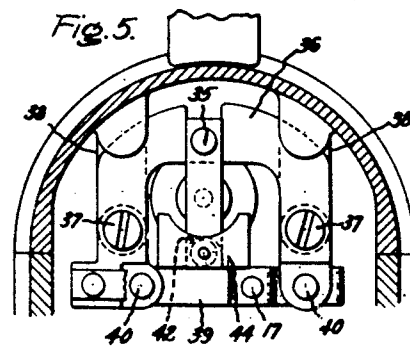
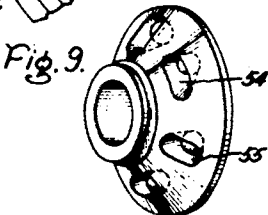
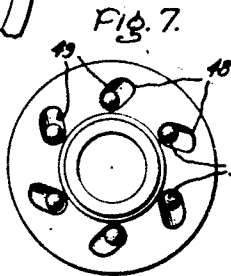
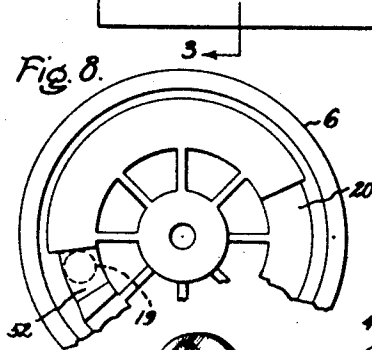
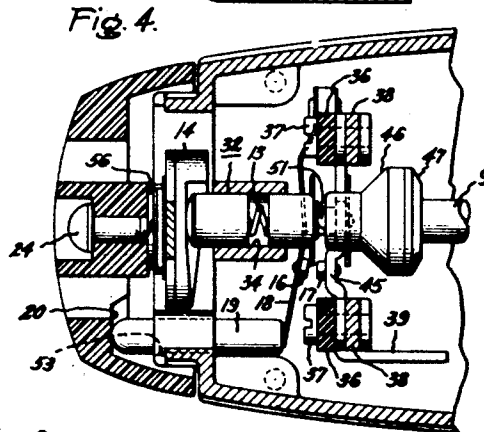
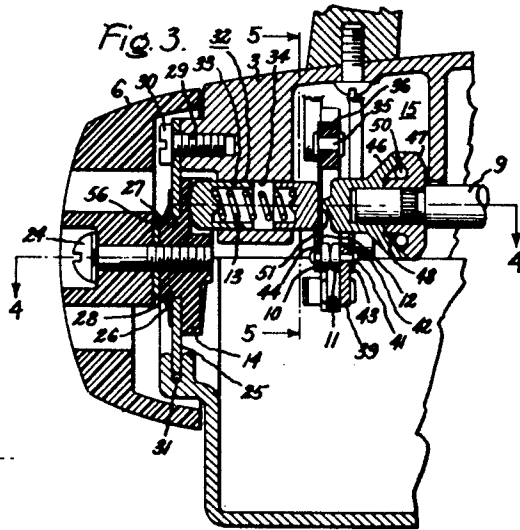
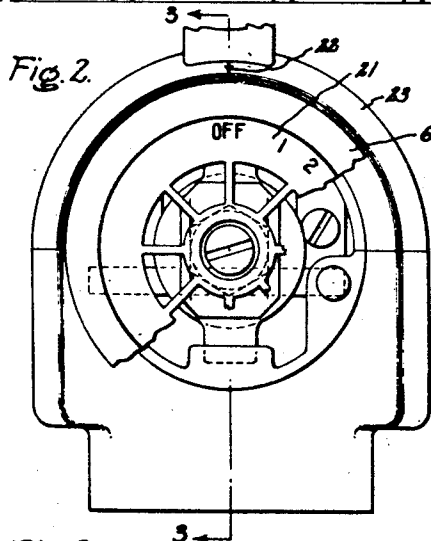
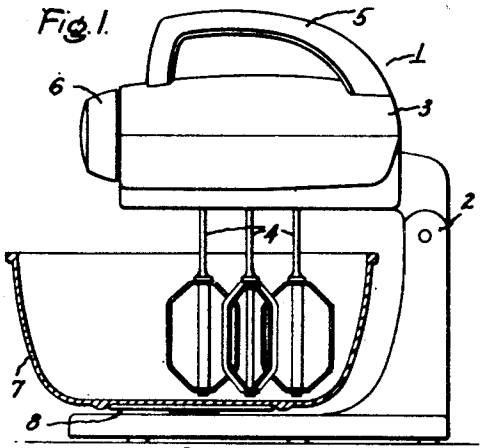


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A. D. ROBERTSON
SPEED CONTROL MECHANISM

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Inventor:
Alastair D. Robertson,
by *Heridant & Co.*
His Attorney.

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SPEED CONTROL MECHANISM

Alastair D. Robertson, Stepney, Conn., assignor
to General Electric Company, a corporation of
New York

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This invention relates to control mechanisms responsive to the speed of a rotating member and more particularly to speed control mechanisms for use with electric kitchen mixers and the like.

In electric kitchen mixers and the like, one or more beaters are mechanically connected to a small electric motor by which they are rotated to mix or beat foodstuffs, and it is desirable to vary the speed of the beaters in accordance with the density of the material being mixed. It is also desirable to maintain a constant speed of rotation of the beaters under varying load conditions.

It is an object of my invention to provide an improved control mechanism responsive to the speed of a rotating member.

A further object of my invention is to provide an improved speed control mechanism having means for selecting a desired motor speed.

Another object is to provide an improved speed control mechanism having means for maintaining a selected motor speed under varying conditions of load.

A still further object is to provide, in an improved speed control mechanism having the above properties, a means independent of the regulating means for starting the motor to be controlled.

In general, my invention comprises a centrifugal governor arranged to operate a pair of regulating contacts movable between opened and closed positions and which are connected in the motor supply circuit to disconnect the power supply to the motor when the speed of the latter rises above a predetermined high value and to restore the power when the speed falls below the predetermined value, thereby to hold the speed substantially constant at this value; and further, improved governor means controlling the opening and closing movements of the contacts, including spring means for applying to one contact a normally substantially constant force to move it in one direction with respect to the other, which spring means is opposed by a force generated by a speed governor driven by the motor and acting on the one contact in order to bias it in the other direction, the latter force varying as the motor speed varies so as to effect opening and closing movements of the contacts in accordance with the motor speed, thereby to hold the speed substantially constant. The speed of the motor is adjusted by adjusting the spring means to vary value of the normally constant force which it generates.

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My invention further comprises a governor structure, which applies the variable force, arranged so that the force generated depends both upon the acceleration and speed of the motor.

In addition, switch means are provided, independently controlled, for effecting the starting of the motor independently of the speed regulating means.

For a complete understanding of my invention, reference should be had to the following specification and accompanying drawing in which like members are given the same character reference throughout the several views.

In the drawing, Fig. 1 is a side elevation view of an electric kitchen mixer built in accordance with my invention; Fig. 2 is a front elevation view, partly in section, of a portion of the mixer of Fig. 1; Fig. 3 is a cross sectional view taken on line 3—3 of Fig. 2; Fig. 4 is a view partially in cross section taken on line 4—4 of Fig. 3; Fig. 5 is a view partially in cross section taken on line 5—5 of Fig. 3; Fig. 6 is a perspective view of a cam member used in my invention; Fig. 7 is a front elevational view of a portion of the governor; Fig. 8 is a rear elevation of a control knob used in my invention; and Fig. 9 is a perspective view of a modified form of a portion of my governor.

For an understanding of my invention in general, attention is directed in order to Figs. 1, 3, 6 and 4 of the drawing. Fig. 1 shows an electric kitchen mixer 1 used for the purpose of illustrating my invention. Mixer 1 comprises a pivoted support 2, a main housing 3, beater elements 4 protruding from the base of housing 3, a handle 5, a control knob 6, and a mixing dish 7 mounted on a turntable 8. The main body 3 encloses the usual motor having a drive shaft, and a control mechanism which will be described in detail later.

Beaters 4 are geared to a shaft 9, shown in Fig. 3, which is driven by a conventional motor (not shown). To regulate the speed of motor driven shaft 9, two electrical regulating contacts 10 and 11 are placed in series in the motor supply circuit. Contact 10 is movable and is supported on a flat resilient spring member 12, thus forming a spring biased movable contact member. Contact 11 is stationary. Contacts 10 and 11 are opened or closed in accordance with the relative value of two opposed forces acting upon the spring member 12. One force tending to retain the contacts closed is supplied by a helical spring 13 actuated by an adjustable circular cam 14, shown in perspective view in Fig. 6. An opposing force on the other side of spring 12, tend-

ing to open the contacts, is provided by a centrifugal governor 15 secured to shaft 9. When the force applied by governor 15 to spring 12 is greater than the force applied by spring 13, contact 10 opens and the electrical power supply to the motor driving shaft 9 is disconnected from the motor. When the force of governor 15 becomes less than that of spring 13, contact 10 again closes on contact 11, energizing the motor. Thus, the relative value of the two forces is used to regulate the speed of shaft 9 at a substantially constant predetermined value. This predetermined value of the speed of shaft 9 is set by rotating cam 14 to increase or decrease the pressure on spring 13.

To provide an "off" position in which the motor is disconnected from its power supply independently of the governor control, I provide a second set of contacts 16 and 17, as shown in Fig. 4. Contacts 16 and 17, which I call starting contacts, are also in series in the motor supply circuit. Contact 16 is carried by a flat resilient spring 18 which is biased against one end of a slidable pin 19. The position of pin 19 is regulated by a cam surface 20 on control knob 6, which cam surface allows pin 19 to move longitudinally under pressure of resilient spring 18 when control knob 6 is turned to one extreme position thereby opening contact 16. For all other positions of control knob 6, contact 16 is biased closed by pin 19.

For a complete understanding of the details of structure of my invention, attention is redirected to Figs. 2 and 3 in order. As shown in Fig. 2, control knob 6 has indicated on its rim an "off" position and a numbered scale of speeds 21 cooperating with an indicator 22 on the main housing 3. The control knob 6 is adjusted or oriented relative to circular cam 14 to calibrate control knob 6 with the actual speed governing effect of governor 15. When control knob 6 has been so adjusted, it is rigidly secured to circular cam 14 by means of a screw 24 and a lock-washer 56, or other suitable means, and rotates with cam 14 as one piece. Cam 14 rotates in a fixed support plate 25 to which it is frictionally secured by means of a speed nut 26 or other suitable means. Plate 25 is made of any suitable material, such as steel, and is centrally apertured as at 27 to accommodate a hub portion 28 of cam 14. One end of plate 25 is apertured as at 29 and secured to the open end of main housing 3 by a screw 30, or other suitable means. The other end of bracket 25 is positioned in a groove 31 in the housing 3, as shown in Fig. 3. When control knob 6 is turned, thereby rotating cam 14, the latter exerts a force on one end of a compression member 32, which member comprises helical spring 13 enclosed in a cylindrically shaped split housing 33 made of any suitable non-conducting material and slidably positioned in a cylindrical aperture 34 of main housing 3. The force exerted by cam 14 on one end of compression member 32 is transmitted through the other end of member 32 to the front face of spring 12. Spring 12 is made of any suitable resilient conducting material and carries movable contact 10 on its rear face adjacent its lower end. Spring 12 and contact 10 form a spring biased movable contact member. The other end of spring 12 is secured by a rivet 35 or other suitable means to the central portion of a U-shaped electrical insulating support member 36, made of any suitable insulating material. As so secured, spring 12 is centrally located with respect to the longitudinal axis of compression member 32 and gov-

ernor 15 and vertically disposed in main housing 3. U-shaped insulating support member 36 is secured by means of screws 37 to two oppositely disposed support members 38 projecting from the top of housing 3 and lying in a plane perpendicular to the longitudinal axis of the drive shaft 9, as shown in Figs. 4 and 5.

To support stationary contacts 17 and 11 and to electrically connect the two, I provide an approximately L-shaped electrically conductive support member 39 made of any suitable conducting material and secured, as shown in Fig. 5, by rivets 40 or any other suitable means to the ends of U-shaped insulating support member 36. As so secured, conducting support member 39 lies in a transverse position within main housing 3. Contact 11 is positioned in the path of contact 10 and secured to the front face of a projecting portion 42 of the conducting support member 39 by means of a rivet 41 or other suitable means as shown in Figs. 3 and 5.

In order to cool contact 11, a cooling fin 43 is secured to the back side of conducting support member 39 by means of the same rivet 41 which secures the contact button 11. To cool contact 10, a cooling fin 44 is secured in a similar manner to the front side of spring 12 opposite contact button 10. Contact 17 is secured by a rivet or other suitable means to the front face of a U-shaped portion 45 of conducting support member 39, as shown in Figs. 4 and 5, and as so positioned lies in the path of contact 16.

Governor 15 comprises an actuated flange member 46 and a second flange member 47. Actuated flange member 46 has a frusto-conically shaped rear face which mates with the front frusto-conical face of flange member 47. Actuated flange 46 is positioned rotatably and slidably on the front end of shaft 9. The second flange member 47 is positioned on shaft 9 behind flange 46 and is secured to shaft 9 in any suitable manner so as to rotate with it. The front conical face of flange member 47, as shown in Fig. 7, is provided with a plurality of tapered recesses 48 equally spaced circumferentially therein and from the longitudinal axis of shaft 9. Tapered recesses 48 form oblong openings 49 in the conical front face of flange member 47 and are declined from the frusto-conical face of flange member 47 in the direction of rotation of that member, that is, in a counterclockwise direction, as indicated in Fig. 7, and at an angle to the longitudinal axis of drive shaft 9. Weights in the form of balls 50 are positioned in recesses 48. The front end of flange 46 is closed and has a projecting portion 51 engaging the rear face of spring 12. In operation, when shaft 9 is rotated, balls 50 are centrifugally forced against the rear conical face of flange 46 in response to the speed of shaft 9, thereby sliding flange 46 along shaft 9 in the direction of spring 12 and tending to open contacts 10 and 11 of the motor supply circuit.

In addition to the centrifugal force of balls 50 resulting from the speed imparted to drive shaft 9, a further force, also acting to force balls 50 against flange 46, results from a rapid acceleration of shaft 9. This effect is provided by slanting the tapered recesses 48 from the frusto-conical face of the second flange member 47 in the direction of rotation of flange member 47. Thus, when flange 47 is rapidly accelerated, the inertia of balls 50 and the inclined position and taper of recesses 48 result in a less rapid acceleration of balls 50 and, therefore, an outward movement

along the tapered recesses 48 toward flange 46. Governor 15 thus creates a force against the rear face of spring 12, which force is responsive to both the speed and acceleration of drive shaft 9.

The object of introducing an acceleration component of force in governor 15 is to provide a balance of acceleration and centrifugal force to prevent an undesirably rapid acceleration of drive shaft 9 which would result in overshooting of the desired speed, thus creating a hunting effect.

While I have shown, for the purpose of illustrating my invention, tapered recesses by which the governor 15 is responsive to both acceleration and speed of drive shaft 9, it is to be understood that various other arrangements may be used employing the characteristics outlined. For example, a combination of recesses having different characteristics may be used. That is, as shown in Fig. 9, one or more recesses 54, which are responsive only to acceleration and which recesses would be declined only in the direction of rotation of the second flange member, may be used in conjunction with one or more recesses 55, responsive only to the speed of shaft 9, which recesses would be declined only at an angle to the longitudinal axis of shaft 9. With such an arrangement, the proper amount of weight in each recess may be feasibly adjusted to provide the proper operating characteristics of the governor.

Opposing the force of governor 15 and tending to close regulating contacts 10 and 11 is a second force exerted by circular cam 14 through the medium of compression member 32 acting against the front face of spring member 12. Although I have shown compression member 32 in the form of a helical spring 13 enclosed in a split housing 33, it is to be understood that this member may be made of any other suitable resilient material and may take any other convenient shape. For example, it may be a resilient sphere or disc positioned in a suitable aperture in main housing 3.

In operation, to select a higher or lower speed of shaft 9 to be maintained by governor 15, cam 14 is rotated by means of control knob 6 to increase or decrease respectively the pressure on compression member 32.

Thus, through the medium of a balance of two forces, one exerted by compression member 32 against the front face of spring member 12, and the other exerted by governor 15 against the rear face of spring member 12, I provide an arrangement for maintaining a substantially constant speed of drive shaft 9 under varying load conditions and means for selecting the constant speed required for the particular material being mixed.

To provide an "off" position on this control mechanism, the rear surface of control knob 6 is provided with a cam surface 20 having a recess 52, as shown in Fig. 8. When control knob 6 is in the "off" position, recess 52 is aligned with the rounded end of a cylindrical pin 19 which is slidably positioned in aperture 53 of main housing 3. The other end of pin 19 engages the free end of resilient spring 18, which spring carries movable contact 16. As so positioned, contacts 16 and 17, which are in series with contacts 10 and 11 in the motor circuit, are open. However, as soon as control knob 6 is rotated to the first speed setting, pin 19 is forced in a rearward direction, thus closing contacts 16 and 17. Thereafter, the supply of power to the motor is controlled by the regulating contacts 10 and 11.

While I have shown and described particular embodiments of my invention, it will be obvious

to those skilled in the art that various changes and modifications may be made without departing from my invention in its broader aspects and I, therefore, aim in the appended claims to cover all such changes and modifications as fall within the true spirit and scope of my invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. In a kitchen mixer or the like having an electric motor and a drive shaft enclosed in a main housing, means for selecting and maintaining speeds of said drive shaft for varying load conditions comprising a pair of cooperating speed regulating contacts for said motor for controlling its speed by opening and closing with respect to each other, one of said regulating contacts being stationary and the other movable, a spring biased movable contact member supported within said main housing and carrying said movable contact, a control knob, a cam arranged to be rotated by said control knob, a resilient member positioned in said main housing, said resilient member being aligned with the axis of rotation of said drive shaft, one portion of said resilient member engaging said cam, another portion of said resilient member engaging one side of said movable contact member and producing a force thereon, a centrifugal governor connected to said drive shaft, one portion of said governor engaging the other side of said movable contact member and arranged to produce a force thereon in opposition to the force of said resilient member, whereby the speed of said shaft is regulated by the relative value of the two opposing forces on said movable contact member.

2. In a kitchen mixer or the like having an electric motor and a drive shaft enclosed in a main housing, means for selecting and maintaining speeds of said drive shaft for varying load conditions comprising a pair of cooperating speed regulating contacts for said motor for controlling its speed by opening and closing with respect to each other, one of said regulating contacts being stationary and the other movable, a spring biased movable contact member supported within said main housing and carrying said movable contact, a control knob, a cam arranged to be rotated by said control knob, a resilient member positioned in said main housing, said resilient member being aligned with the axis of rotation of said drive shaft, one portion of said resilient member engaging said cam, another portion of said resilient member engaging one side of said movable contact member, an actuated flange member positioned slidably and rotatably on the end of said drive shaft and engaging the other side of said movable contact member, a second flange member secured to said drive shaft adjacent to said actuated flange, adjacent frusto-conical mating faces on said flange members, tapered recesses equally spaced circumferentially in said second flange member through its frusto-conical face, weights positioned in said recesses, said tapered recesses being declined from said frusto-conical face of said second flange member in the direction of rotation of said member and at an angle to said drive shaft, whereby said weights move outwardly and axially against said actuated flange responsive to acceleration as well as the speed of said drive shaft.

3. In a kitchen mixer or the like having an electric motor and a drive shaft enclosed in a housing, a pair of cooperating starting contacts for said motor for effecting its energization and deenergization by closing and opening with re-

spect to each other, one of said contacts being stationary and the other movable, a first spring biased movable contact member supported within said housing and carrying said movable contact, means for closing said starting contacts, said means comprising a control knob, a cam face on said control knob, an elongated pin slidably positioned in said housing, one end of said pin engaging said cam face of said control knob, the other end of said pin engaging said first movable contact member, means for selecting and maintaining speeds of said drive shaft for varying load conditions, said means comprising a pair of cooperating speed regulating contacts for said motor for controlling its speed by opening and closing with respect to each other, one of said regulating contacts being stationary and the other movable, a second spring biased movable contact member supported within said housing and carrying said movable contact of said pair of regulating contacts, a cam arranged to be rotated by said control knob, a resilient compression member positioned in said main housing, said compression member being aligned with the axis of rotation of said drive shaft, one portion of said compression member engaging said cam, another portion of said compression member engaging one side of said second movable contact member, an actuated flange member positioned slidably and rotatably on the end of said drive shaft and engaging the other side of said second movable contact member, a second flange member connected to said drive shaft adjacent to said actuated flange, said flange members having adjacent frusto-conical mating faces, means defining tapered recesses in the second flange member through its frusto-conical face, weights positioned in said recesses, said tapered recesses being declined from said frusto-conical face of said second flange member in the direction of rotation of said member and at an angle to the axis of rotation of said drive shaft, whereby said weights move axially and outwardly responsive to both rotative velocity and acceleration of said drive shaft to apply a force against said actuated flange member proportional to rotative velocity and acceleration.

4. A speed control mechanism for an electric motor responsive to the speed of a rotating member comprising a pair of cooperating speed regulating contacts for said motor for controlling its speed by opening and closing with respect to each other, one of said regulating contacts being stationary and the other movable, means for mounting said stationary contact, means securing one portion of said movable contact member, a control knob, a cam arranged to be rotated by said control knob, a resilient member aligned with the axis of rotation of said rotating member, said resilient member having one portion engaging said cam and another portion engaging one side of said movable contact member and producing a force thereon, a centrifugal governor connected to said rotating member, one portion of said governor engaging the other side of said movable contact member and arranged to produce a force thereon in opposition to the force of said resilient member, whereby the speed of said motor is regulated by the relative value of said two opposing forces on said movable contact member and is responsive to the speed of said rotating member.

5. In a kitchen mixer or the like having an electric motor and a drive shaft enclosed in a main housing having one open end, a pair of co-

operating starting contacts for said motor for commencing and terminating its operation by closing and opening with respect to each other, one of said contacts being stationary and the other movable, an insulating support member secured within said main housing, a flat resilient spring member carrying said movable contact of said starting contacts, one end of said spring member being secured to said insulating support member, an electrical conducting support member secured to said insulating support member, said stationary contact being mounted on said conducting support member, means for closing said starting contacts, said means comprising a control knob supported on the open end of said main housing and free to rotate, a cam face on said control knob, an elongated pin slidably positioned in said main housing, one end of said pin engaging said cam face of said control knob, the other end of said pin engaging said resilient spring member, means for selecting and maintaining speeds of said drive shaft for varying load conditions comprising a pair of cooperating speed regulating contacts for said motor for controlling its speed by opening and closing with respect to each other, one of said regulating contacts being stationary and the other movable, said stationary contact being secured to said conducting support member, a second flat resilient spring member carrying said movable contact of said pair of regulating contacts, one end of said second spring contact member being mounted on said insulating support member, a cam arranged to be rotated by said control knob, an elongated split housing positioned in an aperture of said main housing, a helical spring enclosed in said split housing, said split housing being aligned longitudinally with the axis of rotation of said drive shaft, one end of said split housing engaging said cam, the other end of said split housing engaging one face of said second spring contact member, an actuated flange member positioned slidably and rotatably on the end of said drive shaft and engaging the other face of said second spring contact member, a second flange member secured to said drive shaft adjacent to said actuated flange, adjacent frusto-conical mating faces on said flange members, tapered recesses in the frusto-conical face of said second flange member, weights positioned in said recesses, said tapered recesses being declined from said frusto-conical face of said second flange member in the direction of rotation of said member and at an angle to the axis of rotation of said drive shaft, whereby said weights move outwardly against said actuated flange member as a result of acceleration as well as the speed of said drive shaft.

6. In a kitchen mixer or the like having an electric motor and a drive shaft enclosed in a main housing having one open end, means for selecting and maintaining speeds of said drive shaft for varying load conditions comprising a pair of cooperating speed regulating contacts for said motor for controlling its speed by opening and closing with respect to each other, one of said regulating contacts being stationary and the other movable, an insulating support member secured within said main housing, an electrical conducting member mounted on said insulating support member and carrying said stationary contact, a flat resilient spring member carrying said movable contact, one end of said spring member being mounted on said insulating support member, a control knob, a support plate mounted on the open end of said main housing and having an aperture centrally

located therein, a cam having a projecting portion positioned in said aperture of said support plate, said cam being frictionally secured to said support plate, said cam being secured to said control knob and rotatable therewith with respect to said plate, an elongated split housing positioned in an aperture of said main housing, a helical spring enclosed in said split housing, said split housing being aligned longitudinally with the axis of rotation of said drive shaft, one end of said split housing engaging said cam, the other end of said split housing engaging one face of said flat resilient spring member, an actuated flange member positioned slidably and rotatably on the end of said drive shaft and engaging the other face of said resilient spring member, a second flange member secured to said drive shaft adjacent to said actuated flange, adjacent frusto-conical mating faces on said flange members, means defining tapered recesses in said second flange member through its frusto-conical face, weights positioned in said recesses, the taper of said recesses being declined from said frusto-conical face of said second flange member in the direction of rotation of said member and at an angle to the axis of rotation of said drive shaft, whereby said weights move outwardly as a result of acceleration as well as the speed of said drive shaft to apply force to said actuated flange member responsive to both speed and acceleration.

7. In combination in a kitchen mixer or the like, an electric motor and drive shaft enclosed in a housing, a pair of cooperating starting contacts for said motor for commencing and terminating its operation by closing and opening with respect to each other, one of said contacts being stationary and the other movable, a first spring biased movable contact member secured within said housing and carrying said movable contact, means for closing said starting contacts, said means comprising a control knob, a cam face on said control knob, an elongated pin slidably positioned in said housing, one end of said pin engaging said cam face of said control knob, the other end of said pin engaging said first movable contact member, means for selecting and maintaining speeds of said drive shaft for varying load conditions, said means comprising a pair of cooperating speed regulating contacts for said motor for controlling its speed by opening and closing with respect to each other, one of said regulating contacts being stationary and the other movable, a second spring biased movable contact member secured within said housing and carrying said movable contact of said pair of regulating contacts, a cam arranged to be rotated by said control knob, a resilient compression member positioned in said main housing, said compression member being aligned with the axis of rotation of said drive shaft, one portion of said compression member engaging said cam, another portion of said compression member engaging one side of said second movable contact member, an actuated flange member positioned slidably and rotatably on the end of said drive shaft and engaging the other side of said second movable contact member, a second flange member secured to said drive shaft adjacent to said actuated flange, said flange members having adjacent frusto-conical mating faces, means defining tapered recesses extending through the frusto-conical face of and into said second flange member, weights positioned in said recesses, said tapered recesses being declined from said frusto-conical face of said second flange member in the

direction of rotation of said member and at an angle to the longitudinal axis of said drive shaft, whereby said weights provide an axial force against said actuated flange member as a result of acceleration as well as the speed of said drive shaft.

8. In a kitchen mixer or the like having an electric motor mechanically connected to a drive shaft, a centrifugal governor comprising an actuated flange member floatably positioned coaxially on a free end of said drive shaft, a second flange member connected to said drive shaft adjacent to said actuated flange member, adjacent frusto-conical mating faces on said flange members, a first tapered recess in the frusto-conical face of said second flange member, a weight positioned in said recess, said tapered recess being declined from said frusto-conical face at an angle to the axis of rotation of said drive shaft, whereby said weight provides a force having an axial component against said actuated flange member proportional to the speed of said drive shaft, a second tapered recess in said frusto-conical face of said second flange member, a weight positioned in said second recess, said second recess being declined from said frusto-conical face of said second flange member in the direction of rotation of said member, whereby said weight provides a force having an axial component against said actuated member responsive to the acceleration of said drive shaft.

9. In a kitchen mixer or the like having an electric motor mechanically connected to a drive shaft, a centrifugal governor comprising an actuated flange member floatably positioned coaxially on a free end of said drive shaft, a second flange member connected to said drive shaft adjacent to said actuated flange member and having a face mating with a face of said actuated flange member, a plurality of tapered recesses equally spaced circumferentially in said second flange member, weights positioned in said recesses, the taper of said recesses being declined from said face in said second flange member in the direction of rotation of said member and at an angle to the axis of rotation of said drive shaft, whereby said weights move outwardly and axially against the face of said actuated flange member responsive to both acceleration and speed of said drive shaft.

10. In a kitchen mixer or the like having an electric motor mechanically connected to a drive shaft, a centrifugal governor comprising an actuated flange member floatably positioned coaxially on a free end of said drive shaft, a second flange member secured to said drive shaft adjacent to said actuated flange member, adjacent frusto-conical mating faces on said flange members, a plurality of tapered recesses equally spaced circumferentially in the frusto-conical face of said second flange member, weights positioned in said recesses, said tapered recesses being declined from said frusto-conical face of said second flange member in the direction of rotation of said member and at an angle to the axis of rotation of said drive shaft, whereby said weights move outwardly responsive to acceleration and speed of said drive shaft, a second plurality of tapered recesses equally spaced circumferentially in said frusto-conical face of said second flange member, weights positioned in said second plurality of recesses, said second plurality of recesses being declined from said frusto-conical face of said second flange member and at an angle to the axis of rotation of said drive shaft, whereby

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said weights in said second plurality of recesses move outwardly responsive to rotative velocity only of said drive shaft.

11. In a kitchen mixer or the like having an electric motor mechanically connected to a drive shaft, a centrifugal governor comprising an actuated flange member floatably positioned coaxially on a free end of said drive shaft, a second flange member secured to said drive shaft adjacent to said actuated flange member, adjacent frusto-conical mating faces on said flange members, a plurality of tapered recesses equally spaced circumferentially in the frusto-conical face of said second flange member, weights positioned in said recesses, said tapered recesses being declined from said frusto-conical face of said second flange member in the direction of rotation of said member and at an angle to the axis of rotation of said drive shaft, whereby said weights move outwardly responsive to acceleration and speed of said drive shaft, a second plurality of tapered recesses equally spaced circumferentially in said frusto-conical face of said second flange member, weights positioned in said second plurality of recesses, said second plurality of recesses being declined from said frusto-conical face of said second flange member in the direction of rotation of said member, whereby said weights in said second plurality of recesses move outwardly and axially responsive only to acceleration of said drive shaft.

12. In a kitchen mixer or the like having an electric motor mechanically connected to a drive shaft, a governor comprising an actuated flange member floatably positioned with respect to the drive shaft, a second flange member connected to said drive shaft adjacent to said actuated flange member, adjacent mating faces on said flange members, tapered recesses in the face of said second flange member, weights positioned in said recesses, at least one of said recesses being declined from said face at an angle to the axis of rotation of said drive shaft, and at least one of said recesses being declined from said face in the direction of rotation of said second flange member, whereby a weight moves outwardly and axially responsive to the speed of said drive shaft and a weight moves outwardly and axially responsive to acceleration of said drive shaft, with forces proportional to angular velocity and acceleration respectively bearing against the mating face of said actuated flange member for moving it axially of said shaft.

13. The combination in a combined motor and speed control of an electric motor and means for controlling the speed thereof in response to variations in said speed, a control shaft driven by said motor in synchronism therewith, a pair of contact arms mounting mutually coacting speed regulating contacts for controlling the speed of said motor by moving into and out of engagement with each other, mounting means mounting one of said contact arms in a normally stationary po-

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sition and the other arm for movement to move its contact into and out of engagement with that on said one arm, and both arms in non-rotatable relation with and transversely of said shaft, spring means applying a force to said other contact arm in the direction of the axis of rotation of said shaft and to move its contact toward said one contact, a centrifugal governor rotatable with said shaft on an axis coincident with its axis of rotation, said governor engaging the other side of said other contact arm and arranged to produce a force in opposition to the force of said resilient means variable in accordance with the speed of said shaft so that said contacts are opened and closed by the relative value of the two opposing forces on said movable contact arm imposed by said spring means and said governor, thereby to regulate the speed of said motor in response to variations of said speed from a substantially constant value to restore the speed substantially to said constant value, and means for adjusting the force of said spring means in order to vary the value of the motor speed.

14. In a kitchen mixer or the like having an electric motor and a drive shaft enclosed in a main housing, means for selecting and maintaining speeds of said drive shaft for varying load conditions comprising a pair of cooperating speed regulating contacts for said motor so that the speed thereof is regulated in accordance with the opening and closing of said contacts, one of said regulating contacts being stationary and the other movable, a movable contact member supported within said main housing and carrying said movable contact and extending transversely of said shaft, a resilient member in said housing positioned in alignment with the axis of rotation of said shaft engaging one side of said movable contact member to move its contact in a predetermined direction with relation to said stationary contact, a centrifugal governor connected to said drive shaft engaging the other side of said movable contact member and arranged when the shaft is rotated to produce a force thereon in opposition to the force of said resilient member, whereby said contacts are moved into and out of engagement with each other and the speed of said motor thereby regulated by the relative value of the two opposing forces on said movable contact member, and means for adjusting the force applied by said spring member on said contact member to adjust the speed of said motor.

ALASTAIR D. ROBERTSON.

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