

July 6, 1943.

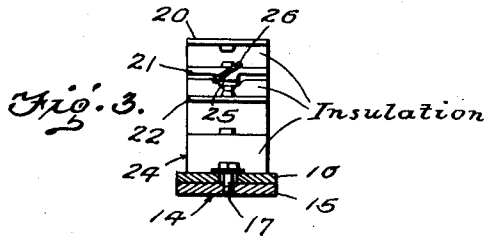
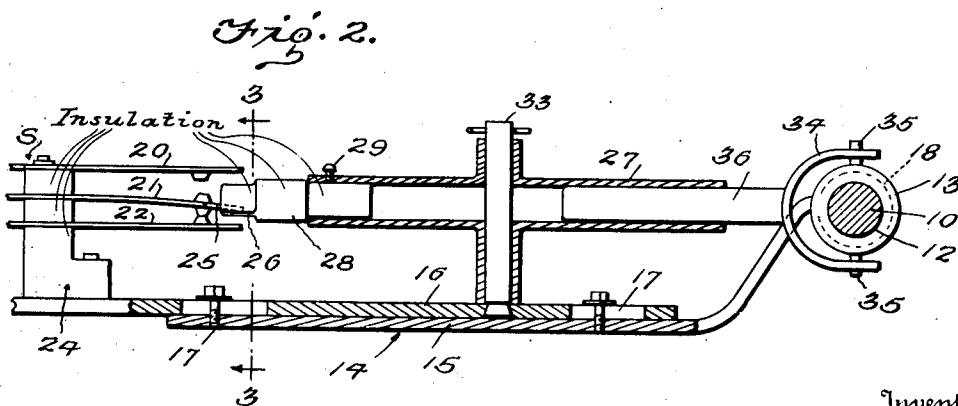
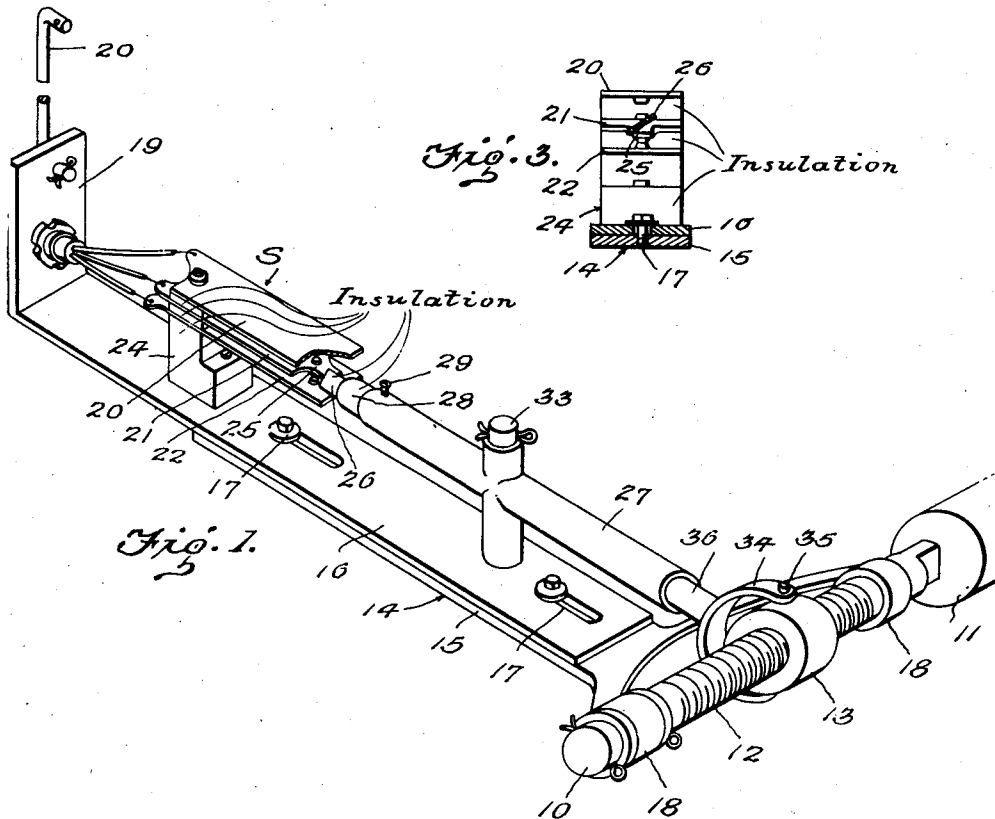
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2,323,646

SWITCH MECHANISM

Filed April 8, 1942

2 Sheets-Sheet 1



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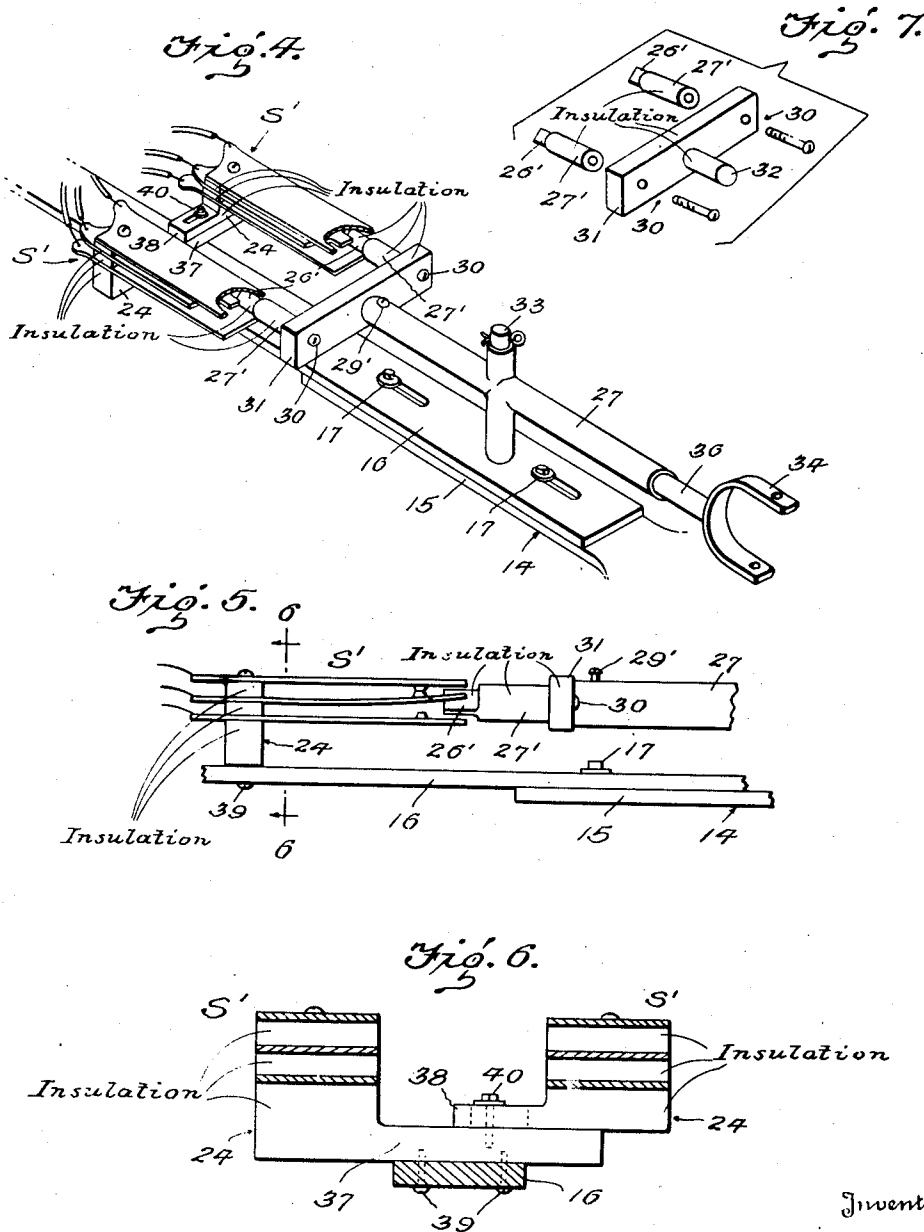
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SWITCH MECHANISM

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

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SWITCH MECHANISM

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Application April 8, 1942, Serial No. 438,165

5 Claims. (Cl. 200—30)

The invention aims primarily to provide a new and improved switch mechanism which, while usable for various other purposes, is particularly adaptable to cause alternate rotation of a reversible electric motor in opposite directions, for example, a driving motor for a washing wheel in a laundry. Such a wheel must turn a few revolutions in one direction, then a few in the other direction, and a different number of turns each way for different fabrics, and a further object is to provide a switch mechanism which may be advantageously used to effect such control of the driving motor as to attain these ends.

With the foregoing and minor objects in view, the invention resides in the novel subject matter hereinafter described and claimed, description being accomplished by reference to the accompanying drawings.

Figure 1 is a perspective view disclosing one form of a switch mechanism which is particularly adapted to be wired to the actuating coils of two magnetic contactors used for reversing a three-phase reversible electric motor.

Fig. 2 is a longitudinal sectional view partly in elevation of the mechanism shown in Fig. 1.

Fig. 3 is a vertical transverse sectional view on line 3—3 of Fig. 2.

Fig. 4 is a view similar to Fig. 1 but illustrating a switch mechanism which is well adapted for wiring directly to a three-phase reversible electric motor to effect reversing thereof.

Fig. 5 is a fragmentary side elevation of a portion of the switch mechanism shown in Fig. 4.

Fig. 6 is a transverse sectional view on an enlarged scale, on line 6—6 of Fig. 5.

Fig. 7 is a disassembled perspective view showing a number of the parts illustrated in Figs. 4 and 5.

Preferred features of construction have been illustrated and will be rather specifically described, with the understanding, however, that variations may be made within the scope of the invention as claimed. Also, while the mechanism is intended primarily to effect motor reversal, it could of course be used for controlling other electrical circuits.

On the drawings, 10 denotes a shaft to be rotated first in one direction and then in the other. When the invention is used to effect reversal of the driving motor of a laundry or other machine, the shaft 10 may be secured to one end of a shaft 11 forming a conventional part of said machine. The shaft 10 is provided with a threaded portion 12 upon which there is a nut 13.

An elongated support 14 extends laterally from the shaft 10 and is composed of two sections 15 and 16 adjustably connected with each other at 17 for relative longitudinal adjustment. The outer end of the section 15 is provided with bearings 18 which mount it upon the shaft 10 at the ends of the threaded portion 12, and the outer end of the section 16 is preferably turned upwardly at 19 and connected with a supporting link 20 which may be attached to any desired overhead support, preferably a part of the machine which is to be reversed.

Mounted on the section 16 of the support 14 in Figs. 1 to 3, I have shown a switch S which includes three resilient contact fingers 20, 21 and 22, and in Figs. 4, 5 and 6, I have shown two switches S' mounted on said section 16, each of said switches S' being substantially a duplicate of the switch S, so that a description of said switch S will in most respects suffice for all.

The three spring contact fingers 20, 21 and 22 all project in the same direction from a suitable insulating support 24 which is secured upon the support section 16, said fingers extending toward the shaft 10 and being insulated from each other. The fixed ends of these spring fingers are provided with appropriate terminals for connecting three wires thereto, and the free end of the intermediate finger 21 is provided with a longitudinally projecting operating portion or member 25, said finger 21 being normally separated from the other fingers 20 and 22. One cam 26 is provided to cooperate with the operating member 25 of the switch S to either spring the contact 21 upwardly against the contact 20 or downwardly against the contact 22, and two cams 26' are employed to similarly cooperate with the intermediate contact fingers of the switches S'. Whether there be a single cam 26 or two cams 26', a lever 27 is provided for carrying and operating same. In Figs. 1 and 2, the cam 26 may be considered as an integral part of a stub 28 secured by a set screw 29 in the inner end of the lever 27. In Figs. 4, 5 and 6, the cams 26' are integral parts of stubs 27' which are secured at 30 to a block 31, said block having an integral stud 32 secured in the inner end of the lever 27 by a set screw 29'.

The lever 27 is fulcrumed between its ends upon a vertical pin 33 which is suitably secured to the support section 16, and the outer end of said lever is both pivotally and slidably connected with the nut 13. In the present disclosure, there is a fork 34 which straddles the nut 13 and is pivoted to it as shown at 35, said fork having a shank

36 which is slidable in the outer end of the lever 27.

As the shaft 10 rotates in one direction, the nut 13 travels toward one end of said shaft and thus the cam 26 or cams 26' is/are moved in one direction to downwardly spring the intermediate switch contact or contacts against the subjacent contact or contacts, and as said shaft 10 rotates in the other direction, the nut 13 travels in the other direction on said shaft, thus changing the direction of movement of the cam 26 or cams 26' and causing it or them to push the intermediate contact or contacts upwardly against the superposed contact or contacts.

By adjusting the support section 16 upon the section 15, the effective length of the outer arm of the lever 27 may be varied, thus changing the stroke of the cam or cams carried by the inner end of said lever. Thus, when the switch or switches controls/control a driving motor for the shaft 10 to change the direction of rotation of said shaft, the duration of time between motor reversals may be regulated as required, which is particularly advantageous when the switch mechanism is used with a washing wheel in a laundry, as the adjustment permits turning of the wheel in one direction and then in the other for any desired number of revolutions.

The switch S in the form of construction shown in Figs. 1 to 3 may well be wired to the actuating coils of two magnetic contactors used for reversing a three-phase reversible motor, while the switches S' shown in Figs. 4, 5 and 6 may be directly wired to such a motor. In order to prevent the reversing action from occurring with too much of a jerk, it is preferable to so set the switches S' that they will operate successively. In order that this may be readily accomplished, I have shown overlapping arms 37 and 38 on the contact supports 24 of these switches, one of these arms 37 being secured at 39 to the support section 16 while the other arm 38 is adjustably secured at 40 to said arm 37. The distance between the two switches S' may thus be adjusted as required to obtain the above mentioned successive action of said switches.

From the foregoing taken in connection with the accompanying drawings, it will be seen that novel and advantageous provision has been made for carrying out the objects of the invention, and while preferred details have been disclosed, attention is again invited to the possibility of making variations within the scope of the invention as claimed.

I claim:

1. In a switch mechanism, a rotatably mounted shaft turnable first in one direction and then in the other, said shaft having a threaded portion, a support having a bearing mounting one end of said support on said shaft near said threaded portion of said shaft, means for supporting the other end of said support, a switch mounted on said support near said other end thereof, said switch having an operating member to be moved first in one direction and then in the other, a lever fulcrumed between its ends on said support, said lever having means at one end for moving said operating member in said one direction when said lever end moves in one direction and for moving said operating member in said other direction when said lever end moves in the other direction, and a nut connected with the other end of said lever and engaged with said threaded portion of said shaft for oscillating said lever.

2. In a switch mechanism, a rotatably mounted

shaft turnable first in one direction and then in the other, said shaft having a threaded portion, a support extending laterally from said shaft, said support comprising one section having a bearing mounted on said shaft, a second section slidably engaged with said one section for adjustment toward and from said shaft, and means for securing said second section in adjusted position, means for supporting the end of said second section remote from said shaft, a switch mounted on said second section and having an operating member to be moved first in one direction and then in the other, a lever fulcrumed between its ends on said second section, said lever having means at its inner end for moving said operating member in said one direction when said lever is swung in one direction and for moving said operating member in said other direction when said lever is swung in the other direction, a nut on said threaded portion of said shaft, and means establishing a pivotal and slidable connection between said nut and the outer end of said lever.

3. In a switch mechanism, a rotatably mounted shaft turnable first in one direction and then in the other, said shaft having a threaded portion, a support extending laterally from said shaft, said support comprising one section having a bearing mounted on said shaft, a second section slidably engaged with said one section for adjustment toward and from said shaft, and means for securing said second section in adjusted position, means for supporting the end of said second section remote from said shaft, a switch mounted on said second section and having an operating member to be moved first in one direction and then in the other, a lever fulcrumed between its ends on said second section, said lever having means at its inner end for moving said operating member in said one direction when said lever is swung in one direction and for moving said operating member in said other direction when said lever is swung in the other direction, the outer end of said lever being provided with a longitudinally slidable terminal, and a nut pivoted to said lever terminal and engaged with said threaded portion of said shaft.

4. In a switch mechanism, a support, at least three normally separated resilient fingers secured to and projecting in the same direction from said support, the intermediate resilient finger being engageable with another of said resilient fingers when sprung in one direction from a neutral position and being engageable with the third resilient finger when sprung in the other direction from said neutral position, said intermediate resilient finger being provided with an operating member unitarily secured thereto and projecting longitudinally from its free end, a cam having one cam surface cooperable with said operating member for springing said intermediate resilient finger in said one direction when said cam is moved in one direction, said cam also having a second cam surface cooperable with said operating member for springing said intermediate resilient finger in said other direction when said cam is moved in the other direction, and means mounting said cam for movement in said directions.

5. In a switch mechanism, one assemblage of elements comprising a support, at least three normally separated contact fingers secured to and projecting in the same direction from said support, the intermediate contact finger being engageable with another of said contact fingers when sprung in one direction from a neutral

position and being engageable with the third contact finger when sprung in the other direction from said neutral position, said intermediate contact finger being provided with an operating member unitarily secured thereto and projecting longitudinally from its free end, and a cam having one cam surface cooperable with said operating member for springing said intermediate contact finger in said one direction when said cam is moved in one direction, said cam also having a second cam surface cooperable with said operating member for springing said intermediate

contact finger in said other direction when said cam is moved in the other direction; a second assemblage of elements substantially duplicating said one assemblage, a single movably mounted member upon which the two cams of said assemblages are mounted in spaced relation; and means mounting the two supports of said assemblages for adjustment in a direction to vary the distance between the two operating members of said assemblages.

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