Jan. 13, 1959 A. S. CASWELL 2,868,330

AUXILIARY SPRING CLOSING DEVICE

Filed March 29, 1957

4 Sheets-Sheet 1

FIG. 1

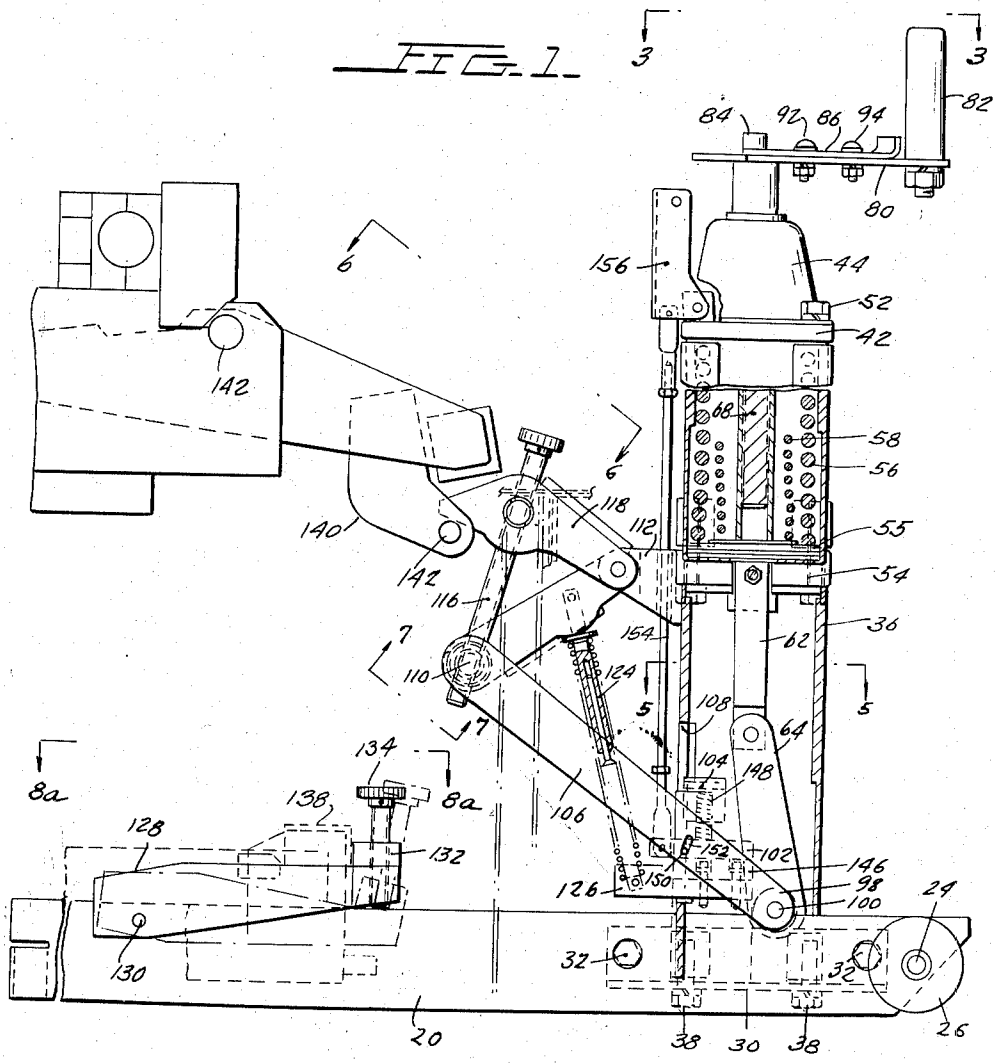


FIG. 5

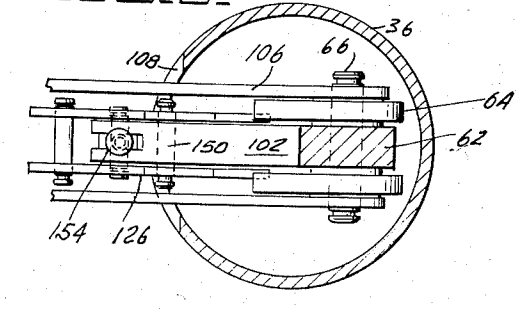
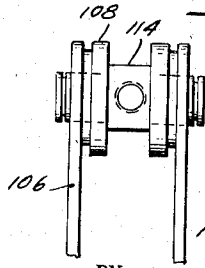


FIG. 7



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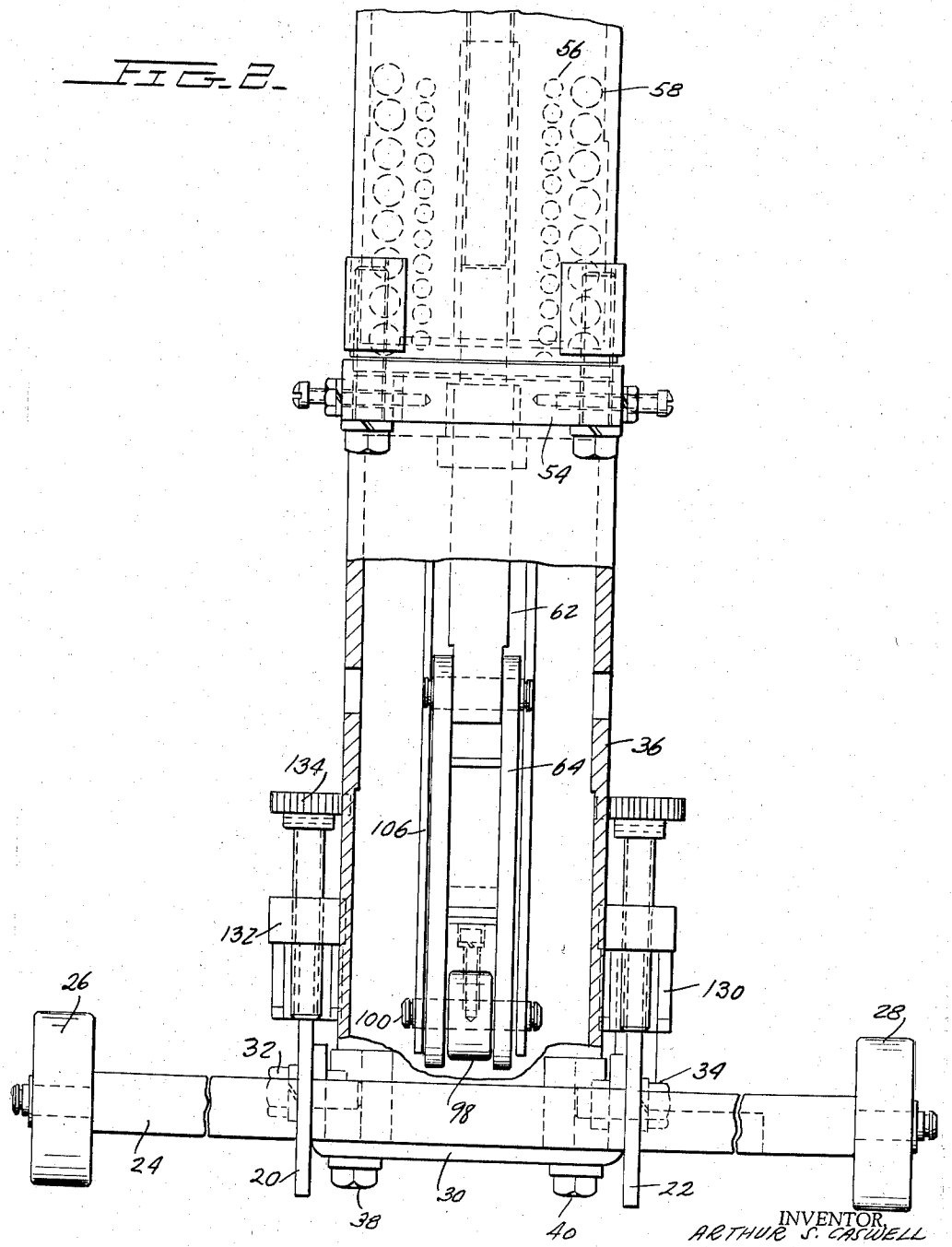
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AUXILIARY SPRING CLOSING DEVICE

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4 Sheets-Sheet 2

FIG. 2.



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AUXILIARY SPRING CLOSING DEVICE

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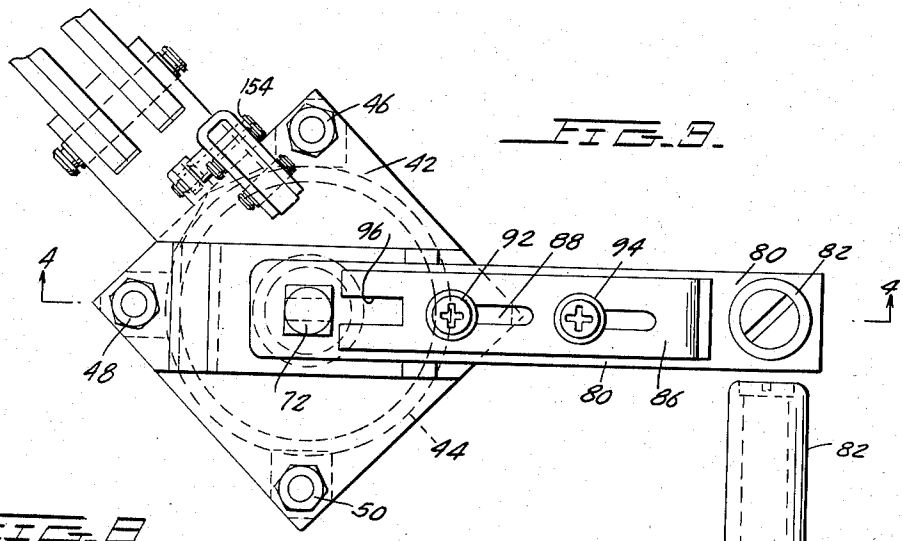


FIG. 3.

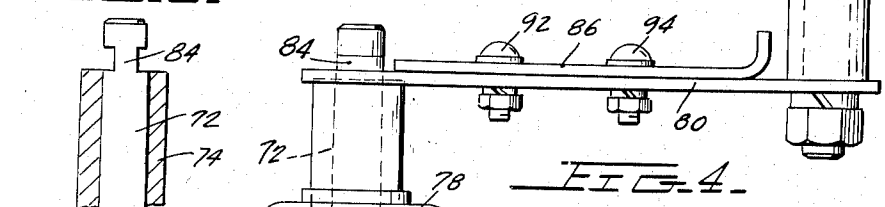
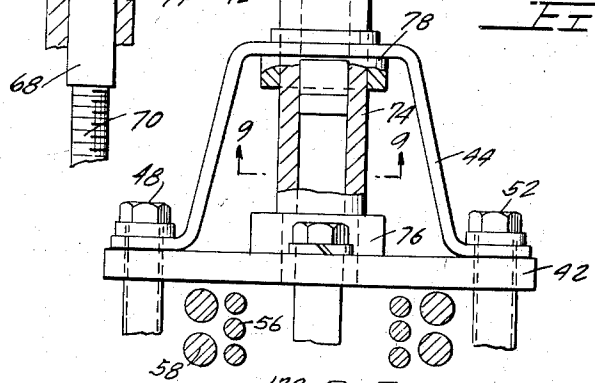


FIG. 4.



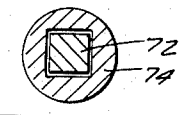


FIG. 9.

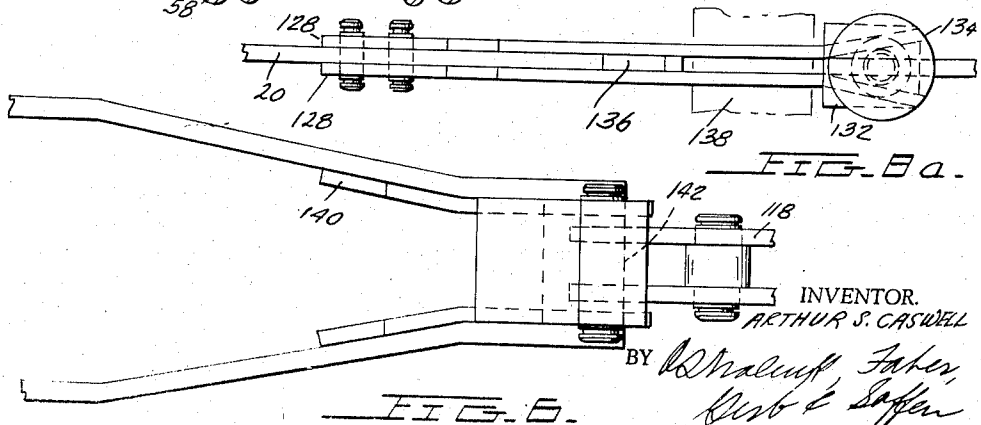


FIG. 8a.

FIG. 8.

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AUXILIARY SPRING CLOSING DEVICE

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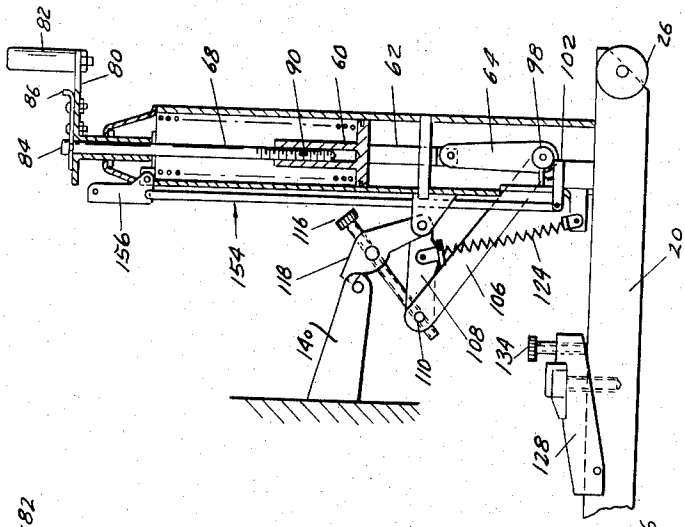


FIG. 12.

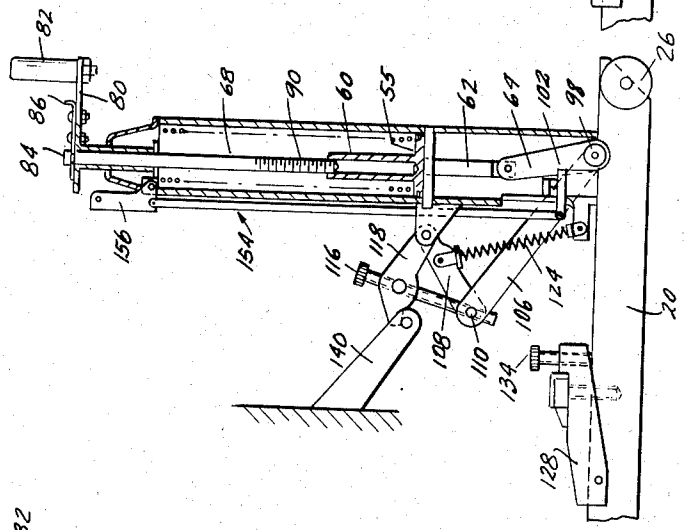


FIG. 11.

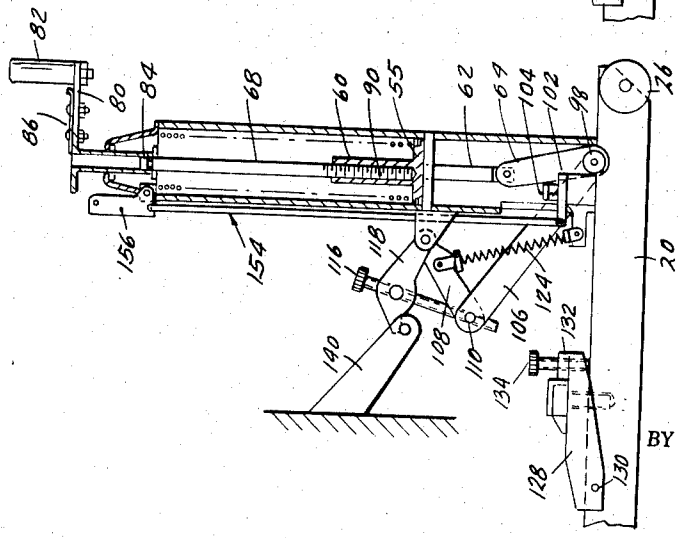


FIG. 10.

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2,868,330

AUXILIARY SPRING CLOSING DEVICE

Arthur S. Caswell, Glenside, Pa., assignor to I-T-E Circuit Breaker Company, Philadelphia, Pa., a corporation of Pennsylvania

Application March 29, 1957, Serial No. 649,521

17 Claims. (Cl. 185—37)

My invention relates to an auxiliary closing device for electric circuit breakers and, more particularly, to an auxiliary closing device which can close and latch a power circuit breaker against an energized power line.

In certain situations the electrical control power normally relied on for the closing of a circuit breaker may be unavailable. Frequently, during such situations, it is necessary that the breaker be closed against an energized line in order to restore service over the line. Because of the high magnetic opposing forces which may be produced when a large circuit breaker is closed against an energized high power line, it is neither practical nor safe to rely upon a manually operated device for such closing operation. For properly performing such a closing operation the device relied upon must be capable of imparting to the contacts of the breaker such force and speed to drive the contacts closed at high speed even against short circuit forces.

In the past auxiliary circuit breaker closing devices have been provided which usually relied on a compressed gas in some form wherein the energy stored or imparted to the compressed gas is subsequently transferred to the mechanical linkages for operating the circuit breaker contact.

This, however, introduces problems in gasketing and careful maintenance because of the inherent properties of the compressed fluids.

The principal object of my invention is to provide a novel auxiliary closing device which utilizes the stored power of a spring wherein the spring can be easily charged and can be discharged from a remote point when connected to the circuit breaker.

Another important object of my invention is to provide a novel spring closing device which is easily connected to a circuit breaker and requires no outside source of power.

Another object of my invention is to provide a novel auxiliary spring closing device which must be fully ers which utilizes mechanical linkages only, and does not require the use of compressed fluids.

Another object of my invention is to provide a novel spring closing device which is connectable to a circuit breaker for closing thereof, is contained within a single assembly, and may be remotely operated.

A still further object of my invention is to provide an auxiliary spring closing device which must be fully charged before it can be operated.

These and other objects of my invention will become apparent from the following description when taken in connection with the drawings in which:

Figure 1 shows my novel invention in a partially section and partially plan view.

Figure 2 is a front view of Figure 1 partially in section and partially in plan view.

Figure 3 is a top view of Figures 1 and 2 and particularly illustrates the operating crank mechanism.

Figure 4 is a view of Figure 3 when taken across the

lines 4—4 and particularly illustrates the latching mechanism.

Figure 5 is a cross-sectional view of Figure 1 when taken across the lines 5—5.

Figure 6 is a top view of the output link of my novel mechanism when it is in position to engage the manual operating arm of the circuit breaker.

Figure 7 shows the pivotal connection between two of the operating links of my novel device.

Figure 8 shows a side view of the latch shaft utilized in my invention.

Figure 8*a* shows the top view of the anchor mechanism of Figures 1 and 2 for fastening my novel spring closing device to a circuit breaker which is to be operated.

Figure 9 is a fragmentary view taken across the lines 9—9 of Figure 4 and particularly illustrates the manner in which the latch shaft cooperates with the operating crank mechanism.

Figure 10 schematically illustrates my novel invention when the circuit breaker is in its closed position and the spring is discharged.

Figure 11 illustrates the device of Figure 10 when the latch shaft is moved to a latched position and prior to the charging of the spring.

Figure 12 is similar to Figures 10 and 11 and shows my novel spring closing device with the spring in the fully charged position prior to tripping of the closing device and operation of the circuit breaker.

Referring now to Figures 1 and 2, my novel auxiliary spring closing device is mounted on floor runners **20** and **22** (Figure 2) which support an axle member **24** having wheels **26** and **28** connected thereto. A supporting cradle **30** is fastened to runners **20** and **22** by the bolt members **32** and **34** respectively, the cradle **30** supporting the cylindrical housing **36** which contains a portion of the spring operating mechanism.

More specifically, cylindrical housing **36** is fastened to the cradle **30** by a screw fastening means **38** and **40** which maintain the lower end of cylindrical housing **36** against the upper surface of cradle **30**. The upper end of cylindrical housing **36** is closed by a plate member **42** (Figures 1 and 4) having an aperture therein for passing an operating shaft, as will be described hereinafter. The upper end is capped by a bell shaped member **44**, the bell shaped member benig fastened to plate **42**, as seen best in Figure 3, by screw means such as screws, **46**, **48** and **50**, as well as screw **52**, seen in Figure 4.

A central partition **54** is provided in housing **36**, as shown in Figures 1 and 2, which acts to seat the bottom of piston **55**, the upper surface of which seats the bottom of coaxial operating springs **56** and **58**.

If desired, spring **56** could be a right-hand spring, while spring **58** would be a left-hand spring. The upper end of springs **56** and **58**, as may be seen in Figures 1, 2 and 4, rests against the upper plate **42** to thereby bias piston **55** downwardly and against partition **54** which acts as a stop.

A hollow rod **60** which is internally threaded is fastened to the top of piston **55** so as to be axially movable therewith. Furthermore, the piston plunger **60** has a length which is less than the length of springs **58** or **56** when in their fully compressed position so that the piston plunger will not strike plate **42** when the springs are charged.

The bottom of piston plunger **60**, as best seen in Figures 1 and 2, protrudes through a centrally located aperture in partition **54** and is connected to an intermediate link **62** which link is subsequently pivotally fastened to member **64** by the pin connection including pin **66**, as best seen in Figure 5.

The internally threaded portion of rod **60** is threadably engaged by the bottom portion of operating shaft

68 which, as is seen in Figures 4, 8 and 9, comprises a first section 70 which is threaded to engage the internal threads of member 60 and has an upper rectangular portion 72 which is slidably movable within a rectangular opening of crank shaft 74, as is best seen in Figure 9.

The crank shaft 74 is rotatably mounted within a bushing 76 fastened to plate 42, and extends through an opening in bell-shaped member 44 and through a second bushing 78 supported thereby. The crank shaft is then connected to a crank arm 80, as seen in Figures 3 and 4, which crank arm is terminated in a handle 82.

Thus, by rotating the handle 82 crank shaft 74 is rotated on the bushings 76 and 78 to cause a rotation of operating shaft 68. In order to latch the operating shaft portion 72 the upper rectangular portion is provided with a reduced neck section 84 which is engageable by the forked latch member 86 which, as best seen in Figure 3, is supported by slot members 88 and 90 which pass the holding bolts 92 and 94 connected to crank arm 80.

Thus, the forked latch member 86 will not latch the operating shaft 84 in the upper position when in the retracted position of Figure 4. When, however, the forked latch member 86 is moved forward, slot 96 (Figure 3) of latch member 86 engages the reduced neck portion 84 of latch member 86 (Figures 4 and 8), and the latch member will be maintained in this upward position.

As has been heretofore described, the link 64 is operatively connected to tube 60 by link 62 which is connected to the bottom surface of piston plunger 55.

The opposite end of link 64, as seen in Figures 1 and 2, contains a latch roller 98 which is pivotally connected to link 64 by the pivot pin 100. Latch roller 98 cooperates with latch plate 102 (Figure 1) which latch plate includes a stop block means 104. Stop block means 104 controls the latch bite by controlling the maximum leftward displacement which roller 100 may have when positioned on top of the latch plate in its latched position (see Figure 12 for a schematic representation of the latch position).

The pivot pin 100 also pivotally connects the member or link 106 as seen in Figures 1 and 2 to the lower end of link 64. The link 106 protrudes through an opening 107 in housing 36 and is pivotally connected at its outer end to a link 108 by the pivot pin 110 as seen in Figure 7.

A fixed pivot for link 108 is provided by protruding ear 112 of Figure 1 which is fastened to the housing 36. The pivotal connection including pivot pin 110 further includes a central member 114 which has a tapped hole therein as seen in Figure 7. This tapped hole receives the combined adjusting and connecting member 116 of Figure 1 which engages the pivotally mounted output member 118.

More specifically, output member 118 is pivotally mounted on the ear 112 of housing 36 and as is best seen in Figure 6 pivotally mounts at an outer end thereof a member 120 having a tapped opening 122 therein for threadably receiving member 116. Therefore, by threading member 116 through the aperture 122 of member 120 and thereafter into the aperture of member 114, (Figure 7), connected to link 106, it is clear that member 106 is operatively connected to the output member 118.

Furthermore, the relative positions of links 106 and 118 are readily controlled or adjusted by varying the length of member 116 protruding through aperture 122 of Figure 6 before threadably engaging member 114 (Figure 7) of link 106.

The reset spring 124 is then connected at one end to a portion of the link 106 as shown in Figure 1 and has its opposite end connected to a second protruding ear 126 of housing 36. Spring 124 is normally in compression and therefore tends to rotate link 108 in a clockwise direction to thereby bias link 106 to the left and bias latch roller 98 into engagement with the latch stop block 104.

An anchor mechanism as seen in Figures 1, 2 and 8*a* which will anchor my novel spring closing device to a circuit breaker which is to be operated thereby includes the pivotally mounted members 128 and 130 (Figure 2) which are pivotally mounted to floor runners 20 and 22. By way of example, members 128 are pivotally mounted to floor runner 20 by pivot pin 130. Referring only to anchor members 128, it is seen that they have fastened thereto a stop block member 132 which receives an adjusting screw 134. The end of the adjusting screw 134 abuts against the floor runner 20 and operates to raise or lower the anchor arm assembly responsive to being threaded into and out of the stop block 132.

A further bridging member 136, as seen in Figures 8*a* and 1 then straddles the member 128 forming the anchor arm support.

It is assumed that the breaker has a front wheel support member 138 as best seen in Figures 1 and 8*a*. Therefore, when fastening my novel auxiliary closing device to the breaker, the adjusting screws are turned to put the anchor structure in the position shown in the dotted lines in Figure 1 so that the anchor assembly will pass underneath the front wheel support member 138. Once the anchor arm is in registry with the front wheel support 138 the adjusting screws are operated to bring the anchor assembly back to the position shown in the solid lines whereby members 136 and 132 straddle the front wheel support 138 and rigidly maintain the auxiliary spring closing device in engagement with the circuit breaker.

The circuit breaker as further shown in Figure 1 has a protruding manual operating handle 140 having an engaging pin 142 (see Figure 6) which is engageable by the lower surface of the output link 118 of the spring closing device. While this manual output shaft 140 could be of any type, it is assumed for illustrative purposes, that output link 140 is pivotally mounted at a pivotal point 142 within the circuit breaker whereby a clockwise rotation of manual operating handle 140 will cause a manual closing of the circuit breaker contacts.

The latch plate 102 which has been previously described as receiving the latch roller 98 is positioned against its lower support member 146 which is fastened to the housing 36 by screw members engaging ear 126. Compression spring 148 which is held within the latch stop lock 104 then braces latch plate into engagement with member 146. In order to prevent linear motion of latch plate 102, it is provided with a protruding pin 150 which cooperates with a slot 152 in support member 146.

The outer end of latch plate 102 is connected to an operating link 154 as seen in Figures 1 and 3 and the opposite end of link 154 is connected to an operating lever 156 which is pivotally connected to extension 158 of plate 42. Thus by rotating operating lever 156 in a clockwise direction, latch plate 102 will be tilted in a clockwise direction against the bias of spring 148 so as to cause latch roller 98 to roll off the latch plate when it is in its latched position.

In order to simplify a description of the operation of my novel spring closing device, I have shown the mechanism set forth in Figures 1 through 9 in a schematic form in Figures 10, 11 and 12, and a description of operation will be given therewith.

Figure 10 shows the mechanism in the same position as that of Figures 1 through 9, namely with the circuit breaker in its closed position and the spring emergency closing device being discharged.

It will now be assumed that the circuit breaker is in its open position (see Figure 12 where the operating handle 140 is displaced upwardly) and it is desired to close the circuit breaker by means of my novel spring device. It is further assumed that the spring closing device is in its discharged position as shown in Figure 10. Prior to connecting the spring closing device to the circuit breaker, crank arm 82 of Figure 10 is rotated in a counterclockwise direction so that the lower threaded portion

70 of shaft 68 will be moved upwardly in view of its threaded engagement with the internal threads of cylinder 60. Once the square upper end 72 of shaft 68 reaches the latching position, the latch member 86 may be moved forwardly to engage neck 84. This position is shown in Figure 11.

Once the shaft 84 is latched the crank arm is then rotated in a clockwise direction whereby the engagement between the threaded portion 70 and cylinder 60 will cause piston 55 to move upwardly and compress the springs 56 and 58.

At the same time, shaft 62 which is fastened to piston 55 will pull the link 64 upwardly until the latch roller 98 seats itself upon the latch plate 102 and against the latch stop block 104, and is maintained in this latched position by the reset spring 124. Thus, the mechanism moves into the position shown in Figure 12.

The spring closing device is now moved into engagement with the circuit breaker by causing floor runners 20 and 22 to straddle the circuit breaker front wheel assembly and fasten the anchor arm assemblies into engagement with the circuit breaker front wheel support as has been set forth above in conjunction with Figures 1, 2 and 8*a*.

In order to close the breaker latch member 86 is moved to the right and the upper end of operating lever 156 is pulled in a clockwise direction. Thus, the link 154 is pulled upwardly and causes the latch plate 102 to tilt in a clockwise direction. The force of closing springs 56 and 58 may then push latch roller 98 downwardly to unlatch the spring mechanism and subsequently allow the force of biasing springs 56 and 58 to be transmitted through links 124 and 116 to the output link 118 which will rotate in a counterclockwise direction to drive circuit breaker operating handle 140 to its closed position. Thus the complete mechanism will then assume the position shown in Figure 10 as well as in Figures 1 through 9.

If desired, the operating lever 18 may be operated from a remote position by a heavy cord of sufficient length to allow the operator to be at a safe distance away from the breaker in the event that it will close on a fault.

It is to be noted that the spring load can be released slowly by reversing the above described charging procedure. Furthermore, once the operating lever 156 is operated, all control of the operation is lost by the operator and the force of the closing springs is automatically transmitted to the operating handle.

Although I have here described preferred embodiments of my invention, many modifications and variations will now be obvious to those skilled in the art and I prefer therefore to be limited, not by the specific description herein, but only by the appended claims.

I claim:

1. In an auxiliary spring closing device; said auxiliary closing device including an output member constructed to be operatively connectable to a circuit breaker operating mechanism, a spring means, a charging means for charging said spring and a latching means; said spring means being operatively connected to said output member for operating said operating member between a first and second position; said latching means being positioned to latch said spring means in a charged condition when said charging means charges said spring, and means for unlatching said latch means to allow the stored energy of said spring means when said spring means is in said charged condition to move said output member from said first position to said second position, the circuit breaker contact associated with said circuit breaker operating mechanism being operated by the stored energy of said spring.

2. In an auxiliary spring closing device; said auxiliary closing device including an output member constructed to be operatively connectable to a circuit breaker operating mechanism, a spring means, a charging means for charging said spring and a latching means; said spring means being operatively connected to said output member for operating said operating member between a first and second position; said latching means being positioned to latch said spring means in a charged condition when said charging means charges said spring, and means for unlatching said latch means to allow the stored energy of said spring means when said spring means is in said charged condition to move said output member from said first position to said second position; said output member transferring said stored energy of said spring means to said circuit breaker operating mechanism for operation thereof, the circuit breaker contacts associated with said circuit breaker operating mechanism being operated by the stored energy of said spring.

3. In an auxiliary spring closing device; said auxiliary closing device including an output member constructed to be operatively connectable to a circuit breaker operating mechanism, a spring means, a charging means for charging said spring and a latching means; said spring means being operatively connected to said output member for operating said operating member between a first and second position; said latching means being positioned to latch said spring means in a charged condition when said charging means charges said spring, and means for unlatching said latch means to allow the stored energy of said spring means when said spring means is in said charged condition to move said output member from said first position to said second position; said unlatching means being operable from a remote position, the circuit breaker contacts associated with said circuit breaker operating mechanism being operated by the stored energy of said spring.

4. In an auxiliary spring closing device; said auxiliary closing device including an output member constructed to be operatively connectable to a circuit breaker operating mechanism, a spring means, a charging means for charging said spring and a latching means; said spring means being operatively connected to said output member for operating said operating member between a first and second position; said latching means being positioned to latch said spring means in a charged condition when said charging means charges said spring, and means for unlatching said latch means to allow the stored energy of said spring means when said spring means is in said charged condition to move said output member from said first position to said second position, the circuit breaker contacts associated with said circuit breaker operating mechanism being operated by the stored energy of said spring; said latching means being operative to latch said spring means only when said spring means is fully charged.

5. In an auxiliary spring closing device; said auxiliary closing device including an output member constructed to be operatively connectable to a circuit breaker operating mechanism, a spring means, a charging means for charging said spring and a latching means; said spring means being operatively connected to said output member for operating said operating member between a first and second position; said latching means being positioned to latch said spring means in a charged condition when said charging means charges said spring, and means for unlatching said latch means to allow the stored energy of said spring means when said spring means is in said charged condition to move said output member from said first position to said second position; said output member transferring said stored energy of said spring means to said circuit breaker operating mechanism for operation thereof, the circuit breaker contacts associated with said circuit breaker operating mechanism being operated by the stored energy of said spring; said unlatching means being operable from a remote position; said latching means being operative to latch said spring means only when said spring means is fully charged.

6. An auxiliary spring closing device; said auxiliary spring closing device comprising an output member constructed to be operatively connectable to a circuit breaker operating mechanism; latchable mechanism and a spring driving means; said latchable mechanism interconnecting said output member and said spring driving means; means for charging said spring and cooperating latch means for latching said latchable mechanism when said spring is charged to maintain said spring in said charged condition; and means for unlatching said latch means when said spring is charged to allow said charged spring to operate said output member operatively connectable to said circuit breaker operating mechanism, the circuit breaker contacts associated with said circuit breaker operating mechanism being operated by the stored energy of said spring.

7. An auxiliary spring closing device; said auxiliary spring closing device comprising an output member constructed to be operatively connectable to a circuit breaker operating mechanism; latchable mechanism and a spring driving means; said latchable mechanism interconnecting said output member and said spring driving means; means for charging said spring and cooperating latch means for latching said latchable mechanism when said spring is charged to maintain said spring in said charged condition; and means for unlatching said latch means when said spring is charged to allow said charged spring to operate said output member operatively connectable to said circuit breaker operating mechanism, the circuit breaker contacts associated with said circuit breaker operating mechanism being operated by the stored energy of said spring; said means for operating said latch being operable from a remote point.

8. An auxiliary spring closing device; said auxiliary spring closing device comprising an output member constructed to be operatively connectable to a circuit breaker operating mechanism; latchable mechanism and a spring driving means; said latchable mechanism interconnecting said output member and said spring driving means; means for charging said spring and cooperating latch means for latching said latchable mechanism when said spring is charged to maintain said spring in said charged condition; and means for unlatching said latch means when said spring is charged to allow said charged spring to operate said output member operatively connectable to said circuit breaker operating mechanism, the circuit breaker contacts associated with said circuit breaker operating mechanism being operated by the stored energy of said spring; said latchable mechanism comprising a link having one end thereof connected to a movable portion of said spring driving means and its other end operatively connected to said output member.

9. An auxiliary spring closing device; said auxiliary spring closing device comprising an output member constructed to be operatively connectable to a circuit breaker operating mechanism; latchable mechanism and a spring driving means; said latchable mechanism interconnecting said output member and said spring driving means; means for charging said spring and cooperating latch means for latching said latchable mechanism when said spring is charged to maintain said spring in said charged condition; and means for unlatching said latch means when said spring is charged to allow said charged spring to operate said output member operatively connectable to said circuit breaker operating mechanism; said means for operating said latch being operable from a remote point, the circuit breaker contacts associated with said circuit breaker operating mechanism being operated by the stored energy of said spring; said latchable mechanism comprising a link having one end thereof connected to a movable portion of said spring driving means and its other end operatively connected to said output member.

10. In an auxiliary spring closing device; said auxiliary closing device including an output member constructed to be operatively connectable to a circuit breaker operating mechanism, a spring means, a charging means for charging said spring and a latching means; said spring means being operatively connected to said output member for operating said operating member between a first and second position; said latching means being positioned to latch said spring means in a charged condition when said charging means charges said spring, and means for unlatching said latch means to allow the stored energy of said spring means when said spring means is in said charged condition to move said output member from said first position to said second position, the circuit breaker contacts associated with said circuit breaker operating mechanism being operated by the stored energy of said spring; said latch means comprising a latchable linkage having one end thereof connected to a movable portion of said spring means and its other end operatively connected to said output member.

11. In an auxiliary spring closing device; said auxiliary closing device including an output member constructed to be operatively connectable to a circuit breaker operating mechanism, a spring means, a charging means for charging said spring and a latching means; said spring means being operatively connected to said output member for operating said operating member between a first and second position; said latching means being positioned to latch said spring means in a charged condition when said charging means charges said spring, and means for unlatching said latch means to allow the stored energy of said spring means when said spring means is in said charged condition to move said output member from said first position to said second position, the circuit breaker contacts associated with said circuit breaker operating mechanism being operated by the stored energy of said spring; said latch means comprising a latchable linkage having one end thereof connected to a movable portion of said spring means and its other end operatively connected to said output member; said charging means comprising manually operable means engaging said linkage and operable to move said linkage to charge said spring and latch said linkage.

12. An auxiliary spring closing device; said auxiliary spring closing device comprising an output member constructed to be operatively connectable to a circuit breaker operating mechanism; latchable mechanism and a spring driving means; said latchable mechanism interconnecting said output member and said spring driving means; means for charging said spring and cooperating latch means for latching said latchable mechanism when said spring is charged to maintain said spring in said charged condition; and means for unlatching said latch means when said spring is charged to allow said charged spring to operate said output member operatively connectable to said circuit breaker operating mechanism, the circuit breaker contacts associated with said circuit breaker operating mechanism being operated by the stored energy of said spring; said means for operating said latch being operable from a remote point; said latchable mechanism comprising a link having one end thereof connected to a movable portion of said spring driving means and its other end operatively connected to said output member; said means for operating said latch being operable from a remote point.

13. In an auxiliary spring closing device; said auxiliary closing device including an output member constructed to be operatively connectable to a circuit breaker operating mechanism, a spring means, a charging means for charging said spring and a latching means; said spring means being operatively connected to said output member for operating said operating member between a first and second position; said latching means being positioned to latch said spring means in a charged condition when said charging means charges said spring, and means for unlatching said latch means to allow the stored energy of said spring means when said spring means is in said

charged condition to move said output member from said first position to said second position, the circuit breaker contacts associated with said circuit breaker operating mechanism being operated by the stored energy of said spring; said latch means comprising a latchable linkage having one end thereof connected to a movable portion of said spring means and its other end operatively connected to said output member; said charging means comprising manually operable means engaging said linkage and operable to move said linkage to charge said spring and latch said linkage; said manual operating means being movable to a first position independently of said linkage and latchable in said first position, said manual operating means being thereafter operable for said charging of said spring.

14. In an auxiliary spring closing device; said auxiliary closing device including an output member constructed to be operatively connectable to a circuit breaker operating mechanism, a spring means, a charging means for charging said spring and a latching means; said spring means being operatively connected to said output member for operating said operating member between a first and second position; said latching means being positioned to latch said spring means in a charged condition when said charging means charges said spring, and means for unlatching said latch means to allow the stored energy of said spring means when said spring means is in said charged condition to move said output member from said first position to said second position, the circuit breaker contacts associated with said circuit breaker operating mechanism being operated by the stored energy of said spring; said charging means for charging said spring comprising manually operable means threadably engaging a cooperating threaded member fastened to a movable portion of said spring.

15. In an auxiliary spring closing device; said auxiliary closing device including an output member constructed to be operatively connectable to a circuit breaker operating mechanism, a spring means, a charging means for charging said spring and a latching means; said spring means being operatively connected to said output member for operating said operating member between a first and second position; said latching means being positioned to latch said spring means in a charged condition when said charging means charges said spring, and means for unlatching said latch means to allow the stored energy of said spring means when said spring means is in said charged condition to move said output member from said first position to said second position, the circuit breaker contacts associated with said circuit breaker operating mechanism being operated by the stored energy of said spring; said charging means for charging said spring comprising manually operable means threadably engaging a cooperating threaded member fastened to a movable portion of said spring; said threaded members being rotated with respect to one another by said manual operating means until said spring is drawn to said charged condition and said latch means latches said spring in said charged condition; said latch means being operable from a remote point for allowing discharge of said spring and operation of said circuit breaker operating mechanism by said output member.

16. An auxiliary spring closing device; said auxiliary

spring closing device comprising an output member constructed to be operatively connectable to a circuit breaker mechanism, a spring means, a spring charging means and a latch means; said spring means being operatively connected to said output means to impart motion thereto for operating a circuit breaker operating mechanism when said spring means is discharged from a charged condition; said charging means being constructed to charge said spring, said latch means being constructed to latch said spring in said charged condition when said spring charging means charges said spring, and means for unlatching said latch means to allow discharge of said spring means when said spring means is latched in said charged condition, the circuit breaker contacts associated with said circuit breaker operating mechanism being operated by the stored energy of said spring; said charging means comprising crank means having an operating crank and a crank shaft; one end of said crank shaft being threadably connected to one end of said spring, rotation of said crank means in one direction compressing said spring against a stop means positioned at the opposite end of said spring to charge said spring; said crank shaft being axially movable with said threadably connected end of said spring when said latch means is defeated and said spring is in said charged condition to allow said spring to move said spring to said discharged position; rotation of said crank in an opposite direction moving said crank toward said discharged position.

17. An auxiliary spring closing device; said auxiliary spring closing device comprising an output member constructed to be operatively connectable to a circuit breaker operating mechanism; latchable mechanism and a spring driving means; said latchable mechanism interconnecting said output member and said spring driving means; means for charging said spring and cooperating latch means for latching said latchable mechanism when said spring is charged to maintain said spring in said charged condition; and means for unlatching said latch means when said spring is charged to allow said charged spring to operate said output member operatively connectable to said circuit breaker operating mechanism, the circuit breaker contacts associated with said circuit breaker operating mechanism being operated by the stored energy of said spring; said means for charging said spring comprising a crank means having an operating crank and a crank shaft, one end of said crank shaft being threadably connected to one end of said spring driving means, rotation of said crank means in a first direction compressing said spring driving means against a stop means positioned at the opposite end of said spring, the crank shaft of said crank means being latchable when said spring is fully charged; said crank shaft being slidably movable with respect to said operating crank to allow said crank shaft to move with said movable end of said spring driving means when said spring is discharged.

References Cited in the file of this patent

UNITED STATES PATENTS

2,614,489	Saxby	Oct. 21, 1952
2,760,025	Van Sickle	Aug. 21, 1956
2,773,484	Peek	Dec. 11, 1956