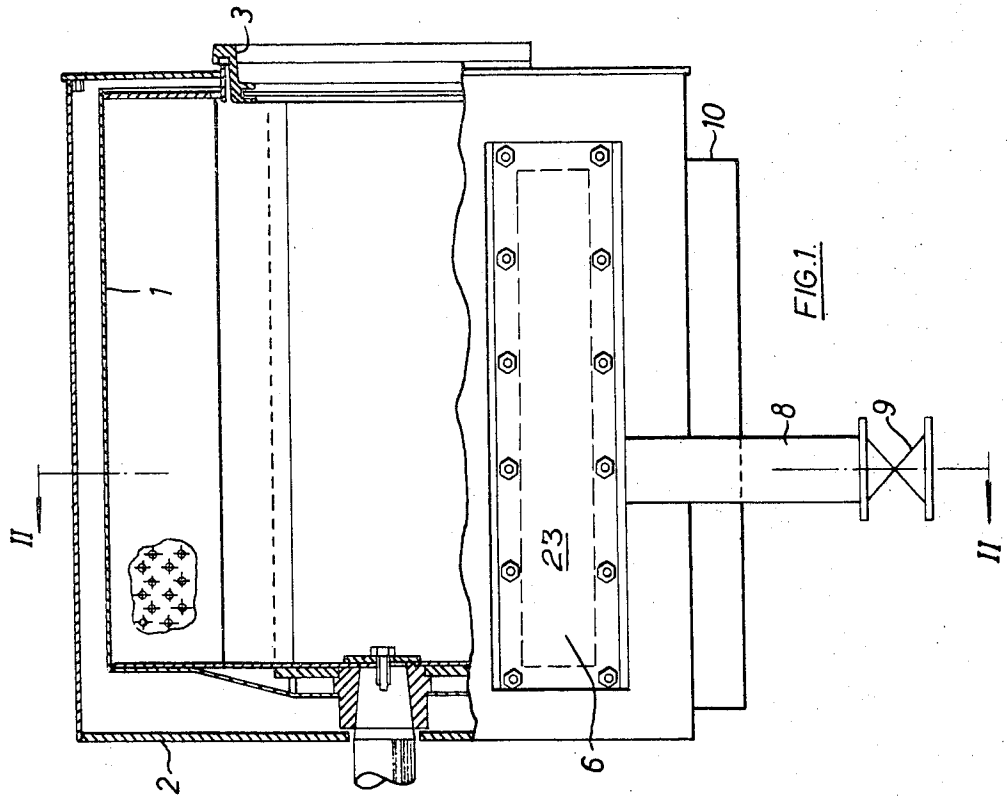

FIG. 1.

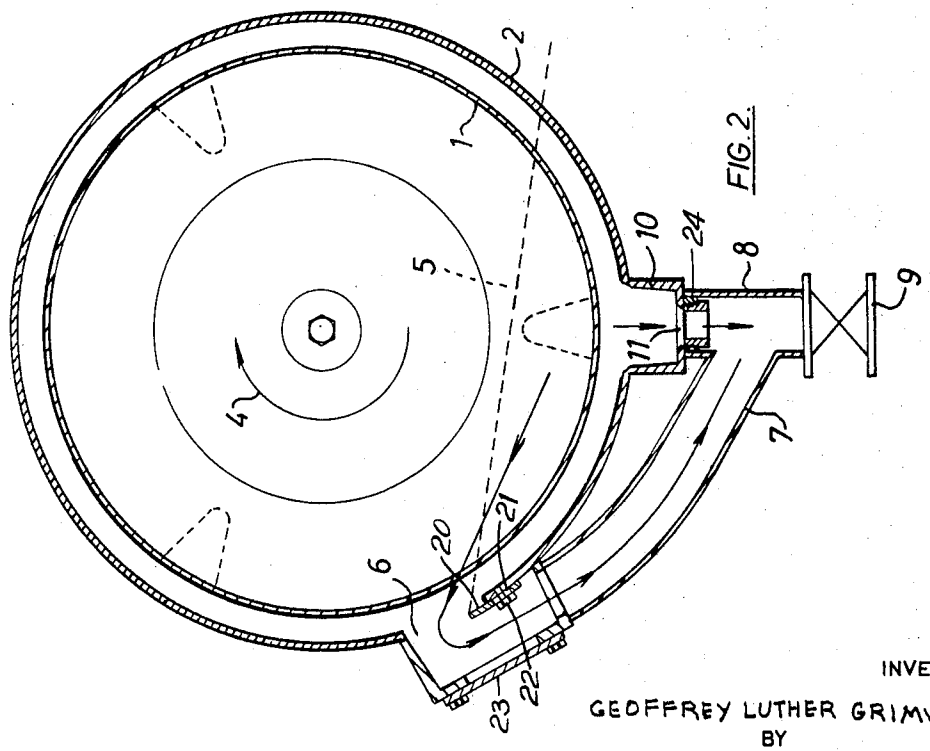

FIG. 2.

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DRAIN SYSTEM FOR LAUNDRY WASHING MACHINES

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U.S. Cl. 68—208 4 Claims

ABSTRACT OF THE DISCLOSURE

In a laundry washer extractor the casing **2** which encloses the rotary basket **1** has a valve controlled drain **8**, **9** which communicates restrictedly with the bottom **10** of the casing and communicates substantially unrestrictedly with a large port **6** located approximately at the optimum liquid level **5** at which for an average load the liquid should stand at the commencement of an extraction operation for the achievement of good distribution of the load about the basket and for the avoidance of unduly retarded acceleration and buffeting. The said large port is preferably provided at that side of the casing towards which the liquid level inclines upwardly.

The present invention relates to laundry washing machines and in particular to rotary washer extractors in which a reticulate cage or basket is rotatably mounted in a liquid receiving casing and can be rotated at a lower speed for washing a load of laundry and at a higher speed for the extraction of liquid from the load after washing or after rinsing.

In such machines it is customary to wash, rinse and extract without removing the load from the basket and the amount of liquid present in the basket at the beginning of any particular operation depends upon the nature of the load and upon the nature of the operation. Thus the level of the liquid in the basket immediately before an extraction operation might in some cases be near the axis of rotation of the basket and sometimes considerably lower.

During an extraction operation it is desirable that the load should be reasonably uniformly distributed about the circumference of the basket and this is best achieved by commencing the extraction operation with a quantity of liquid in the casing sufficient to assist in the distribution of the load about the basket. In the absence of a sufficient quantity of liquid at the commencement of an extraction operation the uniformity of the distribution of the load about the basket is likely to be poor and to give rise to vibration. On the other hand too much liquid present in the basket at the beginning of an extraction operation tends to retard to an unnecessary degree the acceleration of the basket and to give rise to violent buffeting in the casing.

In any particular washer extractor there will be for a particular duty an optimum level at which, for an average load, the liquid should stand at the commencement of an extraction operation for the achievement of good distribution of the load about the basket and for the avoidance of excessively retarded acceleration and buffeting.

In accordance with the present invention in a substantially horizontally-disposed laundry washing machine including a washing cycle and a spin drying cycle said machine having a casing, and a basket for receiving a load of articles to be laundered, bearing means being provided for mounting said basket for rotation thereon, and a door in said casing for allowing articles to be inserted into and removed from said basket, the improvement comprising;

a first drain channel in the lowermost position of said casing for extracting liquid from said casing, means defining in said first drain channel, a drain hole therein for restricting the flow of liquid therethrough, a common drain channel connected to said first drain channel, adjacent said drain hole, for receiving liquid from said drain hole, means, in said casing, defining an unrestricted port at a predetermined position upstream of said first drain channel in the direction of rotation of said basket, for allowing part of the liquid used in said machine during said washing, or a rinsing cycle, to be drained from said casing with the commencement of said spin drying cycle, a by-pass pipe connecting said unrestricted port with said common drain channel for allowing liquid drained through said unrestricted port to exhaust to said common drain channel, and valve means connected in said common drain channel for controlling the flow of liquid therefrom.

When a machine is equipped with a drain, the drain valve can be opened at the beginning of an extraction operation to enable liquid to escape quickly through said large port until it descends to said optimum level and thereafter to descend more slowly to afford an opportunity for the load to be uniformly distributed about the basket. Furthermore the presence in the casing of a volume of liquid descending slowly from said optimum level will serve to retard the acceleration of the basket while the distribution of the load about the circumference of the basket takes place.

The invention together with advantages and features thereof, will be best understood from the following description when read in conjunction with the accompanying somewhat diagrammatic drawings, in which:

FIG. 1 is a side view illustrating the casing and rotary basket of a laundry washing machine embodying the invention, and

FIG. 2 is a sectional view taken on the line II—II of FIG. 1.

In the drawings there is shown a substantially horizontally-disposed laundry washing machine having at least, a washing cycle, a rinsing cycle, and a spin drying cycle.

The washing machine includes a cylindrical reticulate basket **1** rotatably mounted on bearings, in a casing **2**. The basket **1** is provided with a door **3** at one end for loading and unloading of the machine. During the washing cycle, the basket **1** rotates first in one direction and then in the other at timed intervals. During the spin drying, or extraction cycle the basket rotates at a higher speed in the direction of the arrow **4**. As has been stated heretofore, it is desirable that with the commencement of the spin-drying, or extraction cycle, a predetermined, or optimum level of liquid should be present in the laundry washing machine. This optimum level is indicated by the inclined broken line **5** in FIG. 2.

In accordance with the invention a large unrestricted port **6** is defined in the casing **2** and the lowermost margin of said port **6** is arranged to coincide with said optimum level **5**. The port **6** communicates substantially unrestrictedly through a pipe by-pass **7** with a common drain **8** controlled by a valve means **9**. The casing **2** is provided at the bottom with a first drain channel **10** in which is formed a drain hole **11** which permits restricted communication between the first drain channel **10** and the common drain **8**.

If, at the end of the washing or rinsing cycle and, at the commencement of the spin-drying or an extraction cycle the liquid level in the casing is high, say approximately at the level of the axis of rotation of the basket **1**, then on opening of the valve means **9** the liquid will quickly escape through the large unrestricted port **6** and the by-pass pipe **7** until it descends to the level **5** whereupon the liquid will escape relatively slowly through the

drain hole **11** so as to keep a sufficient quantity of liquid in the casing long enough to enable rotation of the basket to achieve a reasonably uniform distribution of the load.

Means may be provided for altering the level of the lower edge of the port **6** and for altering the size of the drain hole **11** in order to enable a given machine to be adapted for different duties. For example the port **6** may be provided with an adjustable shutter or slide **20** whose upper edge defines the lower edge of the port **6** and which can be raised and lowered by means of its mounting slots **21** and screws **22**. Access to slide **20** for such adjustment may be provided by a removable cover plate **23**. Plates or threaded bushings **24** with drain holes of differing size may also be fixed in the drain channel **10** to vary the effective size of the drain hole.

While the invention has been described with reference to a particular embodiment it is to be understood that modifications may be made by persons skilled in the art without departing from the spirit of the invention or the scope of the appended claims.

I claim:

1. In a substantially horizontally-disposed laundry washing machine including a washing cycle and a spin drying cycle said machine having a casing, and a basket for receiving a load of articles to be laundered, bearing means being provided for mounting said basket for rotation thereon, and a door in said casing for allowing articles to be inserted into and removed from said basket, the improvement comprising; a first drain channel in the lowermost position of said casing for extracting liquid from said casing, means defining, in said first drain channel, a drain hole therein for restricting the flow of liquid therethrough, a common drain channel connected to said first drain channel, adjacent said drain hole, for receiving liquid from said drain hole, means, in said casing, defining an unrestricted port at a predetermined position upstream

of said first drain channel in the direction of rotation of said basket, for allowing part of the liquid used in said machine during said washing, or a rinsing cycle, to be drained from said casing with the commencement of said spin drying cycle, a by-pass pipe connecting said unrestricted port with said common drain channel for allowing liquid drained through said unrestricted port to exhaust to said common drain channel, and valve means connected in said common drain channel for controlling the flow of liquid therefrom.

2. A laundry washing machine as set forth in claim **1** wherein means are provided for altering the lower edge of said unrestricted port.

3. A laundry washing machine as set forth in claim **2** wherein said means for altering the lower edge of said port comprises an (adjustable member) the upper edge of which defines the lower edge of said port.

4. A laundry washing machine as set forth in claim **1** wherein said means defining said drain hole in said first drain channel is removable from said first drain channel.

References Cited

UNITED STATES PATENTS

2,412,078	12/1946	Breckenridge et al.	68—208 X
3,073,668	1/1963	Rothenberger	68—24 X
3,231,909	2/1966	Candor	68—208 X

FOREIGN PATENTS

1,227,426	3/1960	France.

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68—24