May 8, 1962 G. A. NEYHOUSE ETAL 3,033,014

COMBINATION WASHER-DRYER HAVING TWO TWO-SPEED MOTORS FOR DRIVING PUMP, FAN, AND CLOTHES DRUM

Filed Nov. 12, 1959 2 Sheets-Sheet 1

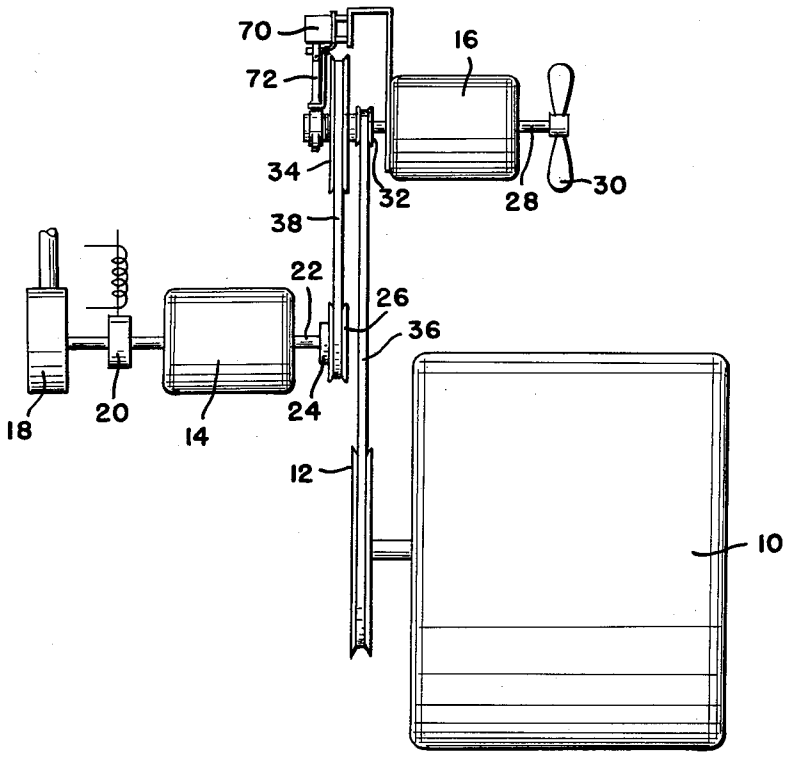

Fig. 1

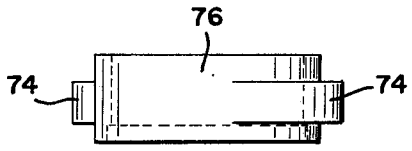

Fig. 4

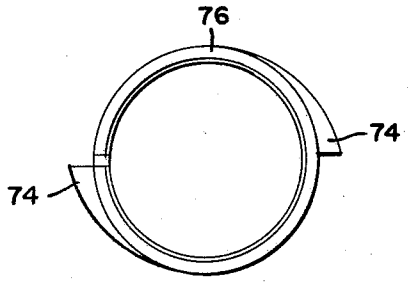

Fig. 5

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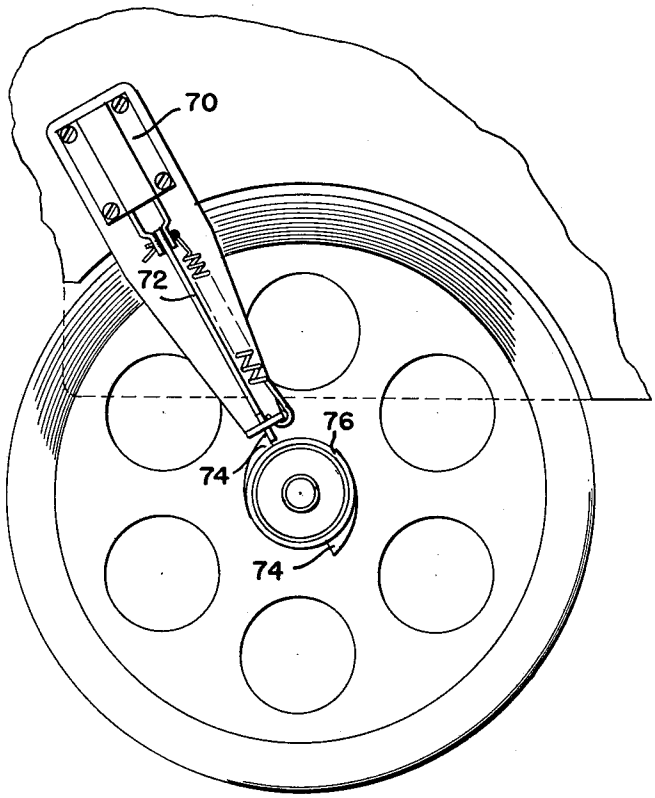

Fig. 3

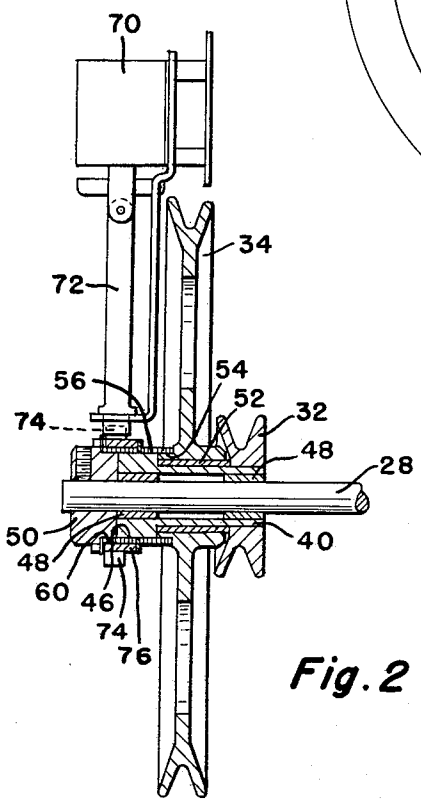

Fig. 2

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COMBINATION WASHER-DRYER HAVING TWO TWO-SPEED MOTORS FOR DRIVING PUMP, FAN, AND CLOTHES DRUM

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1 Claim. (Cl. 68—19)

This invention relates to a domestic appliance and more particularly to a drive mechanism for use in a combination washer-dryer.

With the advent of miracle fabrics, it becomes increasingly desirable to provide washing machines which can be operated at various speeds. This is necessary wherein the spin dry operation can be performed at various speeds so as to provide the most desirable spin speed for the particular fabric being washed.

It is an object of this invention to provide a simple drive which makes it possible to use two two-speed motors to operate the rotatable drum of a combination washer at four different speeds.

A further object of this invention is to provide a simple arrangement whereby the air circulating fan motor in a combination washer-dryer can be used for driving the drum during portions of the cycle of operation.

These and further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawing wherein preferred embodiments of the present invention are clearly shown.

In the drawing:

FIGURE 1 is a schematic view showing the drive mechanism forming a part of this invention.

FIGURE 2 is a fragmentary sectional view showing the main drive pulleys and clutch arrangement.

FIGURE 3 is a side elevational view of the structure shown in FIGURE 2.

FIGURE 4 is a plan view of the clutch operating cam element.

FIGURE 5 is a view taken at right angles to the view in FIGURE 4.

Referring now to the drawing wherein a preferred embodiment of the invention has been shown, reference numeral 10 generally designates the tumbling drum of a combination washer-dryer of the general type shown in U.S. Patent 2,225,407. This drum is provided with a pulley 12 which serves to rotate the drum. A pair of motors 14 and 16 are provided as shown for operating the clothes tumbling drum 10 and the various accessories required for a combination washer-dryer. These accessories include the usual water pump 18 and the blower or fan schematically shown at 30. Each of the motors 14 and 16 is adapted to be selectively operated either as a four-pole or a two-pole motor so as to provide motor speeds of approximately 1725 r.p.m. and 3450 r.p.m. A solenoid operated clutch 20 is provided between the motor 14 and the pump so as to render the pump inoperative at such times when no pumping is required. The motor 14 is provided with a drive shaft 22 on which an overrunning clutch 24 is provided for driving a pulley 26.

The motor 16 directly drives the fan 30 which is used for circulating air for drying the clothes during the drying period in accordance with well known practice. The drive shaft 28 of the motor 16 has a pair of pulleys 32 and 34 supported on its one end as best shown in FIGURE 2 of the drawing. A first belt 36 transmits power from the pulley 32 to the pulley 12 which is provided on the tumbling drum. A second belt 38 transmits power from the pulley 26 which is driven by the motor 14 through the overrunning clutch 24 to the pulley 34.

Referring now to FIGURE 2 of the drawing, the pulley 32 is secured directly to a sleeve element 40 so as to at all times rotate in unison with the sleeve element 40. A clutch surface 46 is formed on the enlarged outer periphery of the sleeve 40 for a purpose to be explained more fully hereinafter. Bearing inserts 48 are provided as shown for providing bearing support for the sleeve 40 on the shaft 28.

The shaft 28 is provided with a clutch or collar element 50 which is directly keyed to the shaft 28 so as to at all times rotate with the shaft 28. The pulley 34 is rotatably supported on the sleeve 40 by means of a bearing insert 52 and is free to rotate relative to the sleeve 40 under certain operating conditions as will be explained more fully hereinafter. The pulley 34 is provided with a clutch surface 54 adjacent its outer periphery. A first conventional wrap-up type spring clutch element 56 is provided for drivingly connecting the sleeve 40 and the pulley 34 when it is desired to utilize the motor 14 to drive the drum 10. Thus when the motor 14 is energized, the pulley 34 will be driven by the motor and when this takes place, the spring clutch element 56 will transmit power from the pulley 34 to the sleeve 40 on which the pulley 32 is secured. By virtue of the speed reduction obtained by using pulleys of different sizes between the driving motor 14 and the drum 10, it is possible to utilize the motor 14 to drive the drum 10 at speeds of approximately 50 and 100 r.p.m. When the motor 14 is operated at a speed of approximately 1725 r.p.m., the drum 10 will be operated at a speed of 50 r.p.m. and when the motor 14 is operated at a speed of approximately 3450 r.p.m., the drum 10 will be operated at a speed of approximately 100 r.p.m. The drum speed of 50 r.p.m. is desirable whenever the clothes in the drum 10 are to be tumbled during a washing or drying operation. The 100 r.p.m. speed of the drum 10 is used for centrifugally distributing the clothes in the drum prior to shifting the drive ratio into the extraction ratio which function has been described in a related patent application Serial No. 804,372, filed April 6, 1959.

A second conventional wrap-up type of coil spring clutch 60 is provided for drivingly connecting the element 50 which is secured to the end of the shaft 28 to the sleeve 40 when it is desired to transmit power from the motor 16 to the tumbling drum 10. Thus, when it is desired to operate the clothes drum 10 at a speed of approximately 500 r.p.m., the motor 16 will be energized to operate at a speed of approximately 1725 r.p.m. and when this takes place, the shaft 28 and the element 50 secured thereto will operate at 1725 r.p.m. At this same time wrap-up spring clutch element 60 drives the sleeve 40, which has secured thereto the pulley 32. The pulley 32 then drives the drum 10 through the belt 36. When it is desired to use the fan motor 16 to operate the drum 10 at approximately 1000 r.p.m., the motor 16 is operated at its 3450 r.p.m. speed.

The spring clutch 60 is controlled by the solenoid 70 which when energized serves to retract a pawl element 72 out of the path of the ratchet teeth 74 provided on the sleeve 76. The sleeve 76 surrounds the coil spring clutch element 60, as shown in FIGURE 2. Whenever the solenoid 70 is energized, the pawl 72 will be ineffective to prevent rotation of the sleeve 76 with the result that the spring clutch element 60 will wrap around the members 50 and 40 so as to transmit power from the member 50 to the member 40 and thence to the pulley 32 and the parts operated thereby.

When the motor 16 serves to drive the associated mechanism, the over-running clutch 24 provided between the

pulley 26 and the motor 14 permits the motor 16 to drive the tub 10 without driving the motor 14.

It will be apparent that with solenoid 70 deenergized and motor No. 14 operating at 1725 r.p.m., a drum tumbling speed of 50 r.p.m. can be effected and air flow from fan 30 for drying can be provided simultaneously by energizing motor 16 for either 1725 or 3450 r.p.m. operation.

By virtue of the above described construction and arrangement, it is apparent that the drum 10 can be operated at any one of four speeds merely using two two-speed motors for providing the necessary power for actuating the drum. The drive mechanism for transmitting power from the motors 14 and 16 to the drum 10 is relatively simple and inexpensive.

While the embodiments of the present invention as herein disclosed, constitute preferred forms, it is to be understood that other forms might be adopted.

What is claimed is as follows:

In a combination washer-dryer, the combination, a clothes drum, a first motor, a second motor, a water pump, means including a clutch for transmitting power from said first motor to said pump, power transmitting means for selectively connecting said motors to drive said drum, said second motor having a drive shaft projecting from its one end, a power transmitting means comprising a sleeve rotatably supported on said shaft, a first pulley secured to said sleeve, a second pulley supported on said sleeve for rotation relative to said sleeve, said power transmitting means including spring clutch means for selectively transmitting power from either of said motors to said drum, said spring clutch means comprising a first wrap-up spring having one end arranged to wrap around a surface on said sleeve and having its other end arranged to wrap around a surface on said second pulley and a second wrap-up spring having its one end arranged to wrap around a surface on said shaft and having its other end arranged to wrap around a surface on said sleeve, each of said motors being multiple speed motors whereby said drum may be operated at at least four different speeds by the two motors, said second motor having a clothes drying fan secured to its drive shaft so as to be operated thereby.

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