Oct. 6, 1959 J. J. GASPAROTTI 2,907,226

SPEED CONTROL DEVICE

Filed June 27, 1955

Fig. 1

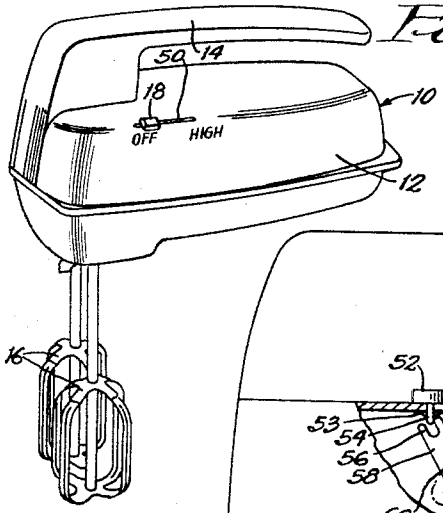


Fig. 2

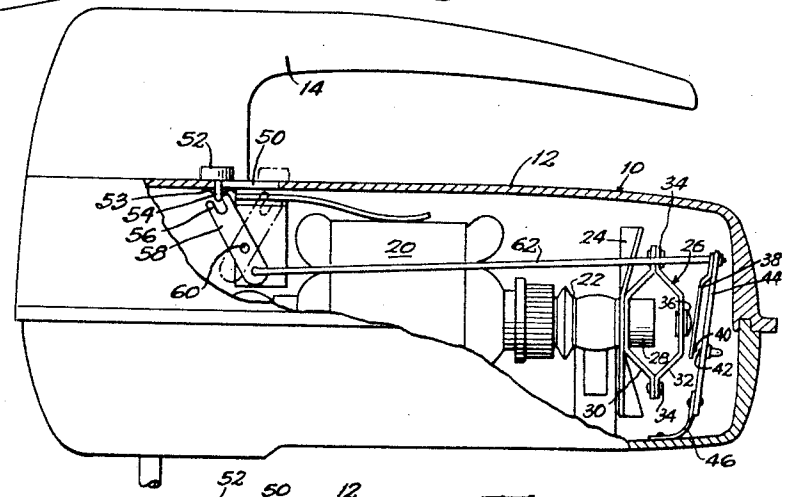


Fig. 3

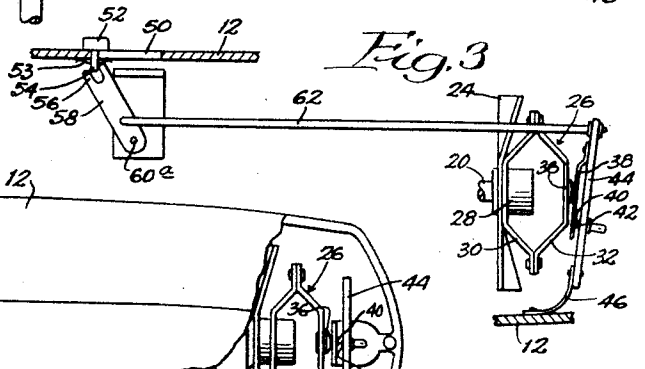


Fig. 4

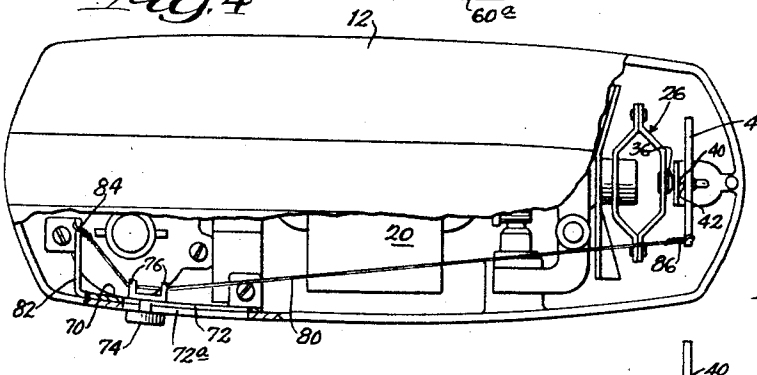


Fig. 6

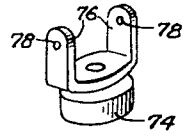
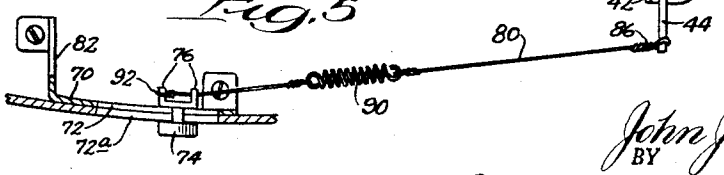


Fig. 5



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SPEED CONTROL DEVICE

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4 Claims. (Cl. 74—469)

This invention relates generally to a speed control device, and more particularly to a novel speed control linkage mechanism for an electrical food mixer of the portable hand type.

It is a primary object of this invention to provide a speed control device wherein straight-line motion of a sliding control knob effects positioning of a pair of electrical switch contacts relative to a speed responsive governor, whereby the predetermined motor speed at which the governor will effect opening and closing of the contacts may be adjusted.

It is another object to provide a novel linkage arrangement for translating the relatively long linear movement of a manual control knob into relatively short linear adjustment of a pair of governor-actuated contacts, whereby variable speed control of a motor at full power may be effected simply and accurately.

It is a further object to provide a novel linkage arrangement utilizing a substantially longitudinally elongated connector element for transmitting the relatively long linear movement of a slidable manual control knob to effect relatively short linear movement of a pair of adjustably positionable switch contacts.

Further objects and advantages of this invention will become apparent as the following description proceeds and the features of novelty which characterize this invention will be pointed out with particularity in the claims annexed to and forming part of this specification.

A preferred embodiment of the invention is shown in the accompanying drawing, in which:

Figure 1 is a perspective view of an electrical hand mixer employing the speed control switch of the present invention;

Figure 2 is a side elevational view, partly broken away and in vertical section, showing internal structural details of a first embodiment of the mixer of Figure 1;

Figure 3 is a fragmentary view, similar to Figure 2, showing a modified form of the linkage of Figure 2;

Figure 4 is a top plan view, partly broken away and in horizontal section showing a hand mixer employing a speed control switch constituting an alternative embodiment of the present invention;

Figure 5 is a fragmentary view similar to Figure 4 showing a modified form of the linkage of Figure 4; and

Figure 6 is a perspective detail view, on an enlarged scale, of the sliding control knob employed in the constructions of Figures 4 and 5.

Referring now more particularly to Figures 1 to 3 of the drawing, I have indicated generally at **10** an electrical hand mixer of the type comprising a motor housing **12**, a manual carrying handle **14**, and a pair of mixer beaters **16**. A combined speed control and on-off switch **18** is positioned adjacent a top side corner of the mixer housing **12**.

As best seen in Figure 2, the housing **12** encloses an electrical motor **20** which is fixedly mounted therein. The motor **20** provides a rearwardly extending drive shaft

22 which carries an air circulating fan **24** and a speed control governor device **26**. The governor **26** is fixedly secured to the shaft **22** at a terminal hub portion **28**.

The governor comprises a pair of spiders **30** and **32** which are flexibly deformable and peripherally attached to each other. Suitable weights **34** are carried by the spiders **30, 32** for effecting flattening deformation of the spiders toward each other by centrifugal force when rotated at high speeds. The rearmost spider **32** carries an actuator button **36** at its center portion, and serves to effect longitudinal movement thereof as the spider assembly is flexibly deformed.

A resilient spring blade **38** is disposed adjacent the button **36**, and carries an electrical contact **40** for cooperation with a second contact **42**. The contact **42** and the spring blade **38** are carried by a bendable bracket **44**. Normally, the contacts **40** and **42** are spaced from each other. The bracket **44** is secured to the housing **12** by a resiliently bendable connector element **46**.

The housing **12** is formed with an axially elongated slot **50** along which a slider knob **52** is adapted to move. A pin shaft **54** of the knob **52** extends inwardly through the slot **50** and carries a push-on type of speed clip **53** at its terminal end within the housing **12**. In this way, the knob **52** is securely retained for sliding movement along the slot **50**. The pin shaft **54** cooperates with the yoked end **56** of a lever **58**, effecting a mechanical coupling therebetween. The lever **58** is centrally pivoted at **60** on a suitable fixed element within the housing **12**. In this way, sliding movement of the knob **52** effects a pivoting of the lever **58**, as shown by the dotted line position of Figure 2.

A substantially elongated actuator rod **62** is pivotally connected at its forward end to the lower end of the lever **58**, and is fixedly secured at its rearward end to the free end of the bendable bracket **44**. It will be apparent that sliding movement of the knob **52**, and consequent pivoting of the lever **58**, will serve to effect longitudinal shifting movement of the actuator rod **62**. In this way, the bendable bracket **44** can be positioned relative to the actuator button **36** of the governor **26**. By predetermining the relative compression between the actuator button **36** and the spring blade **38**, the motor speed at which deformation of the spiders **30, 32** will effect opening and closing of the contacts **40, 42** can be selected. When a separating distance exists between the actuator button **36** and the spring blade **38**, the normally spaced contacts **40, 42** provide an "off" circuit position. When the slider knob **52** is moved a sufficient distance, the contacts **40, 42** will be closed by engagement with the actuator button **36**. When the motor reaches a sufficiently high speed, determined by the particular position of the knob **52**, the spiders **30, 32** will deform and effect withdrawal of the button **36** so as to permit opening of the contacts **40, 42**. In this way motor speed may be effectively regulated.

In Figure 3 of the drawing, I have shown a modification of the linkage arrangement of Figure 2. If it is desired to reverse the direction of movement of the slider knob **52**, with respect to the front and rear of the mixer housing **12**, the pivot point for the lever **58** may be located at the lower end of the lever rather than intermediately thereof as in Figure 2. This modified location for pivotal connection is indicated at **60*a*** on Figure 3. The forward end of the actuator rod **62** is then pivotally secured to the lever **58** intermediate the pivot **60*a*** and the yoked end **56**. The operation of the linkage is substantially identical in basic principle as heretofore described, except that the "off" and "high" positions for motor speed adjustment are reversed relative to the front and rear of the mixer housing **12**. In the arrangement of Figure 2, rearward movement of the slider **52** is from

"off" to "high," whereas in the arrangement of Figure 3 the opposite direction of slider movement effects the same operation.

In Figure 4, I have shown an alternative embodiment of the present invention wherein a slider bracket **70** is fixedly mounted on an inner side wall of the housing **12** adjacent the upper forward end thereof. The bracket **70** is provided with an axially elongated slot **72** which mates with a corresponding elongated slot **72***a* formed in the housing wall. A slider knob **74** is adapted for axial sliding cooperation with the registered slots **72** and **72***a*. As shown in Figure 6, the knob **74** provides a pair of inwardly extending spaced ears **76** within the interior of the housing **12**. These spaced ears are apertured as indicated at **78** to receive therethrough a length of flexible wire or other suitable line material **80**. The wire **80** is fastened at its forward end to an inwardly extending arm portion **82** of the bracket **70**, as indicated at **84**. The wire **80** is fastened at its rear end to the bendable contacts bracket **44**, as indicated at **86**.

In this way, longitudinal sliding movement of the knob **74** along the slots **72**, **72***a* serves to effect a variation in the angle between points **84—76—86**, and thereby provide a pulling or releasing force on the portion of wire length extending between the knob **74** and the bendable bracket **44**. By moving the slider knob **74** in a forward direction (to the left as seen in Figure 4) a pulling force will be exerted on the bracket **44** effecting a forward bending movement thereof and consequent close cooperative positioning of the actuator button **36** and the contacts **40**, **42** of the governor mechanism. High speed operation of the motor is thereby obtained. Similarly, reverse movement of the slider knob **74** will effect a sufficient release of the tensioning of wire **80** so as to provide an off position of contact separation.

In Figure 5 of the drawing, I have illustrated a modification of the linkage arrangement of Figure 4, wherein a tension spring **90** is provided in the length of wire **80** between the points **76** and **86**. The forward end of the wire **80** is not connected to the bracket arm **82**, but terminates at the forward ear **76** of the slider knob **74**. The use of the tension spring **90** in the wire length **80** results in a still smaller relative movement of the bendable bracket **44** when the slider knob **74** is moved to its full longitudinal range of adjustment. In this way, very small adjusting movement of the governor contacts may be effected by substantially long control knob movement.

By the present invention I have provided an extremely simple and low-cost form of speed control switch for a mixing device having a coupling arrangement wherein substantial longitudinal movement of a control knob serves to effect relatively small and therefore fine adjusting movements for regulating the operation of a motor speed governor. The present invention accomplishes this purpose without the necessity for complex and costly multi-position electrical switches.

Changes may be made in the construction and arrangement of the parts of my speed control device without departing from the real spirit and purpose of my invention, and it is my intention to cover by the claims any modified forms of structure or use of mechanical improvements which may be reasonably included within their scope.

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

1. A speed control device for an electrical appliance motor comprising a finger actuated control knob adapted to be mounted for longitudinal sliding momevent to control motor speed through a range of speeds including an "off" position, and linkage means for interconnecting said control knob to a variably positionable switch mounting means, said linkage means including a lever pivoted in fixed location relative to the path of movement of said control knob, a longitudinally elongated actuator member of substantially greater length than, and disposed generally parallel to, the path of movement of said control knob, said actuator member having its one end pivotally secured to said lever and having its other end adapted to be secured to a remote variably positionable switch mounting means having a limited range of movement, said lever being pivotally connected to said control knob, the distance from said fixed pivot to said pivotal connection between the actuator member and the lever being substantially short in length relative to the path of movement of said control knob, whereby relatively long longitudinal movement of said control knob serves to effect parallel and relatively short longitudinal shifting of said actuator member.

2. A speed control device for an electrical appliance motor comprising a finger actuated control knob adapted to be mounted for longitudinal sliding movement to control motor speed through a range of speeds including an "off" position, and linkage means for interconnecting said control knob to a variably positionable switch mounting means, said linkage means including a lever pivoted in fixed location relative to the path of movement of said control knob, a longitudinally elongated actuator member of substantially greater length than, and disposed generally parallel to, the path of movement of said control knob, said actuator member having its one end pivotally secured to said lever and having its other end adapted to be secured to a remote variably positionable switch mounting means having a limited range of movement, said lever having an open yoke portion at a free end thereof to effect loose coupled engagement with said control knob, straight line movement of said control knob being thereby transmitted through said yoke coupling to effect arcuate movement of said lever about its fixed pivot, the distance from said fixed pivot to said pivotal connection between the actuator member and the lever being substantially short in length relative to the path of movement of said control knob, whereby relatively long longitudinal movement of said control knob serves to effect parallel and relatively short longitudinal shifting of said actuator member.

3. A speed control device for an electrical appliance motor comprising a finger actuated control knob adapted to be mounted for longitudinal sliding movement to control motor speed and including an "off" position, and linkage means for interconnecting said control knob to a variably positionable switch mounting means, said linkage means including a lever pivoted in fixed location relative to the path of movement of said control knob, a longitudinally elongated actuator member of substantially greater length than, and disposed generally parallel to, the path of movement of said control knob, said actuator member having its one end pivotally secured to said lever at one side of said fixed pivot and having its other end adapted to be secured to a remote variably positionable switch mounting means having a limited range of movement, said lever being pivotally coupled to said control knob at the other side of said fixed pivot, the distance from said fixed pivot to said pivotal connection between the actuator member and the lever being substantially short in length relative to the path of movement of said control knob, whereby relatively long longitudinal movement of said control knob serves to effect parallel and relatively short longitudinal shifting of said actuator member.

4. A speed control device for an electrical appliance motor comprising a finger actuated control knob adapted to be mounted for longitudinal sliding movement to control motor speed and including an "off" position, and linkage means for interconnecting said control knob to a variably positionable switch mounting means, said linkage means including a lever having its one end pivoted in fixed location relative to the path of movement of said control knob, a longitudinally elongated actuator member disposed generally parallel to the path of movement of said control knob, said actuator member having its one end

pivotally secured to said lever intermediate said fixedly pivoted end and the other end thereof, said actuator member having its other end adapted to be secured to a variably positionable switch mounting means having a range of movement, said lever being pivotally coupled at its said other end to said control knob, the distance from said fixed pivot to said pivotal connection between the actuator member and the lever being substantially short in length relative to the path of movement of said control knob, whereby relatively long longitudinal movement of said control knob serves to effect parallel and relatively short longitudinal shifting of said actuator member.

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