Oct. 11, 1938. T. W. BARLOW 2,133,160

SAFETY ELECTRIC CONTROL CONTACTOR

Filed Jan. 13, 1938 2 Sheets-Sheet 1

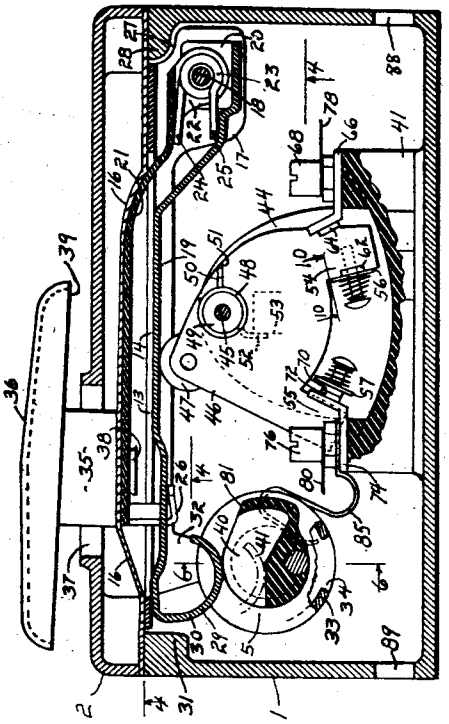


Fig. 3

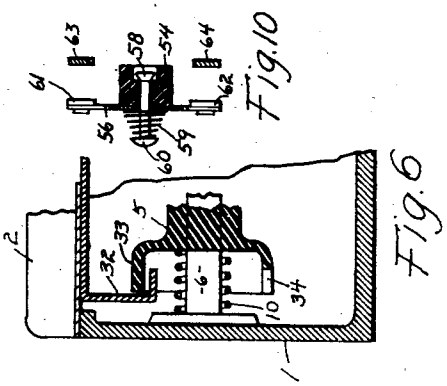


Fig. 10

Fig. 6

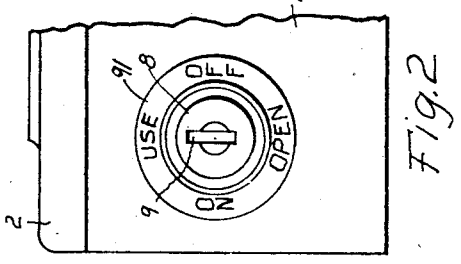


Fig. 2

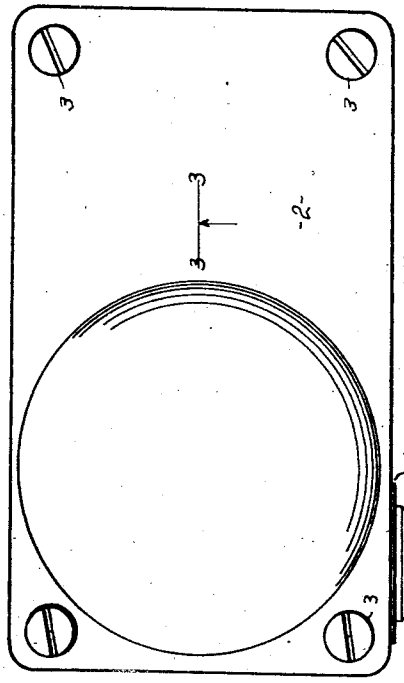


Fig. 1

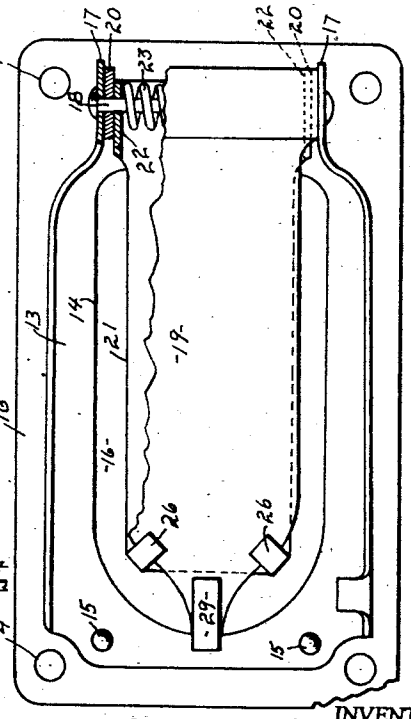


Fig. 4

INVENTOR.
Theodore W. Barlow.
BY Harry P. Caufield
ATTORNEY.

Oct. 11, 1938. T. W. BARLOW 2,133,160

SAFETY ELECTRIC CONTROL CONTACTOR

Filed Jan. 13, 1938 2 Sheets-Sheet 2

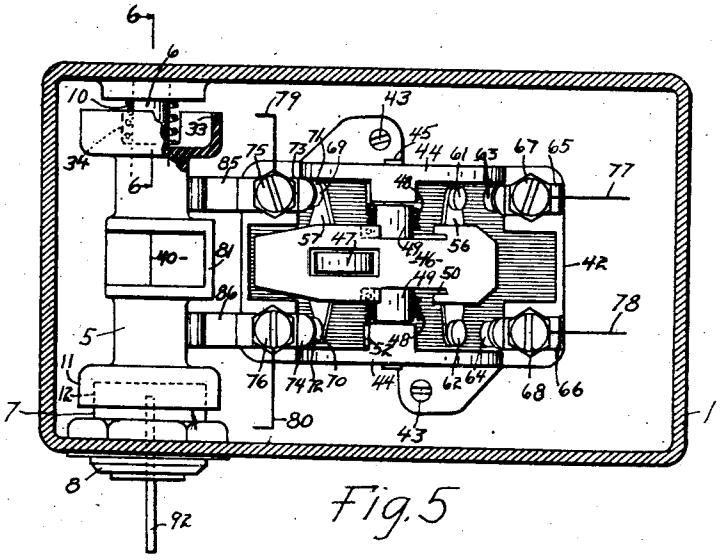


Fig. 5

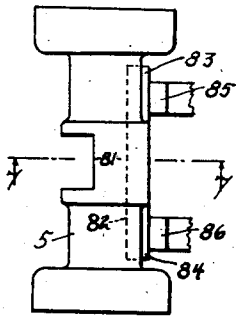


Fig. 8

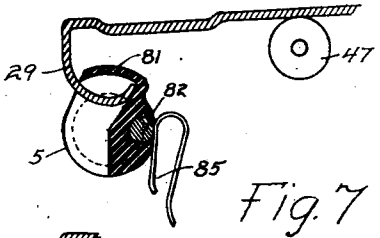


Fig. 7

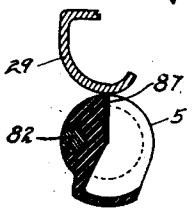


Fig. 9

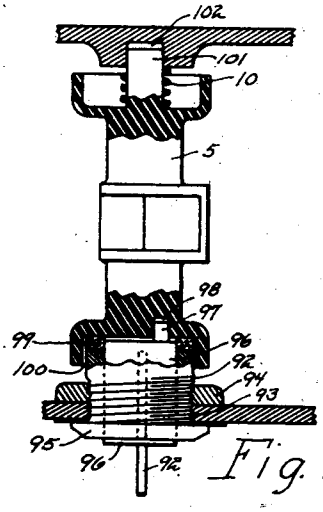


Fig. 11

INVENTOR.
Theodore W. Barlow
BY Harry P. Caufield
ATTORNEY.

Patented Oct. 11, 1938 2,133,160

UNITED STATES PATENT OFFICE

2,133,160

SAFETY ELECTRIC CONTROL CONTACTOR

Theodore W. Barlow, Detroit, Mich.

Application January 13, 1938, Serial No. 184,863

12 Claims. (Cl. 200—44)

This invention relates to electric control contactors.

In various ones of the arts electric contactors are employed by which an operator or a plurality of operators control the supply of power to a machine, power press, process, etc. Such contactors in general are well known and are sometimes of the push button type.

In some cases it is desirable to prevent the unauthorized use of such a contactor and to put it wholly out of use even against the wishes of the operator, for example to prevent the accidental operation of a machine while it is being worked upon.

In other cases it is desirable to insure or make necessary the use of the contactor or a plurality of like contactors, for example to insure that the hands of a machine operator or a plurality of operators are at the contactors and therefore out of danger of injury by the machine during the operation thereof.

In other cases it is desirable to insure that such a contactor will remain permanently operated so that an operator therefor may optionally be dispensed with.

It is also often desirable to prevent the unauthorized tampering with or adjustment of such contactors.

The present invention accomplishes the above described ends in a single structure. A contactor is provided having a handle or push button by which it may be operated; but may optionally be set to remain operated, or optionally set to remain inoperable independently of movement of the handle or push button.

Preferably but not necessarily the contactor parts are enclosed within a casing or housing having a door or cover provided with a lock and key, the handle or push button being external to the casing; and access to the contactor within the casing, as well as the setting of the contactor so that it may be operated, or so that it will remain inoperable, or so that it will remain operated, are under the control of the lock and key.

The primary object therefore of this invention is to provide a contactor by which any one of, or combination of, the above described functions and conditions of a contactor may be accomplished.

Another object is to provide a contactor having improved means by which it may be converted into an operable contactor, or a permanently operated contactor, or a permanently inoperable contactor, the object contemplating the effecting of such conditions singly or in combination.

Another object of the invention is to provide a contactor in which the improved means referred to in the preceding paragraph is a rotary drum having a plurality of different positions in which the said changes to one or more of the said conditions of the contactor may be effected in an improved manner.

Another object is to provide an improved contactor which may be converted from one condition to another as described above, and locked against unauthorized changes thereof in an improved manner.

Another object is to provide a contactor having means for converting it from one condition to another as described above and having locking means for locking it against unauthorized change, and locking means also locking shut a contactor-enclosing tamper-proof housing.

Another object is to provide an improved contactor which may be operated to open or to close an electric circuit by the turning of a lock by a key, the contactor remaining locked in open or closed condition upon removal of the key.

Another object is to provide an improved contactor controlling two electric circuits and normally maintaining one circuit closed, and the other open, and which may be operated to open the closed circuit and close the open circuit, and having means for optionally closing both circuits and maintaining them closed.

Other objects will be apparent to those skilled in the art to which my invention appertains.

My invention is fully disclosed in the following description taken in connection with the accompanying drawings, in which:

Fig. 1 is a top plan view of an embodiment of my invention;

Fig. 2 is a fragmentary front elevational view taken in the direction of the arrow 2 of Fig. 1;

Fig. 3 is a longitudinal sectional view of the embodiment of Fig. 1 taken approximately from the plane 3 of Fig. 1;

Fig. 4 is a view of the underside of a cover element and parts associated therewith of the embodiment of Figs. 1 and 3, the views being taken approximately from the plane 4—4—4 of Fig. 3;

Fig. 5 is a top plan view of the embodiment of Figs. 1 and 3 with the said cover element of Fig. 4 removed and with the wall of a housing element thereof shown in section;

Fig. 6 is a fragmentary sectional view taken from the plane 6—6 of Fig. 3, and the view may also be considered as taken from the plane 6—6 of Fig. 5;

Fig. 7 is a fragmentary view of a part of Fig.

3 with operative parts thereof in different positions and the view may also be considered as taken from the plane 7—7 of Fig. 8;

Fig. 8 is a fragmentary view similar to part of Fig. 5, with operative parts thereof in different positions and in the same position as the parts of Fig. 7;

Fig. 9 is a fragmentary view similar to Fig. 7 with the operative parts thereof in still another position;

Fig. 10 is a fragmentary sectional view taken from the plane 10—10 of Fig. 3.

Fig. 11 is a view of an operative part shown in Fig. 5, but illustrating a modification thereof and illustrating in more detail a lock device which I may employ.

Referring to the drawings, I have shown at 1 a housing in the form of an upwardly open box, and at 2 a cover for the box and forming, in association therewith, a substantially closed housing. The cover 2 may be secured to the box 1 by screws 3—3 in a well known manner, the screws being projected through perforations 4—4 in the cover and threaded into suitable corner bosses in the upper portion of the box 1, not completely shown to avoid complication in the drawings.

A rotary barrel 5, which performs a number of functions to be described, is mounted transversely of the box 1 adjacent to one end thereof. One end of the barrel 5 rotates upon a trunnion 6 secured upon the adjacent side wall of the box 1 and the opposite end of the barrel is supported upon and connected to a rotary element 7 of a lock 8 mounted upon the side wall of the box 1 at a point opposite the trunnion 6. To turn the barrel 5, a key 92 must be inserted in a keyhole 9 of the lock 8 to turn the lock part 7 and the key thus constitutes the only means by which the barrel 5 may be rotated, the barrel 5 being locked by the lock against rotation when the key is withdrawn. It is believed unnecessary to illustrate the inner part of such a lock, the same being well known. The barrel may be secured to the lock part 7 in any suitable manner, one means being a spring 10, Figs. 5 and 6, which holds the barrel toward the lock and maintains a sleeve 11 of the barrel in telescopic relation with the lock part 7, as at 12, the sleeve and lock part being formed so as to be non-rotatable relatively.

The cover 2 has secured on its under side a plate 13 having a large opening 14 in the central part thereof. The plate 13 is riveted by rivets 15—15 to the under side of the cover 2 and a diaphragm 16 of flexible material such as leather is disposed between the plate 13 and the cover 2 before it is riveted thereto, so that when the cover 2 is secured upon the box 1 by the screws 3—3 as described, the diaphragm will seal all of the parts within the box and under the diaphragm.

The plate 13 has depending therefrom laterally spaced ears 17—17, through aligned perforations in which a transverse bearing pin 18 is disposed. A sheet metal contactor-actuator 19 is mounted to hingingly move on the pin 18, having at a rearward portion thereof ears 20—20 bent upwardly therefrom and provided with aligned perforations through which the pin 18 is projected. A push button support 21 is also hingingly mounted upon the pin 18, the support 21 being disposed above the pin 18 and having depending ears 22—22 thereon through aligned perforations in which the pin 18 is projected. A spring 23 is wound around the pin 18 and one end 24 thereof engages the underside of the push button support 21 and the other end 25 thereof engages the upper side of the actuator 19 tending to move them apart.

The support 21 has a pair of depending hooks 26—26 the lower ends of which are bent inwardly under the actuator 19 in forward portions thereof, so that the movement apart of the actuator 19 and the support 21 is limited and stopped by the hooks 26. By this means they are free to hingingly move toward each other by the yielding of the spring 23, or may hingingly move in unison, with the actuator 19 in engagement with the hooks 26—26, for purposes to be described.

Means is provided to lock the cover 2 on the box 1, under control of the lock even if the screws 3—3 have been removed. To this end the ears 17—17 on the plate 13 have notches 27—27 formed therein under an inwardly extending flange 28 on the rearward end wall of the box 1; and, the ears 17—17 being secured to the plate 13 and the plate being secured to the cover 2, the rear end portion of the cover cannot be raised to remove it from the box without first giving it a forward movement, toward the left, as viewed in Fig. 3. On the forward end portion of the actuator 19 is a depending hook 29 having a generally vertical portion 30 disposed adjacent to a flange 31 on the box and the engagement of the hook portion 30 with the flange 31 will stop forward motion of the cover before it has moved sufficiently to remove the notches 27—27 from under the flange 28 referred to, so that before the cover 2 can be removed the forward end portion thereof must be raised sufficently to permit the hook 29 to be moved forward over the top of the flange 31, and it follows that if the forward portion of the cover be held downwardly the hook 29 cannot be so raised and the cover cannot be removed. To thus prevent the forward end of the cover from being raised, a hook 32, integral with the plate 13, Figs. 3, 4 and 6, depends therefrom, the lower end of the hook 32 hooking under a flange 33 on the end of the barrel 5 adjacent its bearing trunnion 6.

In order at will to remove the cover 2 to give access to parts to be described within the box 1, the key must be inserted in the lock and the lock turned, turning the barrel 5 through 180° from the operative position illustrated. This will rotate a recess 34 in the flange 33 until it comes opposite the hook 32, and then the forward end of the cover 2 may be raised, the hook passing upwardly through the recess 34 and when the hook 29, above referred to, has thereby been raised sufficiently to ride over the flange 31 of the box, the cover may be moved forwardly to remove the notches 27—27 from under the flange 28, and then the cover may be removed.

Thus one of the functions of the lock 8 and the barrel 5 is to lock the cover on the box to prevent unauthorized removal thereof and tampering with the parts within the box to be described, including the barrel itself.

Secured to the upper side of the support 21 is the cylindrical stem 35, a push button 36, the stem projecting inwardly through the cover 2 through a relatively large perforation 37 therein, the push button 36 being of large diameter, suitable to be operated to push it downwardly by a blow or by pressure from the hand or palm of the operator. The stem 35 clamps the diaphragm 16 between it and the support 21 and may have a portion of reduced diameter 38 projected through perforations in the diaphragm and in the support and riveted over on the underside of the support. By this arrangement the diaphragm prevents the entrance

of dust or foreign matter through the perforation 37 to the parts under the diaphragm.

When the push button 36 is depressed it rocks the support 21 counter-clockwise as viewed in Fig. 3, and if at that time, in a manner to be described, the actuator is free to move, the support 21 and actuator 19 move downwardly in unison. If, however, for reasons to be described the actuator 19 is prevented from moving downwardly the support 21 may move downwardly against the tension of the spring 23 as described without transmitting the blow or pressure which may have been given to the push button 26 to the actuator 19 with the possibility of injuring it and parts associated therewith; and in any case, the downward movement of the push button 36 is stopped and the blow given thereto absorbed by the striking of the lower face 39 of the push button upon the upper side of the cover 2. Thus no matter how violently the push button is operated it cannot injure parts within the housing.

When the barrel 5 is in the position illustrated in Figs. 3 and 5, a recess 40 on the barrel is disposed directly under the hook 29 so that when the push button 36 is depressed, the contactor actuator 19 will be depressed, being moved downwardly by the tension of the spring 23 with a predetermined amount of cushioned force, the hook in its lower position being indicated in broken lines at 41, and this downward movement of the actuator 19 is utilized to operate a contactor which will now be described.

A contactor base 42 of insulating material is secured upon the bottom of the box by screws 43—43, Fig. 5. Preferably integral with the base 42 are upstanding laterally spaced sides 44—44 through which a shaft 45 extends. Upon this shaft is oscillatably supported a contact carrier 46, Figs. 3 and 5, having rotatably mounted thereon a roller 47 maintained in contact with the underside of the intermediate portion of the actuator 19, as shown in Fig. 3, by yieldable resilient means tending to rotate the contact carrier 46, clockwise, as viewed in Fig. 3. The resilient means preferably comprises a pair of springs 48—48 wound around trunnions 49—49 projecting laterally from opposite sides of the carrier 46 and through which the shaft 45 extends, one end 50 of each spring being lodged on a shoulder 51 on the carrier and the other end 52 being lodged against a shoulder 53 on the adjacent one of the sides 44.

The contact carrier has a pair of longitudinally spaced depending arms 54 and 55 each of which carries a contact bridging bar 56 and 57, the preferred mounting for the bar being shown for the bar 56, in Fig. 10, wherein a pin 58 is secured in the arm projecting inwardly therefrom; the pin is telescoped through a perforation in the bar 56, and a spring 59 abuts at one end upon the head 60 of the pin and at the other end upon the bar, resiliently holding the bar against the arm 54, but permitting the bar to yield toward the pin head when the arm 54 moves to engage contacts 61 and 62 on the bar with stationary contacts 63 and 64. The contacts 63 and 64, Figs. 3 and 5 are mounted on metal pieces 65 and 66 on the base 42 and terminal nuts 67 and 68 are provided for making electrical connection thereto. The contacts 69 and 70 on the bar 57 may similarly make engagement with contacts 71 and 72, the latter being mounted on metal pieces 73 and 74 having terminal nuts 75 and 76 associated therewith to which electric connections may be made.

Circuit wires 77, 78, 79, 80 are shown connected to the terminal nuts respectively, 67, 68, 75 and 76.

As will now be apparent, a circuit connected to the wires 79 and 80 will normally be closed through the engaged contacts 69 and 71 and 70 and 72; and when the push button 36 is depressed, depressing the actuator 19, it will act through the roller 47 and oscillate the carrier 46 counter-clockwise, as viewed in Fig. 3, and disengage the said contacts opening the said circuit and by engaging the contacts 61—63 and 62—64 will close the circuit of the wires 77 and 78.

Thus another function of the barrel 5 is provided, namely, to permit the closing of a circuit 77—78 and the opening of a circuit 79—80, by operation of the push button 36. Obviously, if one of the bars 56 or 57 be omitted, then the only operation would be to close the circuit 77—78 or to open the circuit 79—80 when the push button is operated.

After the contactor has been operated as above described by rocking the carrier 46 counter-clockwise, as viewed in Fig. 3, it may be locked so that it will remain in that position. To accomplish this, the push button 36 is depressed to operate the contactor which places the hook 29 in the broken line position 41, Fig. 3, and the key is inserted in the lock and turned counter-clockwise through 90°. A flange 81 on the drum 5 is thereby rotated around until it overhangs the end of the hook, the parts then being in the position shown in Fig. 7. The actuator 19 is thereby held downward in the contactor operating position, maintaining the contactor operated. It is therefore another function of the drum to lock the contactor in operated position.

Still another function of the drum will now be described. In some cases it may be desired, in effect, to eliminate entirely the functions of the device, that is to say, to close both circuits 77—78 and 79—80, and to lock them closed. To this end the circuit 77—78 is closed as described above and the drum 5 is rotated to lock the actuator 19 in its downward position; and auxiliary contacting means is provided which at the same time will close and maintain closed the circuit 79—80. This means, in the embodiment illustrated, comprises a metal bar 82, embedded in the material of the barrel 5 and having end portions 83 and 84 projecting laterally therefrom; and a pair of spring-type contacts 85 and 86 are connected to the metal pieces 73 and 74 on the base 41 and normally, resiliently pressed against the side of the barrel 5, and the spring contacts and bar end portions 83 and 84 are so disposed that when the barrel is rocked into the said locked position, the spring contacts engage the bar and complete an electric circuit therethrough.

Another function of the barrel 5 is to prevent any operation of the device and to lock it in such condition, and to this end the barrel 5 is provided with a solid portion 87 which, by inserting the key and rotating the lock and the barrel, may be brought directly under the hook 29, as shown in Fig. 9.

By this means, when the push button 36 is depressed, the push button support will be depressed and the push button 36 will be stopped upon the top of the cover 2, but the actuator 19 will be held up and no operation of the contactor will result.

The walls of the box 1, for example the end walls thereof Fig. 3, may be provided with perforations as those shown at 88 and 89 through

which electric wires may be conducted to the terminals. Such outlets may be of usual, or any preferred, construction, constituting no essential part of the invention, and being well known.

In Fig. 11, I have shown in some detail the lock for locking the barrel 5 to the box 1. A tubular, externally threaded lock shell 92 is projected through a perforation 93 in the wall of the box and has a nut 94 on the threads which, cooperating with a flange 95 on the shell clamps the wall therebetween to mount the shell on the box wall. The cylindrical lock plug 96, rotatable within the shell by the key 92 has an eccentrically located pin 97 thereon projecting into a recess 98 in the barrel to turn the barrel when the plug is rotated. A leather or like sealing washer 99 is disposed between the inner end of the shell and the bottom of a recess 100 in the barrel. The spring 10 effects pressure engagement between the washer and recess bottom and shell end. In the modification illustrated in this figure, a coaxial trunnion 101 is formed on the barrel and projects into a recess or bore 102 in the box wall.

From the foregoing it will now be clear that I have provided a contactor device, comprising a contactor operating element or handle, which in the preferred form is a push button; and have arranged a contactor which can be operated thereby; and have provided a lock mechanism by which the contactor can be operated by the push button; can be rendered inoperative thereby, or can be operated and locked in operated position; and I have provided means also by which the operative parts are entirely enclosed in a dust and dirt proof enclosure or housing which may be locked closed to prevent unauthorized access thereto; and while all of these functions are combined in a single device, it will be apparent that any one or any combination thereof may be provided and utilized optionally.

The four portions of the drum above described are indicated upon a dial 91, associated with the lock 8, by the following legends: "Use", when the key is turned to that position, indicates that the contactor may be operated by the push button; "Off" indicates the position in which the contactor cannot be operated; "On" indicates that the contactor has been operated and locked in that condition; and "Open" indicates that the drum is in position to permit the cover to be removed.

In some cases it may be desired to utilize the device above described merely to close or open a circuit, such as that comprising the wires 75 and 76, and to leave the circuit locked in closed or open position. To that end the push button 36, and actuator 19 and carrier 46 may be omitted. Then when the key is inserted in the lock it may rotate the barrel 5 to bring the bridging bar 82 into position to either engage or disengage the spring contacts 55 and 86 to respectively close or open the circuit 75—76 and when the key is withdrawn the barrel being locked in position will maintain the said circuit condition against unauthorized change.

The barrel 5 when utilized in this manner as well as in the more comprehensive manner described above is in ecect a selector element and may have other forms than the barrel form illustrated herein. In this respect and in other respects as well my invention is not limited to the exact details of construction illustrated and described. Changes and modifications may be made, within the spirit of my invention without sacrificing its advantages and within the scope of the appended claims.

I claim:

1. In an electric contactor construction, a main frame, two sets of contacts on the frame, an oscillatable carrier carrying contacts engageable with the sets of contacts respectively when oscillated in one direction or the other, a spring means maintaining the carrier yieldably oscillated in one direction, a contactor operating element movably supported on the frame, a handle for moving the contactor operating element, to oscillate the carrier in the other direction, a rotary barrel on the frame carrying an abutment which in one rotative position of the barrel is disposed in the path of the contactor operating element to prevent movement thereof and corresponding oscillatory movement of the carrier thereby, and in another position permits movement of the contactor operating element, lock means associated with the contactor operating element and the barrel engageable in another rotative position of the barrel, to lock the contactor operating element in carrier oscillated position, a cover for the contactor, locking means on the cover and barrel engaged to lock the cover on the frame in all three said rotative positions, and disengageable to unlock it upon rotation of the barrel to a fourth position.

2. In an electric contactor construction, a housing, a push button external to the housing having a stem projecting into the housing, a reciprocable member in the housing normally reciprocated in one directios by spring means and reciprocable in the other direction by the push button stem, contact means carried by the reciprocable member, a first and a second pair of contacts in the housing, the first pair being normally bridged by the contact means and upon reciprocation of the reciprocable member by the push button stem the first pair being unbridged and the second pair being bridged, means comprising an element manually movable from outside the housing to hold the second pair bridged independently of the push button stem and auxiliary contact means operated by movement of the manually movable element to effect bridging of the first pair of contacts.

3. In an electric contactor construction, a housing, a push button external to the housing having a stem projecting into the housing, a reciprocable member in the housing normally reciprocated in one direction by spring means and reciprocable in the other direction by the push button stem, contact means carried by the reciprocable member, a first and a second pair of contacts in the housing the first pair being normally bridged by the contact means and upon reciprocation of the reciprocable member by the push button stem the first pair being unbridged and the second pair being bridged, a rotary element extending into the housing and rotatable from outside the housing, means associated with the rotatable element and the reciprocable member by which when the reciprocable member has been reciprocated by the push button stem to bridge the second contacts the rotary member may be rotated to a position in which it holds the reciprocable member reciprocated independently of the push button stem, and auxiliary contact means associated with the rotary element and operated by said rotary movement thereof to bridge said first pair of contacts.

4. In an electric contactor construction, a housing, a push button external to the housing having

a stem projecting into the housing, a spring retracted arm pivoted in the housing and movable by the stem, an oscillatable element supported in the housing and retracted in one oscillatory direction by spring means and movable in the other direction by the arm, and carrying bridging contacts, a first and a second pair of contacts in the housing alternately bridged by the bridging contacts upon oscillatory movement of the oscillatable element, the first pair being normally bridged, a rotary barrel in the housing manually rotatable from outside the housing, interengaging latch means on the barrel and arm by which upon rotating the barrel to a predetermined position the arm and oscillatable element may be latched in a position in which the second pair of contacts is bridged and the first pair unbridged, and auxiliary contacts on the barrel and housing engageable upon said rotation of the barrel to said position to bridge the first pair of contacts.

5. In an electric contactor construction, a housing, a push button external to the housing having a stem projecting into the housing, a spring retracted arm pivoted in the housing and movable by the stem, an oscillatable element supported in the housing and retracted in one oscillatory direction by spring means and movable in the other direction by the arm, and carrying bridging contacts, a first and a second pair of contacts in the housing alternately bridged by the bridging contacts upon oscillatory movement of the oscillatable element, the first pair being normally bridged, a rotary barrel in the housing manually rotatable from outside the housing, interengaging abutment means on the barrel and arm by which upon rotation of the barrel to a predetermined position the arm is prevented from being moved by the push button stem.

6. In an electric contactor construction, a housing, a push button external to the housing having a stem projecting into the housing, a reciprocable member in the housing normally reciprocated in one direction by spring means and reciprocable in the other direction by the push button stem, contact means carried by the reciprocable member, a first and a second pair of contacts in the housing the first pair being normally bridged by the contact means and upon reciprocation of the reciprocable member in said other direction by the push button stem, the first pair being unbridged and the second pair being bridged, manually operable auxiliary contact means for bridging the first pair of contacts, and means comprising an element manually movable from outside the housing to hold both pairs bridged independently of the push button.

7. In an electric contactor construction, a main supporting frame, a first and a second pair of contacts, a reciprocable member reciprocable in one direction by spring means and in the other direction by a handle and carrying contact bridging means to bridge the first and second pairs of contacts respectively when reciprocated, auxiliary bridging means manually movable to bridge the first contact pair, a lock comprising a lock-barrel normally locked to the frame against rotation and releasable by a key and when released being manually rotatable, means associated with the barrel rendered effective by rotation of the barrel to hold the reciprocable member in the reciprocated direction to bridge the second pair of contacts and to also hold the auxiliary bridging means in position to bridge the first pair of contacts.

8. In an electric contactor construction, a main supporting frame, a first and a second pair of contacts, a reciprocable member reciprocable in one direction by spring means and in the other direction by a handle and carrying contact bridging means to bridge the first and second pairs of contacts respectively when reciprocated, auxiliary bridging means manually movable to bridge the first contact pair, a lock comprising a lock-barrel normally locked to the frame against rotation and releasable by a key and when released being manually rotatable, means associated with the barrel operated by rotation of the barrel to hold the reciprocable member in the reciprocated direction to bridge the second pair of contacts and to also hold the auxiliary bridging means in position to bridge the first pair of contacts.

9. In an electric contactor construction, a main frame, a first and a second pair of contacts, a reciprocable member reciprocable in one direction by spring means and in the other direction by a handle and carrying contact bridging means to bridge the first and second pairs of contacts respectively when reciprocated, auxiliary bridging means manually movable to bridge the first contact pair, a lock comprising a lock-barrel normally locked to the frame against rotation and releasable by a key and when released being manually rotatable, means associated with the barrel rendered effective by rotation of the barrel to one position to hold the reciprocable member in the reciprocated direction to bridge the second pair of contacts and other means associated with the barrel and rendered effective by rotation of the barrel to another position to prevent reciprocation of the reciprocable member.

10. In an electric contactor construction, a housing, a cover closing the housing, a first and a second pair of contacts in the housing, a reciprocable member in the housing reciprocable in one direction by spring means and in the other direction by a handle exterior to the housing and carrying contact bridging means to bridge the first and second pair of contacts respectively when reciprocated, auxiliary bridging means manually movable to bridge the first contact pair, a lock comprising a lock-barrel normally locked to the frame against rotation and releasable by a key and when released being manually rotatable, means associated with the barrel rendered effective by rotation of the barrel to a predetermined position to hold the reciprocable member in the reciprocated direction to bridge the second pair of contacts and latch means associated with the barrel and operated by rotation of the barrel and effective in said predetermined position thereof to latch the cover on the housing.

11. In an electric contactor construction, a housing, a cover closing the housing, a push button external to the housing having a stem projecting into the housing, a reciprocable member in the housing normally reciprocated in one direction by spring means and reciprocable in the other direction by the push button stem, contact means carried by the reciprocable member, a first and a second pair of contacts in the housing, the first pair being normally bridged by the contact means and upon reciprocation of the reciprocable member by the push button stem the first pair being unbridged and the second pair being bridged, means comprising an element manually movable from outside the housing to a position to hold the second pair bridged, auxiliary contact means operated by movement of the manually movable element to said position to effect bridging of the first pair of contacts and latch

means operated by movement of the manually movable element and effective in said position thereof to latch the cover on the housing.

12. In an electric contactor construction, a housing, a push button external to the housing having a stem projecting into the housing, a reciprocable member in the housing normally reciprocated in one direction by spring means and reciprocable in the other direction by the push button stem, contact means carried by the reciprocable member, a first and a second pair of contacts in the housing, the first pair being normally bridged by the contact means and upon reciprocation of the reciprocable member by the push button stem, the first pair being unbridged and the second pair being bridged, means comprising an element manually movable from outside the housing to hold the second pair bridged in one position of the movable element and auxiliary contact means operated by movement of the manually movable element to said position to effect bridging of the first pair of contacts and means rendered effective by movement of the manually movable element to another position to prevent reciprocatory movement of the reciprocable element.

THEODORE W. BARLOW.