

Nov. 22, 1938.

J. MOTYCKA

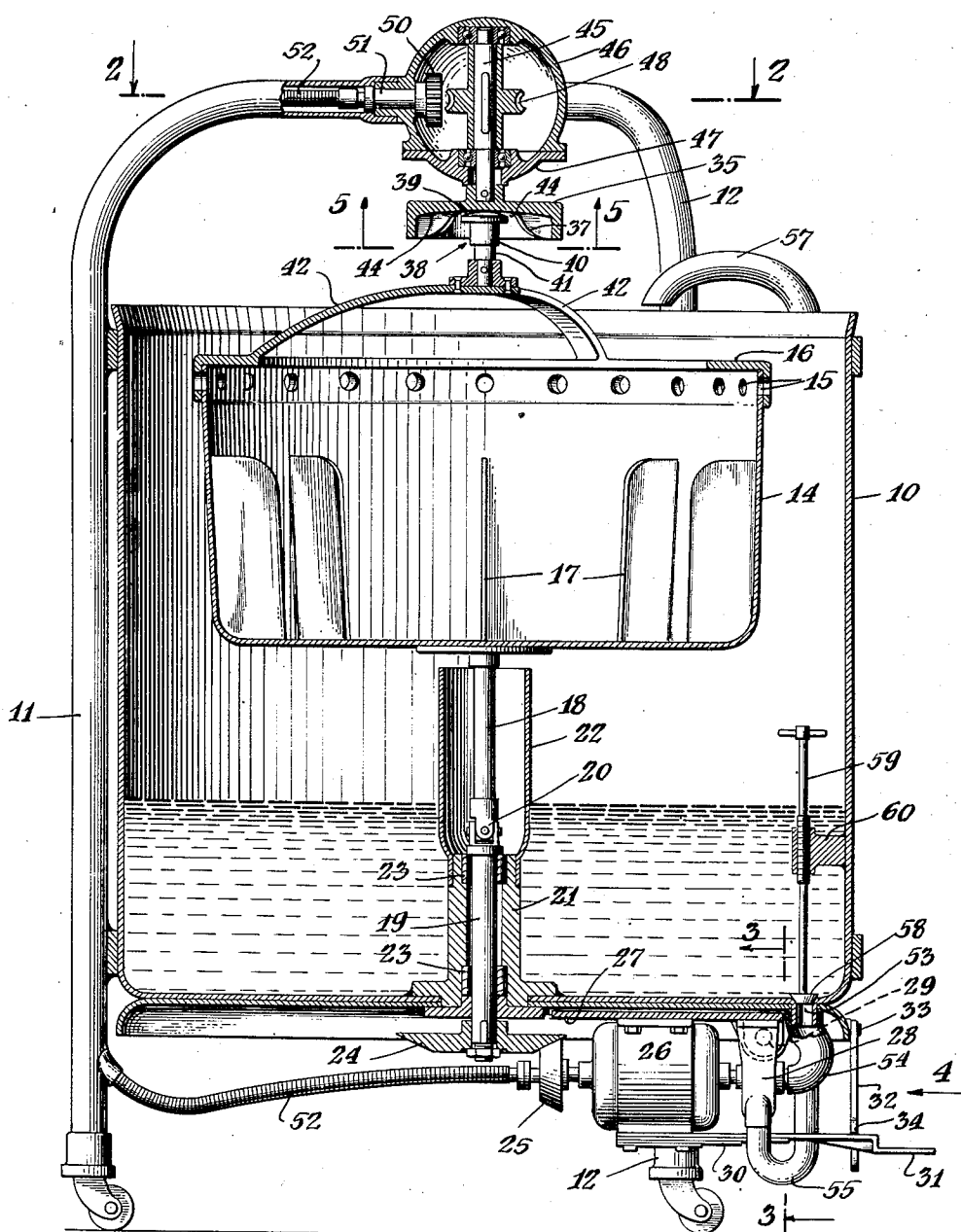
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WASHING MACHINE

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Fig. 1

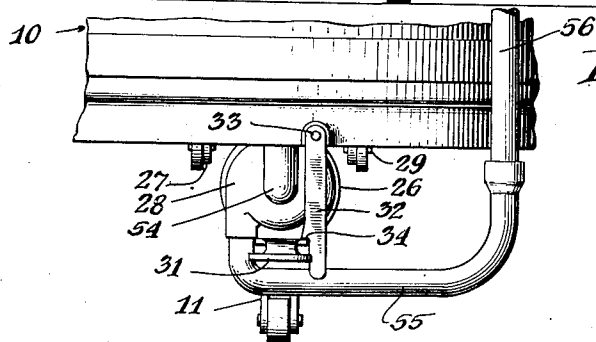


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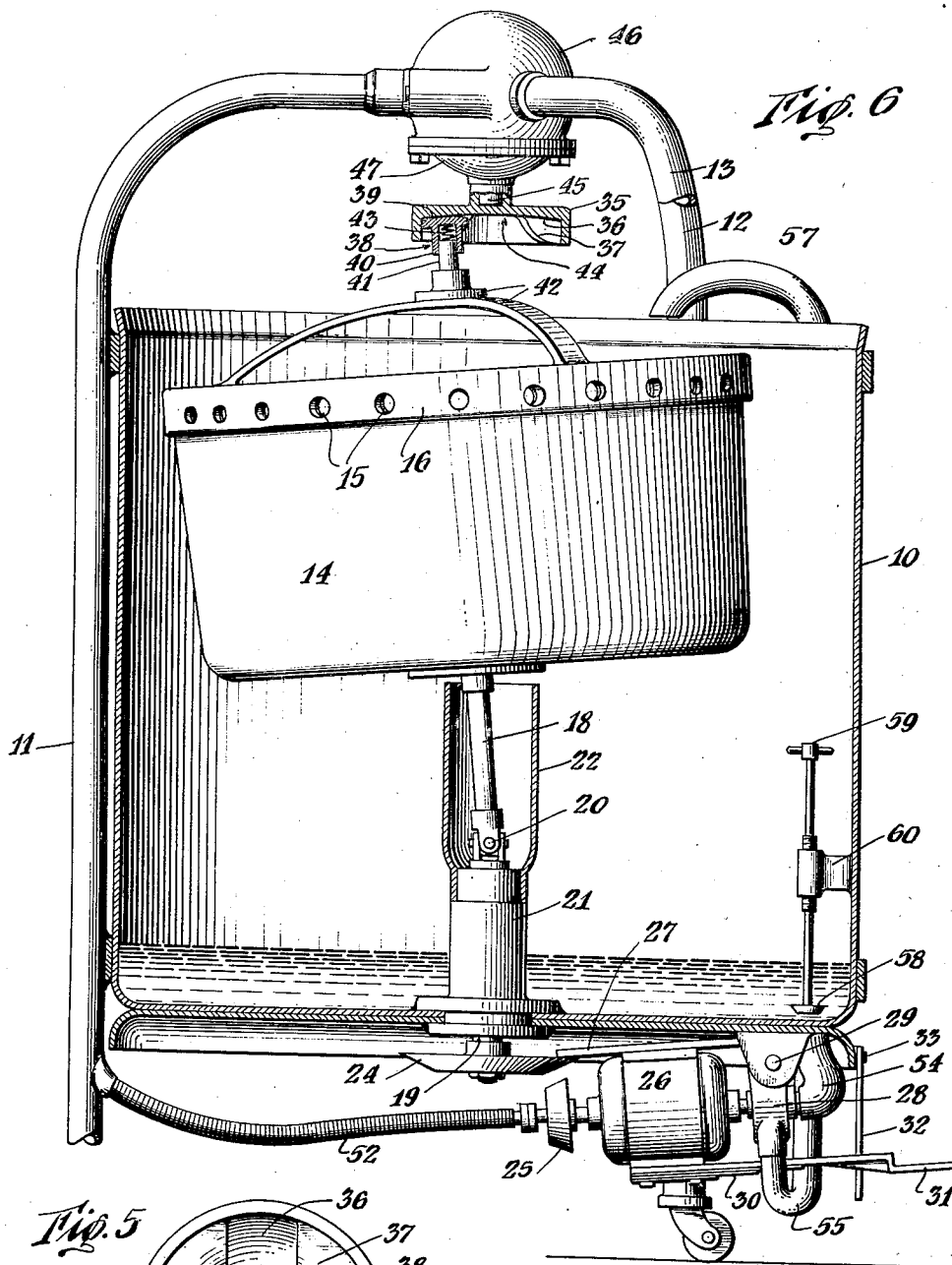
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WASHING MACHINE

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8 Claims. (Cl. 68—23)

The invention relates to centrifugal separating apparatus, and more particularly to a washing machine using such apparatus for drying.

The invention relates particularly to overcoming the troublesome vibration present in ordinary centrifugal driers, this application constituting a continuation-in-part of Patent No. 2,033,146, issued Mar. 10, 1936.

According to the invention, the basket holding the clothes or other articles is supported by a flexible connection or universal joint so that the basket, when spinning, may assume any position off vertical necessary to bring the center of mass of the basket plus its contents into vertical alignment with the center of said flexible connection.

With this treatment alone, the basket, when spinning at ordinary centrifugal drying speeds, will not remain spinning on a true vertical axis, but will almost immediately begin to precess, i. e., its spinning axis will rotate about the true vertical axis through the universal joint or coupling following a spiral path, swinging further and further away from the true central vertical position.

The invention overcomes this tendency to precess by applying a correcting force, tangential to the path of precession and in such a direction as to cause the rotating basket to move toward true central position so that the center of mass of the basket and its contents will lie directly in line with the central point of support.

In the present application, the basket is supported and driven from below. The corrective means may constitute a rotating gyrating cup driven in such a direction as to apply an accelerating force to hurry the precessional movement. The action of this corrective force will cause the center of mass of the basket and its contents to approach true vertical position over the universal joint.

According to the invention, provision is made for limiting the lateral movement of the basket for washing. This may comprise the gyrating cup by which the corrective force is applied to the basket. This gyrating cup normally rotates at an angular velocity higher than the maximum angular velocity of precession, and in the same direction as the normal precessional movement.

The gyrating cup may also be used to impart a washing movement to the basket. In this instance, means are provided for preventing rotational movement of the basket drive shaft. The gyrating cup then moves the basket about its universal joint, causing the axis thereof to de-

scribe a conical path. This causes the water and laundry to slosh about in the basket, exerting a washing action on the clothes.

The invention also consists in certain new and original features of construction and combinations of parts hereinafter set forth and claimed.

Although the novel features which are believed to be characteristic of this invention will be particularly pointed out in the claims appended hereto, the invention itself, as to its objects and advantages, and the manner in which it may be carried out, may be better understood by referring to the following description taken in connection with the accompanying drawings forming a part thereof in which—

Fig. 1 is a vertical section through the machine, illustrating its drying position;

Fig. 2 is a section along the line 2—2 of Fig. 1;

Fig. 3 is a section along the line 3—3 of Fig. 1 illustrating the control for changing over from washing to drying;

Fig. 4 is a detail of said washing and drying control looking in the direction of the arrow 4 in Fig. 1;

Fig. 5 is the detail taken along the line 5—5 of Fig. 1; and

Fig. 6 is a vertical section through the machine, illustrating the washing position.

In the following description and in the claims, various details will be identified by specific names for convenience, but they are intended to be as generic in their application as the art will permit.

Like reference characters denote like parts in the several figures of the drawings.

In the drawings accompanying and forming part of this specification, certain specific disclosure of the invention is made for purposes of explanation, but it will be understood that the details may be modified in various respects without departure from the broad aspect of the invention.

Referring now to the drawings, the machine comprises a tank 10 having a basket 14 rotatably mounted thereon. This basket is given a gyrating movement for washing the clothes, and a spinning movement for extracting the water from the clothes, as will be described more in detail hereinafter.

The tank 10 has a structural framework to which are secured vertical supports 11, 12 and 13 resting on suitable casters to give the well-known three-point support. The basket 14 is of the imperforate type capable of holding water

for washing purposes. The basket is provided with a series of holes 15 through which the water is expelled during the centrifugal drying operation, and the basket also has a guard 16 for preventing the clothes from being discharged from the basket, either during the washing or drying operations. The basket 14 is provided with a series of agitator blades 17 secured to the bottom and side walls thereof, to assist in tumbling the clothes during the washing operation.

The basket 14 is supported from below by a drive shaft 18 on the axis of the basket. The shaft 18 is supported by shaft 19 through a universal joint 20. The shaft 19 is journaled by suitable bearings 23 in a pedestal 21 secured to the bottom of the tank 10. A sleeve 22 is secured to the pedestal 21 and extends into close proximity to the bottom of the basket 14 to prevent water from being splashed down in between the pedestal 21 and shaft 19. The sleeve 22 extends considerably above the highest water level in the tank, as indicated in Fig. 1.

For driving the machine for both washing and drying, an electric motor 26 is provided. This motor is suspended from a suitable supporting plate 27 pivoted to the tank frame at 29. A centrifugal pump 28 is also suspended from the supporting plate 27.

The shaft of motor 26 has mounted directly thereon the impeller of pump 28. It also has mounted directly thereon a frictional bevel gear 25 engageable with a similar gear 24 on the shaft 19. The assembly comprising plate 27, motor 26 and pump 28 has two positions; an upper position, as illustrated in Fig. 1, for the drying operation, and a lower position, as illustrated in Fig. 6, for the washing operation.

For controlling the two positions of the motor assembly, a pedal and latch mechanism is provided. A leaf spring 30 is secured to the bottom of the motor casing, and has at its end a pedal 31. The pedal 31 is engageable with a latch 32 (Fig. 4). The latch 32 is pivoted to the tank at 33, and has a step 34 engageable with the spring 30, as illustrated in Figs. 1 and 4, to yieldably hold the bevel gears 24 and 25 in engagement for the drying operation.

The latch may be disengaged by depressing the pedal 31 and moving the latch 32 laterally to disengage the step 34. This permits the motor assembly to drop until the support plate 27 rests on the top of the bevel gear 24, as indicated in Fig. 6. This is the washing position, as will be explained more in detail hereinafter.

For imparting the tangential correcting force to the basket, and for imparting the gyrating movement to the basket during washing, a gyrating cup 35 is provided. This cup has a series of radial, tapered walls 37 dividing the cup into recesses or pockets 36. The tapered walls 37 merge into the surface 44 of the cup, this surface being spherical with its center of curvature at the universal joint 20.

Cooperating with the gyrating cup 35 is a knob 38 having a mushroom head with a smooth surface 39 having a greater curvature than surface 44. For yieldably holding knob 38 and cup 35 in engagement, a coil spring 43 is provided. The knob 38 has a cylindrical sleeve 40 telescoping on a stud 41 mounted on radial members 42 secured to the top of the basket 14.

Thus, the spring 43 frictionally holds the knob 38 and cup 35 in engagement. The particular co-action between the cup 35 and the knob 38 will be described more in detail hereinafter.

The gyrating cup 35 is mounted on a shaft 45 mounted in a spherical casing 46, having a detachable bottom cover 47. This casing carries bearings for the shaft 45 on which is mounted a worm wheel 48 driven by a worm 49 (Fig. 2), which in turn is driven by spur gears 50 one of which is mounted on a shaft 51.

It will be noted that the casing 46 is mounted upon the curved ends of uprights 11, 12 and 13. Upright 11 journals shaft 51, and carries a flexible shaft 52 which is secured to the shaft of the motor 26.

For circulating the water during the washing operation, a circulatory system is provided. This system includes a pump 28 to the inlet of which is secured a rubber hose 54, which in turn is secured to the outlet 53 of the tank 10. A stopper 58, controlled by a handle 59, screw-threaded into a support 60, is provided for controlling the flow of water.

To the discharge side of the pump 28 is secured a flexible hose 55 which is secured to a stand pipe 56, secured to the side of the tank 10. The upper end of the stand pipe 56 has a swivel goose-neck nozzle 57, by means of which water may be directed into the basket 14, or clear of the machine into a sink or like location.

To use the machine for washing, the basket 14 is filled with water, and also the bottom of the tank 10, as illustrated in Fig. 6. After suitable washing compounds are added to the water and the clothes placed in the basket, the motor 26 is turned on, with the latch 32 released, as illustrated in Fig. 6. The motor 26, through a flexible shaft 52, drives the gyrating cup 35. The basket 14 tips to its farthest position with the knob 38 engaged in one of the pockets 36. The rotating movement of cup 35 causes the basket 14 to execute a gyrating movement about the universal joint 20 as a pivot point, the drive shaft 18 describing the surface of a cone. The engagement between support 27 and gear 24 prevents rotation of drive shaft 19 on its own axis. The basket 14, therefore, maintains a fixed rotational position, with its sides always facing in the same horizontal direction. This gyrating movement causes the laundry to be tumbled within the basket, the blades 17 assisting in such tumbling action. This washing movement opens up all parts of the clothes, exposing them to the surging action of the water in the basket.

During the washing operation, the stopper 58 will be in its upper position, permitting the water to be continuously circulated, which keeps the basket 14 full, replacing any water which has splashed out.

For the drying operation, the stopper 58 is moved to its lower position, stopping the water circulation. The pedal 31 is depressed, engaging the latch 32 and causing driving engagement between gears 24 and 25.

As the engagement between the frictional gears 24 and 25 permits the basket slowly to pick up speed, the gyrating cup 35 continues to impress its gyrating movement on the basket. When the rotational speed of the drive shaft 19 reaches its centrifugal drying value, the water will be expelled from the clothes through the discharge openings 15 in a manner well known in the art. This water will be collected at the bottom of the tank indicated in Fig. 1, to be ready for the next batch of clothes. If it is desired to empty the machine, it is only necessary to move the swivel nozzle 57 over the sink and open the stopper 58, and this will permit the pump 28 to discharge the water from the machine.

The correcting action of the gyrating cup to overcome precession and to prevent vibration may occur as follows: As the basket 14 gains angular spinning velocity, its corresponding angular velocity, at which it tends to precess, decreases until it equals the angular velocity of the gyrating cup. Thereafter the gyrating cup impresses an accelerating force on the basket in the same direction in which the basket is precessing. This accelerating force on the basket is tangential to the path of precession and causes the knob 38 to move out of pocket 36 and the basket to move toward its central position. This correcting force continues until the basket assumes true central position so that the center of mass of the basket plus its contents is directly in line with the shaft 13.

It will be noted that the central part of the cup is larger than the mushroom head or knob 38, as illustrated in Fig. 1, to permit a small correcting force to be exerted on the basket through the frictional engagement between the knob 38 and the surface 44 of the gyrating cup 35 without the knob engaging in the pockets 36. When the basket is spinning near true central position, i. e., just beginning to precess, the angular velocity of its corresponding precessional movement is small. Since the angular velocity of the gyrating cup 35 is constant, this frictional engagement between knob 38 and the gyrating cup 35 permits applying the necessary accelerating corrective force without any abrupt shock.

While certain novel features of the invention have been disclosed and are pointed out in the annexed claims, it will be understood that various omissions, substitutions and changes may be made by those skilled in the art without departing from the spirit of the invention.

What is claimed is:

1. In a laundry machine, a tank, a clothes basket within said tank, a vertical drive shaft under said basket for spinning the basket, a gear on said drive shaft, a gyrating cup above said basket for applying a gyrating motion to said basket, a drive motor pivotally mounted under said tank and having driving connection with said gyrating cup for both washing and drying, a gear attached to said motor, a stop member attached to said motor, and means for selectively engaging said stop member and said motor gear with said drive shaft gear for washing and drying respectively.

2. In a laundry machine, a tank, a clothes basket within said tank, a vertical drive shaft for spinning the basket, a universal mounting for said drive shaft, a gyrating cup for applying a gyrating motion to said basket to overcome precession during the drying operation, a drive shaft connected to said gyrating cup, a drive motor having driving connection with said gyrating cup shaft for both washing and drying, said drive motor having drive devices for driving said basket drive shaft for the drying operation, and means for preventing rotation of said basket drive shaft for the washing operation.

3. In a laundry machine, a tank, a clothes basket within said tank, a bottom shaft projecting up from the bottom of said tank for supporting and driving said basket, a universal joint in said bottom shaft for permitting said basket to move from central position, said universal joint dividing said bottom shaft into lower and upper sections, a gyrating cup above said basket, said lower section being coincident with the central axis of the machine, said basket having a mem-

ber engaged in said cup, means for rotating said cup at such speed to supply the necessary tangential corrective accelerating force to overcome precession of the basket during centrifugal drying operation, means for driving said bottom shaft during the drying operation, means for preventing spinning movement of said bottom shaft during the washing operation, said means for rotating said cup also providing a gyrating movement for the washing operation.

4. In a centrifugal machine, a rotatable basket, a mounting under said basket for supporting said basket, a stationary support under said basket, a universal connection rotatably mounted upon said support, means for spinning said basket for the centrifugal extracting operation, and means for applying to said basket while it is spinning an accelerating corrective force tangential to the path of precession of the basket to overcome precession.

5. In a washing and drying machine, a tank having a bottom wall, an imperforate type clothes basket in said tank for holding clothes and washing liquid, washing devices in said basket, a mounting assembly extending from said bottom wall for supporting said basket, said assembly including a sleeve secured to said bottom wall, a drive shaft having upper and lower sections with a universal joint therebetween, said universal joint and sections being disposed within said sleeve, means journalling said lower section for rotation about a vertical axis, said upper section being secured to said basket, said sleeve permitting said upper section to execute a precessional movement about true vertical position and providing a water seal between said drive shaft and said bottom wall, driving devices secured to said lower section for driving said drive shaft at centrifugally extracting speed, means for applying a corrective force to said basket, during said extracting operation, tangential to its path of precession, and means for holding said basket in a generally upright position during the washing operation, said basket and the top of said sleeve being spaced sufficiently high to be above the liquid level in the tank when said tank holds the liquid discharged by said basket.

6. In a washing and drying machine, a tank having a bottom wall, a clothes basket in said tank, washing devices in said basket, supporting devices under said basket for permitting said basket to execute a precessional movement about true vertical position, sealing devices between said supporting devices and said bottom wall, driving devices for driving said basket at centrifugally extracting speed, means for applying a corrective force to said basket, during said extracting operation, tangential to its path of precession, and means for holding said basket in a generally upright position during the washing operation.

7. In a washing and drying machine, a tank having a bottom wall, a clothes basket in said tank, washing devices in said basket, a mounting assembly extending from said bottom wall for supporting said basket, said assembly including a sleeve secured to said bottom wall, a drive shaft within said sleeve and having upper and lower sections with a universal joint therebetween, means journalling said lower section for rotation about a vertical axis, said sleeve permitting said upper section to execute a precessional movement about true vertical position and providing a water seal between said drive shaft and said bottom wall, driving devices secured to said lower sec-

tion for driving said drive shaft at centrifugally extracting speed, means for applying a corrective force to said basket, during said extracting operation, tangential to its path of precession, and
5 means for holding said basket in a generally upright position during the washing operation.

8. In a washing and drying machine, a tank having a bottom wall, an imperforate type clothes basket in said tank for holding clothes and wash-
10 ing liquid, washing devices in said basket, a pedestal assembly extending from said bottom wall for supporting said basket, said assembly including a sleeve rigidly secured to said bottom wall, a drive shaft comprising upper and lower sections
15 with a universal joint therebetween, said universal joint and upper section being disposed within

said sleeve, said lower section being journaled for rotation about a vertical axis, said sleeve being spaced from said upper section to provide a clearance space, permitting said upper section to execute a precessional movement about true
5 vertical position, said sleeve providing a water seal between said upper section and said bottom wall, driving devices secured to said lower section for driving said drive shaft at centrifugally extracting speed, means for applying a corrective force
10 to said basket, during said extracting operation, tangential to its path of precession, and means for holding said basket in a generally upright position during the washing operation.

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