

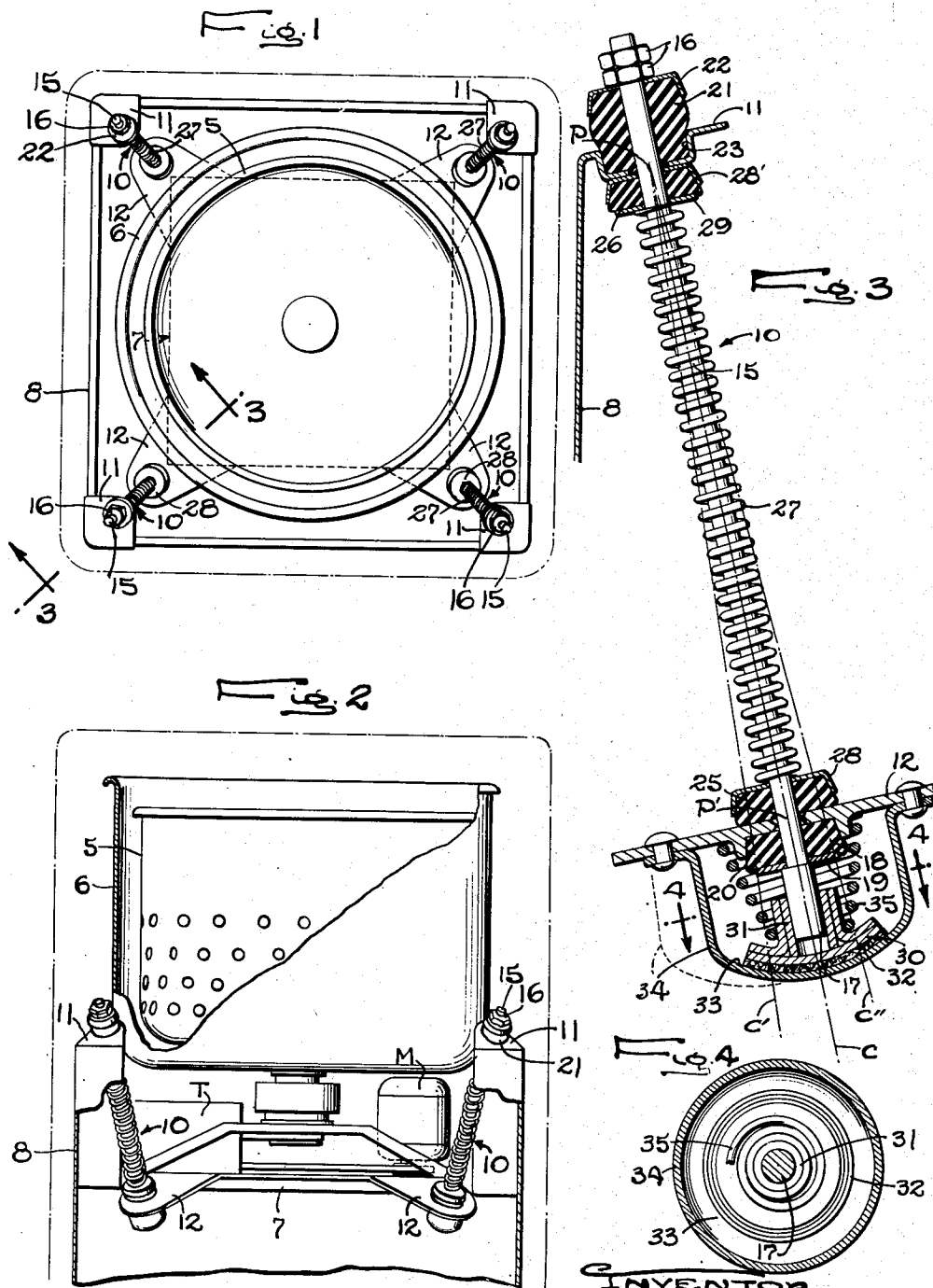
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SUSPENSION FOR LAUNDRY MACHINES

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SUSPENSION FOR LAUNDRY MACHINES

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The invention relates to laundry machines of the centrifugal extractor type and it is more particularly concerned with improved means for mounting the extractor.

One object of the invention is to provide an improved mounting arrangement for machines of the above general character which is adapted to absorb and dissipate the energy tending to cause the extractor to vibrate or gyrate when the load therein is unevenly distributed whereby the strains imposed on the extractor, its bearings and associated driving and supporting instrumentalities are reduced to a minimum and the transmission of destructive and dangerous vibrations to the framework or housing of the machine is substantially eliminated.

Another object is to provide a centrifugal extractor mounting in which the vibrations of the extractor are effectively damped and in which the damping effect is automatically proportioned to the magnitude of the vibrations produced by different degrees of load unbalance in the extractor.

A further object is to provide a mounting for centrifugal extractors which is simple in construction, easy to assemble and which retains its fully operating efficiency under long and hard usage.

Other objects and advantages of the invention will become apparent from the following detailed description of the preferred embodiment illustrated in the accompanying drawings, in which:

Figure 1 is a plan view of a laundry machine equipped with an extractor mounting embodying the features of the invention.

Fig. 2 is a side view of the machine with parts broken away to show the mounting arrangement.

Fig. 3 is a longitudinal sectional view of one of the suspension members comprising a part of the mounting.

Fig. 4 is a transverse sectional view taken in a plane substantially on the line 4—4 of Fig. 3.

While the invention is susceptible of various modifications and alternative constructions, I have shown in the drawings and will herein describe in detail the preferred embodiment, but it is to be understood that I do not thereby intend to limit the invention to the specific form disclosed, but intend to cover all modifications and alternative constructions falling within the spirit and scope of the invention as expressed in the appended claims.

For purposes of illustration, the invention has been shown as incorporated in a domestic laundry or washing machine in which the extractor comprises a perforated cylindrical clothes receptacle or basket 5 serving both for washing and for centrifugal drying. The receptacle 5 is rotatable on a vertical axis within a stationary tub 6 which holds the wash water, the tube of course being provided with a suitable outlet for draining the water before a drying or extracting operation is started. Oscillation and rotation of the receptacle 5 for washing and drying respectively are effected by a motor M through a transmission T which may be of conventional construction. In the exemplary machine, the re-

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ceptacle, tub, motor and transmission are assembled as a unit on a base or spider 7 supported in the frame or housing 8 of the machine which is shown herein as rectangular in form.

Support for the receptacle assembly is provided by a plurality of suspension or support members 10 connected at opposite ends to brackets or segments 11 on the housing and to laterally projecting segments or arms 12 of the spider 7. In the particular machine illustrated, four such suspension members are used and the brackets 11 and arms 12 are accordingly arranged at the four corners of the rectangular housing 8 and the spider 7.

The suspension members 10 are secured to the brackets 11 and arms 12 by resilient connections which allow a limited swinging of the receptacle assembly from a central axis of the receptacle. Such movements which may be either vibratory or gyratory, are imparted to the receptacle when it is rotated at extracting speed with the load therein unevenly distributed, as is usually the case in the operation of domestic laundry machines. Preferably, the brackets 11 and arms 12 are differently spaced from the central axis of the assembly so that the suspension members 10 converge downwardly and thus tend to return the assembly to a centered position when the receptacle is stationary.

In accordance with the invention the suspension members 10 are constructed and arranged so that the energy which produces the swinging movements of the receptacle assembly is absorbed and dissipated without imposing excessive strains on any part of the machine and without transmission of vibration to the housing 8. Furthermore, the vibration produced by the operation of the motor M and transmission which are usually of substantially smaller amplitude than those produced by an unevenly distributed load in the receptacle 5 are effectively absorbed by the suspension members so that the machine is enabled to run smoothly and quietly under all operating conditions.

The suspension members 10 are alike in construction. As shown in Fig. 3, each member comprises an elongated rod 15 threaded at one end for the reception of retaining and locking nuts 16 and having an enlarged head 17 at its other end. In the assembled machine the rod 15 extends through a clearance hole in one of the arms 12 and through a similar hole in the companion bracket 11 with the head 17 projecting below the arm. A pad 18 of resilient material interposed between the lower face of the arm 12 and a washer 19 bearing against the upper end of the head 17 supports the weight of the assembly on the rod 15. As herein shown, the pad 18 is in the form of a disk centrally apertured to receive the rod with a snug fit. A socket 20 is provided on the arm 12 for seating the pad so as to hold the rod 15 centered in the clearance hole and out of direct contact with the arm 12.

The load on the rod 15 is transferred to the housing 8 through the medium of a sleeve-like resilient pad 21 mounted on the upper end of the rod between the upper face of the bracket 11 and a flanged washer 22 bearing against the retaining nut 16. Preferably the bracket 11 is formed with a recess or socket 23 for seating the pad 21 and holding the rod centered in the clearance hole without contacting the bracket. The elimination of direct metal-to-metal contact between the rod and the parts to which it is connected materially reduces transmission of vibration to the housing 8.

Mounted on the rod 15 between the arm 12 and the bracket 11 are a pair of resilient disks or pads 25 and 26. These pads as well as the resilient pads 18 and 21 may be made of rubber or other material suitable for the purpose. Spring means, herein shown as a coiled compression spring 27 wound around the rod 15 acts through thrust

washers 28 and 29 to yieldably urge the pads outwardly and thus clamp the arm and bracket against the companion pads 18 and 21. The washer 28 is preferably flanged so as to partially enclose the pad 25 and thus restrict its compressibility. A similar flanged washer 28' may be interposed between the pad 26 and the bracket 11.

The resilient connection between the rods 15, brackets 11 and arms 12 provided by the resilient pads 18, 21, 25 and 26 constitute, in effect, a universal joint and permit the spider 7 and the assembly of which it forms a part to swing from a centered position in any direction in a horizontal plane. In such swinging of the spider each rod 15 pivots about a stationary point P at the bracket 11 while the lower end oscillates within the limit positions indicated at C' and C'', the central axis of the rod being at C when the machine is idle. There is also a relative angular or pivotal movement between each rod 15 and the associated spider arm 12 about a universal pivot point P' located at the intersection of the axis of the rod and the plane of the arm. Such relative movements result in a twisting or deformation of the resilient pads and, if the movements are of sufficient amplitude, in further compression of the springs 27. The springs and pads thus impose a resistance to the movements of the spider and thereby exert a damping effect on the swinging of the assembly which keeps it within reasonable limits and dissipates a part of the energy producing the movement.

Further damping of the swinging or vibration of the receptacle assembly and dissipation of the remaining energy causing the swinging is effected by novel friction braking mechanism associated with the suspension members 15. In the preferred form illustrated, the braking mechanism for each suspension member comprises a first component constituting a spherically segmental shoe 30 having an axially disposed socket portion 31 slidably mounted on the projecting head 17 of the rod 15 for movement longitudinally of the rod. The shoe 30 is provided at its outer face with a friction pad 32, preferably nonmetallic, adapted to coast with a complementary friction surface 33 defined by a cup-shaped member 34 secured to the underside of the spider arm 12 and constituting a second brake component. A spring 35 interposed between the spider arm and the shoe 30 urges the pad 32 against the surface 33 and thus determines the frictional drag or braking effect produced by the mechanism.

As the shoe is mounted on the projecting end of the rod 15 substantially below the point P', relative pivotal movement of the rod and arm 12 will swing the shoe through an arc over the friction surface 33. Preferably this friction surface and the coasting surface of the friction pad 32 are formed concentric with the point P' so that the pad maintains substantially uniform pressure on the friction surface in all positions of the shoe 30. It will be noted that this pressure is not affected by axial movements of the rod 15 since the shoe is slidably mounted on the head 17. In the embodiment illustrated the shoe may be swung from the central position in which it is shown in solid lines in any direction within a range, the extent of which is indicated by the broken-line representation of the member 34.

It will be apparent from the foregoing that the invention provides a novel mounting arrangement for centrifugal extractors. The rotatable receptacle or extractor and the associated parts which are assembled with it as a unit are supported from the housing of the machine by a plurality of suspension members having resilient connections with the unit and with the housing so constructed and arranged that the unit is permitted to vibrate or swing in a plane perpendicular to the rotational axis of the extractor. Vibration resulting from the operation of the driving motor and transmission are absorbed and a part of the energy producing swinging movements of the unit is absorbed and dissipated without imparting excessive strains to any of the parts of the machine. The vibra-

tion absorbing action of the connections is effectively supplemented by a novel friction mechanism associated with the suspension members which acts to dissipate the major portion of the energy imparting swinging movements to the unit.

The improved mounting is effected with simple, sturdy parts which are inexpensive to manufacture and easy to assemble. Once the parts have been assembled, there is nothing to get out of order and full operating efficiency is maintained for a long time under the hardest usage.

I claim as my invention:

1. A mounting element for suspending an assembly subjected to axial and transverse vibratory movement from a stationary support, comprising in combination mounting brackets having aligned apertures therethrough adapted to be connected to a support and assembly, an elongated rigid member having end portions projected through said apertures in said brackets, a first pair of resilient pads secured outwardly of said brackets on said elongated member and fixed against outward axial movement, a second pair of resilient pads slidable axially on said elongated member and positioned on the opposite side of the brackets from said first pair of pads, a spring intermediate to said second pair of pads urging said pads away from each other and toward respective ones of said first pair of pads thereby clamping said brackets between mating ones of said pairs of pads, a brake shoe having a spherically segmental braking surface and axially slidably mounted on said elongated member outwardly of one of said first pair of pads, a coasting braking element having a complementary spherically segmental braking surface secured to and fixed in spaced relation to one of said brackets, and a spring positioned between said one of said brackets and said brake shoe resiliently pressing the latter into uniform braking engagement with said coasting braking element independently of relative axial movement between said support and said assembly.

2. A mounting for suspending a movable member subjected to axial and transverse vibratory movement from a stationary member, comprising in combination, mounting brackets having apertures therethrough and adapted to be connected respectively to an assembly and support with said apertures in alignment, an elongated rigid member having end portions projected through said apertures in said brackets, a first pair of resilient pads positioned outwardly of said brackets and fixed on said elongated member against outward axial movement, a second pair of resilient pads positioned inwardly of said brackets and mounted on said elongated member for axial sliding movement, a spring positioned between said second pair of pads urging said second pair of pads away from each other and toward respective ones of said first pair of pads thereby clamping said brackets between mating ones of said pairs of pads, a brake shoe having a braking surface and mounted on said elongated member for relative axial movement and unison transverse movement, a coasting braking element having a complementary braking surface and fixedly mounted on one of said brackets for movement in unison therewith, and resilient means positioned between said one of said brackets and said brake shoe resiliently urging the latter into substantially uniform braking engagement with said coasting braking element irrespective of relative movement between said members.

3. A mounting for suspending an assembly subjected to axial and transverse vibratory movement from a stationary support comprising in combination, a pair of mounting brackets having aligned apertures and adapted to be rigidly connected to said support and assembly respectively, an elongated rigid member having end portions projected through said apertures in said brackets, connections including resilient pads on the end portions of said elongated member and a resilient spring pressing said pads into engagement with said brackets for connecting said elongated member to said brackets for limited axial movement of said elongated member relative to said

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brackets and for limited universal swinging movement of said elongated member about pivot points located on the axis of said elongated member and substantially in the plane of each of said brackets respectively, a brake shoe having an outwardly facing spherically segmental braking surface and axially slidably mounted on said elongated member adjacent said other bracket for relative axial movement and unison transverse movement with said elongated member, a coacting braking element having a complementary spherically segmental braking surface secured to the other one of said brackets for axial and transverse movement in unison therewith, said spherically segmental braking surfaces having a radius of curvature substantially equal to the distance of the braking surface on said coacting braking element from said pivot point, a spring interconnecting said other bracket and said brake shoe resiliently urging the latter into braking engagement with said coacting braking element independently of rela-

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tive axial movement between said support and said assembly.

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