July 8, 1958 N. A. STEGMAN 2,842,002

DRIVING UNIT FOR A LAUNDRY MACHINE

Filed Dec. 5, 1955

3 Sheets-Sheet 1

FIG. 1.

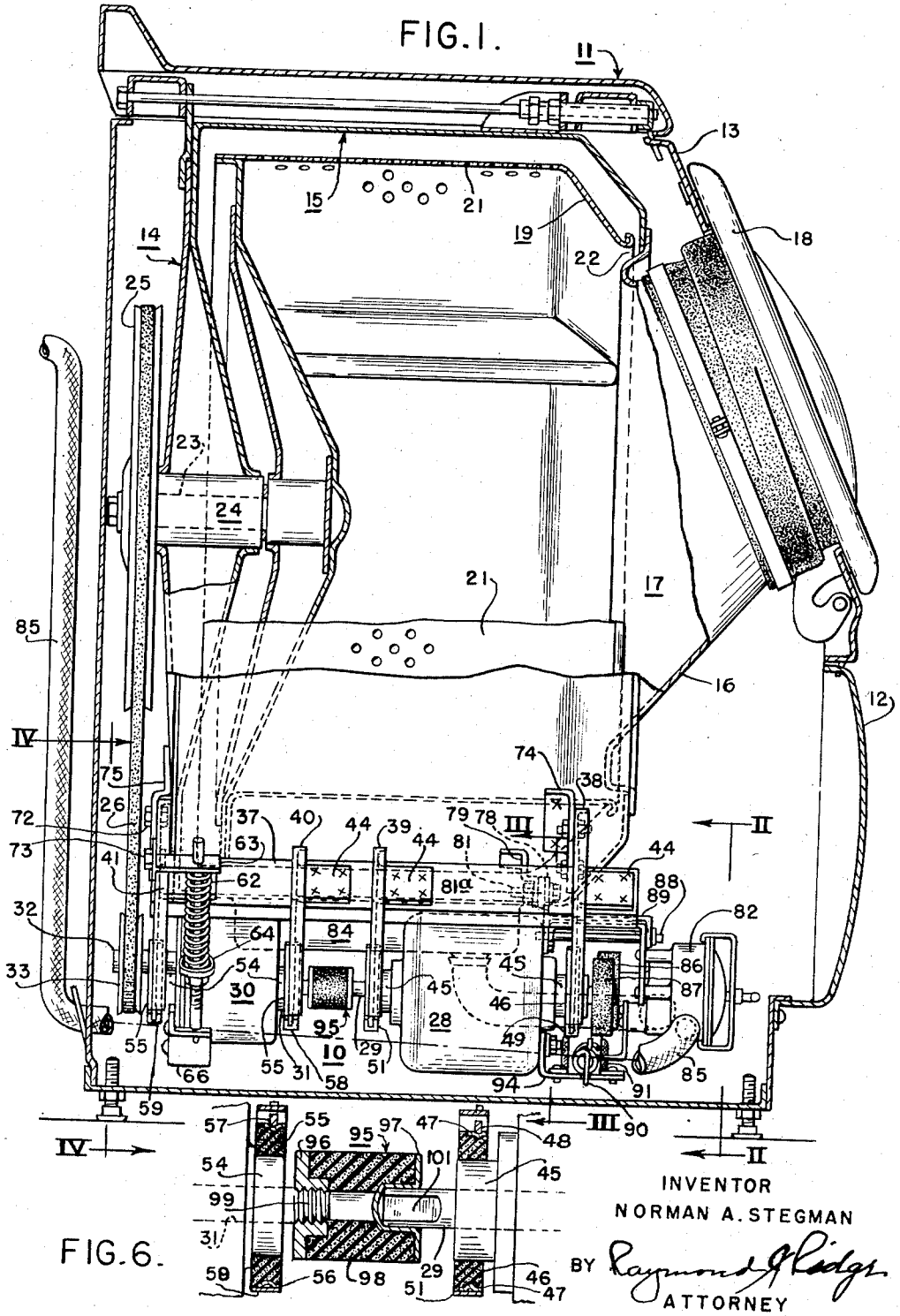

FIG. 6.

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3 Sheets-Sheet 2

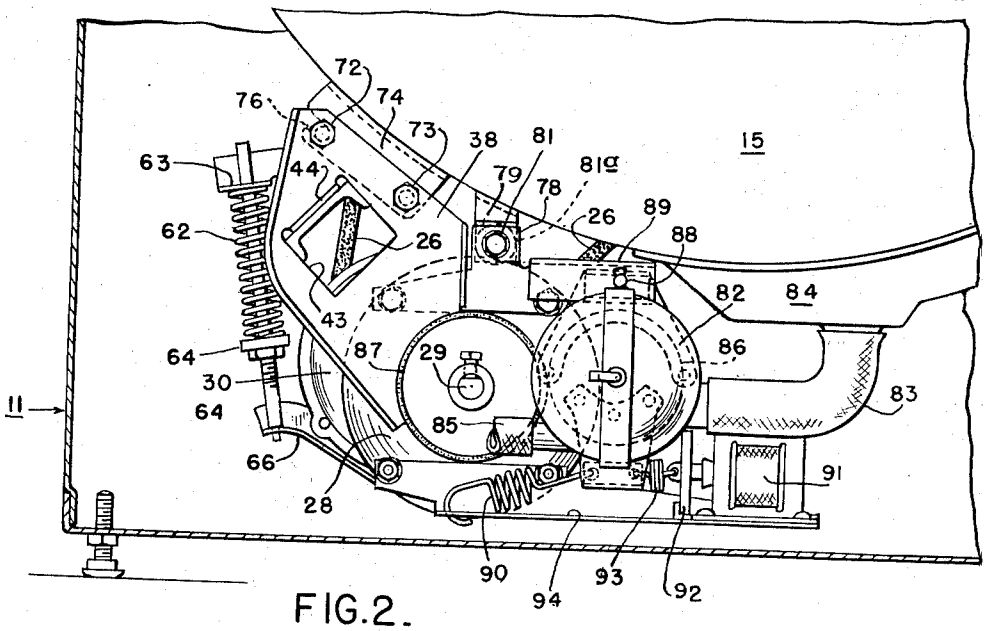

FIG. 2.

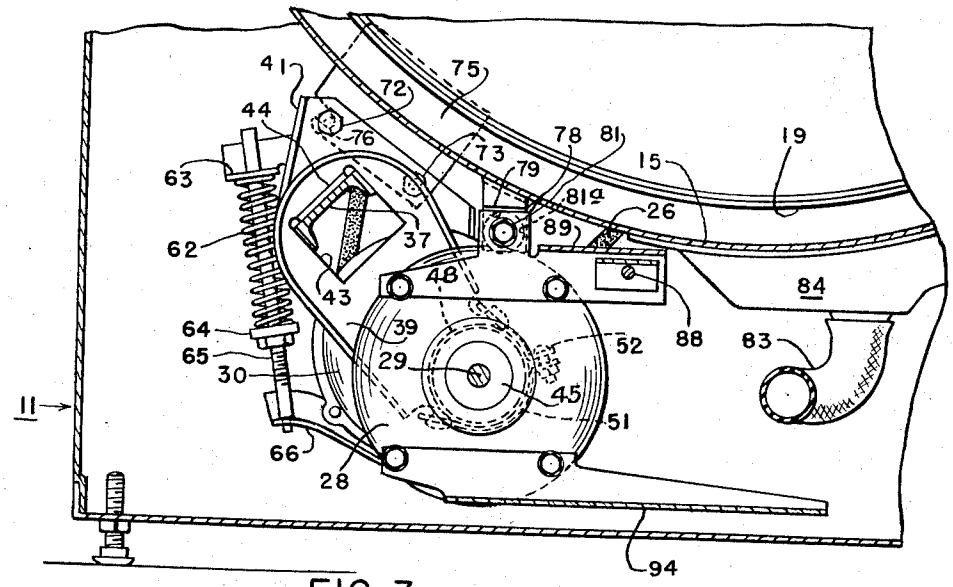

FIG. 3.

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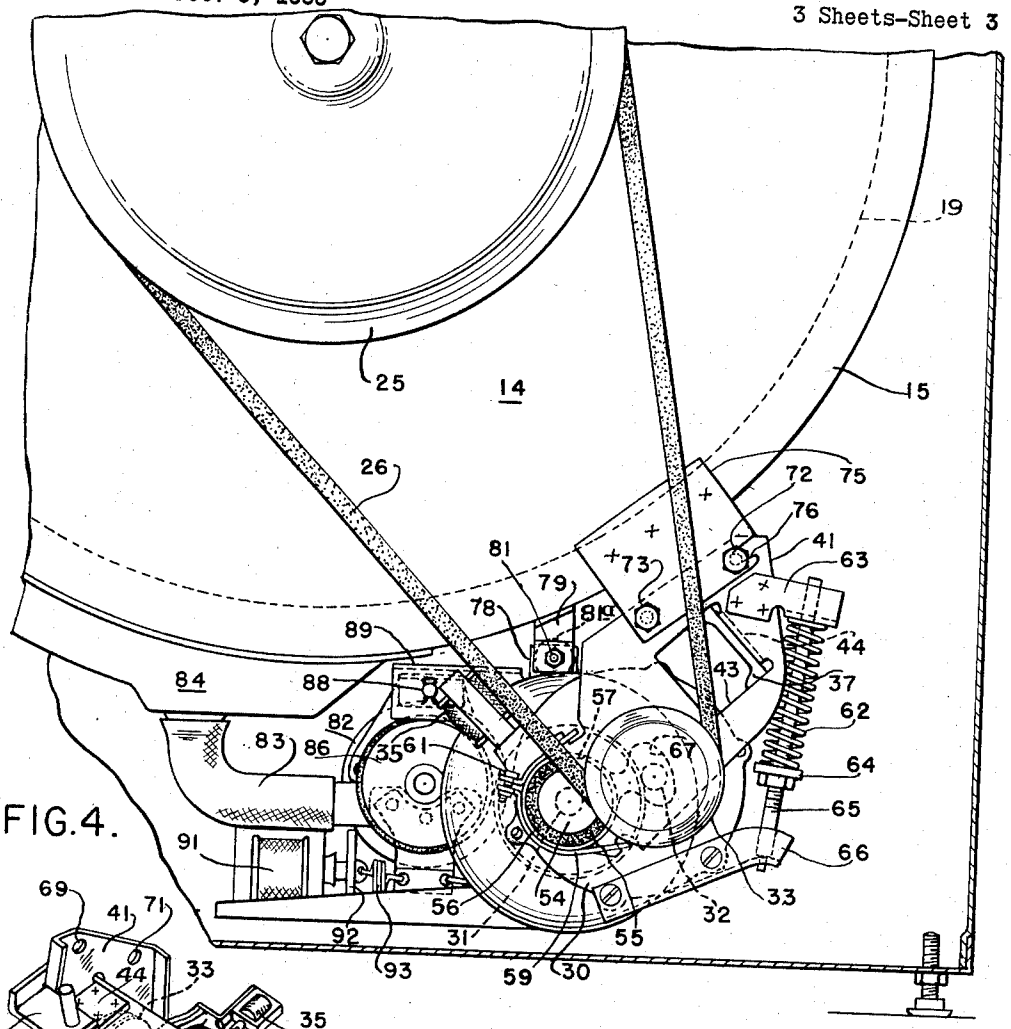

FIG.4.

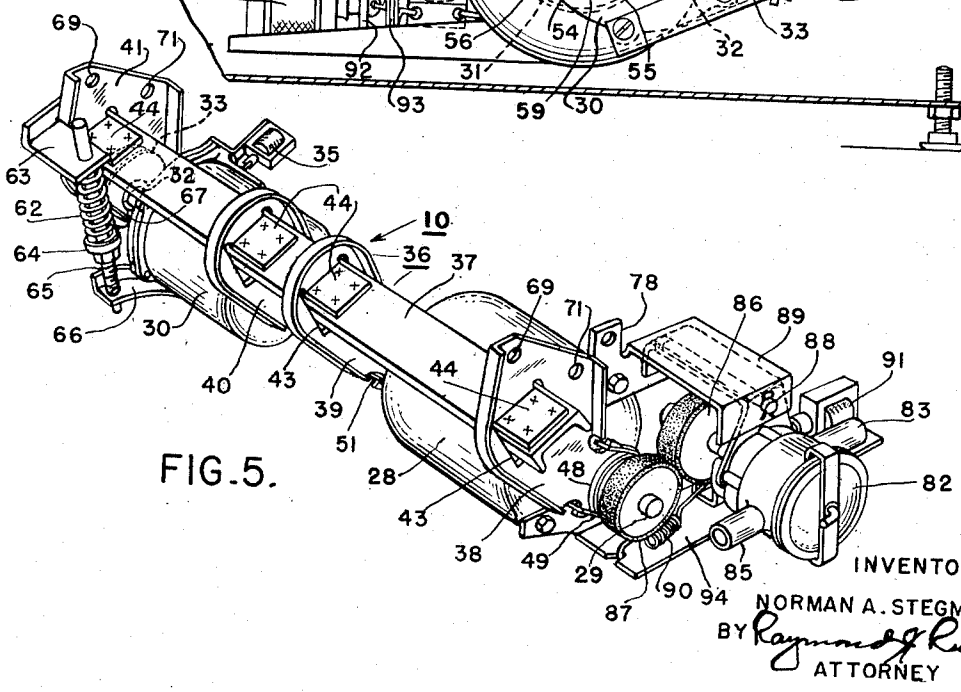

FIG.5.

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DRIVING UNIT FOR A LAUNDRY MACHINE

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Application December 5, 1955, Serial No. 551,100

5 Claims. (Cl. 74—217)

This invention relates to a laundry machine for cleaning fabrics and subsequently centrifuging cleaning fluid therefrom and an object of the invention is to provide improved means for driving the machine.

A further object of the invention is to provide an improved driving means of the class set forth which, when replaced or serviced, may be readily attached to and disengaged from the laundry machine.

Another object of the invention is to minimize wear in a resilient coupling directly connecting the shafts of a motor and transmission defining elements of a drive mechanism of the class set forth.

The invention is particularly applicable to a washer-centrifuge wherein a basket for the fabrics is rotated at low and high speeds for respectively washing the fabrics and spinning fluid therefrom. The improved driving means for rotating the basket is constructed as a unit and includes a substantially constant speed motor directly connected to the input shaft of a suitable two speed transmission. The output shaft of the transmission is spaced laterally from its input shaft and is belted to a sheave on the basket. The driving unit includes, in addition to the motor and transmission, a frame for the support of these members and biasing means urging the transmission about the axis of its input shaft for tightening the belt. Preferably, the motor and transmission are resiliently carried by the frame for quiet operation and a resilient coupling of novel construction is employed between the motor shaft and the power input shaft of the transmission in order to accommodate any misalignment of these shafts. The resilient coupling is constructed to minimize wear in its shaft openings while permitting its ready attachment to the connected shafts.

The driving unit includes a pair of spaced bolts which, during assembly of the unit to the washer structure, are insertable in open end slots formed in brackets carried by the washer structure. After insertion of the bolts in the slots, the driving unit may be swung to its proper position and then bolted or otherwise secured to the brackets. The removal of the drive unit from the washer structure is facilitated by this construction when repair of the unit or its replacement becomes necessary.

The foregoing and other objects are effected by the invention as will be apparent from the following description taken in connection with the accompanying drawings, forming a part of this application, in which:

Fig. 1 is a longitudinal view, partly in elevation and partly in section, of one form of washing and centrifuging apparatus having a driving unit, constructed and arranged in accordance with the invention, applied thereto;

Fig. 2 is a front end view of the driving unit as viewed from the plane II—II of Fig. 1;

Fig. 3 is a section taken along the line III—III of Fig. 1;

Fig. 4 is a rear end view of the driving unit as viewed from the plane IV—IV of Fig. 1;

Fig. 5 is a perspective of the driving unit detached from the washer-centrifuge structure; and,

Fig. 6 is a section of a detail shown in Fig. 1.

Referring now to the drawing, a drive mechanism, generally indicated at 10, is shown applied to a clothes washing and centrifuging machine of the so-called horizontal axis type. The machine, as disclosed, includes an outer casing 11 having a front wall structure 12, an upper portion 13 of which is inclined rearwardly and upwardly of the casing. Arranged within the casing 11 is a washing and centrifuging unit, generally indicated at 14 and including a tub structure 15 for containing a body of washing water, which tub is provided at its front end with a chute 16 defining an access passage 17 for the ingress and egress of fabrics to and from the machine. As shown, the front end of this chute 16 is suitably secured to the portion 13 of the front wall of the tub and the open end of the chute is closed by a door 18 hinged in any suitable manner to the casing front wall 12.

Arranged within the tub 15 is a conventional basket 19 for enclosing the fabrics to be treated, which basket 19 includes a perforate side wall 21 and an access opening 22 registering with the passage 17 of the tub structure. The basket 19 is rotatable about a generally horizontal axis at low speed for tumbling the fabrics during a washing period and subsequently at relatively high speed for centrifuging cleaning fluid from the fabrics. The basket is supported by a shaft 23 extending rearwardly thereof and journalled in the rear wall of the tub 15, as generally indicated at 24. The basket is rotated by a sheave 25 fixed to the shaft 23 and belted as shown at 26 to the driving mechanism 10, further reference to this drive being made hereinafter.

The driving mechanism 10 as best shown in Fig. 5 includes a constant speed motor 28, the shaft 29 of which is coupled to the power input shaft 31 of a suitable two speed transmission 30, the power output shaft of which is indicated at 32. The output shaft 32 is spaced from the input shaft 31 and carries a pulley 33 for driving the belt. The transmission 30 may be of any suitable construction and, since transmissions for this service are so well known, a description of their construction and operation is deemed unnecessary. Usually a magnet, indicated at 35, is employed to adjust the transmission for low and high speed operation all of which is well understood.

The driving unit 10 includes a frame structure, generally indicated at 36, for the support of the motor 28 and the transmission 30, which frame structure includes a channel member or tie 37 welded to two pairs of spaced brackets, the pair of brackets supporting the motor 28 being indicated at 38 and 39 and the pair of brackets supporting the transmission being indicated at 40 and 41. The channel member or tie 37 passes through openings 43 formed in the brackets and is welded to respective pads 44 formed on the brackets 38 to 41, inclusive, at one side of the holes 43.

The motor 28 is provided with axially spaced shoulders 45 upon which annular resilient rings 46 are fitted, the latter being encompassed by metal rings 47 as shown in Fig. 6. The motor brackets 38 and 39 have respective arcuate saddles 48 in which the rings 47 are seated. Clamps 49 and 51 hooked to the brackets 38 and 39 engage arcuate portions of the rings 47 and are drawn together by bolts 52 to seat the rings 47 in the saddles and to maintain the motor in position, all of which is well understood.

The manner of supporting the transmission 30 will now be described. This member has spaced shoulders 54 formed thereon which are coaxially arranged with respect to the power input shaft 31 and are carried by resilient annular rings 55, as shown in Figs. 4 and 6. The latter rings are provided with encompassing metal bands 56 secured thereto and seated in saddles 57 (Fig. 4) formed

in the lower ends of the brackets 40 and 41. Clamps 58 and 59 similar to the clamps 49 and 51 are hooked to the brackets 40 and 41 and are drawn together by a bolt 61 (see Fig. 4). The bolts 61 are drawn to position the rings 56 in the saddles 57 and permit movement of the transmission 30 with respect to the brackets 40 and 41 in order to tension the belt 26. In this connection, a compression spring 62 is employed for tensioning the belt, which spring bears against a seat 63 carried by the bracket 41, the lower end of the spring engaging an adjustable shoulder 64 on a threaded stem 65. The latter under the bias of the spring 62 bears downwardly on an arm 66 suitably secured to the transmission. As viewed in Fig. 4, the transmission 30 is biased clockwise to move the output shaft 32 about the input shaft in belt-tightening direction. It will be noted here that the output shaft 32 of the transmission extends through an opening 67 formed in the bracket 41 (Fig. 4).

The mounting of the drive mechanism 10 on the washer structure will now be described. Each of the supporting brackets 38 and 41 are provided with upper and lower bolt holes 69 and 71, respectively. Bolts 72 and 73 are passed through the respective openings 69 and 71 and secure the brackets 38 and 41 to supporting ears 74 and 75 fixed to lower portions of the tub 15. The ears 74 and 75 have respective upwardly facing slots 76 formed therein for the reception of the bolts 72, while the bolts 73 pass through suitable openings in the ears 74 and 75. In assembling the driving unit 10 of the tub structure, the bolts 72 may be inserted in their openings 69 and the unit 10 then hooked to the ears, the bolts 72 entering the open end slots 76 at this time. The unit 10 may then be swung to its proper operating position and the bolts 73 inserted. The bolts 72 and 73 may then be tightened for firmly holding the unit 10 in position.

It is desirable that the motor 28 be prevented from turning in the saddles 48 and, in this connection, a coupling plate 78 is secured to the motor in any suitable manner. This plate 78 is connected to an ear 79 formed on the bottom of the tub 15 by means of a bolt 81. A resilient grommet 81*a* separates the plate 78 and the ear 89 from each other and from the bolt 81 to provide a resilient connection between these members for preventing vibrations excited in the motor 28 from reaching the tub structure.

Preferably, the drain pump forms a part of the driving unit 10. As shown best in Fig. 5, the drain pump, indicated at 82, has an inlet hose 83 extending to a sump 84 formed in the bottom of the tub. An outlet hose 85 of the pump extends from the pump 82 to a point of discharge, the hose 85 extending above the highest level of water to be maintained in the tub. It will be understood that this is necessary where a conventional drain valve is dispensed with and also that the portion of the drain discharge hose 85, as well as the pump 82 and the inlet hose 83, are flooded during washing periods when the pump 82 is inactive. The pump 82 is driven by a friction wheel 86 engageable with a second friction wheel 87 mounted on the motor shaft 29.

The pump is started and stopped by moving the friction wheel 86 into and out of engagement with the friction wheel 87. In order to provide this operation, the pump 82 is suspended from a pin 88 carried by an extension 89 of the plate 78. The pump is swung pendulum like beneath the pin 88 and is biased to its operating position by a tension spring 90. Separation of the friction wheels 86 and 87 for stopping operation of the motor may be carried out by a magnet 91 which, when energized, actuates its movable armature 92 in opposition to the bias of the spring 90 and thereby swings the pump 82 about the pivot pin 88 for disengaging the friction wheels 86 and 87. Preferably a tension spring 93 is interposed between the armature 92 of the magnet and the pump structure in order to provide for proper seating of the armature during energized periods of the magnet 91. A supporting plate or platform 94 secured to the motor may be employed for the support of the magnet 91 and is a point of attachment for the tension spring 90.

As best shown in Fig. 6, the motor shaft 29 and the power input shaft 31 of the transmission 30 are connected by a resilient coupling 95 having spaced end plates 96 and 97 vulcanized or otherwise secured to a body of suitable rubber and shown at 98. The plate 96 is threaded to the shaft 31, as shown at 99, and the driving plate 97 is provided with an opening, non-circular in cross section for the reception of the motor shaft 29; the driving end portion 101 of which has a cross section similar to the non-circular configuration of the opening in plate 97. The arrangement is such that the end portion 101 of shaft 29 has a close sliding fit with the opening in the plate 97 and may be readily inserted in the opening and withdrawn therefrom. With the shaft 29 withdrawn from the plate 97, the coupling can, of course, be unthreaded from shaft 31 for repair or replacement. Tests have shown that a flexible coupling constructed as shown will wear less between the drive shaft and the opening in which it is fitted than conventional constructions where sliding fits between both the drive and driven shafts and the coupling are employed. This reduction in wear is brought about because of the threaded connection between the driven shaft 31 and the plate 96. It will be understood that, where some misalignment of the driving and driven shafts prevails, as is usually the case in resiliently mounted elements like the motor and transmission of the present structure, the resilient body of the coupling twists, first in one direction and then in the other during each revolution. This twisting force is imparted to the end plates and tends to wobble them relative their shafts and thereby cause wear where the plates and shafts are joined. By firmly threading the driven plate 96 to its shaft, wobble of the plate is prevented and the driven end of the resilient body 98 is stabilized at this point. This stabilization of the body 98 retards its twisting and decelerates wear at its driving end between the shaft end 101 and the portion of plate 97 defining the shaft opening therein.

From the foregoing description, it will be apparent that this invention provides an improved driving unit for a washing and centrifuging machine and having novel belt tightening means, which unit may be readily attached to and disengaged from the washer structure for replacement or repair. The invention further provides for the resilient suspension of both the driving motor and multiple speed transmission in order to isolate vibrations excited therein and minimizes wear in the resilient coupling connecting these members.

While the invention has been shown in but one form, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various changes and modifications without departing from the spirit thereof.

What is claimed is:

1. In a multiple speed driving unit for a machine rotatable at high and low speeds, the combination of a motor having a shaft, a multiple speed mechanism having laterally spaced, power input and output shafts, and including means for adjusting the speed of the power output shaft, said power input shaft being axially aligned with the motor shaft and coupled thereto, a pulley fixed to the output shaft, a belt driven by the pulley for driving said sheave, a frame structure including means for supporting said motor, a pair of brackets carried by the frame and having respective arcuate saddles formed in ends thereof, said multiple speed mechanism having a pair of spaced annular shoulders coaxial with the input shaft for the support of the multiple speed mechanism, said shoulders being seated, respectively, in the arcuate saddles, clamps carried by said brackets and engaging the respective shoulders for retaining the latter in engagement with the saddles and permitting arcuate move-

ment of the multiple speed mechanism relative the brackets, means interposed between the frame structure and the two speed mechanism for biasing the latter about said arcuate saddles in belt-tightening direction, and means associated with the machine for the support of said frame structure.

2. In a multiple speed driving unit for a machine having a sheave adapted for rotation at low and high speeds, the combination of, a motor having a shaft, a multiple speed mechanism having laterally spaced power input and output shafts, said power input shaft being axially aligned with the motor shaft and coupled thereto and said power output shaft having a pulley, a belt driven by the pulley and driving said sheave, said mechanism being adjustable to rotate the power output shaft at low and high speeds, a frame, means carried by the frame and supporting the motor, a pair of brackets carried by the frame and having respective arcuate seats formed therein, said multiple speed mechanism having spaced annular shoulders formed thereon coaxially with respect to the power input shaft, means for retaining said shoulders in said arcuate seats, respectively, and providing for angular movement of the multiple speed mechanism about the axis of the power input shaft, means carried by the frame and biasing the mechanism in a direction to tension the belt, a pair of supporting ears for the unit and having respective, upwardly facing, open end slots therein, a pair of bolts carried by the frame and disposed within the slots and means securing the frame to said ears.

3. In a multiple speed drive mechanism, the combination of a motor having a shaft provided with a non-circular end, a multiple speed mechanism having a power input shaft aligned substantially with the motor shaft and a power output shaft having an axis laterally spaced from said power input shaft, a pulley driven by the output shaft, a frame, respective means resiliently supporting the motor and multiple speed mechanism from the frame, and a flexible coupling connecting the motor shaft and the power input shaft, said coupling including spaced end plates and a resilient deformable body connecting the end plates, one of said end plates having a non-circular opening therein for receiving said non-circular end of the motor shaft, the other of said end plates being threaded to the power input shaft of the multiple speed mechanism.

4. In a multiple speed drive mecnanism, the combination of a frame, a motor carried by the frame and having a shaft, a multiple speed mechanism having a power input shaft and a power output shaft laterally spaced therefrom, said input shaft being aligned substantially with the motor shaft, a flexible coupling connecting the motor shaft and the power input shaft, a pulley fixed to the output shaft, a belt driven by the pulley, said multiple speed mechanism having a pair of spaced bosses formed thereon coaxially with respect to the input shaft, a pair of resilient annular members surrounding the respective bosses for the support of the multiple speed mechanism, respective rings enclosing the annular members, a pair of arms carried by the frame and having arcuate saddles formed in the ends thereof for the reception of said rings, means carried by the arms for seating the rings in said saddles and providing for angular movement of the multiple speed mechanism about the axis of the input shaft thereof, and means for biasing the mechanism in a direction for tensioning said belt.

5. In a multiple speed power unit, the combination of a motor having a shaft, a multiple speed mechanism having laterally spaced, power input and power output shafts and including means for adjusting the speed of the power output shaft, said power input shaft being axially aligned with the motor shaft and coupled thereto, a frame structure including means for supporting the motor, a pair of brackets carried by the frame and having respective arcuate saddles formed in the ends thereof, said multiple speed mechanism having a pair of spaced annular shoulders coaxial with the input shaft for the support of the multiple speed mechanism, respective resilient rings encompassing the annular shoulders and seated in the arcuate saddles, clamps carried by the brackets and engaging the respective rings for retaining the latter in engagement with the saddles and providing for arcuate movement of the multiple speed mechanism relative the brackets, and means interposed between the frame structure and the multiple speed mechanism for biasing the latter about said saddles in a predetermined direction.

References Cited in the file of this patent

UNITED STATES PATENTS

2,297,619	Haberstump	Sept. 29, 1942
2,510,836	Russell et al.	June 6, 1950

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 2,842,002 July 8, 1958

Norman A. Stegman

It is hereby certified that error appears in the printed specificati of the above numbered patent requiring correction and that the said Lette Patent should read as corrected below.

Column 4, line 59, before "rotatable" insert -- having a sheave --.

Signed and sealed this 9th day of September 1958.

(SEAL)
Attest:
KARL H. AXLINE
Attesting Officer

ROBERT C. WATSO
Commissioner of Pate