March 24, 1936. J. BIERENFELD 2,034,938

SWITCH CONSTRUCTION

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Fig. 2

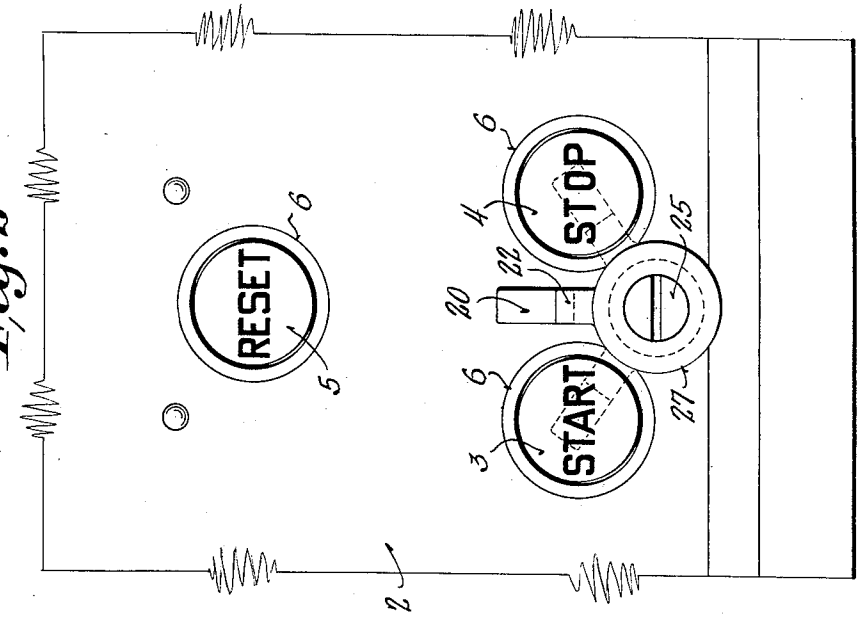
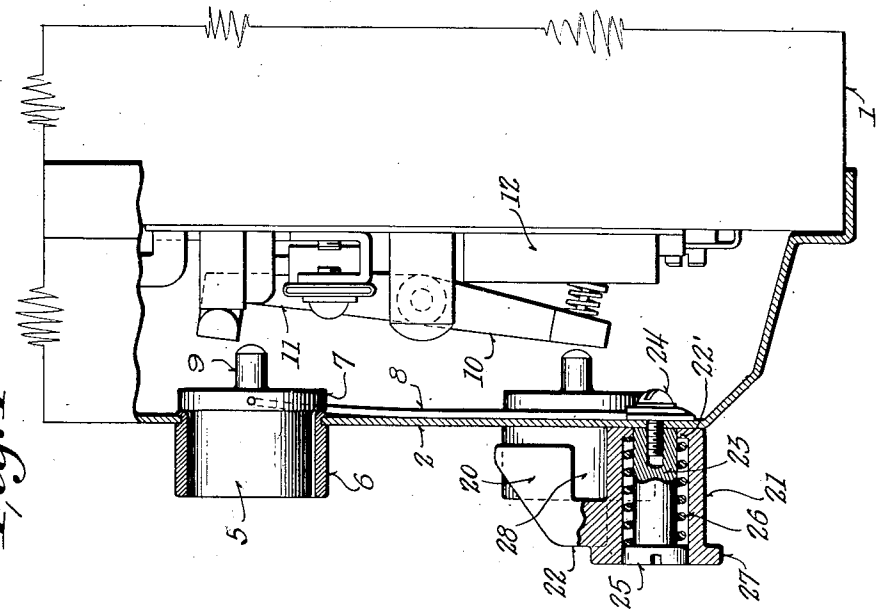


Fig. 1



INVENTOR
Josef Bierenfeld
BY
Arthur R. Woolfolk
ATTORNEY

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Fig. 5

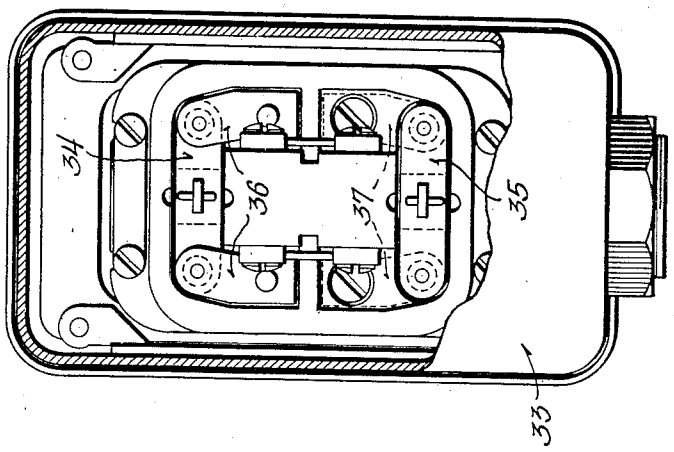


Fig. 4

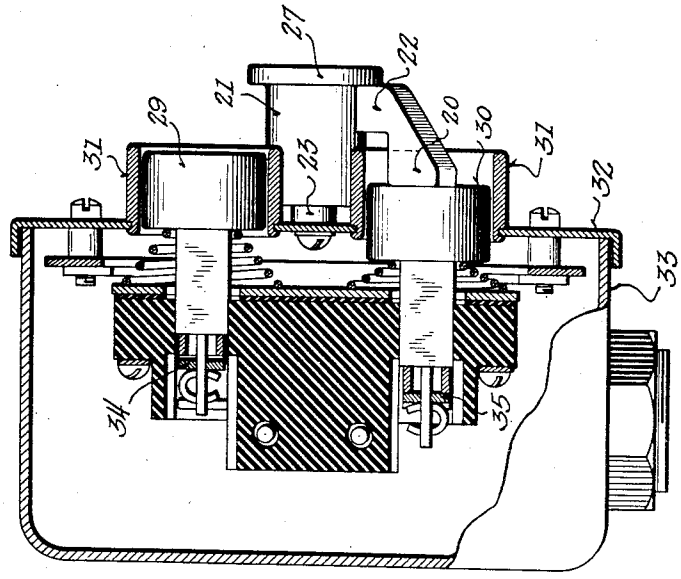
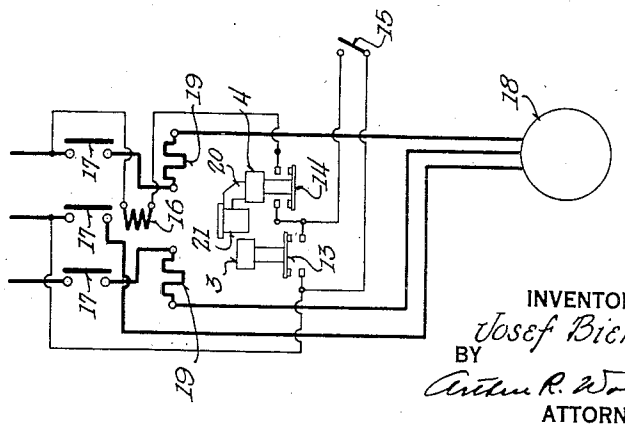


Fig. 3



INVENTOR
Josef Bierenfeld
BY
Arthur R. Woodford
ATTORNEY

UNITED STATES PATENT OFFICE

2,034,938

SWITCH CONSTRUCTIONS

Josef Bierenfeld, Milwaukee, Wis., assignor to Square D Company, Detroit, Mich.

Application July 16, 1934, Serial No. 735,384

3 Claims. (Cl. 200—5)

This invention relates to a switch construction and is particularly directed to a switch construction for use in control switches, such as automatic or manual starters or automatically controlled switches for motors or other translating devices.

In greater detail this invention is particularly related to push button type switch construction, such as those disclosed in the copending applications of Hermon L. Van Valkenburg for Automatic starters filed July 16, 1934, Serial No. 735,440, which matured into Patent No. 2,013,013 on September 3, 1935, and Push button switch filed March 14, 1934, Serial No. 715,451.

In motor starters or the like it is frequently the practice, whether the starter is automatic or manual, to provide additional automatic control such as a float or pressure operated switch which works in conjunction with the starter. It happens at times that it is desirable to either render the starter wholly inoperative, that is to say, to hold the starter control circuit permanently opened, or else to hold the starter control circuit permanently closed, irrespective of the operation of the automatic float, pressure, or other means. This has heretofore been accomplished by providing additional switching means which have to be wired up to the starter and which constitute separate and distinct installations and materially complicate the circuits and add to the expense.

This invention is designed to overcome the above noted defects and objects of this invention are to provide a switch construction, such as an automatic starter switch for instance, which is so made that it may be used in conjunction with automatic switch means and may be set to respond to the automatic switch means or may be set so that it can neither be opened nor closed by the automatic switch means and also so that it is unresponsive to any normal manual operation of the push buttons of the starter itself.

Further objects are to provide a construction such as outlined above which does not require any additional wiring or any additional switches whatsoever, but which is combined as a unitary portion with the control or starter switch itself and is permanently carried by the starter or control switch as a unitary portion thereof.

Further objects are to provide a switch construction which may be substantially instantly thrown into operation to lock the starter or control switch in the desired position, which may be readily returned to its inoperative position allowing the starter or control switch to function in its normal capacity, and which nevertheless takes up a very small amount of room on the starter or control switch and is relatively simple and inexpensive and easy to install or apply, so that it may be made as a permanent portion of the control switch starter or may be added to previously installed starters or control switches.

Embodiments of the invention are shown in the accompanying drawings, in which:—

Figure 1 is a fragmentary side elevation, partly in section, of an automatic starter showing the novel switch construction.

Figure 2 is a fragmentary face view of the structure shown in Figure 1.

Figure 3 is a diagrammatic view of the circuits employed with the starter shown in Figures 1 and 2.

Figure 4 is a sectional view showing the switch construction applied to another type of switch.

Figure 5 is a rear view of Figure 4, with parts broken away and in section.

Referring to the drawings, particularly Figures 1 and 2, it will be seen that a portion of a starter has been illustrated. This starter may be of the type disclosed in the above noted copending application (S. N. 735,440). It comprises a housing 1 provided with a cover 2 having start, stop, and reset push buttons 3, 4 and 5 respectively. Each of these push buttons comprises a cylindrical portion which is slidably carried within a metal sleeve 6 interlocking with the cover 2. Each push button is provided with a flanged inner portion 7 which limits the outward motion thereof, and the push buttons are urged outwardly by means of springs 8, one of which may be seen in Figure 1.

Each push button is provided with an inwardly projecting pin 9 which is adapted to engage the appropriate operating lever of the contactor. The lever for the start switch is indicated by the reference character 10 and the reset lever by the reference character 11, such levers being carried by the control switch block 12, though the specific form of the contactor may be varied.

Referring to the diagrammatic view of Figure 3, it will be seen that the start switch button controls the start switch 13 which is normally open, and the stop switch button controls the stop switch 14 which is normally closed, and additional control of an automatic nature may be provided, as indicated by the switch 15. This switch may be a float switch or a pressure responsive switch, or any other type of automatic or manual switch.

These three switches control the operating winding 16 of the contactor, the main switches of

the contactor being indicated by the reference character 17 in the conventional manner and controlling the circuit to a motor or other translating device indicated by the reference character 18 in a well known manner. If desired, thermal overload means, such as indicated diagrammatically at 19, may be provided.

The wiring diagram shown in Figure 3 is for a contactor which may be manually controlled or which may be automatically controlled by the automatic auxiliary switch 15. Under normal operations, the automatic switch 15 by opening or closing will control the action of the contactor, and consequently the operation of the motor 18. However, it is obvious that this automatic control may be dispensed with and rendered ineffective, provided the stop switch is held open, as shown for instance in Figure 3, thereby rendering the entire mechanism unresponsive and preventing operation of the motor, either upon manual depression of the start switch 3 or automatic closing of the switch 15. On the other hand, it may be desirable at times to have the motor run continuously, irrespective of the operation of the automatic switch 15. This may be readily accomplished by holding the start switch 13 closed.

The means for accomplishing these results without the use of additional wiring and additional switch parts consists of a button depressing or locking finger 20, see Figures 1, 2 and 3. This button depressing finger is joined to a cylindrical cup-shaped member 21 by means of a neck 22 so that the neck can overhang the sleeves 6, see Figure 2, when it is desired to place the finger on either the start or stop button. The sleeve 21 is provided with a bottom portion 22' which is apertured and receives the stud 23, which latter is locked as by means of the screw 24 of the cover 2 of the contactor.

This stud is provided with a headed outer portion 25 which fits within the interior of the sleeve 21. The helical spring 26 loosely surrounds the stud or pin 23 and bears at one end against the head 25 and at the other end against the bottom portion 22' of the sleeve 21 of the locking member, thus yieldingly holding the finger 20 in its innermost position. Normally, the finger 20 is positioned between the start and stop buttons, as shown in full lines in Figure 2.

When it is desired to lock the switch mechanism or starter in either open or closed position, it is merely necessary to grasp the cylindrical member 21 or the flange 27, see Figure 1, and pull such member outwardly against the action of the spring 26, thereafter rotating the tongue 20 over the appropriate button and releasing the hold on the cylindrical member 21, thus allowing the depressing finger to depress the appropriate switch button.

Inasmuch as this member is symmetrically placed with reference to the start and stop button, it is obvious that it may be rocked over either button and allowed to hold either button depressed, as shown in dotted lines in Figure 2. The cut-out portion 28, see Figure 1, formed beneath the yoke 22 provides room for the sleeve 6 in either position of the locking means, the yoke 22 merely extending over the sleeve and the finger 20 projecting downwardly into the sleeve 6 and holding the appropriate button 3 or 4.

In reality, therefore, this construction takes the place of or provides in effect a separate switching means which renders the automatic switch inoperative on the one hand and locks the starter in either open or closed position on the other without the use of any additional wiring whatsoever, as is obvious from an inspection of Figure 3 and from the preceding description.

This construction is not limited to any particular form of starter or switch, as other types of push button switches could be employed.

For instance, the form disclosed in the second mentioned copending application (S. N. 715,451) can be used. This is illustrated in Figures 4 and 5. It will be seen that the start button is indicated by the reference character 29 and the stop button by the reference character 30. These buttons are guided, as previously described, by means of the cylindrical sleeves 31 rigidly secured to the cover plate 32 of the control switch.

This invention is not limited to the particular form of switch or starter, as stated previously, and Figures 4 and 5 show the application of the invention to one of many other forms of switches. The switch mechanism in the form shown in Figures 4 and 5 is carried within a housing 33 and comprises a start switch whose movable contact is indicated at 34 and a stop switch whose movable contact is indicated at 35, and controlled respectively by the start and stop buttons 29 and 30. The locking member 21 is mounted directly on the cover 32, as previously described, and in the position shown in Figure 4 it has the depressing tongue 20 in engagement with the stop button 30 and holding such stop button open. The stationary contacts for the start switch are indicated in Figure 5 by the reference character 36 and the stationary contacts for the stop switch by the reference character 37.

It is apparent that this construction can be applied to other types of starters or control switches without departing from the spirit of the invention, and it will be seen that a very simple arrangement of parts accomplishes the function which was heretofore accomplished by means of additional wiring and additional switch parts.

It is obvious that it is sometimes desirable to work on the motor or other translating device without disconnecting the automatic control switch 15, see Figure 3.

Under these conditions, the stop switch is locked open, as shown in Figure 3. The motor or other translating device may be repaired, replaced, or inspected irrespective of the operation of the automatic switch 15, as the operation of this switch will now have no effect upon the contactor and consequently will have no effect upon the motor 18.

On the other hand, it may be desirable to run the motor, although the automatic switch is open. Under these conditions the finger 20 is moved to a position such that it will hold the start button 3 in switch closed position, so that the operation of the automatic switch 15 will have no effect upon other portions of the apparatus.

It will be seen that a very simple form of switch mechanism has been provided by this invention which greatly simplifies the wiring and avoids the necessity for additional switch elements.

It will be seen further that it in no way complicates the construction of the starter or control switch to which it is applied, and that it is simple and inexpensive to produce and apply.

Although this invention has been described in considerable detail, it is to be understood that such description is intended as illustrative rather than limiting, as the invention may be variously embodied and is to be interpreted as claimed.

I claim:

1. In a push button switch construction, the combination of a plurality of spaced switches, push buttons for operating said switches, sleeves surrounding said push buttons, a pivotally and reciprocally mounted depression finger having a projecting portion, and a spring urging said depression finger inwardly, said finger including a manipulable portion whereby said finger may be lifted axially against the action of said spring and rocked over the sleeve of a selected push button and allowed to descend to hold said push button depressed.

2. In a push button switch construction, the combination of a plurality of spaced switches, push buttons for operating said switches, a depression finger, a pin slidably and rotatably holding said depression finger, a spring normally holding said depression finger below the outer ends of said push buttons, and manually manipulable means forming a portion of said depression finger whereby said depression finger may be lifted against the action of the springs and placed over and in engagement with a selected push button to hold said selected push button depressed.

3. In a push button switch construction, a housing, a pair of switches mounted within said housing, push buttons projecting through said housing for operating said switches, said housing having a pair of sleeves projecting outwardly therefrom for guiding said push buttons, a depression finger for holding either of said push buttons in depressed position, a pivot pin for said depression finger, said depression finger being slidable axially upon said pivot pin and being rotatable about said pivot pin, a spring normally pressing said depression finger inwardly towards said housing and said depression finger having an overhanging portion of lesser dimensions than the diameter of said sleeves, said overhanging portion being normally positioned between said sleeves and being adapted to be lifted outwardly over either of said sleeves and positioned in engagement with a selected push button.

JOSEF BIERENFELD.