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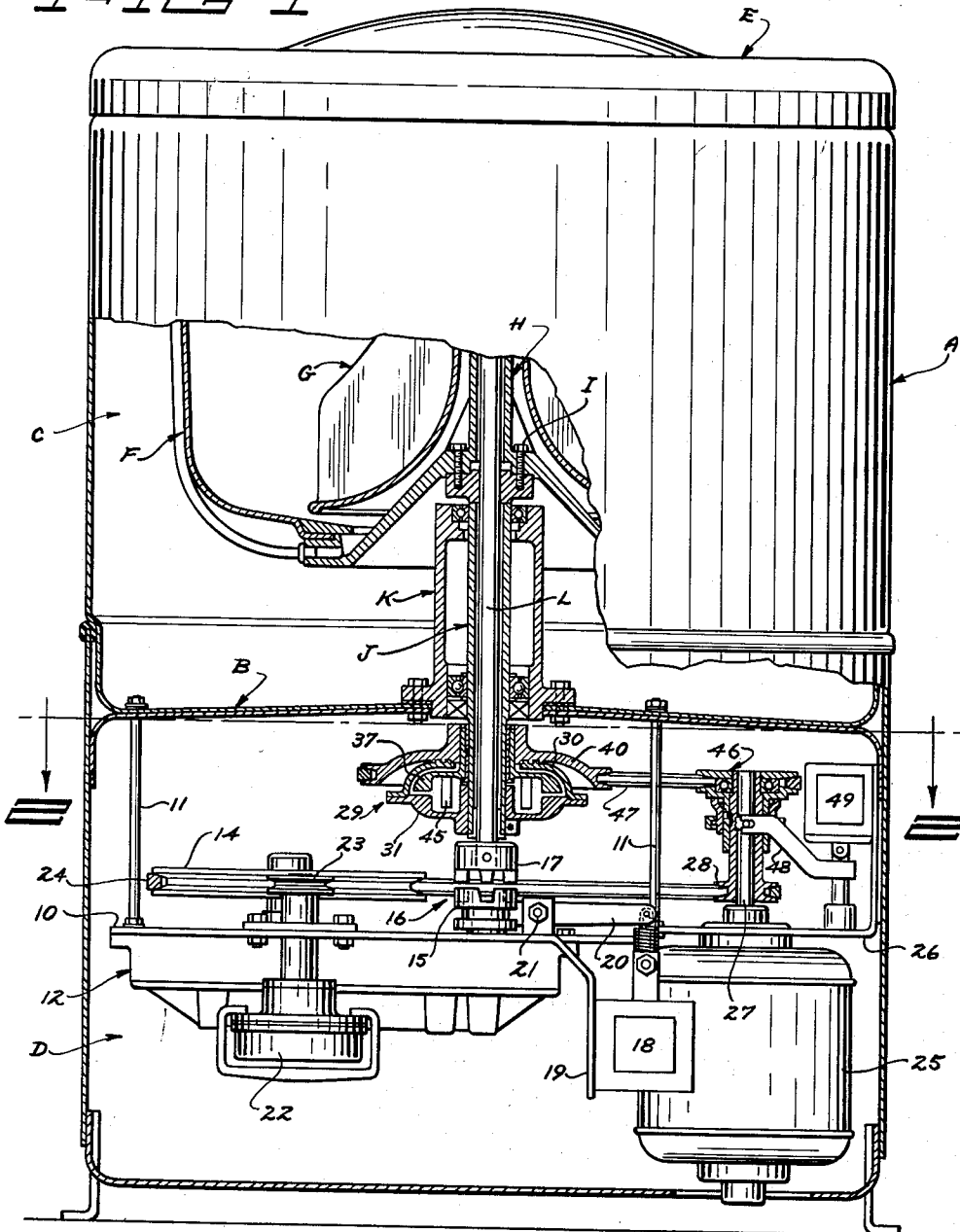
2,625,244

WASHING MACHINE DRIVE MECHANISM

Filed Nov. 24, 1947

3 Sheets-Sheet 1

FIG 1



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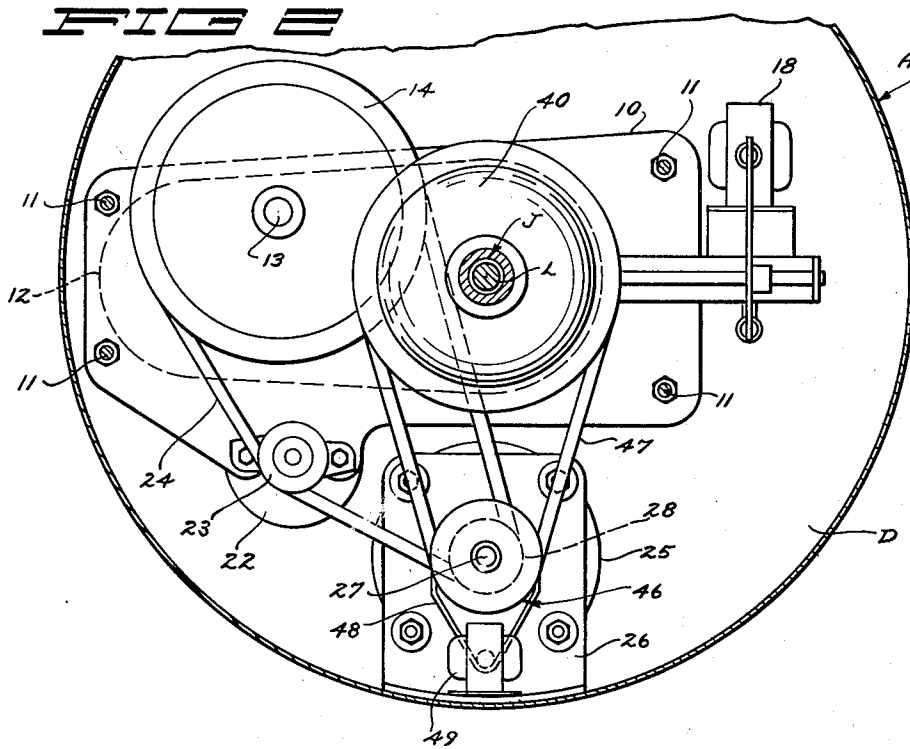
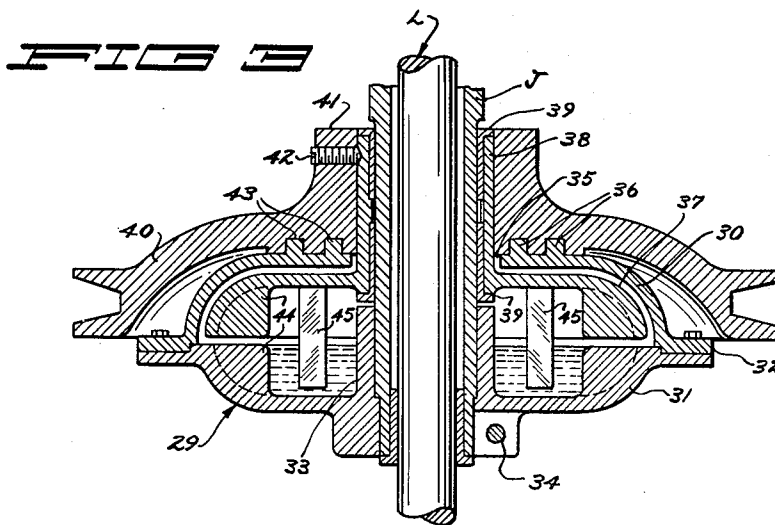
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WASHING MACHINE DRIVE MECHANISM

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3 Sheets-Sheet 2



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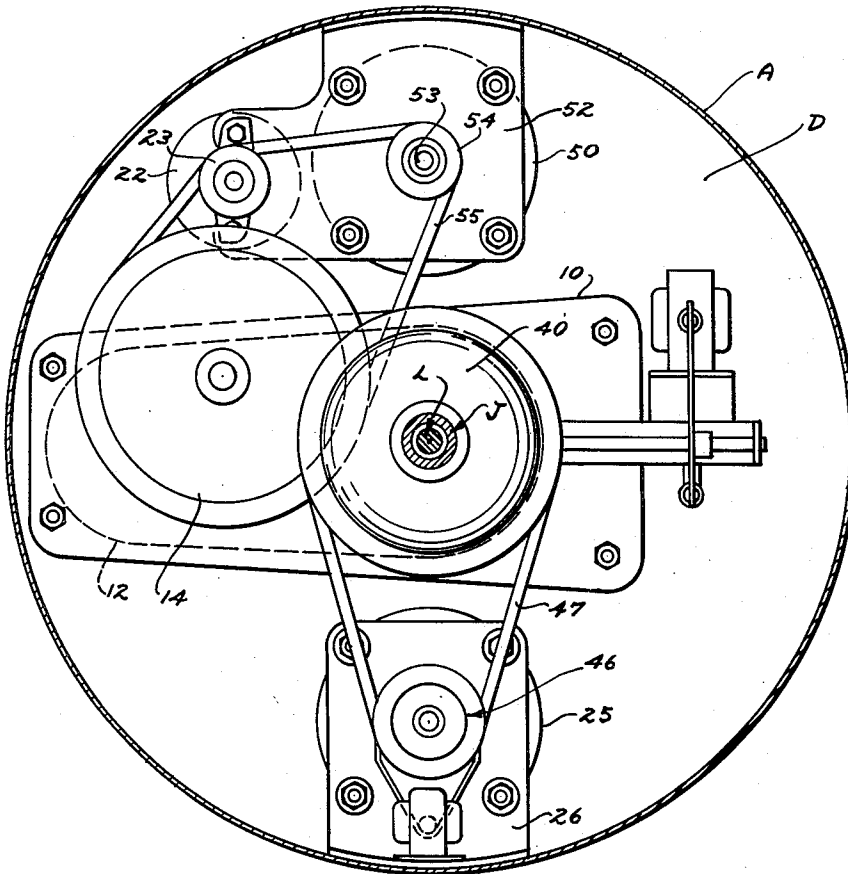
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WASHING MACHINE DRIVE MECHANISM

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3 Sheets-Sheet 3

FIG 4



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WASHING MACHINE DRIVE MECHANISM

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5 Claims. (Cl. 192—3.5)

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This invention relates generally to improvements in clothes washing machine of the type in which the clothes are washed, rinsed and centrifugally wet dried and more particularly to improved drive mechanism for such machines.

The primary object of the present invention is to provide an improved drive mechanism for the clothes receptacle or spin tub of the machine, embodying a fluid drive or coupling arranged upon and about the lower end of the usual shaft by which the receptacle is supported and rotated. Another object is to provide a drive mechanism which is compact and very simple in construction and arrangement.

These and other more detailed and specific objects will be disclosed in the course of the following specification, reference being had to the accompanying drawings, in which—

Fig. 1 is a side elevation and partial vertical section through a washing machine embodying a drive mechanism of my invention.

Fig. 2 is a horizontal sectional view taken substantially along the line 2—2 in Fig. 1.

Fig. 3 is an enlarged detail vertical sectional view through the fluid drive means or coupling and immediately associated parts.

Fig. 4 is a view similar to Fig. 2 but showing a modification of the drive mechanism.

Referring now more particularly and by reference characters to the drawing, the washing machine, per se, as shown therein is, of course, for example only and the machine comprises a housing A divided by a substantially horizontal partition B into upper and lower chambers C and D, the former being covered by a removable cover E. In the upper chamber C there is provided a rotary clothes receptacle or spin tub F wherein is located an agitator G. The receptacle F includes an axial center sleeve H which is secured at I atop a tubular operating or drive member or spindle J journaled upwardly through a bearing member K secured to and through the partition B. The agitator G is supported and oscillated by a shaft L journaled in the spindle J. The spindle J depends below the partition B some distance while the agitator shaft L extends even further downward. The arrangement is such that by separate drive means, later to be described, the receptacle F may be spun at comparatively high speed, or the agitator G may be oscillated within the receptacle.

It will, of course, be understood that in operation the clothes and cleansing liquid in the receptacle F are agitated for washing (or rinsing) the clothes by the agitator G and at the comple-

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tion of each washing (or rinsing) operation the agitator is stopped and the receptacle is rotated to expel the liquid by centrifugal force in the usual manner of such machines.

Within the lower chamber D is located the drive mechanism constituting my present invention and as here shown this mechanism includes a supporting plate 10 which is hung below the partition B by long bolts 11. Mounted on the underside of the plate 10 is a conventional washing machine transmission unit 12, of the type for example shown in Patent No. 1,964,440. This unit 12 has a power input shaft 13 provided above the plate 10 with a large pulley 14, and has an oscillating power output shaft upon which is located the shiftable lower part 15 of a jaw clutch 16. The lower end of the agitator drive shaft L has a cooperating clutch part 17 and a solenoid 18, hung on a bracket 19 on the plate 10, is connected to a shifter fork 20 fulcrumed at 21 on the plate and engaging the shiftable clutch part. The arrangement is such that energization of the solenoid 18 will push the clutch part 15 upward into driving engagement with the clutch part 17 to thus oscillate the agitator G through the shaft L.

A water pump 22 is also supported below the plate 10 and has its upwardly extending drive shaft equipped with a pulley 23. This pump may thus be driven by a belt 24, also driving the transmission pulley 14, as seen in Fig. 2 and the pump is, of course, for handling the cleansing liquid as it is expelled from the receptacle F in the usual manner of such machines.

As shown in Figs. 1 and 2 a single electric motor 25 is used for driving the machine and it is hung on a bracket 26 secured to the side of the housing A, with its shaft 27 extending upwardly. A pulley 28 is secured to the motor shaft 27 and drives the aforesaid belt 24.

The receptacle is rotated by the motor 25 through a fluid drive unit or coupling, designated generally at 29, which in many respects is similar to that shown in application, Serial No. 690,532, filed August 14th, 1946, now Patent No. 2,513,844, in which I am a joint inventor with Arthur D. Lund. In the present case, however, the fluid drive unit 29 is arranged concentrically about the lower part of the receptacle drive spindle J and reference is invited at this point to Fig. 3 which best discloses the construction of the unit. The fluid drive is of the turbine type and comprises a fluid containing housing having upper and lower sections 30 and 31 joined around their peripherally flanged edges 32. The

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lower section 31, constituting the driven part of the drive unit, has an axial sleeve 33 fitted around the lower part of the receptacle drive spindle J and clamped thereon by a clamp bolt 34, or secured to drive the spindle in any other suitable way. The upper housing section 30 has a large center opening 35 surrounding which are concentric, circular and upwardly projecting ribs 36.

Positioned in the housing is a drive or impeller unit 37 having an axial and upwardly extending center sleeve 38 which is journaled by bearings 39 upon the spindle J. A drive pulley 40 has a hub 41 which is placed over the impeller unit sleeve 38 and secured thereto by a set screw 42. The pulley is downwardly curved over the housing and the underside of the hub 41 has circular grooves 43 which closely but rotatably fit the aforesaid ribs 36. The impeller unit 37 and lower housing section 31 have the usual facing radial vanes 44 and the impeller further has depending pick-up vanes or blades 45 extending down into the lower housing section, which is filled with fluid up to about the level of the upper edges of its vanes 44 as clearly shown.

A conventional clutch-equipped pulley 46, of a commercially available form, is placed upon the motor shaft 27 and a belt 47 is trained around this pulley and the drive pulley 40 on the fluid drive unit 29. The pulley 46 is selectively drivingly connected to the motor shaft under control of a shifter fork 48 actuated by a solenoid 49.

In operation the fluid drive pulley 40 and attached impeller 37 may be driven by the motor 25 whenever required, by operation of the clutch-pulley 46, and when so driven these parts may, of course, turn independently of the fluid drive housing formed by the upper and lower sections 30-31. However, when set in motion by the pick-up vanes 45 the fluid in the housing will vortex and set up a turbine-like transfer of power between the vanes 44 causing the housing, which is attached to the receptacle spindle J to start up. As has been pointed out in the previous application hereinbefore identified, the fluid drive unit thus constructed has a high initial slippage factor which is of great advantage when starting up the unbalanced load represented by the wet clothes in the receptacle, preventing the excessive vibration which frequently occurs in other machines.

The fluid drive unit as here mounted concentric about and upon the receptacle drive spindle is very compact and the very minimum of shafting, bearings and the like is made possible thus reducing friction losses. It will be understood the ribs 36 and grooves 43 effectively seal the inside of the fluid housing while permitting for independent slippage rotation of the parts.

In lieu of the single drive motor 25 for both agitator and receptacle, I may also employ separate motors as seen in Fig. 4. In this case, an extra motor 50 is mounted by a bracket 52 upon the housing A and its shaft 53 has a pulley 54 on which is placed a belt 55 running over the pulley 14 driving the transmission unit 12. The pump 22 may be placed in any convenient position on the plate 10 or bracket 52 and its pulley 23 operated by the belt 55. The other motor 25 on its bracket 26 now may be used only to drive the fluid drive pulley 40 through the clutch-pulley 46 and belt 47 exactly as previously described. Obviously in this case a separate electrical control to start the motor 25 when required may be used, if desired, and the clutch-pulley 46 replaced by a plain pulley. In some respects the

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use of separate motors is preferable over the single motor drive since it results actually in a simplification of the mechanism, as will be understood.

It is understood that suitable modifications may be made in the structure as disclosed, provided such modifications come within the spirit and scope of the appended claims. Having now therefore fully illustrated and described my invention, what I claim to be new and desire to protect by Letters Patent is:

1. Drive mechanism of the character described for a washing machine having a rotary receptacle adapted to be rotated by a depending spindle, comprising a motor having a shaft, a rotary fluid drive coupling arranged concentrically about the axis of the spindle, the said coupling comprising vertically opposed vaned elements one of which forms a sealed chamber about the other, means connecting the motor shaft to drive the uppermost of said vaned elements, means securing the lowermost vaned element to the spindle, driving fluid in the said sealed chamber in an amount substantially less than the total capacity thereof, and means carried by the uppermost vaned element for vortexing the fluid into driving engagement with both elements.

2. Drive mechanism of the character described for a washing machine having a rotary receptacle adapted to be rotated by a depending spindle, comprising a motor having a shaft, a rotary fluid drive coupling arranged concentrically about the axis of the spindle, the said coupling comprising vertically opposed vaned elements one of which forms a sealed chamber about the other, fluid in the chamber in an amount substantially less than the total capacity thereof, means securing the lowermost vaned element to the spindle, a sleeve extending upwardly from the uppermost vaned element, a pulley secured to the said sleeve, a pulley on the motor shaft, and a belt connecting the respective pulleys.

3. Drive mechanism of the character described for a washing machine having a rotary receptacle adapted to be rotated by a depending spindle, comprising a motor having a shaft, a rotary fluid drive coupling arranged concentrically about the axis of the spindle, the said coupling comprising vertically opposed cooperating vaned elements, a housing member forming part of the lowermost vaned element and enclosing the other vaned element to form a fluid chamber, driving fluid in the chamber, means securing the lowermost vaned element to the spindle, the said housing member having a center opening larger than the spindle diameter and a sleeve on the uppermost vaned element extending upward through said opening, a pulley secured on the sleeve, a pulley on the motor shaft, a belt connecting the pulleys, and the first mentioned pulley and said housing member having cooperating annular sealing means arranged in running engagement.

4. Drive mechanism for a washing machine having a rotary receptacle with a depending hollow spindle and an agitator with a drive shaft extending down through and below the spindle, comprising a motor having a shaft, a pair of pulleys on the shaft, an agitator driving transmission having an input shaft and a pulley thereon, a belt connecting the pulley on the transmission input shaft to one pulley on the motor shaft, the transmission having an output shaft and a clutch for selectively drivingly connecting this shaft to the agitator drive shaft, a rotary fluid coupling arranged concentrically on the recepta-

cle spindle and having cooperating upper and lower vaned elements and means forming a sealed chamber, fluid in the chamber for transmitting torque from one vaned element to the other, means securing one vaned element to the spindle, a pulley on the other element and a belt connecting this pulley to the remaining pulley on the motor shaft, and a clutch for selectively disabling the motor connection to the last mentioned pulley.

5. Drive mechanism for a washing machine having a rotary receptacle with a depending hollow spindle and an agitator with a drive shaft extending down through and below the spindle, comprising a motor, an agitator driving transmission, drive means connecting the transmission to the motor and drive means connecting the transmission to the agitator drive shaft, one of said drive means including a clutch for disabling the drive connection between the motor and agitator, a rotary fluid coupling mounted coaxially on the receptacle spindle and comprising upper and lower vaned elements and means forming a closed fluid chamber, fluid in the chamber for transmitting torque from one vaned element to the other, means securing one vaned element to the spindle, drive means connecting the motor

to rotate the other vaned element, and a clutch for disabling said last mentioned drive means.

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