March 16, 1954 L. J. FAITH-ELL ET AL 2,672,534

MOTOR-DRIVEN MACHINE

Original Filed June 16, 1945

Fig. 1.

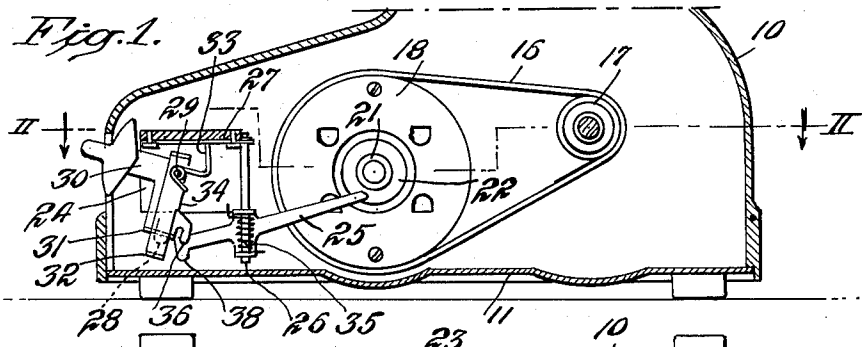


Fig. 2.

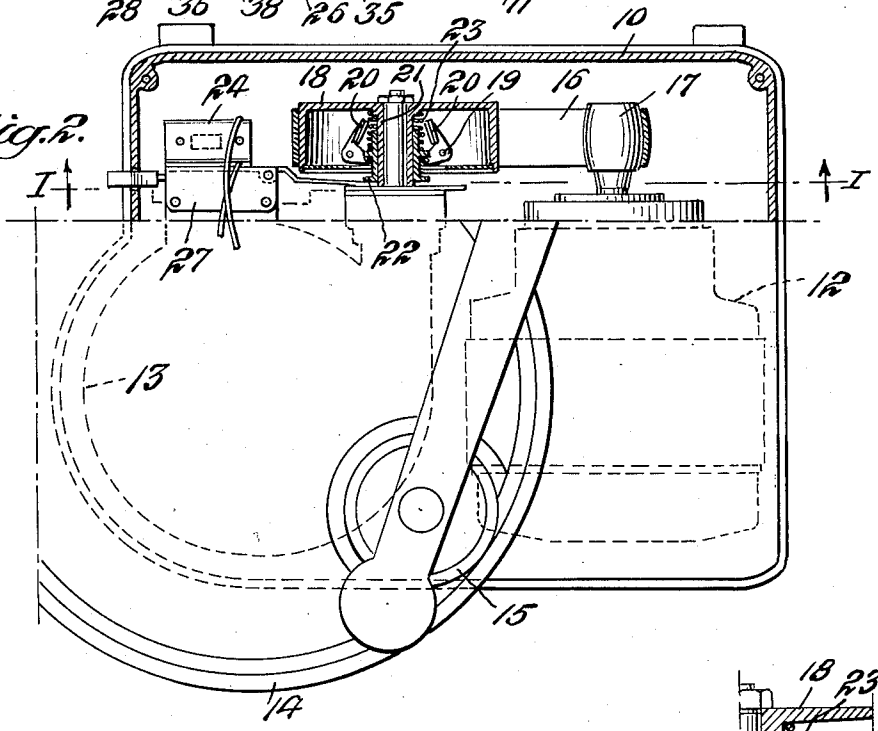


Fig. 3.

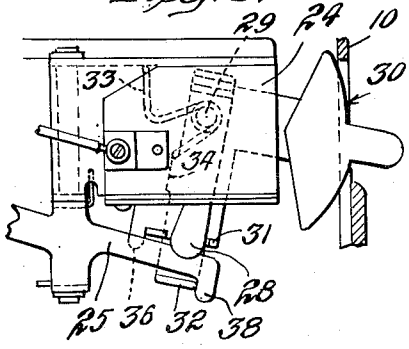
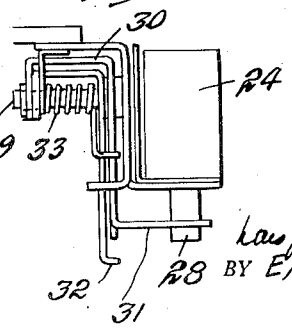


Fig. 4.



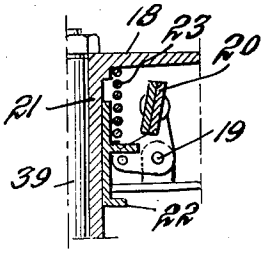


Fig. 5.

INVENTORS
Lars Johan Faith-Ell
BY Erik Oskar Helge Hansen
Glascock Downing & Seebold
ATTORNEYS

Patented Mar. 16, 1954 2,672,534

UNITED STATES PATENT OFFICE

2,672,534

MOTOR-DRIVEN MACHINE

Lars Johan Faith-Ell and Erik Oskar Helge Hansson, Stockholm, Sweden, assignors to Aktiebolaget Elektrolux, Stockholm, Sweden, a corporation of Sweden

Original application June 16, 1945, Serial No. 599,934. Divided and this application December 17, 1949, Serial No. 133,552

Claims priority, application Sweden August 3, 1944

6 Claims. (Cl. 200—80)

1

The present invention relates to motor driven machinery, and more particularly to machinery having an electric motor drive and automatic provisions for quickly interrupting the electric current upon overload of the machinery. This application is a division of our application Serial No. 599,934 filed June 16, 1945, which has become abandoned.

In electrically driven machines which are subject to temporary heavy overloads, it has previously been known to protect the motor against damage from overload by employing a centrifugal switch which interrupts the electric current upon decrease in the speed of rotation of the motor shaft. However, when the motor shaft and the driven shaft are connected by means of a slipping transmission, the speed of the driven shaft may decrease without any corresponding decrease in the speed of the motor shaft, thereby not affecting the switch. Consequently, the transmission means may be subjected to considerable wear due to slipping.

In other cases, when using a belt drive, a certain degree of slipping causes the belt to leave the pulley. This operating condition is favorable because the duration of the slipping and wear of the belt is reduced, but, on the other hand, it is combined with the disadvantage that the belt must be put back into its place each time. Especially with motor driven apparatus and machinery for common use, such as floor polishers and kitchen appliances, this disadvantage causes much trouble to the operator.

It is, therefore, an object of this invention to provide an improvement for protecting motor driven machinery against damage from overload which overcomes and obviates the foregoing disadvantages.

Further objects and advantages of the invention will be apparent from the following description considered in connection with the accompanying drawings forming part of this specification, and of which:

Fig. 1 is a sectional view, taken on the line I—I of Fig. 2, of the lower portion of a mixing machine for kitchen use illustrating an embodiment of the invention;

Fig. 2 is a plan view of the machine, partly in section on line II—II of Fig. 1; and

Figs. 3 to 5 are elevation and sectional views, respectively, showing details of the machine in Figs. 1 and 2 on an enlarged scale.

Referring to Figs. 1 and 2, reference character 10 designates generally the housing and 11 the base plate of the mixing machine, the electric motor and gearing of which are designated by 12 and 13, respectively. Two tools of the machine, a container and an agitator, are designated by 14 and 15. Further, 16 designates the driving belt of the machine, 17 the motor pulley and 18 the pulley of the gearing.

2

In the embodiment of the invention illustrated in Figs. 1 to 5, a centrifugal relay which is adapted to interrupt the electric current of the motor 12 upon overload of the machine, is applied to the pulley 18. This relay comprises two governor weights 20 symmetrically pivoted within the pulley on pins 19. When the pulley rotates with an incerasing speed the weights 20, due to increase in centrifugal force, turn or pivot about the pins 19 to a position corresponding to the speed. Due to this movement of the weights, a sleeve 22, which is slidably mounted on the hub of the pulley, is pressed inwardly into the pulley and compresses a spring 23 which tends to press the sleeve inwardly (upward in Fig. 5).

When the speed and hence the centrifugal force decreases, the sleeve 22 moves outwardly and engages a lever 25, which in turn coacts with the control mechanism of a switch 24. The lever 25 is pivoted on a pin 26 carried by a support 27 in the gear housing. This support also carries the switch and the control means therefor. The switch 24 is a toggle switch, the lever 28 of which is arranged to be actuated by an angle lever 30 carried by a pin 29 on the support 27. One end of the angle lever 30 is provided with a handle which projects through the housing 10. The lower portion of the angle lever 30 forms a fork 31 which guides the lever 28 of the switch.

Another lever 32 is also carried by the pin 29 and coacts with the angle lever 30. The lever 32 is actuated by a torsion spring 33 also mounted on the pin 29, such spring tending to turn the lever 32 in a clockwise direction to the position illustrated in Fig. 1. By means of a small hook 34 on the lever 32, the angle lever 30 can be actuated to move the lever 28 of the switch to its "off" position (open position) when the lever 32 is moved in the clockwise direction just mentioned. The lever 32 is arranged to coact with the lever 25. A torsion spring 35 tends to press the lever 25 against a tongue 36 of the angle lever 30, such tongue serving to guide the lever 25 in relation to the lever 32.

The embodiment just described is operated in the following manner. To start the machine, the handle of the angle lever 30 is pushed down so that this lever will turn about the pin 29 in a counterclockwise direction, as seen in Fig. 1,

whereby the fork **31** moves the lever **28** of the switch **24** to its "on" position (closed position). Simultaneously the hook **34** is engaged and the lever **32** will also be moved in a counterclockwise direction, as seen in Fig. 1, until that lever moves to the position shown in Fig. 3. The handle of angle lever **30** is maintained in its down position for a few seconds until the motor speed picks up and the motor shaft rotates at a normal rate.

Due to rotation of the pulley **18**, the outward movement of the weights **20** forces the sleeve **22** inwardly into the pulley hub. The lever **25** is then actuated by the spring **35** to catch and take hold of the lever **32** by a tongue **38**, thereby keeping the switch in its "on" position (Fig. 3). If the machine becomes overloaded and the speed of the driven shaft decreases, the sleeve **22** is pushed outwardly (downward in Figs. 2 and 5) by the spring **23**. The lever **25** is thus acted upon and caused to pivot a little about the pin **26**, whereby the tongue **38** becomes disengaged from the lever **32**. When this occurs the lever **32** is then actuated by the spring 33, and, by means of the hook **34**, moves the angle lever **30** and also the lever **28** of the switch **24** back to its "off" position (Fig. 1). When the machine is stopped manually by pushing up the handle of the lever **30**, the latter turns about the pin **29** independently of the lever **32**. When the speed of the driven shaft decreases to a certain suitable value, however, the lever **32** is released in the manner just described when overload occurs.

The regulator is so adjusted that the electric current will be interrupted before the belt slips off the pulley. In the event the belt should slip off, this indicates that the belt should be exchanged because it cannot transmit power efficiently due to wear.

While a single embodiment of the invention has been shown and described, it will be apparent that modifications and changes may be made without departing from the spirit and scope of the invention, as pointed out in the following claims.

What is claimed is:

1. Control mechanism comprising a manually operable part movable between operative and inoperative positions, a catch movable toward and from a holding position, a member movable between active and inactive positions, spring means to bias the member to its inactive position, the member being moved to its active position against the tension of the spring means responsive to manual movement of the part from its inoperative to its operative position, the catch in the holding position being capable of holding and retaining the member in its active position when moved thereto responsive to manual movement of the part, the spring means being operable to move the member from the active to the inactive position when the catch moves from its holding position, the part, responsive to movement of the member from the active to the inactive position, being moved from its operative to its inoperative position whenever the part at such time is in its operative position, the part also being manually movable from its operative to its inoperative position independently of the member even when the latter is retained in its active position by the catch.

2. Control mechanism for controlling the operation of apparatus comprising a manually operable part movable between operative and inoperative positions, a catch movable between holding and releasing positions, first spring means to bias the catch to one of its positions, the catch being adapted to be moved to its other position, against the tension of the first spring means, responsive to a condition affected by operation of the apparatus, a member movable between active and inactive positions, second spring means to bias the member to its inactive position, the member being moved to its active position against the tension of the second spring means responsive to manual movement of the part from its inoperative to its operative position, the catch in the holding position being capable of holding and retaining the member in its active position when moved thereto responsive to manual movement of the part, the second spring means being operable to move the member from the active to the inactive position when the catch moves from its holding to its releasing position, the part, responsive to movement of the member from the active to the inactive position, being moved from its operative to its inoperative position whenever the part at such time is in its operative position, the part also being manually movable from its operative to its inoperative position independently of the member even when the latter is retained in its active position by the catch and the catch subsequently moves from its holding to its releasing position responsive to the condition affected by operation of the apparatus.

3. Control mechanism for controlling the operation of apparatus having a driven element, such mechanism comprising a manually operable part movable between "on" and "off" positions, a member movable between active and inactive positions, spring means to bias said member to its inactive position, a movable catch adapted to move toward and from a holding position responsive to predetermined increase and decrease in speed, respectively, of the driven element, the member having a region in the path of movement of the part which is effective to move the member to its active position when the part is moved to its "on" position, the catch being operable to hold and retain the member in the active position when in its catch holding position, the spring means being operable to move the member from the active to the inactive position when the catch moves from its holding position, the part being contacted by the region of the member when the latter moves from the active to the inactive position to cause the part to move from the "on" to the "off" position whenever the part at such time is in its "on" position, the part also being manually movable from the "on" to the "off" position independently of the member even when the latter is held and retained in its active position by the catch.

4. Control mechanism comprising a manually operable part movable between operative and inoperative positions, a pivotally mounted catch angularly movable toward and from a holding position, a member movable between active and inactive positions, said part and member being angularly movable with respect to one another about the same axis, torsional spring means at the vicinity of such axis to bias the member to its inactive position, the member being moved to its active position against the tension of the spring means when the part is manually moved from its inoperative to its operative position, the catch in the holding position being capable of retaining the member in its active position, the spring means being operable to move the member from the active to the inactive position thereof when the catch moves from its holding position, the

part, upon movement of the member from the active to the inactive position, being actuated to move from its operative to its inoperative position whenever the part at such time is in its operative position, the part also being manually movable from its operative to its inoperative position independently of the member even when the latter is retained in its active position by the catch.

5. Control mechanism as set forth in claim 2 in which the catch is angularly movable about a first axis between its holding and releasing positions and the part and the member are angularly movable with respect to one another about a second axis perpendicular to said first axis, the first spring means to bias the catch to said one position comprising a first torsion spring at the vicinity of said first axis and the second spring means to bias the member to its inactive position comprising a second torsion spring at the vicinity of said second axis.

6. Control mechanism as set forth in claim 3 including a shaft and means for mounting the part and the member on said shaft for independent angular movement thereon, the spring means to bias said member to its active position including a torsion spring disposed about said shaft.

LARS JOHAN FAITH-ELL.
ERIK OSKAR HELGE HANSSON.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
934,211	Pomeroy	Sept. 14, 1909
1,044,609	Watson	Nov. 19, 1912
1,047,557	Owens	Dec. 17, 1912
1,263,978	Lebovici	Apr. 16, 1918
1,346,067	Touchy	July 6, 1920
1,553,595	Dauplaise	Oct. 27, 1925
2,100,710	Dendel	Nov. 30, 1937
2,472,526	Frazee	June 7, 1949