

Nov. 23, 1965

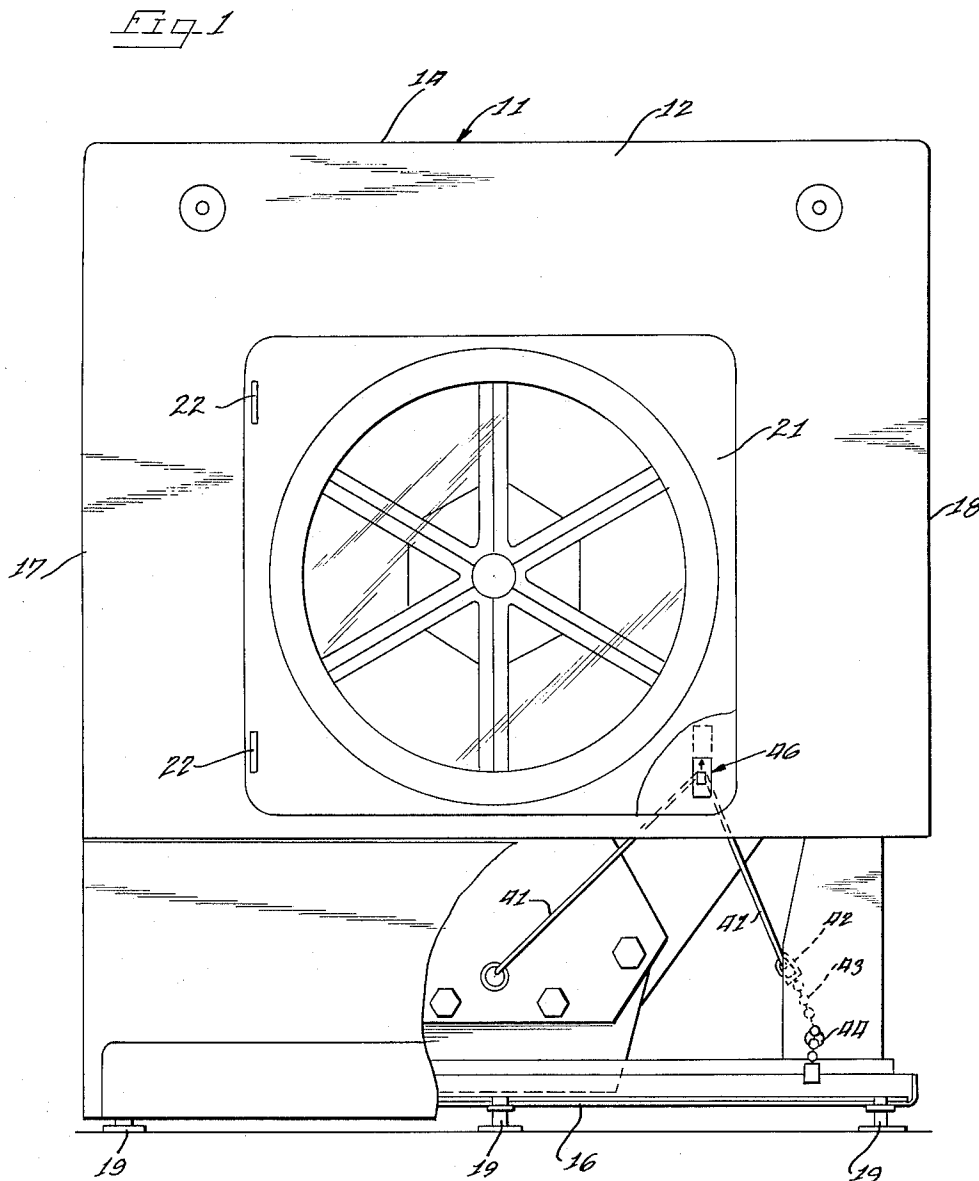
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3,219,773

KICK-OUT MECHANISM FOR EXTRACTOR

Filed May 28, 1962

4 Sheets-Sheet 1



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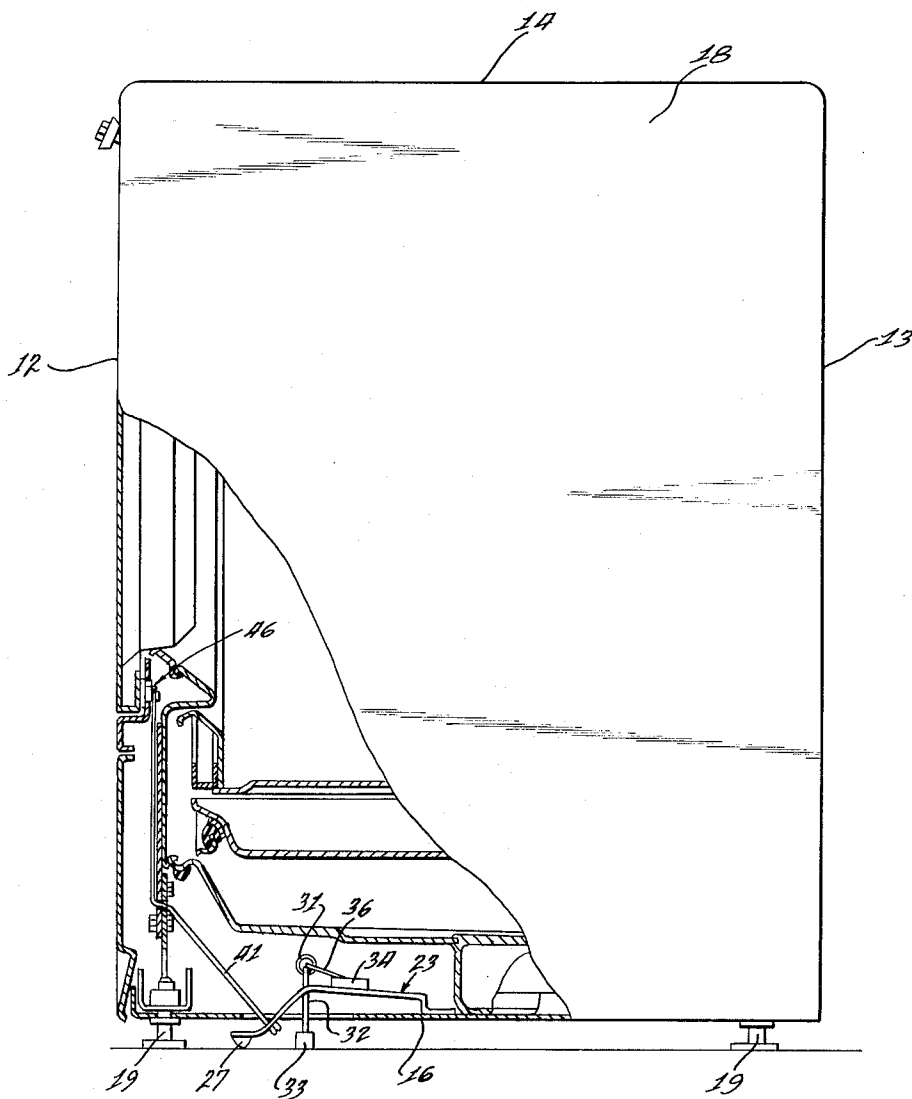
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KICK-OUT MECHANISM FOR EXTRACTOR

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Fig. 2



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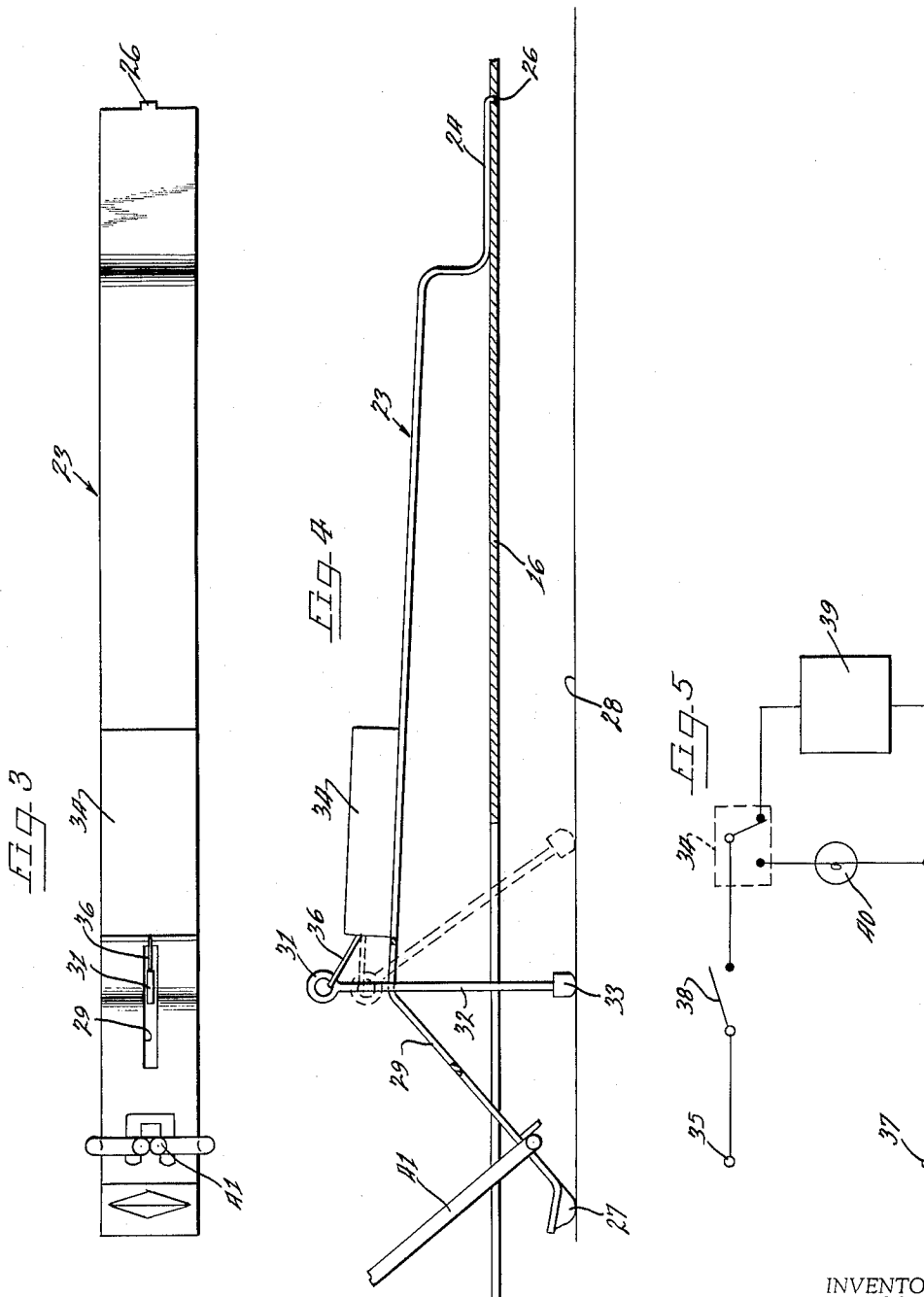
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KICK-OUT MECHANISM FOR EXTRACTOR

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4 Sheets-Sheet 4

Fig. 9

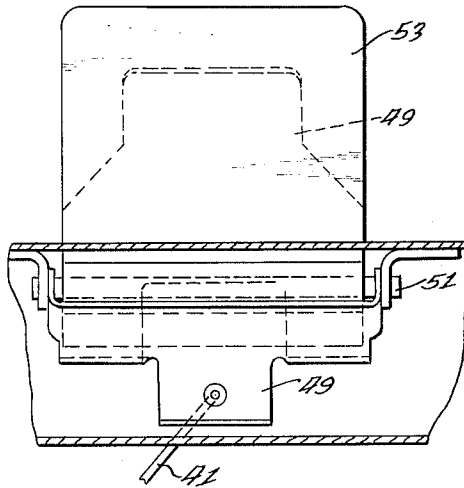


Fig. 10

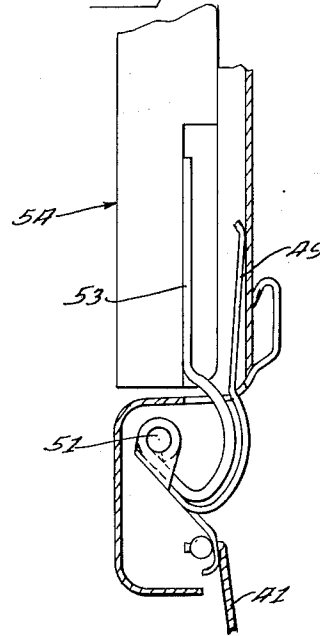


Fig. 6

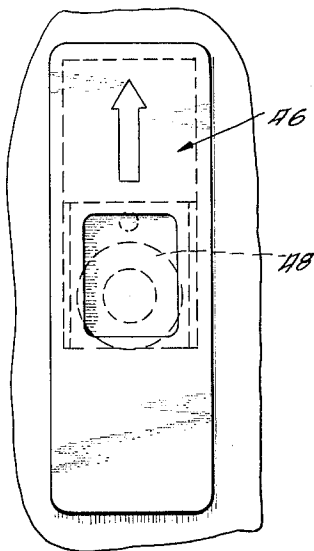


Fig. 7

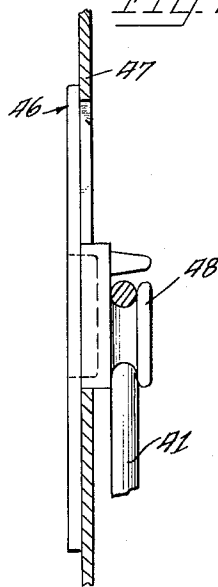
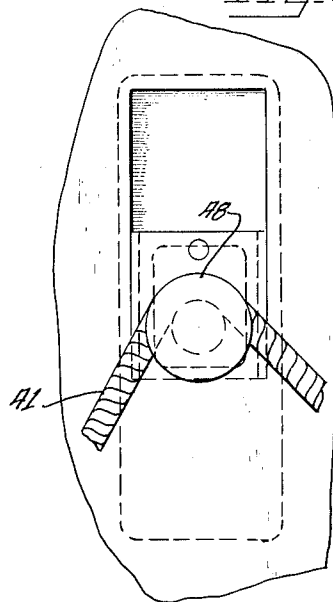


Fig. 8



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1

3,219,773

KICK-OUT MECHANISM FOR EXTRACTOR

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8 Claims. (Cl. 200—61.45)

The present invention relates to laundry equipment which may consist of a washer, an extractor, or a combination washer-dryer.

In any horizontal axis laundry machine having a period of high speed operation there is a tendency, during the high speed operation to create an off balance condition in the horizontal drum, creating a definite vibration problem. The vibration may become severe enough so that it actually wobbles the frame and may cause the machine to "walk" across the floor. Such excessive vibration is, of course, to be avoided since it is likely to result in serious damage to the machine and to its surroundings.

Accordingly, an object of the present invention is to provide a vibration sensing mechanism which detects conditions of excessive vibration and deenergizes the laundry machine.

Still another object of the invention is to provide a mechanical sensing means for inclusion in a laundry machine subject to excessive vibration, the sensing means being simple but durable.

A further object of the invention is to provide a sensing means for detecting excessive vibration of the laundry machine with respect to the floor or other means on which the machine is positioned.

A still further object of the invention is to provide a sensing means for detecting excessive vibration in combination with an improved reset mechanism to facilitate reenergizing the laundry machine after the sensing mechanism has been initially tripped.

Other objects and features of the present invention will become apparent to those skilled in the art from the following description of the attached sheets of drawings, in which:

FIGURE 1 is a front elevational view, partly broken away, of a laundry machine embodying the novel vibration sensing and reset mechanism of the present invention;

FIGURE 2 is a side elevational view, partly broken away, of the laundry machine assembly of FIGURE 1;

FIGURE 3 is a plan view of the vibration sensing device employed;

FIGURE 4 is a view in elevation of the vibration sensing device shown in FIGURE 3;

FIGURE 5 is a simplified wiring diagram of the electrical circuitry involved;

FIGURE 6 is a front elevational view of a type of reset mechanism which can be employed;

FIGURE 7 is a side elevational view of the reset mechanism of FIGURE 6;

FIGURE 8 is a rear elevational view of the reset mechanism illustrated in FIGURES 6 and 7;

FIGURE 9 is a front elevational view of another type of reset mechanism which can be employed with a bottom hinged door; and

FIGURE 10 is a side elevational view of the structure shown in FIGURE 9 plus the addition of the door.

As shown on the drawings:

In FIGURES 1 and 2, reference numeral 11 refers generally to a laundry machine having a frame structure including front and rear walls 12 and 13, top and bottom walls 14 and 16, and side walls 17 and 18. The frame structure is arranged to be positioned along a floor surface on vertically adjustable legs 19 extending from the front corners of the frame and the rear side of the frame. A

2

centrally located access door 21 mounted on hinges 22 is provided to permit entry into the interior of the cabinet.

The present invention is particularly concerned with an improved vibration sensing means which is shown in detail in FIGURES 3 to 8, and is shown in position in the laundry machine in FIGURES 1 and 2. Turning first to FIGURES 3 and 4 it will be seen that the sensing means includes a spring arm 23 having an end portion 24 rigidly secured to the base wall 16 of the frame assembly by means of spotwelding and a bent over marginal portion 26 which fits into a slot provided in the base wall 16 for that purpose. At the opposite end of the spring arm 23 there is provided a contact button 27, the natural resiliency of the spring arm 23 tending to bias the contact button 27 into engagement with the floor surface, generally indicated at numeral 28.

Intermediate its ends, the spring arm 23 is provided with a longitudinally extending slot 29. Passing through this slot is a gravity positioned actuating arm assembly having at one end a coupling such as a hook portion 31, a narrow central dependent member 32 which passes through the slot 29 and which is free to move vertically therein, and an enlarged end portion 33 which cooperates with dependent member 32 in acting as a plumb bob and tends to hold the actuating arm into a generally upright position when the end portion 33 is lifted away from the floor.

Also carried by the spring arm 23 is a double pole, single throw switch 34 having an operating arm 36 extending therefrom and engaging the hook 31 on the actuating arm. As long as the actuating arm is in its substantially upright position, as indicated in the solid line showing of FIGURE 4, the switch 34 is in the position in which it permits energization of the laundry machine. The simplified schematic circuit is illustrated in FIGURE 5 of the drawings, in which reference numerals 35 and 37 refer to the two sides of the input line, reference numeral 38 refers to the door interlock switch which is closed when the access door is closed, reference numeral 39 refers to the remainder of the machine circuitry, and reference numeral 40 has been applied to a reset warning lamp. As long as the actuating arm is in its substantially upright position, and the access door is closed, the power is thereby applied across the remainder of the machine circuitry indicated at numeral 39. When, however, the excessive vibration of the frame causes the actuating arm to become canted and eventually lodged in a non-upright position, as indicated in the dotted line showing of FIGURE 4, the switch 34 is actuated to remove the energization from the remainder of the machine circuits, and apply the line voltage across the warning light 40.

The device of the present invention also includes reset means for reenergizing the machine circuits after the cause of the vibration, such as an unbalanced load in the laundry basket, has been corrected. This reset mechanism includes a cable 41 having one end attached to the spring arm 23 and, at its other end, being secured by means of a ferrule 42 to a chain of the type normally employed in electric light sockets. The chain 43 is locked in variable position within a slot 44 provided in the frame to compensate for different heights of the legs 19 and also provides a position for shipment.

The spring arm 23 is lifted against the natural bias of the spring by means of a reset slide generally indicated at numeral 46 in FIGURE 1. The slide 46 is slidably mounted along a wall 47 in the interior of the laundry machine and includes a spool portion 48 about which the cable 41 is trained. Thus, the machine operator merely moves the slide 46 in an upward direction, thereby pulling the cable 41 upwardly which, in turn, lifts the spring arm 23, the actuator arm 36 and the actuating arm 32. When the slide 46 is released, the actuating arm comes to rest in

3

a substantially upright position as indicated by the solid line of FIGURE 4, and the electric power is reapplied to the machine circuits.

The reset mechanism shown in FIGURES 9 and 10 is particularly adapted for use with a bottom hinged door. In this embodiment of the invention, the cable 41 is connected to a reset lever mechanism 49 which in turn is connected to a hinge pin 51. A hinge member 53 is also arranged to pivot about the hinge pin 51 and is secured to the bottom opening door generally indicated at numeral 54. When the door 54 is opened, the reset lever comes into full view and, upon rotation of the lever 49 to the left as viewed in FIGURE 10, the cable 41 is drawn upwardly, thereby lifting the spring arm 23 and resetting the sensing mechanism.

From the foregoing, it will be seen that the present invention provides a simple but highly effective sensing mechanism for detecting conditions of excessive vibration. The device is easy to install and economical to manufacture but is highly reliable in operation.

It should be evident that various modifications can be made to the described embodiment without departing from the scope of the present invention.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. In a centrifugal extractor,
 - a frame structure including legs extending to a common plane,
 - said extractor being capable of being subjected to excessive vibration during operation of extractor of sufficient severity to cause "walking" of the extractor across a supporting surface,
 - a vibration-sensitive device to prevent "walking" comprising
 - a dependent member,
 - means connecting said dependent member to said frame structure for extending said dependent member to said common plane of said legs in a first substantially upright position but permitting movement of said dependent member to a non-upright position relative to said frame structure in response to any lateral movement of said frame structure due to excessive vibration,
 - switch means actuated by movement of said dependent member into a non-upright position, and circuit means controlled by said switch means to deenergize said extractor upon such movement of said dependent member due to the excessive vibration of said extractor.
2. In a centrifugal extractor,
 - a frame structure including legs extending to a supporting surface,
 - said extractor being subject to excessive vibration of sufficient severity to cause "walking" of the extractor across the supporting surface,
 - a vibration sensing device which comprises arm means carried by said frame structure,
 - a dependent member loosely received within said arm means to permit relative movement between said arm means and said dependent member,
 - said dependent member being movable from a first substantially upright position wherein said dependent member extends to said supporting surface to a second non-upright position in response to any lateral movement of said frame structure due to excessive vibration,
 - a switch controlled by said dependent member to deenergize said extractor when said dependent member deviates substantially from said upright position, and reset means carried by said frame structure and connected to said arm means to restore said dependent member to a substantially upright position.
3. In a centrifugal extractor susceptible to excessive vibrations during operation,
 - a frame structure including a plurality of supporting

4

- members positioned in a substantially common horizontal plane for engagement with a supporting surface,
 - a vibration sensing device which comprises a dependent member located on said frame structure for movement between a first upright position wherein said dependent member extends downwardly to said horizontal plane for engagement with said supporting surface and a second non-upright position when said frame structure moves laterally in said horizontal plane in response to excessive vibration,
 - and switch means controlled by the movement of said dependent member to deenergize said extractor when said dependent member deviates substantially from said upright position upon excessive vibration of said extractor.
4. In a centrifugal extractor having a frame structure including legs extending to a supporting surface and being subject to excessive vibration, a vibration sensing device comprising
 - arm means carried by said frame structure,
 - said arm means having a slot therein,
 - a dependent member extending through said slot and being capable of movement therein,
 - said dependent member extending to said supporting surface when in a substantially upright position,
 - a switch carried by said arm means and actuated by movement of said dependent member into a non-upright position,
 - circuit means controlled by said switch to deenergize said extractor upon such movement of said dependent member, and
 - reset means carried by said frame structure and connected to said arm means to restore said dependent member to a substantially upright position.
 5. In a laundry machine having a frame structure including legs extending to a supporting surface and being subject to excessive vibration, a vibration sensing device comprising
 - arm means carried by said frame structure,
 - said arm means having a slot therein,
 - a dependent member extending through said slot and being capable of movement therein,
 - said dependent member extending to said supporting surface when in a substantially upright position,
 - a switch carried by said arm means and actuated by movement of said dependent member into a non-upright position,
 - circuit means controlled by said switch to deenergize said machine upon such movement of said dependent member,
 - reset means carried by said frame structure at a position remote from said dependent member,
 - and cable means interconnecting said reset means and said arm means to restore said dependent member into a substantially upright position.
 6. In a laundry machine having a frame structure including legs extending to a supporting surface and being subject to excessive vibration, a vibration sensing device comprising
 - arm means carried by said frame structure,
 - said arm means having a slot therein,
 - a dependent member extending through said slot and being capable of vertical movement therein,
 - said dependent member extending to said supporting surface when in a substantially upright position,
 - switch means carried by said arm means and actuated by movement of said dependent member into a non-upright position,
 - circuit means controlled by said switch to deenergize said machine upon such movement of said dependent member, and

5

reset means carried by said frame structure at a position remote from said dependent member

said reset means including a slide and means connecting said slide to said arm means to lift said arm means upon movement of said slide and thereby restore said dependent member into a substantially upright position.

7. In a laundry machine having a frame structure including legs extending to a supporting surface and being subject to excessive vibration, a vibration sensing device comprising

arm means carried by said frame structure,

said arm means having a slot therein,

a dependent member extending through said slot and being capable of vertical movement therein,

said dependent member extending to said supporting surface when in a substantially upright position,

a switch carried by said arm means and actuated by movement of said dependent member into a non-upright position,

circuit means controlled by said switch to deenergize said machine upon such movement of said dependent member, and

reset means carried by said frame structure at a position remote from said dependent member

said reset means including a pivotally mounted lever,

and means connecting said lever to said arm

means to lift said arm means upon pivotal movement of said lever and thereby restore said dependent member in its substantially upright position.

8. In a laundry machine having a frame structure including legs extending to a supporting surface and being subject to excessive vibration, a vibration sensing device comprising

a spring arm mounted on said frame structure and having one end extending to said supporting surface,

6

said spring arm biasing said one end toward said surface,

said spring arm having a longitudinally extending slot therein,

a dependent member extending through said slot and having a coupling at the upper end thereof,

the lower end of said dependent member extending to said surface with said dependent member extending through said slot in a generally upright position,

a switch carried by said spring arm, means connecting a switch carried by said spring arm,

means connecting said switch to said coupling on said dependent member,

circuit means controlled by said switch to deenergize said machine when said dependent member is dislodged from its substantially upright position by vibration of said frame structure,

and reset means on said frame structure mechanically coupled to said spring arm to raise said spring arm and thereby restore said dependent member to its substantially upright position.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,219,773

November 23, 1965

Lewis L. Miller et al.

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 6, line 11, strike out "a switch carried by said spring arm, means connecting".

Signed and sealed this 18th day of October 1966.

(SEAL)

Attest:

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Attesting Officer

EDWARD J. BRENNER

Commissioner of Patents