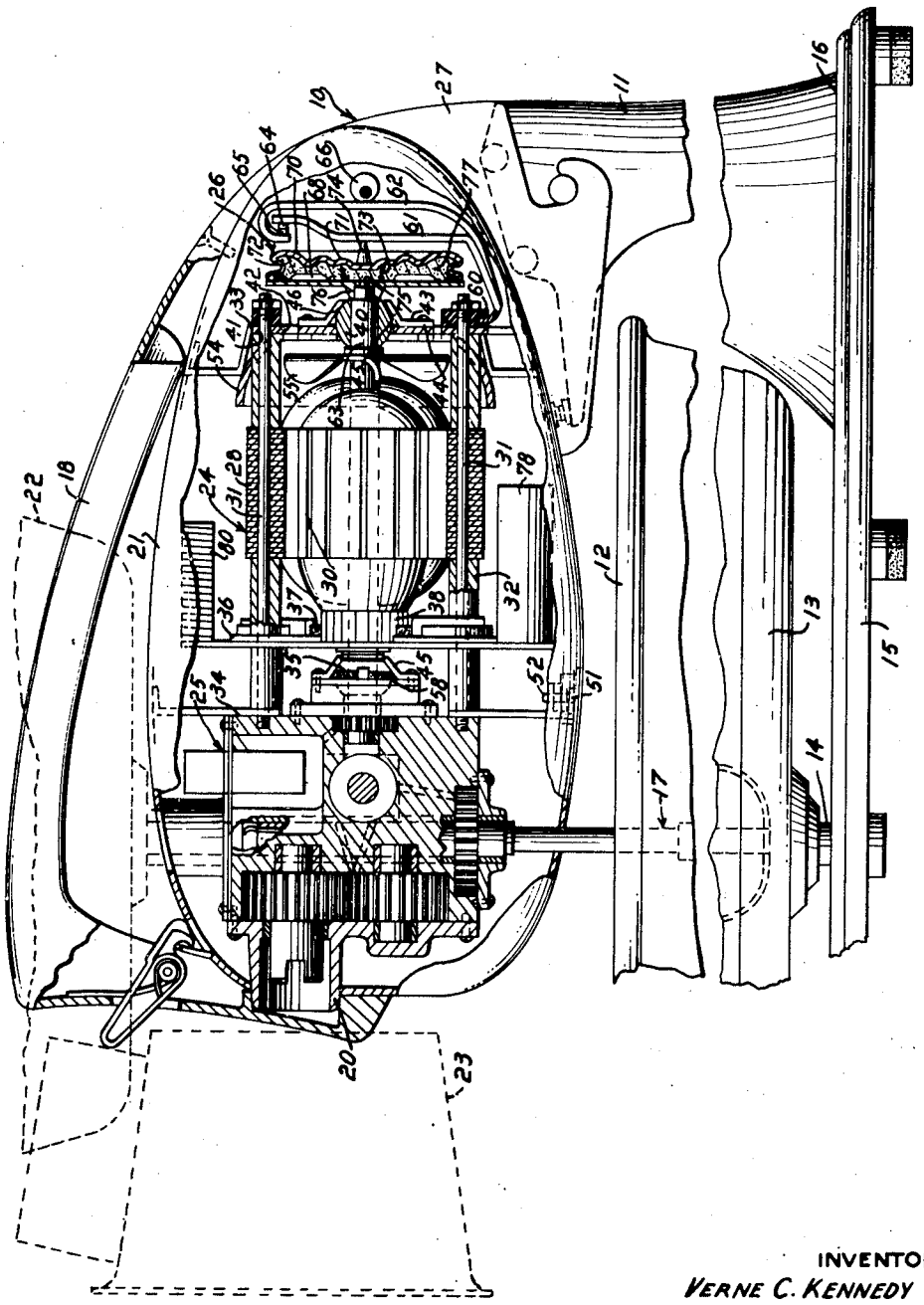
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CENTRIFUGAL GOVERNOR FOR MOTORS

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CENTRIFUGAL GOVERNOR FOR MOTORS

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7 Claims. (Cl. 318—325)

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This invention relates to variable speed governors for prime movers such as electric motors.

This application is a division of Patent No. 2,382,158, and certain features of the invention are related to and constitute improvements over the construction disclosed in my Patent No. 2,406,150, reference to which is hereby made.

One of the objects of the invention is to provide an improved centrifugal speed governor wherein a self-contained body of fluid is employed as the centrifugated element.

Another object of the invention is to locate the self-contained body of speed governor fluid in the path of incoming cooling air for a power unit before the air is subjected to the varying heat of the power unit.

Another object of the invention is to provide a speed governor having a centrifugally influenced fluid which operates uniformly at all times independently of motor heat.

Another object of the invention is to provide an improved cooling system and an arrangement for fractional horse power motors wherein electrical accessories to the motor, such as the condenser, interrupter, and resistance for a speed governor are located outside the path of air passing through the motor, and along with the transmission are mounted within a finishing shell and cooled with a continuous bath of air by the same fan cooling the motor.

These being among the objects of the invention, other and further objects will become apparent from the drawings, the description relating thereto, and the appended claims.

Referring now to the drawings,

The figure is a fragmentary sectional view in which the section is taken vertically through the longitudinal center of a food mixer illustrating an embodiment of the present invention.

Referring now to the drawings in further detail, the power unit 10 is shown disposed in its working position as mounted upon the support 11 to overhang a bowl 12 rotatably mounted on a turntable 13. The turntable 13 is pivoted as at 14 on the base 15 and the lower end of the support is rigidly secured to the base as at 16 in a suitable manner. When the unit is in its working position the beaters 17, preferably interdigitating beaters, depend and are disposed in the bowl to agitate the contents thereof.

A handle 18 is releasably secured to the power unit, and at its forward end conceals in mutually supporting relationship the front end of the power takeoff socket 20 where it extends through the shell 21 for this purpose. Removal of the handle provides access to the juicer attachment shown in phantom 22, or a meat chopper shown in phantom 23.

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Power unit

The power unit 10 comprises the shell 21, a prime mover 24, a transmission 25, the removable handle 18, just mentioned, a speed governor 26, and preferably two downwardly extending parallel flanges 27 upon the shell 21 spaced from each other to straddle and receive the top of the support 11.

Prime mover

Briefly stated, the prime mover 24 in turn comprises a stator 28 and a rotor or armature 30 supported with respect to each other in operative position by bolts 31 and spacer sleeves 32 secured to spaced end members 33 and 34, one of which 34 is a part of or is secured to the transmission 25.

Self aligning armature bearings 35 are mounted in the end members and a brush holder 36 is also carried by the bolts and spacers where the brushes 37 may cooperate in the usual manner with the commutator 38.

As more particularly shown in Fig. 1 the rear end member 33 is a stamped plate having a central opening 40 and laterally spaced openings 41 to receive the ends of the bolts, and is provided with arcuate perforations 42 which allow for the passage of air through the end member.

The bearing 35 has a preferably spherical or rounded contour over a portion of its outer surface, which portion has a greater diameter than the opening 40 so that the bearing can be disposed to rest and be supported in the opening where it is held in place by a stamped retainer 43 riveted to the end member as at 44.

Speed governor

The speed governor 26 is mounted on the end of the armature shaft 63 where it extends beyond the rear bearing 35 and comprises a centrifugally responsive device, two contacts 64 and 65 carried by the spring arms 61 and 62 that are mounted at spaced points upon the insulating member 60 just mentioned, and an adjustable element 66 for varying the position of the arm 62 in relationship to the arm 61.

The responsive device comprises a circular plate 67 provided with radially disposed vanes 68 upon one side. Over the vanes is secured marginally, as by brazing, a cup-shaped member 70 having a flexing end wall 71 and a bellows type side wall

72 so that the center of the end wall and the side wall flex independently of each other.

A spring 73 is disposed between the plate and the end wall at the axis of rotation to urge the center of the end wall away from the plate. The exposed face of the end wall receives a conical end thrust member 74 whose apex is disposed at the axis of rotation and engages the spring arm 61 under the tension present in the spring arm and under that which is created by the spring. The conical member is held in place permanently as by brazing.

The plate is slightly concave and is provided with an opening 75 at the center of the concavity and a cylindrical flange 76 by which it is mounted upon the shaft. The space between the plate and member is filled with a liquid 77, preferably an oil, and all the air is permitted to escape through the opening 75. During filling operation the spring 73 will have expanded the compartment quite measurably and after all the air is replaced with oil the assembly is placed in a form and collapsed to an exact extent to remove surplus oil from the compartment, after which the opening 75 is sealed.

Thereafter, when released from the form the expansion force exerted by the spring 73 will force the point of the member 74 outwardly and collapse the side wall bellows 72 inwardly. When the device is rotated by the motor shaft the oil 77 in the compartment centrifugates to expand the side wall bellows 72 under the influence of which the end wall 70 is drawn inwardly at the center. The vanes 68 keep the contents of the compartment in step with the speed of rotation of the shaft 63 and in order to accentuate their action the position of the vanes may be such that they are canted slightly from radially with the outer edge trailing a true radius. With this arrangement, as the motor speeds up the vanes will tend to force the oil outwardly and as the motor slows down the oil will overtake the vanes and be moved by them inwardly. As the motor slows down the reverse will take place, thereby inducing a relative axial movement of the bearing point in relationship to variations in the speed of the motor.

This relative movement of the bearing point is used to control the make and break of the contacts 64 and 65. The contact 65 is adjusted by the cam represented diagrammatically at 66 to vary the point in the speed curve of the motor at which a break between the contacts 64 and 65 takes place. These contacts comprise a switch connected in series with the motor windings and in parallel with a condenser 78 and a resistance 80 that cushions the electrical drop in the motor circuit when the contacts are separated and also to suppress radio interference.

The cam control 66 may be operated from outside the housing in any suitable manner and upon the housing may be printed or inscribed instructions or indices (not shown) to assist the operator in selecting the speed adjustment he or she might desire. A start and stop switch (not shown) is controlled by the same shaft as the cam to open at the low point on the speed curve of the motor. This switch may be either a separate switch or the governor contacts 64 and 65 themselves. If the governor contacts are utilized then a suitable construction upon the cam which comes into operation at a predetermined point of rotation of the cam will accomplish the result desired.

Thus, from the description had and the designation of the operations performed, it will be seen that the objects and purposes mentioned and claimed herein are accomplished by the embodiment defined, and although the description has been lodged in terms somewhat specific in details for a better understanding of the embodiment illustrated, the several embodiments of the invention suggested and described will be apparent to those skilled in the art that various and further uses, modifications and changes may be made without departing from the spirit and substance of the invention, the scope of which is commensurate with the appended claims.

What is claimed is:

1. In a controlling switch of a power unit for food mixers, a rotatable envelope having a closed body of liquid therein and a flexible wall, a switch in circuit with the power unit, and means interconnecting said wall and switch for controlling the switch in relation to movement of the wall.

2. A speed control for a food mixer power unit comprising a rotating envelope having a closed body of liquid therein and a flexible wall, means for urging the wall in one direction, centrifugation of the liquid in the envelope urging the wall in the opposite direction, a switch, and means interconnecting said switch and wall for operating the switch in relationship to the movement of said wall.

3. A speed governor for a motor comprising an envelope rotatable by a prime mover, said envelope having a body of liquid therein centrifugated by rotation of said envelope, said envelope including a wall flexing under the influence of the liquid when centrifugated, means opposing said flexing, and a switch in the circuit of the prime mover actuated by said flexing wall.

4. A power unit for a food mixer comprising a a prime mover, a shell for said prime mover, an apertured partition in said shell, means for forcing air through the partition for cooling the prime mover, a speed governor connected in series with the prime mover including a rotating envelope having a body of liquid therein subject to centrifugation, said governor being located on the intake side of said apertures where the temperature of the cooling air is substantially constant.

5. A power unit for a food mixer comprising a prime mover, a shell for said prime mover, electrical resistance means connected in circuit with the prime mover mounted within said shell, an apertured partition in said shell, means for forcing air through the partition for cooling the prime mover, a speed governor connected in series with the resistance means including a rotating envelope having a body of liquid therein subject to centrifugation, said governor being located on the intake side of said apertures where the temperature of the cooling air is substantially constant, and said resistance being located on the outlet side of the apertures out of the path of air moving into direct contact with the prime mover.

6. A speed governor for a motor comprising an envelope rotatable by a prime mover, radially extending vanes carried by and disposed within said envelope, said envelope having a body of liquid therein in contact with said vanes and centrifugated by rotation of said envelope and vanes, and a wall flexing under the influence of the liquid when centrifugated, means opposing said

flexing, and a switch in the circuit of the prime mover actuated by said flexing wall.

7. A speed governor for a motor comprising an envelope rotatable by a prime mover, vanes in said envelope that are canted slightly with their outer edges trailing a true radius, and a body of liquid in said envelope surrounding the vanes centrifugated by rotation of said envelope, said envelope including a wall flexing under the influence of the liquid when centrifugated, means opposing said flexing, and a switch in the circuit of the prime mover actuated by said flexing wall.

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