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ADJUSTABLE VIBRATION SENSING MEANS FOR LAUNDRY MACHINES

Filed Aug. 3, 1955

2 Sheets-Sheet 1

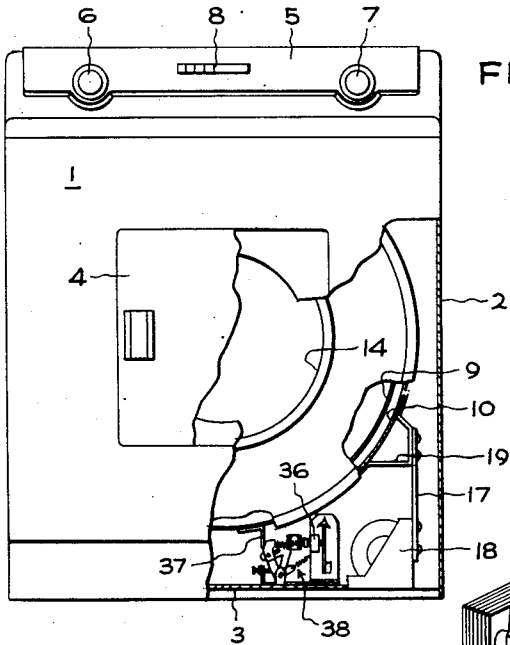


FIG. 1

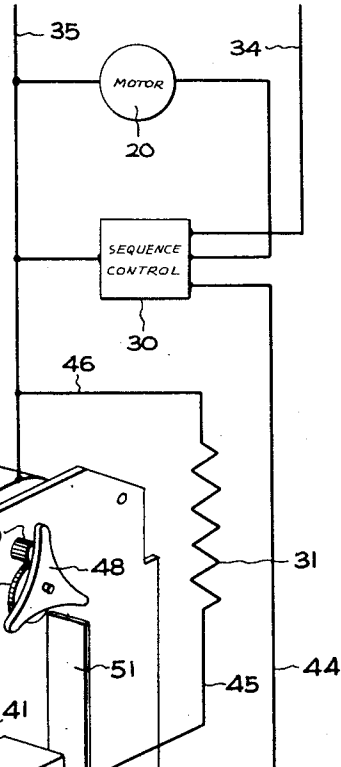
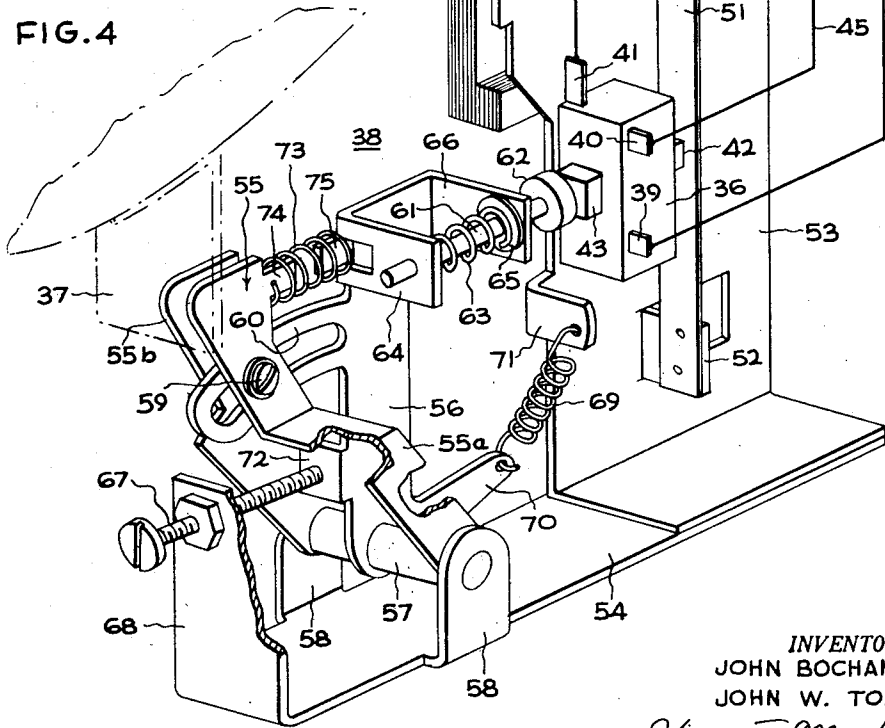


FIG. 4



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2 Sheets-Sheet 2

FIG. 2

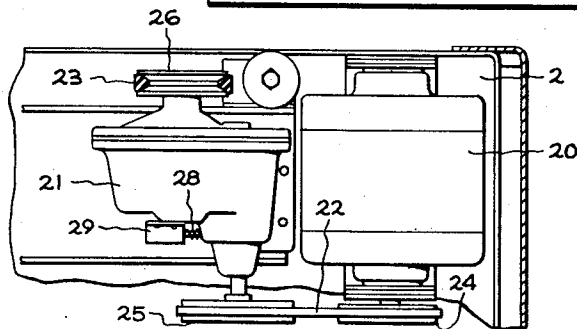
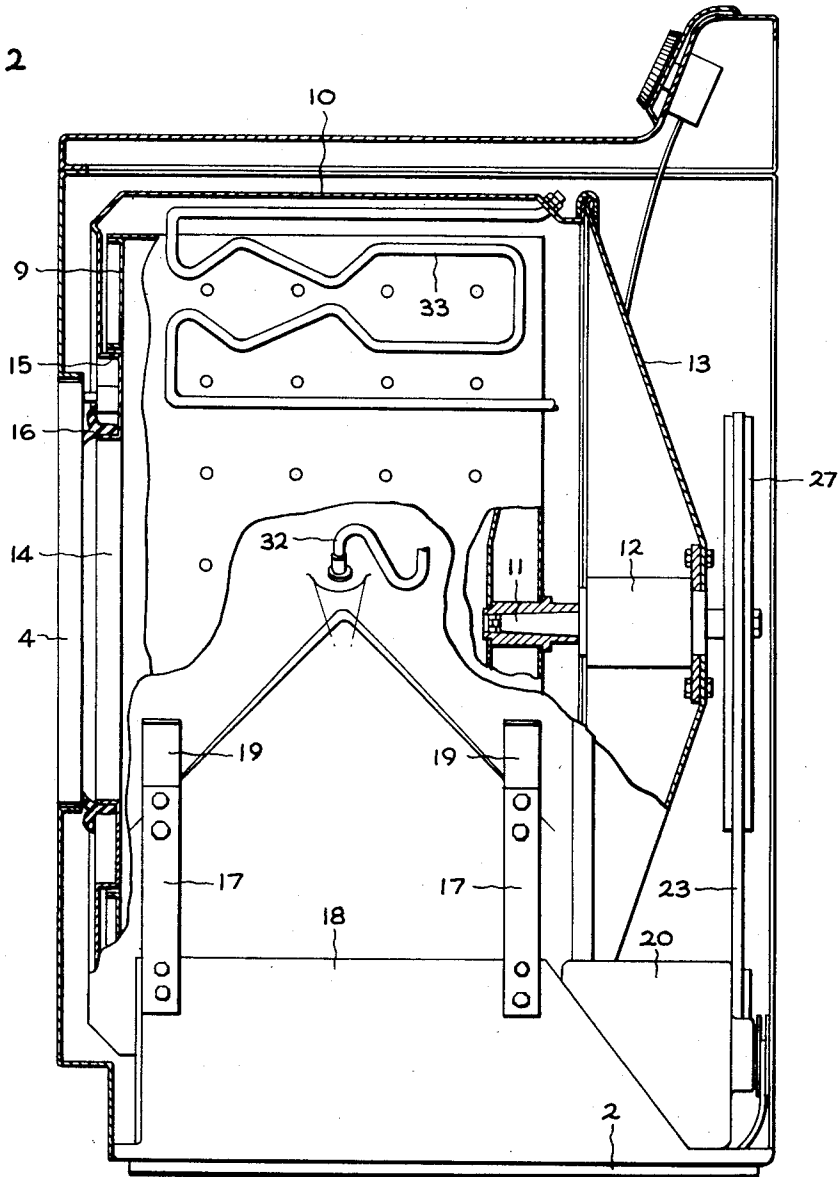


FIG. 3

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ADJUSTABLE VIBRATION SENSING MEANS FOR LAUNDRY MACHINES

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Application August 3, 1955, Serial No. 526,103

6 Claims. (Cl. 68—24)

Our invention relates to automatic laundry machines of the type of which the clothes basket is rotated at one speed for clothes tumbling and at a higher speed for centrifugal extraction; and more particularly it relates to the means included in such machines for preventing the higher speed rotation until the basket is properly balanced to eliminate excessive vibration.

When an automatic laundry machine of the rotating basket type proceeds from a washing or rinsing step into a centrifugal extraction step, vibration of the rotating basket and its enclosing tub structure increases substantially unless the clothes distribute themselves evenly around the basket. Unless the clothes are approximately evenly distributed, the basket is dynamically unbalanced and depending upon the degree of unbalance, excessive vibration may occur. To prevent excessive vibration one method of control has been to measure or sense the vibration as the basket proceeds into the higher speed operation. If the vibration is excessive, a suitable switch is automatically operated so as to change the speed control circuit and return the basket to its lower speed. This gives the clothes a chance to reorient themselves within the basket at the lower speed. After a suitable time delay the same switch is operated reversely or other switch means are thrown so as to return the speed control to its other condition and attempt again the higher speed operation. Usually, the clothes will then distribute properly so that the centrifugal extraction may proceed without delay. If, however, they do not, the basket is once more returned to the lower speed operation to allow them to reorient again. This action repeats until the clothes do distribute evenly enough to reduce vibration to an acceptable level.

To form a suitable control the vibration sensing or unbalance switch may be so arranged that it is operated on a predetermined vibration of the tub structure relative to the stationary base of the machine. In a simplified arrangement the switch is either mounted on the stationary base of the machine and operated by means mounted on the vibrating tub, or else it is mounted on the vibrating tub and is operated by its own movement against means secured on the base. The switch actuating means secured to the opposite member from the switch may, for example, comprise a bracket or an integral portion of the base or the tub structure.

For proper operation in this type arrangement the unbalance switch on the tub or the base and the bracket or other actuating means on the opposite member must be so associated that a predetermined amount of vibration of the tub results in the switch being thrown. If the relationship of the switch and the actuating means is not determined accurately, either a small acceptable tub vibration will throw the switch or else too great a vibration will be required before it is operated. Since the permissible vibration of the tub beyond which the switch should be thrown is ordinarily very small, for example, thirty (30) thousandths of an inch in amplitude, even slight variations from the desired relationship results in the switch

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not being operated at the proper time. However, in the mass production of laundry machines it is extremely difficult to build the machines so that the spacing between the actuating means and the switch is exactly the same from machine to machine. The sizes of parts and the work of assemblers vary somewhat from machine to machine so that slight differences occur in the spacing. Further, even if the actuating means and the switch are properly positioned and aligned after the machines are assembled, shocks occurring during shipment may throw them seriously out of their original relationship.

Accordingly, it is a primary object of our invention to provide a new and improved switch operating device for interposition between the unbalance switch and its actuating means, which device may be simply and easily adjusted after shipment to correct for variations in spacing and insure operation of the unbalance switch at a predetermined amount of vibration of the tub.

It is another object of our invention to provide a switch operating device of this type which after an initial adjustment in the factory is placed in its final correct adjustment after shipment simply by the loosening and tightening of a single screw.

In carrying out our invention we provide a laundry machine having a clothes basket rotatable at a plurality of speeds and a vibration sensing or unbalance switch for returning the basket temporarily to its lower speed if excessive vibration occurs as it is shifted to a higher speed. The switch is mounted either on the tub structure enclosing the basket or on the stationary base structure of the machine, and suitable actuating means are provided on the other of these structures. By our invention we interpose between the switch and the actuating means a novel switch operating device which may be readily adjusted after the shipment of the machine to insure that the switch is operated at the limit of the permissible vibration of the tub structure. The operating device comprises a scissors arrangement which is mounted on the same one of the tub and base structures as the switch. The scissors includes a first pivoted arm for engaging the bracket or other actuating means and a second pivoted arm connected to the first arm for operating the switch. A spring disposed between the arms biases the first arm towards the actuating means, and adjustable means are provided for pre-setting the second arm with a predetermined relationship between it and the switch.

To adjust the scissors so that the switch is operated at the selected amplitude of vibration of the tub, the relationship between the second arm and the switch is set at the factory so the second arm operates the switch when relative movement occurs therebetween equal to the selected amplitude. Then after shipment the means connecting the two arms is first released and then retightened. The releasing of the connecting means allows the spring between the arms to move the first arm against the actuating means without changing the relationship between the second arm and the switch, and the retightening maintains the resultant angle between the two arms thereafter. In this manner changes in spacing between the switch and the actuating means caused by shipment are corrected for, so that upon vibration of the tub above the permissive limit, the switch is operated to return the basket temporarily to its lower speed rotation.

The features of our invention which we believe to be novel are set forth with particularity in the appended claims. Our invention itself, however, may be best understood by reference to the following description taken in conjunction with the accompanying drawings in which:

Fig. 1 is a front elevational view of a domestic laundry machine incorporating a preferred embodiment of our adjustable vibration sensing means, certain surfaces of

the view being broken away in order better to illustrate details;

Fig. 2 is a side elevational view of the machine of Fig. 1, with the side panel removed and with certain surfaces broken away;

Fig. 3 is a fragmentary plan view of the drive means included in the machine; and

Fig. 4 is a perspective view of the embodiment of our vibration sensing means incorporated in the machine, the view also showing in schematic form a suitable control circuit for use therewith.

Referring now to Fig. 1 we have shown therein a domestic laundry machine 1 comprising a combination washer and dryer. The machine 1 includes an outer cabinet 2 which is mounted on a supporting base structure 3. Access to the machine for the loading and unloading of clothes is provided by a hinged door 4 mounted in the front wall of the cabinet. A backplasher 5 mounted at the top of the cabinet serves as the mounting means for suitable operator controls for the machine. These controls may, for example, comprise the rotatable dials 6 and 7 and the pushbuttons 8.

The machine 1 is of the type which includes a clothes basket rotatable about a non-vertical axis. Specifically, it includes a perforated basket 9 which is disposed for rotation about a generally horizontal axis. The basket 9 is mounted within an imperforate tub structure 10 which encloses it on all sides. The basket is rotatably supported from the tub structure by a horizontally extending shaft 11 which is mounted in an elongated bearing 12 hung from the rear wall 13 of the tub structure (see Fig. 2). The shaft 11, as well as supporting the basket, also serves as the means for turning it during the operation of the machine. The tub and the basket are provided respectively with openings 14 and 15 in the front walls thereof, which are aligned with the door opening in the front wall of the cabinet 2 so that clothes may be placed into or removed from the basket. The door 4 seals against a gasket 16 around the tub opening 14 to close off the tub completely during the operation of the machine.

The tub 10 is supported from the base 3 by means of a plurality of brackets or arms 17 which are mounted on upstanding plates 18 fixedly attached to the base 3. Four of these arms 17 are provided, two being secured to each side of the tub. The arms on the opposite sides of the tub are spaced apart as shown in Fig. 2 so that the tub in effect is supported near its front and near its rear on each side thereof. Although the arms 17 can be secured directly to the wall of the tub 10, preferably and as shown, the arms 17 are attached thereto by means of suitable brackets 19. With the tub 10 supported in the manner shown, it is able to vibrate sideways in a plane parallel to the front of the machine if the basket 9 should be unbalanced during a high speed rotation thereof. The arms 17 are relatively long compared to their width and they flex so as to allow slight sideways vibration of the tub relative to the base 2. However the arms 17 are effective substantially to prevent vibration of the tub both from front to rear and in the vertical direction. The arms are not flexible in those directions so that normally front to rear and up and down vibration of the tub cannot occur. Only sideways vibration can occur. As is more fully explained hereinafter, we provide new and improved means for sensing the amount of sidewise vibration thereby to prevent that vibration from ever becoming excessive.

During the operation of the machine the basket 9 is driven from an electric motor 20 through a drive including a transmission assembly 21 and a pair of flexible belts 22 and 23 (see Figs. 2 and 3). The belt 22 connects the output pulley 24 of the motor to the input pulley 25 of the transmission assembly. The belt 23 connects the output pulley 26 of the transmission assembly to a basket drive pulley 27 mounted on the shaft 11 of the clothes tumbling basket 9. The transmission assembly

21 is of the multiple speed type, that is, the ratio thereof can be changed so that the basket is driven at two different speeds. The transmission assembly thus provides one basket speed for clothes tumbling and another basket speed for centrifugal extraction. The ratio of the transmission assembly is changed by means of a suitable spring biased, solenoid actuated plunger 28. When the electrically operated solenoid 29 controlling the plunger 28 is de-energized, the transmission ratio is such that the basket is driven at a suitable speed for washing and tumbling clothes, for example, 45 revolutions per minute. However when the solenoid 29 is energized, the plunger 28 changes the ratio of the transmission so that the basket is driven at a suitable speed for centrifugal extraction, for example, 200 revolutions per minute.

During the operation of the machine the various electrical components thereof are under the control of a timer operated sequence control indicated schematically at 30 in Fig. 4. A suitable sequence control and a complete circuit for the machine 1 are shown in the copending application of Water E. Gray, Jr., S. N. 512,612, filed June 2, 1955, and assigned to the same assignee as the present invention. In Fig. 4 we have shown the sequence control 30 schematically and have illustrated therewith only those electrical components which are necessary to the understanding of our invention. The components shown include the main drive motor 20 and the actuating coil 31 of the transmission assembly solenoid 29.

Besides the elements illustrated it will be understood that the sequence timer 30 also controls suitable means whereby water is admitted to and discharged from the machine, and suitable heating means within the machine. A water inlet connection 32 and a sheathed type resistance heater 33 are both shown in Fig. 2. Any suitable electrically actuated means, such as a drain pump (not shown) can be used to control the discharge of water from the machine.

The sequence control 30 is energized by means of a pair of supply conductors 34 and 35. During operation of the machine a suitable switch or switches within the control are closed so that the motor 20 is continuously energized to rotate the basket 9. The switch means within the sequence control connects one side of the motor to the line 34 and the other side of the motor is connected directly to the supply line 35. As mentioned above the clothes basket 9 is rotated at a relatively low speed for tumbling the clothes, which tumbling action is employed during the washing, the rinsing and the fluff drying steps of the machine. However in order to extract water from the clothes within the basket by centrifugal extraction the basket 9 is rotated at a higher speed for certain periods during the operation of the machine. To cause the rotation of the basket at this higher speed the sequence control closes switch means therein so as to energize the coil 31 of the transmission assembly solenoid and shift the transmission to its higher speed ratio. The circuit through which the sequence control energizes the solenoid will be explained hereinafter.

As soon as the transmission is shifted, the basket 9 begins to rotate at its higher speed, for example 200 R. P. M. If the clothes within the basket distribute approximately evenly, the higher speed rotation does not cause any objectional vibration of the basket and its supporting tub. However, if the clothes distribute unevenly as the higher speed rotation begins, the resulting dynamic unbalance causes a noticeable vibration of the basket and the tub. In fact if the distribution of the clothes around the basket is sufficiently uneven, the vibration may be excessive, sufficient to damage the machine or cause it to move on the floor if continued.

In order to prevent excessive vibration from occurring when the basket is shifted to its higher speed, we have provided a switch for temporarily de-energizing the solenoid coil 31 if the vibration exceeds a preselected, permissible limit, for example thirty (30) thousandths of

an inch in amplitude. This vibration sensing or unbalance switch 36 is shown in Fig. 4. The switch 36 is operated by means of the relative movement occurring between the tub 10 and the base 3. In our preferred embodiment the switch is mounted on the base 3 and is actuated by means of a depending bracket 37 on the tub. A novel switch operating device 38 embodying our invention is interposed between the bracket and the switch to transmit the movement of the bracket to the switch. This device 38, which will be described hereinafter, may be simply and easily adjusted to correct both for production variations in the spacing between the bracket and the switch and for changes in the spacing caused by shipment. Thereby it is insured that the unbalance switch 36 is operated exactly at the limit of the permissible vibration of the tub.

The switch 36 is provided with three terminals 39, 40 and 41 and includes a contactor (not shown) which is movable between two positions. In one of the positions of the contactor the terminals 39 and 40 are connected together and in the second position thereof the terminals 39 and 41 are connected together. When a button or actuator 42 on one side of the switch is pressed, the contactor is moved so as to close the terminals 39 and 40 and open the terminals 39 and 41, whereas when a button or actuator 43 on the opposite side of the switch is pushed, the contactor is moved so as to close the terminals 39 and 41 and open the terminals 39 and 40.

The switch 36 is connected serially in the circuit for coil 31, or more exactly the circuit for coil 31 extends through switch 36 by means of terminals 39 and 40. Commencing with supply line 34 the circuit for the coil extends to the switch terminal 39 through sequence control 30 and a line 44. The circuit is completed from the switch terminal 40 through a line 45, the coil 31 itself and a connection 46 to the supply line 35. With the coil 31 and the switch 36 connected in this manner, it will be seen that when the switch terminals 39 and 40 are connected together, the solenoid coil 31 is energized. Conversely when these terminals are opened, the solenoid is not energized.

To initiate centrifugal extraction the sequence control closes suitable switch means therein so as to energize the coil 31 through switch 36. If excessive vibration occurs as the basket shifts to its higher speed, the switch button 43 is actuated by bracket 37 and operator 38 so as to disconnect the terminals 39 and 40 and connect the terminals 39 and 41. This de-energizes the solenoid coil 31 and allows the basket to return to its lower speed rotation. The clothes then have an opportunity to reorient themselves within the basket at the lower speed. After a short period, the coil 31 is again energized to attempt the higher speed rotation. In order to attempt again the higher speed rotation after the short period of the lower speed rotation, we have provided means for re-setting the switch 36. This means comprises a timer motor 47 which is connected between the terminal 41 of switch 36 and the supply line 35. When the switch 36 is thrown so as to de-energize the solenoid coil 31, it simultaneously closes the terminals 39 and 41 and energizes the timer motor.

The timer motor 47 drives a star wheel 48 through reduction gear means including a pair of gears 49 and 50. The star wheel 48 rotates counterclockwise as viewed in Fig. 4 and is arranged to engage a leaf spring 51 which is fixedly mounted at its opposite end by a tab 52 of the switch mounting bracket 53. As the star wheel 48 rotates it bends the upper end of the leaf spring 51 to the right (as viewed in Fig. 4). This bending of the leaf spring continues until such time as the spring is bent far enough that the engaging arm of the star wheel can slip over its top. At that time the spring moves quickly in the opposite direction striking the button 42 of the switch. The button 42 is thereby actuated and moves the contactor of the switch so as to connect together the terminals 39 and 40 and disconnect the terminals 39

and 41. This stops the rotation of the timer 47 and closes the circuit to the solenoid coil 31.

The solenoid then once again shifts the transmission so that the clothes basket rotates at its higher speed. If the clothes this time distribute evenly around the basket, the rotation will continue until such time as the sequence control 30 opens the circuit to the solenoid coil 31. If however the clothes still do not distribute evenly, the same steps will occur again. In other words the unbalance switch 36 will again be operated by vibration of the basket and tub so as to return the basket temporarily to its lower speed and then will be reset so as to return the basket to its higher speed. Ordinarily a single return of the basket to its lower speed is sufficient to redistribute the clothes properly, but infrequently several tries may be required before the basket will rotate at the higher speed without excessive vibration.

In our preferred embodiment illustrated in the drawings, the unbalance switch 36 is mounted on the base 3 of the machine by means of an upstanding bracket 53 which is attached to a mounting member 54 secured to the base of the machine. The actuating means for the switch, i. e. bracket 37, is mounted on the tub 10 so that upon relative vibration occurring between the tub and the base the actuating means moves relative to the switch and operates the button 43. In order that the switch 36 will always be operated at the limit of the permissible vibration of the tub, it is necessary that a predetermined movement of the tub and the actuator relative to the base result in the operation of the switch. Since it is extremely difficult, if not impossible, to construct machines in mass production so that the actuator 37 and the switch button 43 are always positioned the same distance apart, and since even if they are so adjusted in the factory, handling during shipment might result in the relationship being changed, we have positioned between the actuator 37 and the switch 36 a new and improved, easily adjustable switch operating device for operating the switch 36 upon a predetermined motion of the actuator 37. This switch operating device 38 is mounted on the base 3 of the machine by means of the aforesaid support 54.

The switch operating device 38 comprises an adjustable scissors arrangement including a pair of pivoted arms 55 and 56. These arms are both pivoted on a pin 57 which is mounted in upstanding tabs 58 formed on the support 54. The arm 55 in our preferred embodiment mounts a scissors adjusting screw 59 and for that purpose it comprises a pair of spaced apart pivoted elements 55a and 55b. These separate elements 55a and 55b however pivot together at all times and in effect form a single movable member. Thus, for ease of understanding and description, the two elements are referred to collectively as a single arm 55. Moreover, it is obvious that they could in fact be replaced by a single arm, for example one bifurcated at its upper end to mount the screw.

The one arm 55 of the scissors 38 engages the bracket on the tub 10 so as to be moved thereby, and the other arm 56 operates the switch button 43 upon a sufficient movement of the arm 55. In order that movement of the arm 55 will also cause a pivoting of the arm 56, the two arms are connected together by means comprising a slotted projection 60 formed on the arm 56 and the screw 59 mounted on the arm 55. The screw 59 extends through the curved slot in the projection 60 so that when tightened, it locks the arms firmly together. Thereby when the arm 55 is moved by the actuator 37, the same movement of the arm 56 is effected for operating the switch.

For operating the switch the arm 56 carries a movable plunger 61 which is provided with an enlarged head 62. This head 62 is adapted to engage the switch operating button 43. The plunger 61 is normally held in the

position shown in Fig. 4 by means of a coil spring 63. The spring 63 at its one end bears against one leg 64 of a U-shaped portion of the arm 54, and at its other end the spring forces a washer 65 fixedly mounted on the plunger against the other leg 66 of the U-shaped portion. Relative movement between the plunger 61 and arm 56 is effected by compressing spring 63.

In order to adjust the scissors device 38 so that the switch 36 will be operated upon a predetermined vibration of the tub, the arm 56 is preset so that there is a predetermined relationship between the end of the plunger 61 and the switch button 43. Depending upon the permissible vibration of the tub and the distance the button 43 must be pushed into the switch housing before operating the switch, the arm 56 may be pre-set with a predetermined gap between plunger head 62 and switch button 43, or it may be set with the head 62 directly engaging the switch button. The latter setting would be used when the distance the button must be pushed into the housing to operate the switch is equal to the amplitude of the permissible vibration of the tub. In order to pre-set the arm 56 there is provided an adjustable stop comprising a screw 67 which is threaded in an upstanding portion 68 of the support 54. The arm 56 is biased toward this stop 67 by a coil spring 69 which is secured between a projection 70 formed on the arm and a tab 71 on the stationary bracket 53. The spring 69 maintains the arm 56 against the stop 67 so that by turning the stop 67 in and out, the gap between the end 62 of the plunger 61 and the switch button 43 may be varied. As shown, a tab 72 may be provided on the arm 56 for engaging the stop.

The setting of the arm 56 is performed at the factory when the machine 1 is assembled. In other words the arm 56 is pre-set at the factory before shipment of the machine. It is, of course, set so that it will operate switch 36 after moving a distance equal to the amplitude of the maximum permissible vibration of the tub.

Since the arm 56 and the switch 36 are both mounted on the base structure 3, this relationship does not change during shipment of the machine. Even though the machine may be subjected to dropping or other severe shocks, the position of the arm 56 and the plunger 61 relative to the switch does not change. The spacing between the tub bracket 37 and the switch 36 may however change somewhat during shipment. There is a possibility that the arms 17 will flex or move a little bit and cause a slight change in the gap between the actuator 37 and the switch. For this reason it is desirable that the final adjustment of the scissors arrangement 38 not be completed at the factory. Rather, to insure operation of the switch at the selected tub vibration, the adjustment should be completed when the machine 1 is set up at its ultimate place of use.

In our improved switch operating device this final adjustment is effected merely by loosening the screw 59 and then re-tightening it. That action allows a spring 73 disposed between the arms 55 and 56 to effect automatically the final correct setting of the scissors device. The spring 73 biases the two arms apart and specifically biases the arm 55 toward the actuator 37 on the tub. In the preferred embodiment illustrated, the spring is secured in place by means of the respective tabs 74 and 75 formed on the two arms.

When the machine is set up for use, the screw 59 is loosened allowing the arms 55 and 56 to move relative to each other. The spring 69 attached to arm 56 is stronger than the spring 73 between the arms and therefore the arm 56 does not change position. The pre-set relationship between the end of the plunger 61 and the switch button 38 is not altered. However, since the arm 55 is biased only by the spring 73, it moves into direct engagement with the actuator 37 under the pressure of that spring. Once this movement of the arm 55 has taken place, the screw 59 is then retightened. This locks the

arms together and maintains the resultant angle between them thereafter. With the same relationship existing between the arm 56 and the switch button 43 as pre-set in the factory, and with the arm 55 resting directly against the actuator 37, it will be seen that a movement of the actuator equal to the amplitude of the selected, maximum permissible vibration of the tub will thereafter operate the switch. In other words the switch will be actuated at the exact amount of tub vibration which was selected when the arm 56 was positioned relative to the switch 36 at the factory. Our new and improved switch operating device thereby provides for a very accurate actuation of the unbalance switch 36. It not only corrects for variations in tub and base spacing occurring in the assembling of machines but also it corrects for variations caused by shipment or other handling of the machines.

Although the scissors device 38 is set to open the unbalance switch 36 at the limit of the permissible vibration of the tub 10, there is a possibility that the tub may vibrate once or twice beyond that limit before the basket returns to its lower speed rotation. Particularly this may occur when a serious unbalance condition exists within the basket 9. The spring mounted plunger 61 is intended to take care of this over-travel of the tub 10 beyond the prescribed limit of vibration. If the tub should vibrate beyond the amount necessary to open the unbalance switch, the plunger 61 is forced against spring 63 by its engagement with the switch. The spring gives under this force so that the plunger compresses it and moves relative to the scissors arm 56 rather than breaking the switch. The plunger 61 and spring 63 thus act as a safety means to prevent damage to the switch 36 when the serious over-travel condition of the tub 10 occurs. The spring 63, it will be noted, must be stronger than the switch 69 since the spring 63 must not give until the button 43 has been actuated. The spring 69 however must give originally in order for the scissors to move at all to operate the switch.

In the above description and in the drawings we have described and shown the unbalance switch 36 and the scissors device 38 as mounted on the base 3 and the switch actuator 37 as mounted on the tub 10. However, it will be obvious that their positions can be reversed and that the switch would still be actuated by vibration of the tub relative to the base. In other words the unbalance switch and the scissors device can be mounted on the tub and the actuator mounted on the base without affecting the results obtained. The scissors device is still equally effective to insure operation of the switch at the selected amplitude of the vibration.

While in accordance with patent statutes we have shown what is considered at present to be the preferred embodiment of our invention, it will be obvious to those skilled in the art that various changes and modifications will be made therein without departing from our invention and we therefore aim in the appended claims to cover all such changes and modifications as fall within the true spirit and scope of the invention.

What we claim as new and desire to secure by Letters Patent of the United States is:

1. In a laundry machine, a base structure, a rotatable clothes basket, a tub structure enclosing and rotatably supporting said basket, means supporting said tub structure from said base structure of said machine, drive means for driving said basket at a plurality of different speeds, electrically actuated means for shifting said basket from a lower speed to a higher speed, a switch mounted on one of said structures for controlling said electrically actuated means upon the occurrence of excessive vibration of said tub structure when said basket is shifted to said higher speed, switch actuating means on the other of said structures, and an adjustable scissors mounted on said one structure and disposed between said switch actuating means and said switch for operating said switch upon excessive vibration of said basket and said tub structure, said scissors including a first pivoted arm for engaging said actu-

ating means, a second pivoted arm for operating said switch, a first spring disposed between said arms, means for pre-setting said second arm in a predetermined relationship with said switch, and means interconnecting said arms and releasable to allow said first spring to bias said first arm against said actuating means.

2. In a laundry machine, a base structure, a rotatable clothes basket, a tub structure enclosing and rotatably supporting said basket, means supporting said tub structure from said base structure of said machine, drive means for driving said basket at a plurality of different speeds, electrically actuated means for shifting said basket from a lower speed to a higher speed, a switch mounted on one of said structure for controlling said electrically actuated means upon the occurrence of excessive vibration of said tub structure when said basket is shifted to said higher speed, switch actuating means on the other of said structures, and an adjustable scissors mounted on said one structure and disposed between said switch actuating means and said switch for operating said switch upon excessive vibration of said basket and said tub structure, said scissors including a first pivoted arm for engaging said actuating means, a second pivoted arm for operating said switch, a first spring disposed between said arms, means including an adjustable stop and a second spring whereby said second arm is pre-set with a predetermined relationship between it and said switch, and means interconnecting said arms and releasable to allow said first spring to bias said first arm against said actuating means.

3. In a laundry machine, a rotatable clothes basket, a tub enclosing and rotatably supporting said basket, means supporting said tub from the base of said machine, drive means for said basket including a multi-speed transmission, electrically actuated means for shifting said transmission from a lower speed to a higher speed, a switch mounted on said base for de-energizing said electrically actuated means upon the occurrence of excessive vibration of said tub when said transmission is shifted to said higher speed, means for re-setting said switch after a predetermined interval again to shift said transmission to said higher speed, switch actuating means on said tub, and an adjustable scissors mounted on said base and disposed between said switch actuating means and said switch for operating said switch upon excessive vibration of said basket and said tub, said scissors including a first pivoted arm for engaging said actuating means and a second pivoted arm for operating said switch, a first spring disposed between said arms, means including an adjustable stop and a second spring whereby said second arm is pre-set with a predetermined relationship between it and said switch, and means interconnecting said arms and releasable to allow said first spring to bias said first arm against said actuating means.

4. In a laundry machine, a base structure, a rotatable clothes basket, a tub structure enclosing and rotatably supporting said basket, means supporting said tub structure from said base structure, drive means for driving said basket at a plurality of speeds, electrically actuated means for shifting said basket from a lower speed to a higher speed, a switch mounted on one of said structures for controlling said electrically actuated means upon the occurrence of excessive vibration of said tub structure when said basket is shifted to said higher speed, switch actuating means mounted on the other of said structures, and an adjustable scissors mounted on said one structure and disposed between said switch actuating means and said switch for operating said switch upon excessive vibration of said basket and said tub, said scissors including a first pivoted arm for engaging said actuating means and a second pivoted arm for operating said switch, a first spring disposed between said arms and biasing said first arm towards said actuating means, means including an adjustable stop and a second spring for pre-setting said second arm in a predetermined relationship with said switch, said second spring being stronger than said first spring, and means including a screw interconnecting said arms, said last mentioned means upon the loosening of said screw allowing said first spring to bias said first arm against said actuating means without affecting the relationship between said second arm and said switch whereby said scissors is set upon the retightening of said screw to operate said switch upon a predetermined vibration of said tub structure from its normal position relative to said base structure.

5. The combination of claim 4 including a plunger and a plunger spring mounted on said second arm, said plunger operating said switch upon the movement of said second arm caused by said predetermined vibration of said tub structure, and said plunger spring permitting relative movement between said plunger and said second arm upon further movement of said second arm, thereby to prevent damage to said switch by over-travel of said tub structure beyond said predetermined vibration required to operate said switch.

6. The combination of claim 4 wherein said means interconnecting said arms comprises said screw and a projection formed on one of said arms, said projection having a curved slot therein and said screw being mounted on the other of said arms and extending through said slot.

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