

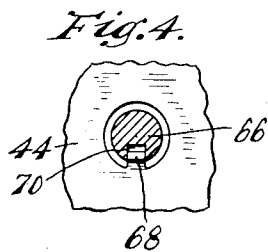
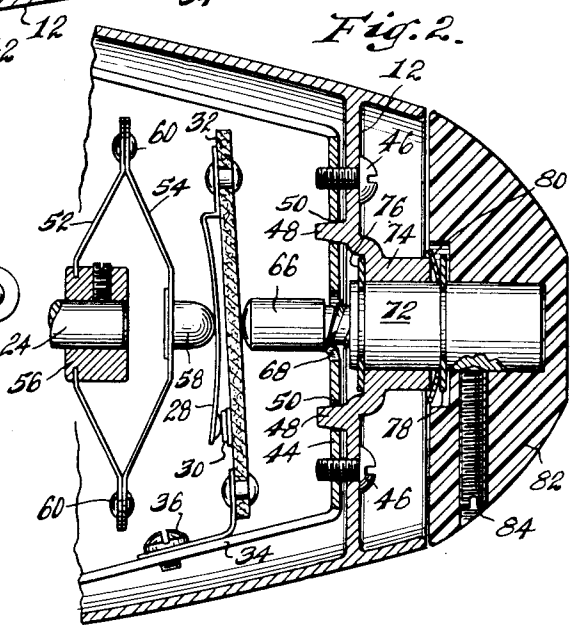
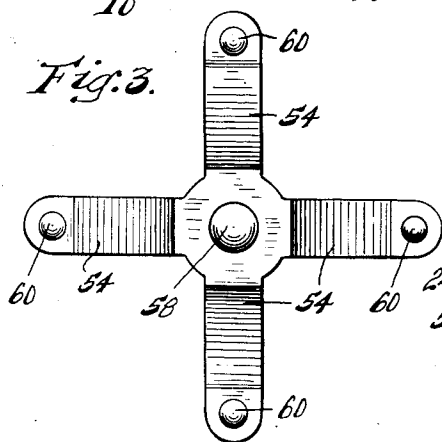
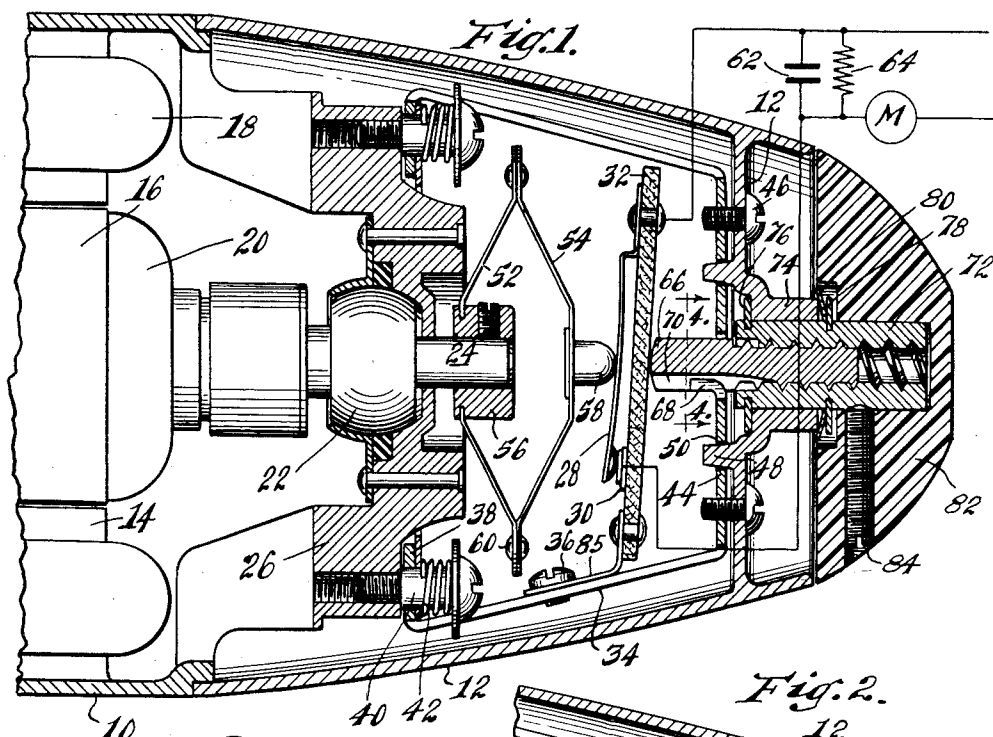
Dec. 30, 1952

A. W. HOLSTEIN

2,623,962

SPEED CONTROL FOR MOTORS

Filed Aug. 13, 1949



Inventor.
Alvin W. Holstein.
By Bair & Freeman
Att'ys.

UNITED STATES PATENT OFFICE

2,623,962

SPEED CONTROL FOR MOTORS

Alvin W. Holstein, St. Louis, Mo., assignor to
Knapp-Monarch Company, St. Louis, Mo., a
corporation of Delaware

Application August 13, 1949, Serial No. 110,155

2 Claims. (Cl. 200—80)

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This invention relates to a speed control of centrifugal type for motors of the series-wound fractional horsepower type such as those used for food mixes and other food processing apparatus.

One object of the invention is to provide a speed control device of the contact breaker type which has a novel adjusting arrangement wherein the adjusting knob may form a continuation of the housing for the motor and speed control device.

Another object is to provide a speed controller which is particularly adapted for mounting at the end of the motor shaft in an extension housing of the motor housing, and an adjusting means for the speed controller is provided which may form a further continuation of the housing.

A further object is to provide an adjusting screw mechanism for the speed controller or governor which includes a slidable and not rotatable screw on which an adjusting knob is threaded, and the knob is held against end-wise movement while permitted to rotate so that rotation of the knob will adjust the screw in a direction axially of the motor and thereby position a contact breaker closer to or farther away from centrifugally operated spiders that control the position of the contacts.

With these and other objects in view, my invention consists in the construction, arrangement and combination of the various parts of my speed control for motors, whereby the objects contemplated are attained, as hereinafter more fully set forth pointed out in my claims and illustrated in the accompanying drawings, wherein:

Figure 1 is a sectional view through a motor and its housing showing my speed control mounted in an extension of the housing and the adjusting means therefor in section.

Figure 2 is a repetition of a portion of Figure 1 showing the parts adjusted to a different position.

Figure 3 is an end elevation of the centrifugally-operated spiders; and

Figure 4 is an enlarged detail sectional view on the line 4—4 of Figure 1.

On the accompanying drawing I have used the reference numeral 10 to indicate a motor housing, 12 an extension thereof, 14 the field of the motor and 16 the armature thereof. The field windings are illustrated in a general way at 18 and the armature winding at 20. A self-aligning bearing 22 is provided for the motor shaft 24 and it is held in a part of the motor frame or housing 10 indicated at 26 and shown in section.

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My speed control comprises a circuit breaker having a spring contact blade 28 and a contact 30. A spring blade 35 mounted on a supporting arm 34 by means of a screw 36 constitutes a mounting spring for a switch base 32 on which the blade 28 and the contact 30 are mounted. The supporting arm 34 extends from a large washer 38 mounted on a plurality of studs 40 and biased toward the frame 26 by springs 42. A somewhat smaller washer 44 serves as a mounting for the extension housing 12 which is secured to the washer 44 by screws 46, positioning studs 48 being provided on the extension housing 12 to enter openings 50 of the washer 44.

The extension housing 12 houses the contacts 28 and 30 and a pair of spiders 52 and 54. The spider 52 is secured to the shaft 24 by a collar 56 and the spider 54 carries an insulating button 58 adapted for actuating the switch 28—30.

The spiders 52 and 54 are riveted together at the outer ends of their arms as indicated at 60 and these rivets serve as centrifugal weights in a manner which will hereinafter be disclosed.

The switch 28—30 constitutes a flutter relay for controlling the motor which is shown diagrammatically at M in Figure 1. The switch is in series with the motor and is shunted by a condenser 62 for reducing arcing at the contacts and a resistor 64 for partially instead of fully de-energizing the motor M when the contacts are open.

Speed controllers of the centrifugal contact breaker type disclosed may be used to adjust the speed of the motor by moving the switch base 32 closer to or farther away from the end of the motor shaft 24. Figure 1 shows an adjustment for slow speed and Figure 2 an adjustment for high speed. For the purpose of such adjustment, the spring blade 35 biases the base 32 to engage an adjusting screw 66 which is slidably and non-rotatably mounted relative to the washer 44 by means of a tongue 68 bent from the washer and extending into an axial slot 70 of the screw. The screw is then adjusted axially by means of a nut 72 rotatable in a hub 74 of the extension housing 12 but non-slidable therein by being limited against end-play by retainer washers 76 and 78. A cupped spring washer 80 is interposed between the retainer washer 78 and the hub 74 to retain the nut 72 in any position to which it is adjusted.

An adjusting knob 82 is mounted on the nut 72 as by a set screw 84 and serves as a means to manually rotate the screw for adjusting purposes in an obvious manner. The sub-housing 12 may

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have suitable indicia thereon adjacent the knob, or the knob may have indicia thereon to indicate the different positions of adjustment for operating the motor M at different speeds.

In the operation of the speed controller, when the parts are in the positions of the Figures 1 or 2, the motor is energized for picking up speed until the speed reaches the predetermined speed to which the controller has been adjusted. At such speed the centrifugal force on the spiders 52 and 54 is such as to collapse them sufficiently for separating the contact blade 28 from the contact 30 thereby momentarily throwing the resistor 64 in circuit with the motor M. This slows down the motor and the contacts will reclose with alternate opening and closing to maintain the desired speed of the motor in a hunting manner but when the parts are properly designed the contact blade 28 merely flutters against the contact 30 and there is no noticeable change in the speed of the motor due to the governor action.

I have provided a conveniently accessible adjusting knob for controlling the position of the switch base 32 and thereby the speed of the motor and the parts therefor are comparatively simple and inexpensive to manufacture and assemble.

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

I claim as my invention:

1. In a speed control for motors, a switch base at the end of the motor shaft, a normally open switch mounted thereon, said switch base being biased away from the motor shaft, centrifugally operated spiders carried by the motor shaft and having a switch engaging element normally ex-

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tended away from the motor shaft for causing engagement of the contacts of said switch, said spiders collapsing in a direction axially of and toward the motor shaft upon increase in speed of the motor for thereby permitting said switch to open, and means for adjusting said switch base comprising a threaded rod against which the switch base is biased, said rod being slidably and non-rotatably carried at the end of the motor shaft, a knob threaded on said rod and means for mounting said knob for rotation and against axial movement.

2. In a speed control for motors, a switch base at the end of the motor shaft, a normally open switch mounted thereon, said switch base being biased away from the motor shaft, centrifugally-operated spiders carried by the motor shaft with the inner one secured thereto and the outer one beyond the motor shaft and normally causing engagement of the contacts of said switch, said spiders collapsing in a direction axially of and toward the motor shaft upon increase in speed of the motor, and means for adjusting said switch base comprising a frame resiliently connected with the motor, an extension motor housing secured to said frame, a thrust rod slidable in said extension motor housing and against which said switch base is biased, and a knob having threaded engagement with said thrust rod, said knob being rotatably carried by said extension motor housing for rotation only relative thereto.

ALVIN W. HOLSTEIN.

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The following references are of record in the file of this patent:

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