United States Patent

[11] **3,629,534**

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[54] **TRIGGER CONTROL SWITCH WITH PARTICULAR BRIDGING AND STATIONARY CONTACT ARRANGEMENTS**
13 Claims, 11 Drawing Figs.

[52] **U.S. Cl.** .... **200/157,** 200/166 BD, 200/166 BF
[51] **Int. Cl.** **H01h13/08,** H01h 1/44
[50] **Field of Search** .... 200/157, 16 R, 166 BD, 166 BF; 310/50, 68 A

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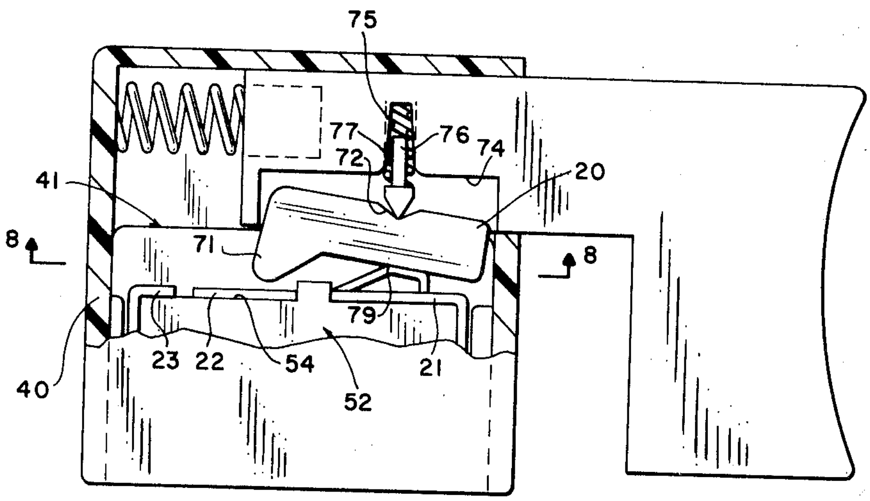
ABSTRACT: A switch in combination with a variable power control. A sliding actuator carries a bridging contact which continuously engages a pivot on one fixed contact and selectively engages two fixed contacts. An actuator pivot urges the bridging contact toward the fixed contacts, and the relative positions of the pivots provide positive switching between bridging and nonbridging conditions. An insulating boss separates the stationary fixed contacts, and the bridging contact never engages said boss in any switch position. A thick film circuit carries resistance elements on a surface; and a second movable contact, moved by the actuator, includes contact fingers engaging the resistance elements.



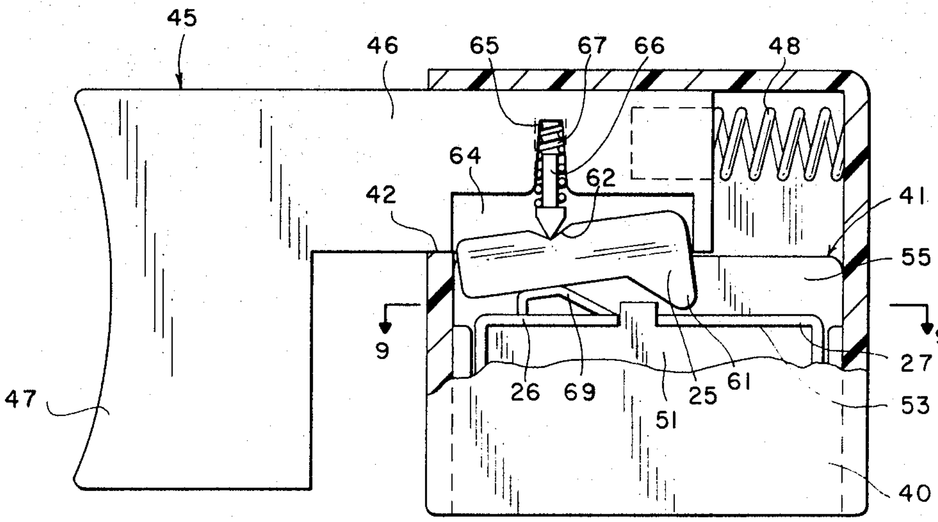


FIG. 1

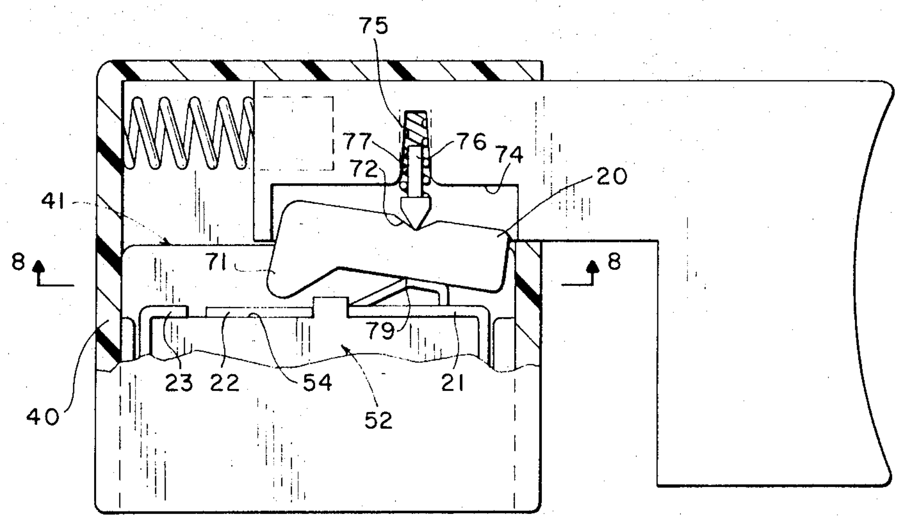


FIG. 2

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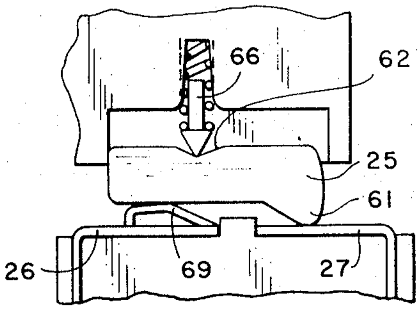

FIG. 3

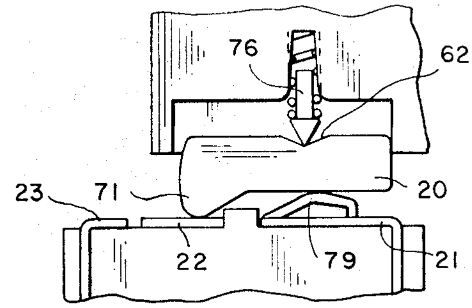

FIG. 4

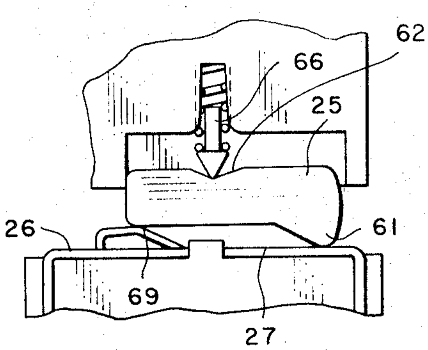

FIG. 5

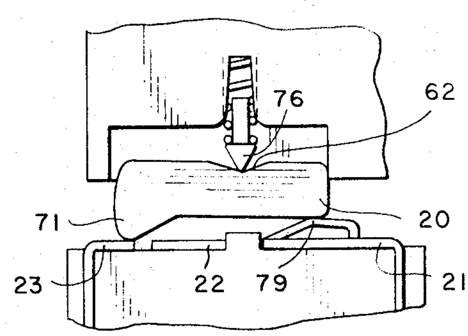

FIG. 6

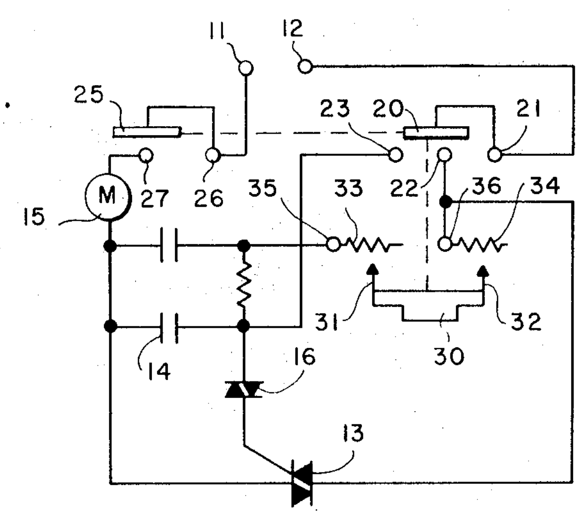

FIG. 11

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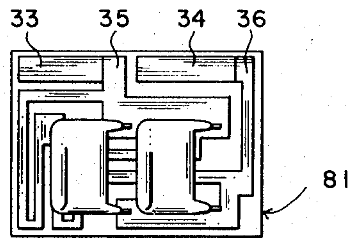

FIG. 7

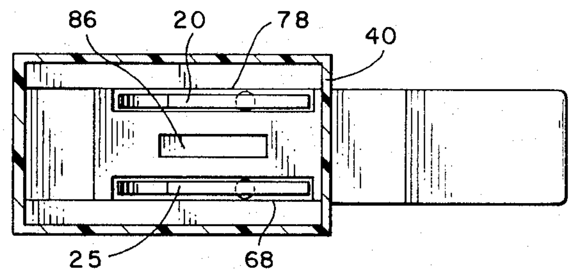

FIG. 8

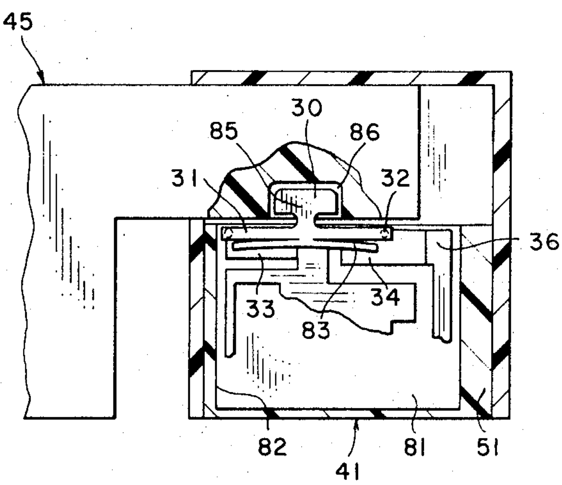

FIG. 10

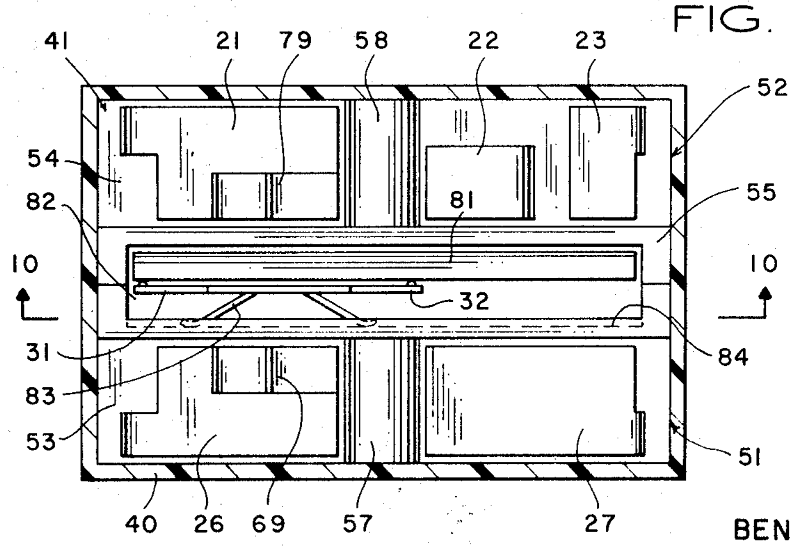

FIG. 9

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TRIGGER CONTROL SWITCH WITH PARTICULAR BRIDGING AND STATIONARY CONTACT ARRANGEMENTS

BACKGROUND OF THE INVENTION

This invention relates to a positive acting switch operated by a sliding actuator, suitable for use to control the power to a manually held electric tool. This invention also relates to the combination of such a switch with a variable power control for such an electrically operated tool.

In tools of the above type, it is usual to provide a pistol grip-type handle with a trigger-type actuator engaged by the finger of the tool operator to control the power to the tool. Initial movement of the trigger will energize the motor at a low power level providing a low speed for the tool motor. Further squeezing movement by the operator will increase the power to increase the speed of the tool motor. The tool motor, then, is switched on and off and the power to the motor is varied in response to movement of a sliding actuator which carries contacts coacting with fixed contacts to produce the desired control.

In this type of motor control, wherein the relatively moving parts which carry the electric contacts are fabricated on insulating material such as plastic material, it is desirable to minimize rubbing engagement of insulating parts which, through abrasion, may produce insulating particles which may build up over a period of time to interfere with the operation of the switch assembly or which may build up on the contact surfaces to increase contact resistance.

It is an object of this invention to provide an electric switch suitable for use in a variable power control in which positive switching action is obtained.

Another object of this invention is to provide a switch actuated by a sliding actuator in which positive snap action switching is obtained.

A further object of this invention is to provide a switch providing a bridging contact carried by a sliding actuator in which positive switching action is obtained through engagement only with the switch stationary contacts.

A still further object of this invention is to provide a positive acting switch in combination with a thick film circuit having integral resistance elements for variable control.

These objects are accomplished in a switch assembly comprising a stationary housing and an actuator mounted for rectilinear movement relative to the stationary housing. At least two longitudinally spaced stationary contacts are mounted on the stationary housing, one contact including an integral pivot. An elongated bridging contact carried by the actuator is urged into engagement with the stationary contacts, with the bridging contact being pivoted into or out of engagement with the other stationary contact responsive to the position of the bridging contact relative to the pivot of the one contact. For variable power control, an elongated resistor means is mounted on the stationary housing and connected to one of the fixed contacts. A sliding contact, movable with the actuator, selects relative resistance values of the resistor means.

DRAWINGS

The novel features of the invention, as well as additional objects and advantages thereof, will be understood more fully from the following description when read in connection with the accompanying drawings in which:

FIG. 1 is a view, partially in section, of a preferred form of switch assembly, as viewed from one side of the assembly;

FIG. 2 is a view similar to FIG. 1 as viewed from the opposite side of the switch assembly;

FIGS. 3 and 5 are fragmentary views based on FIG. 1 illustrating different operative positions of the switch elements;

FIGS. 4 and 6 are fragmentary views based on FIG. 2 illustrating operative positions of the switch elements which correspond respectively to the operative positions illustrated in FIGS. 3 and 5;

FIG. 7 is a view of a thick film printed circuit employed in the switch assembly of FIG. 1;

FIG. 8 is a sectional view taken along the Line 8—8 of FIG. 2;

FIG. 9 is a sectional view taken along the Line 9—9 of FIG. 1;

FIG. 10 is a sectional view, as viewed along the Line 10—10 of FIG. 2, illustrating the relation of the thick film circuit to other elements of the assembly; and

FIG. 11 is a schematic circuit diagram of a power control circuit for an electric motor.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The electric switch apparatus and power control circuit described herein are designed for use in a motor control circuit for varying the power supplied to an electric motor of the type used in the portable tool, such as drill, for varying the speed of the tool.

FIG. 11 is a schematic diagram of an exemplary control circuit for controlling the effective power applied to a load, such as a motor **15**, by varying the resistance of resistors in the control circuit and which are not connected in series with the load. It will be appreciated in this regard that there are many types of control circuits in which the effective power applied to a load is varies by varying a variable resistor not connected in series with the load. The switch apparatus of the present invention can be used with such other circuits as the particular control circuit does not constitute a part of the invention.

In the particular control circuit shown in FIG. **11** of the drawings, power is applied to the motor **15** when bridging contact **25** is connected across contacts **26** and **27** and when bridging contact **20** is connected across contacts **21** and **22**. Upon this occurrence, the motor **15** is connected in series with the symmetrical AC switch **13** across a source of AC supply voltage connected to terminals **11** and **12**. The effective power applied to the motor, and thereby the speed of motor, is controlled by controlling the conduction time of the device **13** during each half cycle of the applied AC supply voltage. The conduction time of the device **13** is controlled by controlling the resistance of the charge path of the capacitor **14**, thereby controlling the time required for the capacitor **14** to be charged to the breakover voltage of breakover diode **16**. Thus, the capacitor **14** is connected across the power device **13** by means including resistors **33** and **34** connected in series with the capacitor **14** and contacts **21** and **22**, terminal **36** of resistor **34** being connected to switch contact **22**, and terminal **35** of resistor **33** being connected to one terminal of a capacitor. As the sliding contact **30** is moved with its spring contacts **31** and **32** moving along resistors **33** and **34** respectively toward terminals **35** and **36** respectively, the resistance in the charge path of the capacitor **14** will be decreased causing the capacitor to charge to the breakover voltage of the device **16** at a faster rate. Accordingly, the power device **13** will be switched to the low impedance state at an earlier time in each half cycle, increasing the effective power applied to the load. At such time as sliding contacts **31** and **32** approach the terminals **35** and **36**, bridging contact **20** contacts contact **23**. On this occurrence, contact **21** will be connected directly to the motor **15** and full power will be applied to the motor.

The bridging contacts **20** and **25** and sliding contact **30** are commonly actuated by a single control element which is biased to a position that the resistance between capacitor **14** and terminal **22** is maximum and the switches are open isolating the motor from line voltage prior to operation of the control element. Upon operation of the control element, both switches will be operated and the slider advanced to charge the resistance in the charge path of capacitor **14** to vary the power supplied to the motor in accordance with the position of the control element. A single resistor rather than the two resistors **33** and **34** could be used. However, for a given resistance per unit length, a greater change in resistance for an incremental change in the distance the slider **30** is moved will provide a greater change in resistance and provide a greater change in the speed of the motor 15.

Referring now to the other figures of the drawing and particularly to FIGS. 1, 2, 8 and 9, the switch assembly includes a generally rectangular housing 40 which is adapted to be received and secured in an appropriate recess in the pistol grip handle of a portable power tool for example. The housing 40 is open at the bottom, as viewed in FIG. 1, to receive a switch subassembly 41 which includes, generally, the stationary elements of the switch mechanism. An actuator 45 includes a horizontal shank portion 46 which is slidably received and supported in the upper portion of the housing 40, the shank portion 46 extending into the housing through an opening 42 in the housing wall. The shank portion 46 of the actuator carries the movable elements of the switching mechanism, as will be described; and a trigger element 47 is provided at the outer end of the actuator suitable for engagement by the finger of a tool operator while gripping the piston grip handle of a portable tool. A compression spring 48 urges the actuator 45 to an outermost extended position, which is determined by coacting stop means (not shown) provided on the housing and actuator. The housing 40, actuator 45, and base parts of the subassembly 41 are all preferably fabricated of an electrically insulating material, such as a plastic material.

FIG. 9 is a top view of the switch subassembly 41, with the parts carried by the actuator 45 not shown for purposes of clarity. The subassembly 41 includes two blocks 51 and 52 which define horizontal surfaces 53 and 54 respectively for supporting the several stationary contacts, which define an upstanding rib 55, defining insulating and guiding walls between the surfaces 53 and 54, and which defines support means for other circuit elements and components as will be described. As best seen in FIGS. 1 and 9, stationary contacts 26 and 27 are supported on the surface 53 on one side of the barrier 55. As best seen in FIGS. 2 and 9, stationary contacts 21, 22 and 23 are supported on the surface 54 on the opposite side of the barrier 55. The surface 53 is provided with an upwardly extending transverse rib 57 defining an insulating barrier between the longitudinally spaced contacts 26 and 27; and correspondingly the surface 54 is provided with an upwardly extending transverse rib 58 defining an insulating barrier between the longitudinally spaced contacts 21 and 22.

As seen in the drawings, the blocks 51 and 52 define a subassembly which is rectangular in configuration and which is received within the lower portion of the housing 40. The blocks 51 and 52 are preferably fabricated of an electrically insulating plastic material; and the contacts 21, 22, 23, 26 and 27 are retained in the subassembly 41 with suitable insulating walls and barriers insulating the contacts from each other.

As best seen in FIGS. 1, 2 and 9, the bridging contact 20, for engagement with the stationary contacts 21, 22 and 23, and the bridging contact 25, for engagement with the stationary contacts 26 and 27, are mounted in side-by-side relation on the shank 46 of the actuator 45.

Referring to the contact 25, as seen in FIGS. 1 and 9, this contact is an elongated, rectangular shaped platelike member having a contact boss 61 projecting from one side edge at one end thereof, and having a V-shaped notch 62 at its opposite side edge spaced from both ends. The actuator shank 46 is generally rectangular in cross section; and one side thereof is provided with a rectangular recess 64 opening to the bottom wall thereof and dimensioned to accommodate the contact 25. A cylindrical recess 65 in the shank opens to the downward facing base of the recess 64 and confines and guides a pivot pin 66 and helical compression spring 67, the pivot pin being aligned with and engaging the contact notch 62 to urge the contact 25 downwardly. When the actuator is assembled in the housing 40, the actuator slot 64 and adjacent housing wall 68 confine the contact 25 for rectilinear movement with the actuator, with the contact being urged downwardly by the spring 67 into engagement with the associated stationary contacts. It will be noted that pin 76 is not required since notch 62 can be of a shape to expeditiously receive the end of the spring in which event the spring could provide the dual function of pivot and biasing member.

As best seen in FIG. 1, the stationary contact 26 is provided with an upwardly projecting portion 69 defining a pivot which is engaged by and supports the downward facing edge of the bridging contact 25. The pivot 69 opposes and confronts the pivot 66; and the relative lateral positions of these pivots provide the positive switching action which will now be described, with particular reference to FIGS. 1, 3 and 5.

In FIG. 1, the actuator 45 is shown in its most extended position relative to the housing 40, being urged to this position by the spring 48 and being limited in an outward excursion by stop means not shown. In this position, the actuator pivot 66 is overcenter to the left relative to the contact pivot 69, so that the bridging contact 25 is rotated in a counterclockwise direction relative to the pivot 69 as viewed in FIG. 1 to lift and maintain the contact boss 61 out of engagement with the stationary contact 27. This is the "off" position of the switch.

In FIG. 3, the actuator 45 has been moved to an intermediate position relative to the housing 40 wherein the actuator pivot 66 has now been moved overcenter to the right relative to the contact pivot 69, thereby rotating the contact 25 clockwise relative to the pivot 69 to move the contact boss 61 into engagement with the stationary contact 27. During this movement, the contact 25 slides to the right on the pivot 69 maintaining electrical contact with the stationary contact 26 through the pivot 69.

The FIG. 5 position represents the extreme position of the actuator 45 resulting from squeezing the trigger element 47; and it will be seen that the bridging contact 25 has slid further along the pivot 69 and the stationary contact 27 to maintain bridging electrical contact between the contacts 26 and 27. When the actuator is released by the operator, the spring 48 will urge the actuator back to its FIG. 1 position to disengage the bridging contact from the stationary contact 27. The bridging contact boss 61 engages only the contact 27, and does not come into engagement with the rib 57 or other parts of the subassembly block 51.

Referring now particularly to FIGS. 2, 4 and 6, the adjacent bridging contact 20 is identical in configuration to the contact 25, including a contact boss 71 projecting from a lower edge at one end and a V-shaped notch 72 in the upper edge intermediate its ends. The contact 20 is similarly confined in a rectangular recess 74 provided in the opposite side of the actuator shank 46; and an upward extending cylindrical recess 75 confines the pivot pin 76 and associated helical compression spring 77 for engaging the notch 72 and urging the bridging contact downwardly into engagement with the associated stationary contacts. The recess 74 with the adjacent housing wall 78 confines the contact 20 for rectilinear movement with the actuator and for pivotal movement relative to the stationary contacts.

As best seen in FIG. 2, the stationary contact 21 is similar in configuration to the contact 26 including an upwardly projecting portion defining a pivot 79 for engaging and supporting the lower edge of the bridging contact 20. The pivot 79 opposes and confronts the pivot 76 to control the positive switching action as will now be described.

Referring particularly to FIGS. 2, 4 and 6, FIG. 2 illustrates the "off" position of the switch wherein the pivot 76 is positioned overcenter to the right relative to the pivot 79; whereby the contact 20 is rotated clockwise to maintain the contact boss 71 out of engagement with the stationary contact 22. FIG. 4 illustrates an intermediate position of the actuator responsive to the squeezing of the actuator trigger by the operator, wherein the pivot 76 has been moved overcenter to the left relative to the pivot 79 to rotate the contact 20 counterclockwise and urge the contact boss 71 into engagement with the stationary contact 22. During most of the movement of the bridging contact 20, the boss 71 maintains sliding engagement with the stationary contact 22 while the contact 20 also maintains engagement with the pivot 79 of the stationary contact 21, to maintain closed circuit through these contacts.

As seen in FIG. 11, the contact 22 is connected in series with the resistors 33 and 34.

FIG. 6 illustrates the extreme position of the actuator 45, corresponding to that of FIG. 5, wherein the boss 71 of the bridging contact has been moved off contact 22 and into engagement with the stationary contact 23. Again, when the actuator is released by the operator, the bridging contact 20 will be returned to the FIG. 2 position.

Throughout these switching movements, the boss 71 of bridging contact 20 engages only the contacts 22 and 23, and does not engage the insulating rib 58.

FIG. 7 is a view of one face of a thick film circuit 81 which includes printed circuit conductors and components and which is included in the subassembly 41. The thick film circuit consists, for example, of a ceramic wafer 81 and, as seen in both FIGS. 7 and 10, it includes the resistor elements 33 and 34 and associated terminals 35 and 36 which are referred to in connection with the circuit diagram of FIG. 11. As best seen in FIGS. 9 and 10, the circuit wafer 81 is enclosed in a cavity 82 defined between the subassembly blocks 51 and 52. The wafer is supported against the block 52; and the bridging slide contact 30 is also supported and guided in this recess 82. As best seen in FIGS. 9 and 10, the sliding contact 30 consists of a thin waferlike plate of conductive spring metal having a lower pair of laterally extending fingers 83 which are received in a longitudinal groove 84 formed in the wall of the block 51 facing the circuit wafer 81. The coaction of the fingers 83 and the groove 83 prevent vertical movement of the sliding contact 30 and permit longitudinal sliding movement. The sliding contact also includes laterally extending contact fingers 31 and 32 which are urged against the resistor elements 33 and 34 to provide the variable resistance in the circuit.

The sliding contact 30 also includes an upwardly extending tab 85, best seen in FIG. 10, which is received in a narrow elongated recess 86, best seen in FIGS. 8 and 10 provided in the lower wall of the actuator shank 46. The length of the recess 86 is only slightly greater than the longitudinal dimension of the tab 85, so that the contact moves longitudinally and rectilinearly with the actuator 45 to position the contact fingers 31 and 32 relative to the respective resistor elements 33 and 34. It will be appreciated that the particular sliding contact is merely exemplary of many known in the art.

In FIGS. 8, 9 and 10, the parts of the switch and power control assembly are illustrated in the off position of the switch corresponding to that of FIGS. 1 and 2. In this position the contact fingers 31 and 32 engage the respective resistor elements at extreme left end of these elements as viewed in FIGS. 7 and 10. Accordingly, when the actuator is moved just slightly away from the off position, wherein the bridging contacts 20 and 25 have just moved to the position to make positive engagement with the respective stationary contacts 22 and 27, the variable resistance provided in the circuit will be a maximum with the current flowing, for example, from terminal 35 through the resistor element 33, the sliding contact 30, and the resistor element 34 to the terminal 36. As the sliding contact is moved toward the right, as viewed in FIG. 10, resulting from the squeezing of the actuator trigger element 47, the lengths of the resistor elements 33 and 34 which are effective in the circuit decreases to provide a diminishing variable resistance. When the actuator is moved to its extreme position, corresponding to that of FIGS. 5 and 6, the bridging contact fingers 31 and 32 are in engagement with the terminals 35 and 36 so that no current flows through the resistor elements 33 and 34. Simultaneously, as described in connection with FIG. 6, the bridging contact 20 engages stationary contact 23 and, as seen in FIG. 11, the motor is connected directly across line voltage.

The operation of the switch and power control, as described above, may be briefly outlined as follows:

In the "off" position of the switch, illustrated in FIGS. 1, 2, 8, 9 and 10, the sliding contact 30 is positioned to provide the maximum variable resistance in the circuit through the resistors 33 and 34. When the actuator 45 is moved slightly from the off position, the bridging contacts 20 and 25 are moved relative to the respective contact pivots 79 and 69 so that these contacts are snapped into engagement with the respective stationary contacts 22 and 27. It is seen, with reference to the circuit diagram of FIG. 11, that the resistor elements 33 and 34 are then connected into the power control circuit. FIGS. 3 and 4 illustrate the condition where the bridging contacts 20 and 25 have just snapped into engagement with the respective stationary contacts.

As the actuator is moved further by the operator, bridging contact 20 continues to bridge the contacts 21 and 22 maintaining sliding engagement therewith, and bridging contact 25 continues to bridge the contacts 26 and 27 maintaining sliding engagement therewith. The sliding contact 30 moves across the resistor elements 33 and 34 to decrease the variable resistance and increase the applied power to the load; or, as the trigger is released, the resistance is increased to decrease the applied power. In the extreme position of the actuator, power is applied to the motor as the motor is connected directly in series with applied line voltage.

What has been described is an improved switch and power control assembly particularly adapted for use with a portable electric power tool for controlling the speed of a series connected motor. A feature of the invention is the provision of a positive acting switch including a bridging contact which maintains continuous engagement with one stationary contact and which is snapped positively into and out of engagement with another stationary contact. A particular feature of the switch is that the bridging contact is urged by spring means into engagement with the two stationary contacts, and the switching action is effected by a pivoting movement of the bridging contact about a fixed pivot on the one stationary contact so that all of the sliding engagement is between the contact members of the switch assembly. An ancillary feature of the switch arrangement is that an insulating barrier or rib may be provided between the adjacent stationary contacts and yet will not be engaged or abraided by the movable bridging contact. Another feature of the invention is the provision of a variable power control, which includes a positive acting switch, and a thick film circuits carrying integral resistor elements wiped by a sliding contact carried with the switch actuator to provide variable resistance in the control circuit.

Although the invention has been described with reference to a particular preferred embodiment, many changes and modifications will become apparent to those skilled in the art in view of the foregoing description which is intended to be illustrative and not limiting of the invention defined in the claims.

I claim:

1. An electrical switch comprising

a housing; an actuator mounted for rectilinear movement relative to said housing;

at least two spaced stationary contacts mounted on said housing; an elongated bridging contact carried by said actuator for rectilinear movement therewith, for selective bridging engagement with said stationary contacts;

one of said stationary contacts defining integral contact pivot means; said bridging contact being mounted on said actuator for pivotal movement relative to said contact pivot means; spring pivot means on said actuator opposing said stationary contact pivot means and continuously urging said bridging contact toward the stationary contacts;

said bridging contact being movable between a nonbridging position, wherein said bridging contact is positioned relative to said pivot means to affect rotation of the contact out of engagement with the other of said stationary contacts, and the bridging position wherein said bridging contact is positioned relative to said pivot means to effect rotation of the contact into engagement with the other stationary contact,

said elongated bridging contact having one end disposed for continuous sliding engagement with said contact pivot means, and having a boss at its other end for selective engagement with said other stationary contact;

said housing providing a transverse insulating boss between said spaced stationary contacts; and said bridging contact being maintained out of engagement with said insulating boss in all positions thereof.

2. An electric switch as set forth in claim 1

wherein said housing is adapted to be mounted in a pistol grip handle of a control device; wherein said actuator includes an integral trigger projecting from said housing and adapted to be engaged by the finger of an operator; and means urging said actuator to an extended position wherein said bridging contact is positioned in the nonbridging position.

3. An electric switch as set forth in claim 1

wherein said stationary contacts are disposed generally in a plane parallel to the direction of rectilinear movement;

said bridging contact being confined in a recess in said actuator for pivotal movement in a plane perpendicular to the plane of said stationary contacts; said actuator a spring pivot means comprising an elongated coil spring guided in a hole in said actuator transverse to said stationary contact plane biasing said bridging contact intermediate its ends.

4. An electric switch as defined in claim 3 wherein said pivot means further include an elongated pin guided in said hole and urged by said spring into engagement with said bridging contact intermediate its ends.

5. An electric switch as set forth in claim 1

including at least four stationary contacts mounted on said housing and disposed generally in a plane parallel to the direction of rectilinear movement; said stationary contacts comprising first and second longitudinally spaced contacts and third and fourth longitudinally spaced contacts disposed in side-by-side relation;

first and second bridging contacts mounted on said actuator in side-by-side relation for rectilinear movement therewith; said first bridging contact being disposed for selective bridging engagement with said first and second stationary contacts, and said second bridging contact being disposed for selective bridging engagement with said third and fourth stationary contacts;

each of said first and third stationary contact having integral pivot means engaged by said bridging contacts; members; and spring pivot means on said actuator urging each of said bridging contacts into engagement with the respective stationary contacts.

6. An electric switch as set forth in claim a including three stationary contacts mounted on said housing in longitudinally spaced relation and disposed generally in a plane parallel to the direction of rectilinear movement; said bridging contact being maintained in continuous engagement with said one contact pivot means; and said boss of said bridging contact selectively engaging one of the other two stationary contacts responsive to the amount of rectilinear movement of said bridging contact from the new bridging position.

7. An electric switch and power control comprising

a housing; an actuator mounted for rectilinear movement relative to said housing;

at least two spaced stationary contacts mounted on said housing; an elongated bridging contact carried by said actuator for rectilinear movement therewith; for selective bridging engagement with said stationary contacts;

one of said stationary contacts defining integral contact pivot means said bridging contact being mounted on said actuator for pivotal movement relative to said contact pivot means; spring pivot means on said actuator opposing said stationary contact pivot means and continuously urging said bridging contact toward the stationary contacts; and

said bridging contact being movable between a nonbridging position, wherein said bridging contact is positioned relative to said pivot means to affect rotation of the contact out of engagement with the other of said stationary contacts, and the bridging position, wherein said bridging contact is positioned relative to said pivot means to effect rotation of the contact into engagement with the other stationary contact;

said elongated bridging contact having one end disposed for continuous sliding engagement with said contact pivot means, and having a boss at its other end for selective engagement with said other stationary contact;

said housing providing a transverse insulating boss between said spaced stationary contacts; and said bridging contact being maintained out of engagement with said insulating boss in all positions thereof;

power control circuit means including elongated resistor means mounted on said housing; a second contact movable rectilinearly with said actuator, having slide means engaging said resistor means and being movable through selective positions along said resistor means to provide a plurality of resistance values; and means electrically connecting said resistor means with one of said stationary contacts.

8. An electronic switch and power control as set forth in claim 10

wherein said stationary contacts are disposed generally in a plane parallel to a direction of rectilinear movement;

said bridging contact being confined in a recess in said actuator for pivotal movement in a plane perpendicular to the plane of said stationary contacts;

said spring pivot means comprising an elongated pin guided in a hole in said actuator transverse to said stationary contact plane and spring means urging said pivot pin into engagement with said bridging contact intermediate its ends.

9. An electric switch and power control as set forth in claim 7

including guide means on said housing for supporting and guiding the rectilinear movement of said second movable contact; and said second movable contact and said actuator having respective coating tab and recess means for effecting the rectilinear movement of said contact with said actuator.

10. An electric switch and power control as set forth in claim 7

wherein said resistor means comprises a pair of elongated resistor elements aligned and spaced longitudinally in a direction parallel to the direction of rectilinear movement; one end of each of said resistor elements being connected in said power control circuit means; and

wherein said second movable contact comprises a bridging contact having a pair of slide fingers for engagement with the respective resistor elements, defining a series connection between said resistor elements.

11. An electric switch and power control as set forth in claim 7

including a thick film printed circuit mounted on said housing; said resistor means being provided by an elongated resistor element formed on a surface of said thick film circuit.

12. An electronic switch and power control as set forth in claim 11

wherein said housing defines a cavity for confining said thick film circuit; and wherein said actuator is provided with a recess for accommodating a projecting boss of said second movable contact whereby said contact is moved rectilinearly with said actuator.

13. An electric switch and power control as set forth in claim 11

wherein said thick film circuit is provided with a pair of elongated resistor elements arranged on the surface thereof in longitudinal alignment; and wherein said second movable contact is provided with a pair of contact fingers each engaging one of said resistor elements, defining a series connection between said resistor elements.