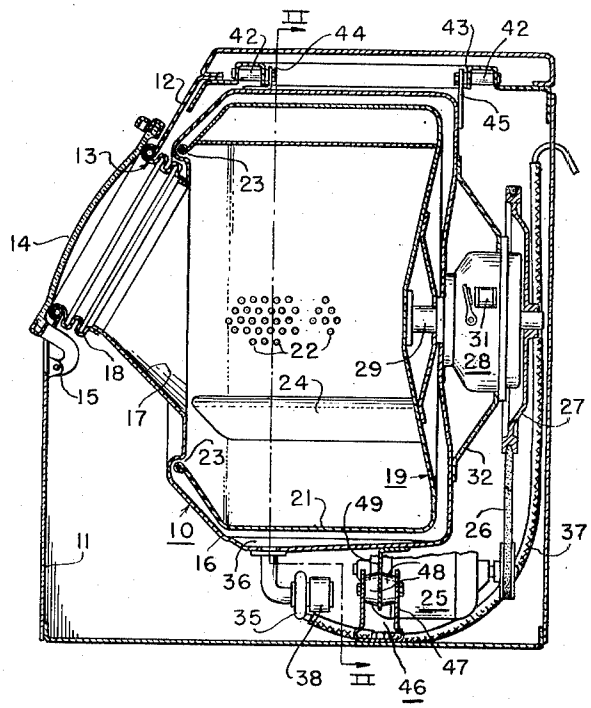
Nov. 19, 1957 E. K. CLARK 2,813,415

LAUNDRY APPARATUS

Filed Oct. 20, 1953

FIG. 1.



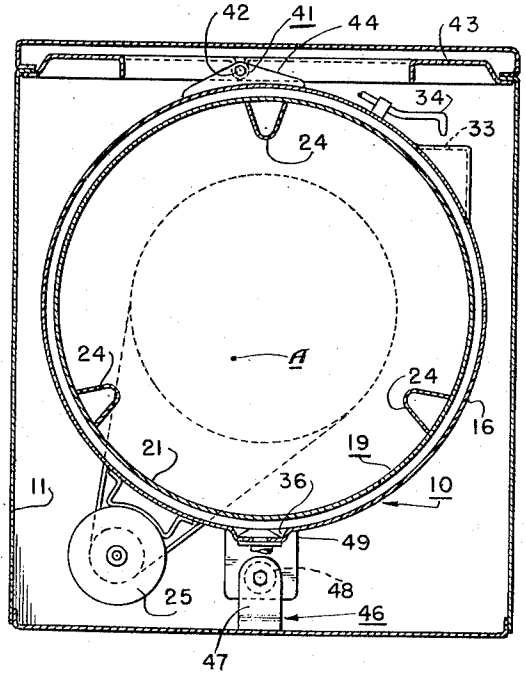


FIG. 2.

INVENTOR

EARL K. CLARK

BY

ATTORNEY

United States Patent Office 2,813,415 Patented Nov. 19, 1957

2,813,415

LAUNDRY APPARATUS

Earl K. Clark, Mansfield, Ohio, assignor to Westinghouse Electric Corporation, East Pittsburgh, Pa., a corporation of Pennsylvania

Application October 20, 1953, Serial No. 387,108
3 Claims. (Cl. 68—24)

This invention relates to a rotary cylinder type machine for washing fabrics and for subsequently centrifuging cleaning fluid therefrom and has for an object to provide improved apparatus of this kind.

A further object of the invention is to provide a relatively low cost, free standing, machine of the type set forth.

A relatively low cost free standing washing and spinning machine has been proposed in which the flexible supporting structure for the washing and spinning unit, a costly item, has been eliminated and the unit rigidly fixed to the housing or supporting base. This, of course, necessitates a slower centrifuging speed than that prevailing in flexibly supported machines with the result that extraction of water from the clothes is substantially reduced. In a combined machine for washing, spinning and air drying of the clothes, to which my invention is particularly adaptable, this means that a longer drying period or more heat is required and, in a conventional washing and centrifuging machine, longer periods of drying in a separate dryer or on the line are necessary.

I have found that, in domestic washing and centrifuging machines of the type having a tumbling cylinder of the so called horizontal axis type, an unbalance of the load in the cylinder will cause sliding or shifting of the machine upon the floor before tipping or lifting of the machine occurs. This condition prevails because the horizontal forces excited by the unbalance may be sufficient to slide the machine upon an ordinary floor while the vertical forces are insufficient to overcome the mass of the machine with the resultant tipping or lifting of the machine.

In accordance with my invention, I provide a low cost support for the washing and spinning unit capable of isolating to a degree the horizontal alternating forces but which does not materially affect the vertical forces. This support includes a fixed pin carried by the housing from which the washing and spinning unit is suspended in pendulum like fashion. The pin is elevated above the center of gravity of the unit and damping of the oscillations of the unit may be provided preferably by a dry friction damping device. The oscillations of the unit about the pin are arcuate but mainly horizontal as the amplitude of vibration is so low that the vertical component of the arcuate movement is negligible. By suspending the washing and spinning unit as described, I have been able to increase the centrifuging speed over a construction wherein the unit is rigidly secured to its base. The speed is determined by the mass of the unit and the expected unbalance and may be set at a value just below that at which translation of the machine occurs. The isolation of the horizontal forces reduces the alternating forces applied to the base such that no sliding of the machine upon ordinary floors occurs.

The foregoing and other objects are effected by the invention as will be apparent from the following description taken in connection with the accompanying drawings, forming a part of this application, in which:

Fig. 1 is a vertical longitudinal section taken through a washing and centrifuging machine constructed and arranged in accordance with the invention; and

Fig. 2 is a vertical transverse section taken along the line II—II of Fig. 1.

In the drawing, a clothes washing and centrifuging machine is disclosed having a cylindrical basket rotated about

a generally horizontal axis at low speed for washing the clothes and at higher speed for spinning fluid therefrom. The machine disclosed carries out washing and spinning steps only but it will be understood that the invention may be applied equally well to machines for effecting other cycles such as, for example, one wherein the clothes are subjected to heated air after the spinning step for the complete drying of the clothes. In fact, the invention is particularly applicable to the latter program of steps as the final drying step by heated air is facilitated by the improved centrifuging afforded by the invention. However, for the sake of brevity and clearness, the invention is disclosed applied to a machine wherein only centrifuging follows the washing step.

Referring now to the drawing, the machine disclosed includes a washing and centrifuging unit, generally indicated at **10** and arranged within a housing **11**, the front wall of which includes an upper portion, shown at **12**, inclined rearwardly and upwardly. An access opening **13** is formed within the front wall portion **12** and is closed by a suitable door **14** hinged, as shown at **15**, to the housing **11**.

The washing and spinning unit **10** includes a tub **16** generally cylindrical in configuration and having an inclined chute **17** formed in the front wall thereof through which access is had to the interior of the tub. As described hereinafter, the washing and spinning unit **10** is movable relative the housing **11** and, therefore, a resilient tubular member **18** is connected at its ends to the wall **12** and the chute **17** peripherally of the openings therein.

Arranged within the tub **16** is a generally cylindrical clothes basket **19** having a perforate side wall **21**. The latter is perforate throughout substantially its extent, a few of the perforations being indicated at **22**. The basket **19** is also provided with an access opening **23** the front side thereof in registry with the chute **17**. A plurality of radially inwardly extending vanes **24** are disposed within the basket for the tumbling of the fabrics during a washing period, all of which is well understood.

The basket **19** is driven at relatively low and high speeds for the washing and spinning of the fabrics by an electric motor indicated at **25** and secured in any suitable manner to the tub structure. The motor **25** is belted, as shown at **26**, to the driving sheave **27** of an adjustable two-speed transmission, indicated generally at **28**. The driven element of the transmission **28** is indicated at **29** connected to the basket for the support and rotation thereof. High and low speed operation of the transmission **28** is provided by a solenoid **31**. It will be assumed that when deenergized, the solenoid **31** provides for low speed operation of the basket and, when energized, provides for high speed operation. As the construction and operation of the adjustable solenoid operated two-speed mechanism shown at **28** are well understood in the art, no further description is deemed necessary. A suitable two-speed mechanism of the type shown at **28** is disclosed in the Patent No. 2,284,047 of H. E. Edwards, granted May 26, 1942. As shown, the two-speed mechanism **28** is carried by the rear wall structure **32** of the tub **16**.

Washing water is admitted to the tub **16** and basket **19** in any suitable manner. As shown, an opening **33** is provided in the tub at one side thereof through which the water is projected by a conduit **34**, the end of which terminates in spaced relation with the tub structure to provide an air gap, as shown in Fig. 2. It will be understood that the conduit **34** connects with a suitable water source under control of a valve (not shown).

Vitiated water is discharged from the tub by a pump indicated at **35**, the inlet of which is connected to a sump **36** formed at the bottom of the tub **16**. The water discharged by the pump **35** is conveyed by a flexible conduit

or hose **37** to a suitable drain. The pump may be operated in any suitable manner such as, for example, by means of a small motor **38**. It will be understood from the description that the pump **35** is flooded at all times that water is retained in the tub and that the water level in the discharge conduit **37** corresponds to the level of the water in the tub **16**. At this time, of course, the pump is idle. The water is discharged from the tub by energizing the pump motor **38**.

In the operation of the machine as described up to the present, the fabrics being treated are elevated by the rotated vanes to an upper region of the basket **19** and are dropped clear of and across the basket into the body of washing fluid. This continued elevating and dropping of the fabrics in the fluid effectively removes the soil from the fabrics. At the conclusion of the washing operation, the pump **35** is energized and the body of washing fluid is discharged to drain. At the conclusion of this operation, the solenoid **31** of the transmission is energized and the basket **19** is accelerated to its centrifuging speed. During acceleration, the fabrics stop tumbling within the basket gradually and are distributed in an annulus within the side wall **21** of the basket. Since it is practically impossible to uniformly distribute the fabrics, an out of balance load results which excites vibrations in the suspended washing and spinning unit **10**.

While vibrations in all modes are excited in the suspended structure, the most serious vibrations are those acting generally horizontally in a direction normal to the axis of the basket. It is these vibrations which tend to slide the cabinet upon the floor or foundation carrying the washer. Vertical vibrations or alternate forces imparted to the housing tend to lift or tilt the housing upon the floor. I have found that, in free-standing apparatus of this general type, the operating speed is determined by the horizontal alternating forces rather than the vertical. In other words, on most floors the machine will slide upon the floor before tipping occurs. The tipping of the machine is, of course, restrained by the mass of the machine.

In accordance with my invention, an improved pivotal support **41** for the suspended unit **10** is provided wherein the horizontal alternating forces excited in the unit are isolated from the housing **11** to an extent without materially affecting the vertical forces. As shown, the pivotal support includes a pair of pins **42** which are axially aligned and carried by a hanger plate **43**, the latter being fixed to the upper portion of the housing **11** in any suitable manner. A pair of webs **44** and **45** are welded or otherwise secured to the tub **16** and are pivotally suspended by the pins **42**.

From the foregoing description, it will be apparent that the unit **10** may swing generally horizontally within the housing but that there is practically no flexibility in vertical direction. The axis of the pins **42** is disposed above the center of gravity of the suspended unit, which is located approximately at the point A in Fig. 2. The amplitude of the vibrations of the suspended unit **10** may be dampened in any well known manner. As shown, a dry friction type of damper is indicated at **46**. This damper includes a U-shaped spring **47**, the ends of which carry respective dampening shoes **48**. The shoes **48** frictionally engage a damper plate **49** welded or otherwise secured to some portion of the suspended structure **10**. As shown, the plate **49** is fixed to the bottom of the tub **16**.

From the foregoing description, it will be apparent that I have provided a low cost free-standing washing and centrifuging machine wherein the washing and centrifuging unit is suspended in pendulum fashion from the housing for the isolation of generally horizontal vibrations excited in the unit. As set forth, it is these horizontal forces which limit the speed of a free standing machine of this type so that, their isolation from the housing or base permits an increased centrifuging speed and, therefore, an increase in the amount of fluid extracted from the fabrics.

While the invention has been shown in but one form, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various changes and modifications without departing from the spirit thereof.

What is claimed is:

1. In apparatus for cleaning fabrics and for subsequently centrifuging cleaning fluid therefrom, the combination of a tub for containing cleaning fluid, a perforate basket disposed within the tub for containing the fabrics, means carried by the tub for rotating the basket about a generally horizontal axis at relatively low and high speeds for respectively cleaning the fabrics and centrifuging cleaning fluid from the fabrics, means for admitting cleaning fluid to the tub, means for discharging vitiated fluid from the tub, said tub, basket and rotating means forming a unitary structure, a housing enclosing a unitary structure, and a pivot pin carried by the housing and suspending said unitary structure from the housing; said pin providing for oscillating, pendulum-like movements of the unitary structure about the axis of the pin, said axis being substantially parallel to the axis of the basket and spaced vertically above the center of gravity of the unitary structure.

2. In apparatus for cleaning fabrics and for subsequently centrifuging cleaning fluid therefrom, the combination of a housing having an access opening in the front side thereof, a unit structure arranged within the housing and including a tub for containing washing water, a perforate basket for containing the fabrics to be treated and journalled in the tub for rotation about a generally horizontal axis and adjustable means for rotating the basket at relatively low and high speeds for respectively washing the fabrics and centrifuging water from the fabrics, means for admitting water to the tub, means for discharging vitiated water from the tub, said tub and basket having registering access openings adjacent the access opening of the housing, a flexible tubular wall connecting the housing and tub peripherally of the access openings thereof and permitting relative movement between the unitary structure and the housing, a pin carried by the housing and suspending the unitary structure, said pin having its axis spaced vertically above the center of gravity of the unitary structure and substantially parallel to the axis of the basket, the construction and arrangement being such that vertical vibrations of the unitary structure relative the housing are restricted by said pin while horizontal vibrations are afforded and means for damping vibrations of the unitary structure.

3. In apparatus for cleaning fabrics and for subsequently centrifuging cleaning fluid therefrom, the combination of a tub for containing cleaning fluid, a perforate basket disposed within the tub for containing the fabrics, means carried by the tub for supporting the basket for rotation about a generally horizontal axis, means for actuating the basket about said axis at relatively low frequency for cleaning the fabrics and for rotating the basket about the axis at relatively high frequency for centrifuging cleaning fluid from the fabrics, said tub and basket forming a unitary structure, a supporting frame for the unitary structure and a pivot pin carried by the frame and suspending said unitary structure from the frame; said pin providing for oscillating pendulum-like movements of the unitary structure about the axis of the pin, said pin being substantially parallel to the axis of the basket and spaced vertically above the center of gravity of the unitary structure.

References Cited in the file of this patent

UNITED STATES PATENTS

2,296,257	Breckenridge	Sept. 20, 1942
2,352,363	Bassett	June 27, 1944
2,356,818	Bruckman	Aug. 29, 1944
2,526,048	Russell	Oct. 17, 1950
2,645,548	Kreitchman et al.	July 14, 1953